

Exploring the Influence of Trust and Culture on Mobile Payment Adoption

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Author's Signature: 

Date: 06/06/2013

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Abstract

The main purpose of this research is to explore how consumers form their trust and the influence of trust on mobile payment adoption from a risk and cultural perspective. We contextualise trust antecedents in a mobile payment context and examine how the characteristics of mobile service providers, the characteristics of mobile payment vendors, and the characteristics of mobile technology shape the development of consumer trust in mobile payment. In addition, we examine the influence of consumers' trust disposition and cultural propensity of uncertainty avoidance on trust in mobile payment. The results of the research are based on a sample of 302 participants. PLS-SEM methodology and SmartPLS are employed for data analysis. Results suggest that a high degree of uncertainty avoidance negatively affects trust in mobile payment. A high level of trust disposition positively relates to trust in mobile payment. Results also highlight that consumers develop their trust through the reputation of the mobile service provider and mobile payment vendor, structural assurance and perceived environmental risk. Sub-sample analyses suggest that consumers with different ethnic identities and mobile banking experience have different mobile payment adoption behaviours.

This research has both theoretical and practical contributions. From a theoretical perspective, it provides a comprehensive understanding of trust factors that consumers may consider when they engage in mobile payment. Furthermore, the research shows that culture affects the degree to which consumers place their trust in mobile payment. From a practical perspective, the research provides implications for mobile payment designers and practitioners when designing and implementing mobile payments. The knowledge of how consumer trust is developed can be applied to develop trust-building mechanisms in mobile payment systems based on factors identified in this research.

Chapter 1: Introduction

1.1 Background to the Study

The diffusion of information and communication technology (ICT), such as smart mobile phones and ubiquitous Internet access, has been increasing the mobility of individuals' lifestyles. People now can buy products or services using their mobile phones; or they can do banking or paying bills using their mobile phones (mobile banking/mobile payments). In some countries, for example Japan, South Korea and the U.S., people use their mobile phones to pay for everyday items (mobile payments). Mobile payments are "payments for which payment data and instructions are made via mobile phones or other mobile devices" (OECD, 2012, p.7). Mobile payment can be broadly classified into two categories: point of sale (POS) contactless payments and mobile remote payments (OECD, 2012). The first requires both buyer and seller's presence to complete transactions. The technology applied here is contactless radio technologies including near field communication (NFC), Bluetooth or infrared technologies for data transfer. The latter represents payment that is made through either SMS (e.g., paying for car parks or at petrol stations) or wireless application protocol (WAP) (e.g., using mobile Internet to make purchases).

In the past few years, mobile phone subscribers have rapidly increased. The OECD (2012) reported that the number of mobile phone subscriptions worldwide reached 5 billion in June 2010. The growth in mobile subscriptions has led to an increase in applications, social networking and online games, as well as a growing consumer appetite for mobile payments (de Meijer & Bye, 2011). Consumers have grown increasingly comfortable using their mobile devices to transfer money and purchase goods (Smith et al., 2012). Microsoft and M-com (2012) estimated that in 2013 almost 300 billion transactions globally, worth more than US\$860 million, will be conducted using mobile phones. However, Au & Kauffman (2008) find that although mobile devices are virtually ubiquitous around the world, the penetration of mobile payment has been uneven. For example, mobile payment has been popular in some developing countries where credit cards are not widely available and many people do not have

bank accounts (OECD, 2012). Mobile payment adoption in developed countries exhibits different patterns too. Studies show that mobile payment has not been widely adopted in the U.S. (Hayashi, 2012; Pope et al., 2011). Japan and Korea are successful with mobile payment adoption (Amoroso et al., 2012; Pope et al., 2011). Pope et al. (2011) studied mobile payment adoption in the U.S., Singapore, Hong Kong and India and concluded that mobile payment is still at an infancy stage. Microsoft and M-com (2012) suggest that now is the best time to invest in mobile payment as mobile service providers and financial institutions are likely to gain profits through this payment channel as consumers are demanding better payment options and user experience.

Despite the growing importance of mobile payment in business, we still lack knowledge on the formation of trust and the influence of trust on consumers' mobile payment adoption decisions. The objective of this research is to examine what shapes consumer trust in mobile payment and its influence on intention to adopt mobile payment with an emphasis on the early adoption process.

1.2 Motivation and Research Questions

Mobile payments, particularly POS mobile payments, are still new to New Zealanders. The Bank of New Zealand and Vodafone had a four-month trial allowing equipped mobile phones to make small amount contactless payments at two inner-city cafes in Auckland and Wellington in 2011. The trial was a success. Telecom and Westpac also conducted a trial using mobile phones to pay for public transport services starting from May 2012. This may suggest that the mobile service providers and related parties may have realised the potential benefits of implementing mobile payments. For a successful implementation of mobile payment services, it is crucial to understand the extent of consumers' knowledge of mobile payments and their concerns about mobile payments. Thus, it is important to study factors influencing consumers' intention to adopt mobile payments.

Factors influencing consumers' acceptance of mobile payments have been studied in the literature. The investigating factors are mainly technological factors and behavioural factors (Andreev et al., 2012; Chandra et al., 2010; Goeke & Pousttchi,

2010; Keramati et al., 2012; Schierz et al., 2010). However, there is a lack of research on how social and cultural factors influence mobile payments.

Trust as a social factor has been widely examined across the context of information systems (IS) and has been confirmed as an essential factor for an individual's technology acceptance. A review of mobile payment studies suggests that consumers express great concerns about privacy and security in mobile payments especially with POS mobile payment (Au & Kauffman, 2008; Dewan & Chen, 2005). Therefore, mobile payment systems should be designed to foster consumer confidence and ease of participation to increase the likelihood of consumer acceptance (Pousttchi, 2003). Some important factors that should be considered include ease of use, usefulness, and trust (Dahlberg et al., 2003). Among these factors, user trust is one of the crucial factors that influence consumer acceptance of mobile payment (Dahlberg et al., 2008). However there is limited research that studies antecedents of trust in the mobile payment context. Therefore, this research aims to investigate factors that shape the development of mobile payment trust.

In Chandra et al.'s (2010) study, they investigate how consumers develop mobile payment trust with an emphasis on mobile service provider and mobile technology characteristics. This research extends their model by incorporating the characteristics of mobile payment vendor in the examination of mobile payment trust development. We believe that a mobile payment vendor, whom customers make payment to, is another entity that can influence consumer trust in mobile payment systems. This is because consumers are willing to make monetary transactions only with well-known and established businesses (Dahlberg et al. 2003). Chandra et al. (2010) also stated that the role of vendors is important in the mobile payment system. They suggest that future research should include consumers' trust perception of vendors in the model.

To develop a deeper understanding of how mobile payment trust is formulated, the characteristics of consumers including individual's disposition to trust and cultural values are examined. This is because trust and culture are closely related (Benbasat et al., 2008). Cultural differences may influence the way trust is developed. Benbasat et al. (2008) highlight Hofstede's (1991) culture dimensions especially uncertainty

avoidance as one of the most significant elements of culture that affects trust in e-commerce and m-commerce. Therefore, this research will examine the influence of an individual's uncertainty avoidance on mobile payment trust.

Overall, the objectives of this study are to study the influence of trust on consumer's intention to adopt mobile payment. We investigate how characteristics of mobile service providers, mobile payment vendors and mobile technology influence the formation of mobile payment trust. In addition, this research also examines two factors related to individual and cultural differences that may influence the formation of trust: culture and individual's disposition to trust. The research questions are:

1. What constitutes mobile payment trust?
2. What is the influence of consumer trust on mobile payment adoption?
3. What is the influence of dispositional trust on mobile payment trust?
4. What is the influence of uncertainty avoidance on mobile payment trust?

This study follows a positivist paradigm approach. First, literatures on information technology adoption, trust and culture are used as a basis to develop the research model. To evaluate the research model, the survey instrument is used to collect self-reported data from respondents. Partial least square structural equation modelling (PLS-SEM) techniques are used to analyse data and test hypotheses.

The rest of this dissertation is organised as follows: Chapter 2 presents the literature review on consumer acceptance of mobile payment and the proposed research model. Chapter 3 discusses the research methodology. Chapter 4 presents the results followed by the discussion of results in Chapter 5. Chapter 6 concludes this study with the contributions and limitations of the research.

Chapter 2: Literature Review and Research Model

2.1 Literature Review

This chapter provides a review of existing literature and the development of proposed research model. Relevant theories related to information technology adoption and mobile payment research are introduced, followed by a discussion of related empirical studies. Next, the proposed research model and associated hypotheses are presented.

Theories related to mobile payments research

Much of mobile payment research draws on technology acceptance theories. These theories are the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the theory of planned behaviour (TPB) (Ajzen, 1991), the technology acceptance model (TAM) (Davis, 1989), TAM2 (the extended TAM) (Venkatesh & Davis, 2000), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), and the diffusion of technology theory (IDT) (Rogers, 2003).

The TRA and TPB have been widely used as the primary theoretical framework for explaining individuals' adoption behaviour in the field of information system (IS). Three factors influencing individual's intention to adopt a new technology are: attitude, subjective norms and perceived behavioural control (Ajzen, 1991; Fishbein & Ajzen, 1975). Among these three factors, attitude and subjective norms are often evaluated in mobile payment adoption (See Table 1).

Building on TRA and TPB, Davis (1989) introduced TAM with the goal to explain an individual's behaviour toward information technology. The model has been widely tested and extended by a large number of empirical studies (See Table 1). The key constructs of TAM are: intention to use (a person's subjective probability to perform a specific behaviour), perceived ease of use (the degree to which a person believes that a system would be easy to use) and perceived usefulness (the degree to which a person believes that using a particular system would enhance one's job performance) (Davis, 1989). Venkatesh and Davis (2000) proposed TAM2, an extended TAM, by incorporating subjective norm as an antecedent of perceived usefulness in the

original TAM. TAM and TAM2 are extensively applied to IS research. Three factors including perceived ease of use, perceived usefulness and subjective norm are the most examined factors in mobile payment adoption research (See Table 1).

The IDT developed by Rogers (2003) is another useful theory to explain individuals' technology acceptance. Five innovation characteristics are proposed to influence an individual's intention to adopt an innovation. These include relative advantage, compatibility, complexity, trialability and image. Among those five factors, relative advantage, compatibility and image are the most examined factors in mobile payment adoption studies (See Table 1).

Later on, Legris et al. (2003) found that TAM and TAM2 only explained 40% of variance of usage intention. To improve the explanatory power of a technology acceptance model, Venkatesh et al. (2003) developed UTAUT based on eight theories including TRA, TPB, TAM, and IDT. The new model was found to explain 70% of variance of usage intention. The model constitutes four constructs that influence users' intention and behaviour: performance expectancy (similar to perceived usefulness), effort expectancy (similar to perceived ease of use), social influence (similar to subjective norm) and facilitating conditions (similar to perceived behavioural control).

Table 1: Theoretical frameworks used in mobile payment research

| Theory | Core constructs | Mobile payment studies |
|--------|-------------------------------|---|
| TRA | Attitude | Mahran & Enaba (2011); Shin (2010); Schierz et al. (2010) |
| | Subjective Norm | Keramati et al. (2012); Shin (2010); Schierz et al. (2010) |
| TPB | Perceived Behavioural Control | Mahran & Enaba (2011) |
| TAM | Perceived Ease of Use | Andreev et al. (2012); Chandra et al. (2010); Cyril et al. (2008); Keramati et al. (2012); Goeke & Pousttchi (2010); Kim et al. (2010); Mahran & Enaba (2011); Schierz et al. (2010); Zhang et al. (2011) |
| | Perceived Usefulness | Andreev et al. (2012); Chandra et al. (2010); Cyril et al. (2008); Keramati et al. (2012); Goeke & Pousttchi (2010); Kim et al. (2010); Mahran & Enaba (2011); Schierz et al. (2010); Zhang et al. (2011) |
| TAM2 | Subjective Norm | Zhang et al. (2011); Yang et al. (2011c); Keramati et al. (2012); Shin (2010); Schierz et al. (2010) |
| UTAUT | Performance Expectancy | Peng et al. (2011) |
| | Effort Expectancy | Peng et al. (2011) |
| | Social Influence | Peng et al. (2011) |
| | Facilitating Conditions | Peng et al. (2011); Mahran & Enaba (2011) |
| IDT | Relative Advantage | Keramati et al. (2012); Lu et al. (2011); Yang et al. (2011b); Yang et al. (2011c) |
| | Compatibility | Keramati et al. (2012); Lu et al. (2011); Yang et al. (2011b); Yang et al. (2011c) |
| | Complexity | Keramati et al. (2012); |
| | Triability | Have not found mobile payment studies investigating this factor |
| | Image | Lu et al. (2011); Yang et al. (2011b); |

Prior research on consumer adoption of mobile payment

Table 2 summarises the main findings from previous research on consumer adoption of mobile payment. As seen from Table 1 and Table 2, TAM, TAM2 and IDT are the most widely used theories in consumer adoption of mobile payment. Studies found

several factors that facilitate mobile payment adoption intention: *Perceived Ease of Use* (Andreev et al., 2012; Chandra et al., 2010; Keramati et al., 2012; Kim et al., 2010; Mallat, 2007; Schierz et al., 2010; Thair et al., 2010), *Perceived Usefulness* (Andreev et al., 2012; Chandra et al., 2010; Keramati et al., 2012; Kim et al., 2010; Schierz et al., 2010; Thair et al., 2010;), *Perceived Security* (Dahlber & Öörni, 2007; Mallat, 2007; Schierz et al., 2010), *Compatibility* (Dahlber & Öörni, 2007; Kim et al., 2010; Schierz et al., 2010; Yang et al., 2011b), *Social Influence* (Dahlber & Öörni, 2007; Peng et al., 2011; Mahran & Enaba, 2011; Schierz et al., 2010; Yang et al., 2011b) and *Trust* (Andreev et al., 2012; Chandra et al., 2010; Dahlber & Öörni, 2007; Mallat, 2007; Thair et al., 2010;).

Other studies found that *Perceived Cost* (Mallat, 2007; Lu et al., 2011; Thair et al., 2010; Yang et al., 2011b) and *Perceived Risk* (Andreev et al., 2012; Peng et al., 2011; Yang et al., 2011b; Yang et al., 2011c) negatively affect consumers' adoption intention. Some studies identify contextual factors such as different payment scenarios (Goeke & Pousttchi, 2010), location based services (Andreev et al., 2012), individual mobility (Kim et al., 2010; Schierz et al., 2010), and comparative value propositions of mobile payments and other payment systems as important adoption intention factors (Thair et al., 2010).

Despite a number of research studies on consumers' intention to adopt mobile payments, much of the previous work focuses on behavioural factors or technological factors. Trust has shown to be closely related to consumers' intention to adopt mobile payment (Chandra et al., 2010; Keramati et al., 2012; Mallat, 2007; Shin, 2010; Thair et al., 2010). However, very little is known about how trust is developed in different study contexts and how individual's cultural influence and their trust propensity affect the way mobile payment trust developed. Therefore, to address some of these gaps in literature, this study aims to explore the underlying factors of mobile payment trust and its influence on the intention to adopt mobile payment.

Table 2: Recent research on consumer adoption of mobile payment

| Authors | Theory | Method | Factors identified | | | | |
|-------------------------|------------------|-----------------------------------|--------------------|-------------|-------|----------------------|---------|
| | | | Technical | Behavioural | Trust | Antecedents of trust | Culture |
| Keramati et al. (2012) | N/A | Survey | √ | √ | √ | | |
| Kim et al. (2010) | TAM | Survey | √ | √ | | | |
| Yang et al. (2011b) | IDT | Survey | √ | √ | | | |
| Thair et al. (2010) | N/A | Survey and simulation experiments | √ | √ | √ | | |
| Peng et al. | UTAUT | Survey | √ | √ | | | |
| Andreev et al. (2012) | TAM | Survey | √ | √ | √ | | |
| Lu et al. (2011) | IDT | Survey | √ | √ | √ | | |
| Chandra et al. (2010) | TAM | Survey | √ | √ | √ | √ | |
| Mallat (2007) | IDT | Focus group interview | √ | | √ | | |
| Zhang et al. (2011) | TAM | Conceptual study | √ | √ | | | √ |
| Mahran & Enaba (2011) | TAM, TPB & UTAUT | Survey | √ | √ | | | |
| Shin (2010) | TRA | Survey | √ | √ | √ | | |
| Cyril et al. (2008) | TAM | Conceptual study | √ | | √ | √ | |
| Yang et al. (2011c) | IDT | Survey | √ | √ | | | |
| Schierz et al. (2010) | TAM/TRA | Survey | √ | √ | | | |
| Dahlberg & Oorni (2007) | TAM, TPB & IDT | Survey | | √ | | | |
| Chen (2008) | TAM & IDT | Survey | √ | √ | | | |

2.2 Proposed Research Model

Based on the literature, we posit that consumer trust is an important factor that affects intention to adopt mobile payment (See Table 2). Benbasat et al. (2008) argue that trust and culture are closely related and uncertainty avoidance is one of the most significant cultural elements that affect trust in e-commerce and m-commerce. However, it appears that very limited research has examined the antecedents of

consumer trust and culture on mobile payment acceptance (see Table 2). Therefore, our proposed research aims to explore the underlying factors of consumer trust in mobile payment and examine how cultural propensity of uncertainty avoidance influences consumer trust.

Trust is described as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer et al., 1995, p.712). In other words, trust is a dyadic relationship between trustor and trustee (Grazioli & Jarvenpaa, 2000) when the trustor believes the trustee will fulfill their expectations without taking advantage of their vulnerabilities (Chandra et al., 2010). In the context of this study, the trustor will be consumers who conduct mobile payment transactions and the trustee will be mobile service providers and mobile payment vendors.

Grazioli and Jarvenpaa (2000) apply Zucker’s (1986) three central modes of trust production into an e-commerce context. They argue that in the early adoption period, trust is mainly based on two modes: characteristic based and institutional based. The characteristic-based trust refers to the characteristics of trustor (mobile payment consumers) and trustee (mobile service provider and mobile payment vendor). The characteristics of trustor are tied to consumers themselves (i.e., ethnicity, culture, and background) (Zucker, 1986). Zhang et al. (2005) argue that attitude to risk is a trustor-related factor in online trust formation.

Espoused uncertainty avoidance is a cultural characteristic that influences the formation of trust. Espoused uncertainty avoidance was defined by Srite and Karahanna (2006) as the level of risk accepted by individuals when they face with uncertain situations. Grazioli and Jarvenpaa (2000) posit the characteristics of trustor refer to the general disposition they hold including the disposition to trust. Therefore in this research, the characteristics of mobile payment consumers will include espoused uncertainty avoidance and disposition to trust.

A mobile payment system consists of three key elements: a mobile service provider (e.g., Vodafone, 2degrees, Telecom), a mobile payment vendor (e.g., retail shops, supermarkets, café) and mobile network technology (e.g., 3G). The characteristics of the mobile service provider and mobile payment vendor influence the formation of trust through mobile payment consumers' belief in integrity, ability and benevolence of the mobile service provider and mobile payment vendor (Grazioli & Jarvenpaa, 2000). Institutional-based trust is tied to the formal structures including that guarantees, regulations, and obligations are operational for safe and secure transactions (Chandra et al., 2010; Zucker, 1986). Structural assurance as an institutional-based trust (McKnight et al., 2002) refers to consumers' perceptions about the institutional environment (Chandra et al., 2010). In this study, structural assurance is related to consumers' perception of the underlying mobile technology networks that support mobile payment applications. For example, mobile technology may have inherent risks including privacy and security risks (Chandra et al., 2010).

In summary, this research will examine the influence of consumer trust on the adoption intention of mobile payment. It will also explore how the characteristics of the mobile service provider, characteristics of the mobile payment vendor, characteristics of mobile technology and characteristics of the mobile payment consumer (disposition to trust and espoused uncertainty avoidance) shape consumer trust in mobile payment. The proposed research model is presented in Figure 1 and the definitions of key constructs are presented in Table 3.

Figure 1: Proposed research model

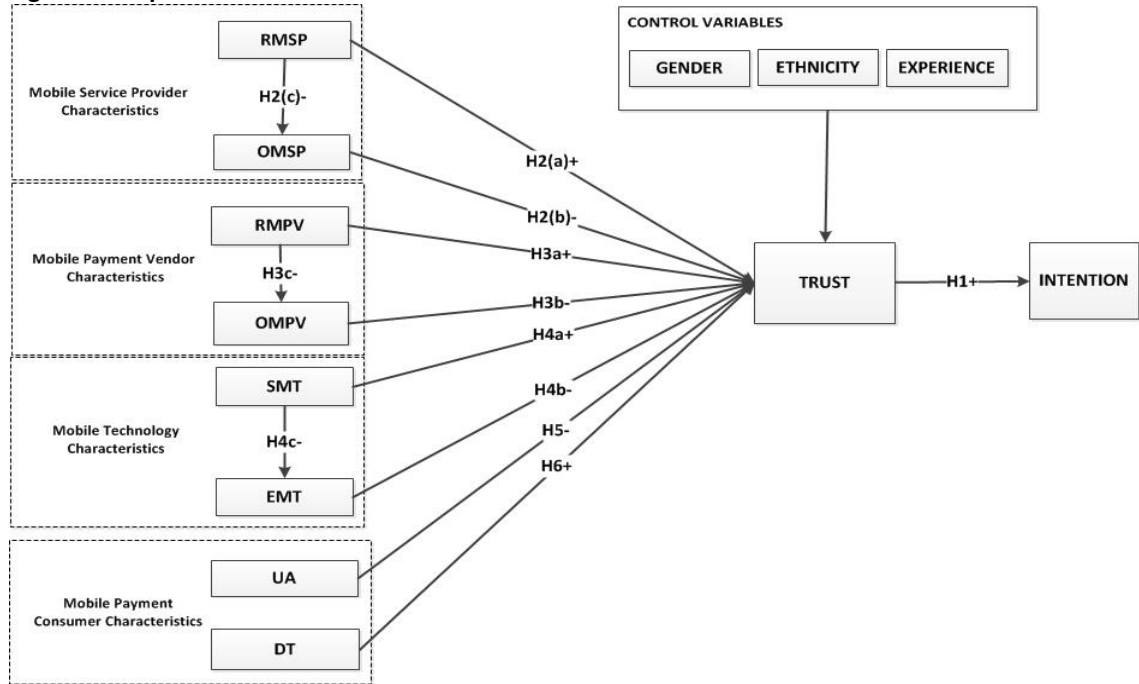


Table 3: Definitions of main constructs

| Constructs | Definition | Reference |
|---|---|---|
| Perceived reputation of mobile service provider (RMSP) | The extent to which consumers believe in the mobile service provider's competency, honesty, and benevolence. | Chandra et al. (2010) |
| Perceived opportunism of mobile service provider (OMSP) | Possible opportunistic behaviour of the mobile service provider in relation to the consumer. It refers to the consumer's risk in transacting with a mobile service provider who might inappropriately exploit the consumer's vulnerabilities. | Chandra et al. (2010) |
| Perceived reputation of mobile payment vendor (RMPV) | The extent to which consumers believe in the mobile payment vendor's competency, honesty and benevolence. | New construct, adapted from Chandra et al. (2010) |
| Perceived | Possible opportunistic behaviours of the | New |

| | | |
|---|---|---|
| opportunism of mobile payment vendor (OMPV) | mobile payment vendor in relation to the consumer. It refers to the consumer's risk in transacting with a mobile payment vendor who might inappropriately exploit the consumer's vulnerabilities. | construct, adapted from Chandra et al. (2010) |
| Perceived structural assurance (SMT) | The consumer's perception about the institutional environment that all structures like guarantees, regulations, and promises are operational for safe, secure and reliable transactions | Chandra et al. (2010) |
| Perceived environmental risk (EMT) | Risk associated with the underlying technological infrastructure, which in the current study is the wireless mobile Internet. Environmental risks refer to the transaction security related risks faced by consumers while using a mobile payment service through a wireless network. | Chandra et al. (2010) |
| Espoused uncertainty avoidance (UA) | The level of risk accepted by an individual, which can be gleaned by one's emphasis on rule obedience, ritual behaviour, and labour mobility. This dimension examines the extent to which one feels threatened by ambiguous situations | Srite & Karahanna (2006) |
| Disposition to trust (DT) | An individual's ability and willingness to form trust in general; a personality trait that formed through an individual's lifetime | McKnight et al. (2002) |
| Consumer trust in mobile payment (TRUST) | The extent to which consumers believe in mobile payment system's competency, honesty and benevolence. | Mayer et al., (1995) |

Consumer trust in mobile payment and intention to adopt mobile payment

Lack of trust is considered to be an obstacle to consumer's technology adoption. The influence of trust on adoption has been examined across a number of technologies such as Internet banking (Mukherjee & Nath, 2003; Suh & Han, 2003; Wang et al., 2003) and mobile banking (Laforet & Li, 2005; Liu et al., 2009; Yang, 2011c). Since mobile payment is a relatively new innovation, consumers may have uncertainties with its technology and operational environment (Chandra et al., 2010; Cyril et al., 2008). Some consumers may feel that they are in a vulnerable position because they have no control over transactions and their financial asset and privacy might be put at risk due to possible opportunistic behaviour made by trading partners (Chandra et al., 2010). Therefore, consumer trust plays a crucial role in the decision to adopt mobile payment.

Previous studies on e-commerce and m-commerce consistently demonstrate that trust has a positive relationship with the intention to adopt technology (Chandra et al., 2010; Gefen et al., 2003; Liu et al., 2009; Yang, 2011c; Suh & Han, 2003; Wang et al., 2003). Extending this logic to the mobile payment context, we believe that the higher level of trust the consumers place in mobile payment, the more likely the intention to adopt mobile payment. Thus we have:

H1: Consumer trust is positively associated with the intention to adopt mobile payment.

The characteristics of mobile service provider

Chandra et al. (2010) identify two categories of mobile service provider characteristics that affect mobile payment trust: perceived reputation of the mobile service provider (RMSP) and perceived opportunism of the mobile service provider (OMSP).

Chandra et al. (2010) define RMSP as "the extent to which consumers believe in the mobile service provider's competency, honesty, and benevolence" (p.565). If consumers believe that the mobile service provider will act in good faith, they are more likely to place more trust in mobile payment systems. Chandra et al. (2010) find that consumers' perceived reputation of the mobile service provider is positively

associated with mobile payment trust. Similarly, Liu et al. (2009) found that trust in a mobile banking service provider positively affects consumer trust with mobile banking. Therefore we have:

H2a: Perceived reputation of the mobile service provider is positively associated with the level of consumer trust in mobile payment.

Chandra et al. (2010) define OMSP as “possible opportunistic behaviour of the mobile service provider in relation to the consumer” (p. 565). In some cases, a mobile service provider may engage in unethical behaviours such as distorting or disclosing information without notifying consumers which may cause a privacy or financial loss to consumers. If consumers have such negative experience with a mobile service provider, they tend not to believe or trust in mobile payment. In their online shopping study, Pavlou et al. (2007) report a negative relationship between the vendor’s opportunism and consumer trust in online shopping. Chandra et al. (2010) posit that the opportunism of the mobile service provider has a negative impact on consumer trust in mobile payment systems. Therefore we propose:

H2b: Perceived opportunism of the mobile service provider is negatively associated with the level of consumer trust in mobile payment.

The good reputation of a firm is viewed as an asset to that firm. Previous research found a negative relationship between the reputation and the opportunism of a web vendor in online shopping (Jarvenpaa et al., 1999). Chandra et al. (2010) also found similar empirical support in the mobile payment context. Therefore we have:

H2c: Perceived reputation of the mobile service provider is negatively associated with the level of perceived opportunism of the mobile service provider.

The characteristics of mobile payment vendor

Mobile payment vendors refer to merchants that conduct a transaction using a mobile device. The vendor and consumer form a seller and buyer relationship. Similar to Chandra et al. (2010), we examine the influence of perceived reputation of the mobile

payment vendor (RMPV) and perceived opportunism of the mobile payment vendor (OMPV) on the formation of trust in mobile payment.

Gefen (2002) suggests that vendor trust in e-commerce consists of competence, integrity and benevolence. Applying this conceptualisation in mobile commerce, we define RMPV as the extent to which consumers believe in the mobile payment vendor's competency, honesty and benevolence (Chandra et al., 2010; Gefen, 2002). Previous IS research has shown a positive association between a seller's reputation and the buyer's trust in e-commerce (Gefen & Straub, 2003; Jarvenpaa et al., 1999). Andreev et al. (2012) find a positive relationship between vendor trust and willingness to use mobile payment in their study. Yang et al. (2011a) also demonstrate that vendor trust positively associates with consumer trust in mobile banking. Therefore we have:

H3a: Perceived reputation of the mobile payment vendor is positively associated with the level of consumer trust in mobile payment.

OMPV refers to possible opportunistic behaviour made by a mobile payment vendor. Opportunistic behaviours include the trustee's distortion of information and failing to fulfil promises and obligations made to the trustors (John, 1984). In a study carried out by Grazioli and Jarvenpaa (2000), they find that perceived opportunistic behaviours made by Internet vendors weakens the relationship between trust in Internet vendors and trust in Internet shopping. If consumers perceive any opportunistic behaviours conducted by mobile payment vendors, they are likely to lower their trust in mobile payment. Therefore we have:

H3b: Perceived opportunism of the mobile payment vendor is negatively associated with the level of consumer trust in mobile payment.

Jarvenpaa et al. (1999) demonstrate that the perceived reputation of the Internet vendor is negatively correlated with opportunistic behaviours. They argue that Internet vendors with good reputations are perceived to be reluctant to put their reputations at risk by conducting opportunistic behaviours. In their study, Chandra et al. (2010) show that the perceived reputation of a mobile service provider has a negative association with the perceived opportunism of mobile service providers. Extending this line of

argument to mobile payment vendors, we believe that if consumers perceive a higher reputation of a mobile payment vendor, then they will perceive lower opportunism of that vendor. Therefore we have:

H3c: Perceived reputation of the mobile payment vendor is negatively associated with the level of its perceived opportunism.

The characteristics of mobile technology

Similar to Chandra et al.'s (2010) study, we examine two characteristics of mobile technology: perceived structural assurance (SMT) and perceived environmental risks (EMT). SMT is defined as "consumers' perception about the institutional environment that all structures like guarantees, regulations, and promises are operational for safe, secure and reliable transactions" (Chandra et al., 2010, p.565). Structural assurance as part of institutional-based trust has been examined in previous studies. For example, studies find that structural assurance contributes positively to consumer trust in mobile banking (Liu et al., 2009; Yang, 2011a). Therefore we have:

H4a: Perceived structural assurance is positively associated with the level of consumer trust in mobile payment.

EMT is defined as risk associated with the underlying technological infrastructure including "the transaction security related risks faced by consumers while using mobile payment services through a wireless network" (Chandra et al., 2010, p.565). Liu et al. (2009) find that trust in a mobile wireless network positively affects consumers' trust in mobile banking. This means that if consumers perceive risks in the mobile wireless network, they will tend to lower their trust in mobile payment. This relationship was confirmed in Chandra et al.'s (2010) study. Therefore we have:

H4b: Perceived environmental risk is negatively associated with the level of consumer trust in mobile payment.

Structural assurance in the form of third-party guarantees mitigates technological risks. For example, Kim et al. (2008) find that the presence of third-party guarantees has a negative effect on perceived risks in an online shopping environment. Chandra et al.

(2010) also establish a negative relationship between perceived structural assurance and perceived environmental risk in the mobile payment context. Therefore we have:

H4c: Perceived structural assurance is negatively associated with the perceived environmental risk in mobile payment.

The characteristics of mobile payment consumers

Differences in culture may influence the way in which trust is perceived and developed (Huff & Kelly, 2003). Uncertainty avoidance as one of Hofstede's (1991) five cultural dimensions has been examined in a number of IS studies. Srite & Karahanna (2006) examine the influence of an individual's espoused uncertainty avoidance on technology acceptance. Espoused uncertainty avoidance refers to the level of risk accepted by the individuals when they are in uncertain situations. Hofstede's (1991) study shows that uncertainty avoidance affects Internet shopping behaviour. He argues that people from high uncertainty avoidance cultures have lower uncertainty tolerance, higher structural needs (i.e., rules and regulations), and stronger faith in institutions than people from low uncertainty avoidance culture. Kale & Barnes (1992) show that people from high uncertainty avoidance culture also tend to be more resistant to change than people from low uncertainty avoidance culture. Given that mobile payment is emerging, there is a degree of uncertainty with mobile payment for consumers than current methods of payments (e.g., debit or credit cards). Consumers with different levels of uncertainty avoidance may react differently with this emerging payment method. Mobile payment consumers with high uncertainty avoidance may have lower tolerance for uncertainties and may require a higher level of standards for regulations and securities for them to trust mobile payment. Otherwise they may resist adopting this new payment method. For example, Vance et al. (2008) show a significant relationship between uncertainty avoidance and trust in information technology (IT) artefacts in an m-commerce study. Therefore, we believe that the higher the uncertainty avoidance individuals espouse, the lower the trust they have for mobile payment. Hence we have:

H5: Espoused uncertainty avoidance is negatively associated with the level of consumer trust in mobile payment.

Disposition to trust and consumer trust in mobile payment

Disposition to trust is a variable personality trait. McKnight et al. (2002) describe it as one's preference to show faith in humanity and to espouse a trusting stance toward others. They postulate a positive relationship between disposition to trust and trust in online shopping websites. Several studies have confirmed this relationship in e-commerce contexts (Gefen & Straub, 2004; Pavlou & Gefen, 2004) and also in mobile banking (Yang et al., 2011a). Therefore we have:

H6: The disposition to trust is positively associated with the level of consumer trust in mobile payment.

Control variables

To better examine how the characteristics of mobile service provider, the characteristics of mobile payment vendor, the characteristics of mobile technology, and the characteristics of mobile payment consumers (namely disposition to trust and uncertainty avoidance) shape the way consumers develop their trust in mobile payment, we incorporate demographic factors (gender and ethnicity) and consumers' experience with mobile banking as control variables on consumer trust in mobile payment. Salo & Karjaluoto (2007) suggest that individual demographics have a strong influence on the development of the trusting belief. Gender has shown to have an impact on trust in IT adoption studies (Gefen, 2003; Gefen & Straub, 1997). Dabholkar (1996) suggests that consumers' experience with a similar technology is one of the factors influencing their attitudes toward, and trust in, a new technology. Chandra et al. (2010) shows that consumers who have experiences with mobile Internet have higher trust in mobile payment systems compared to inexperienced consumers.

Chapter 3: Methodology

This study follows a positivist paradigm. This chapter outlines the methodology in detail and provides the justifications of the methodology. In particular, survey instrument design, data collection procedures, and the data analysis approach are discussed.

Instrument design

The instrument in this research is a questionnaire survey. The measurement items were adopted from extant literature and were formulated as a seven point Likert-scale ranging from 1 (strongly disagree) to 7 (strongly agree). The new constructs *perceived reputation of mobile payment vendor* and *perceived opportunism of mobile payment vendor* were measured with 3 items adapted from Chandra et al. (2010) (See Appendix 1). To ensure all the questions were clear and easily understood by the target population, we conducted a questionnaire pilot test with fifteen university students (Chandra et al., 2010). The feedback from the pilot test leads to changes in the layout of the questionnaire to improve the presentation and clarity.

Sample size

To determine the minimal sample size required in this study, we applied the heuristic guideline that suggests a sample size of ten times the most complex regression relationship in the model (Barclay et al., 1995; Chin, 1998; Henseler et al., 2009). The formation of trust is the most complex relationship in our model. There are ten predictors associated with mobile payment trust (TRUST). Following this heuristic, a minimum sample size of 100 respondents is required for this study.

Data collection

The target population in this research is young adults. We chose undergraduate university students to represent this population. The reason we chose university students is because university students are the main user group of mobile phones and mobile networks (CNNIC, 2010) and they may be more willing to adopt mobile

payment (Scevak, 2010). A random sample of undergraduate students from two major universities in Auckland was chosen for the survey. Random sampling was used to ensure a true representation of the population (Courage & Baxter, 2005). Paper questionnaires were distributed to students on the campuses. 302 questionnaires were obtained and used in data analysis.

Data analysis method

We used partial least square structural equation modelling (PLS-SEM) to test the hypotheses. The reasons we chose PLS-SEM are that, this research is exploratory in nature. Hair et al. (2011) suggest that PLS-SEM is a preferred method for theory development and prediction. In addition, PLS-SEM can easily incorporate both reflective and formative constructs (Gefen et al., 2011) and also can be used with fewer indicator variables (one or two) per construct (Hair et al., 2011). Moreover, PLS-SEM maximises the variance explained in the dependent variable (Hair et al., 2011). Therefore, considering the advantages of PLS-SEM, it appears to be an appropriate method for this study.

We used SmartPLS 2.0 M3 (Ringle et al., 2005) to perform data analysis. We used the bootstrapping technique with 5,000 resamples to determine the significance levels for loadings, weights and path coefficients (Hair et al., 2011).

Chapter 4: Results

4.1 Demographics

Overall, there are 302 respondents from two major universities in Auckland. The sample has a relatively equal split between male (50.3%) and female (49.7%) respondents. The three main ethnic groups in the sample are Asian (41.4%), European (29.8%) and Maori/Pacific (17.5%). Among the participants, 97.6% of them have experience with Internet banking and 62.1% of them have used mobile banking. The demographics profile of the survey respondents is presented in Table 4.

Table 4: Descriptive statistics

| Demographic Variable | Category | Percentage | Frequency[N=302] |
|-----------------------------|----------------|------------|------------------|
| Gender | Female | 49.7% | 149 |
| | Male | 50.3% | 151 |
| Ethnicities | African | 2.3% | 7 |
| | Asian | 41.4% | 125 |
| | Middle Eastern | 3% | 9 |
| | European | 29.8% | 90 |
| | Latin American | 1.7% | 5 |
| | Maori/Pacific | 17.5% | 53 |
| | Others | 4.3% | 13 |
| Internet Banking Experience | Yes | 97.6% | 283 |
| | No | 2.4% | 7 |
| Mobile Banking Experience | Yes | 62.1% | 180 |
| | No | 37.9% | 110 |

4.2 Measurement Model Validation

Henseler et al. (2009) suggest that a reflective and formative measurement model must be evaluated differently. Our research model consists of nine reflective constructs including: *perceived reputation of mobile service provider (RMSP)*, *perceived opportunism of mobile service provider (OMSP)*, *perceived reputation of mobile*

payment vendor (RMPV), *perceived opportunism of mobile payment vendor* (OMPV), *perceived structural assurance* (SMT), *perceived environmental risk* (EMT), *consumer trust in mobile payment* (TRUST), *intention to adopt mobile payment* (INTENTION) and *espoused uncertainty avoidance* (UA). The model has one formative construct: *disposition to trust* (DT). Hence, we should examine these reflective and formative constructs separately.

To evaluate the measurement model, we followed the procedures outlined by Hair et al. (2011) for evaluating PLS-SEM models. Four types of validity tests were carried out to validate reflective constructs: indicator reliability, internal consistency reliability, convergent validity and discriminant validity. For the formative construct, we examined indicators' weights, loadings and their significance and tested multicollinearity.

Reflective construct validation

Three tests were conducted for reflective constructs: internal consistency reliability, indicator reliability, convergent validity and discriminant validity.

Internal consistency reliability was tested by composite reliability (CR). The results are presented in Table 9 (see Appendix 2). The values of CR ranged from 0.81 to 0.96, which are all above the acceptable values of 0.70 (Chin, 1998; Hair et al., 2011).

Indicator reliability was examined by the indicator loadings. The loading should be higher than 0.70 (Hair et al., 2011). However, 0.5 might be acceptable if some other items measuring the same construct have relatively high values (Chin, 2010). The results were presented in Table 9 (see Appendix 2). The values of the loadings except three items range from 0.72 to 0.97, which are above the recommended threshold. The three items with lower than 0.70 loadings are one item from *perceived environmental risk* (EMT1: 0.55), one item in *consumer trust in mobile payment* (T5: 0.53) and one item in *espoused uncertainty avoidance* (UA1: 0.04). We dropped those three items from the proposed model. Both *perceived environmental risk* and *consumer trust in mobile payment* have five measurement items, thus dropping one item would not affect the overall indicator reliability. The construct *espoused*

uncertainty avoidance has three items. Due to the low loading (UA1:0.04), we have to drop this item. Hair et al. (2011) suggest that PLS-SEM can be used with few indicator variables (one or two). Therefore the construct with two items is not a concern.

Convergent validity was tested by the average variance extracted (AVE). The suggested value of AVE is 0.50 or higher (Fornell & Larcker, 1981; Hair et al., 2011). The results are presented in Table 9 (see Appendix 2). The values of AVE range from 0.68 to 0.91, which are all above the acceptable values. We can conclude that convergent validity is confirmed.

Discriminant validity can be assessed by examining cross loadings and the Fornell-Larcker criterion (Fornell & Larcker, 1981; Hair et al., 2011). For sufficient discriminant validity, an indicator's loading on its own construct should be higher than all of its cross loadings and the square root of the AVE should exceed the values of both horizontal and vertical correlations between variables (Chin, 1998; Hair et al., 2011). The results of cross loadings and Fornell-Larcker criterion are presented in Table 10 and Table 11 respectively (see Appendix 2). As seen from the results, the value of loadings of each indicator is higher than all of its cross loadings (see Table 10 in Appendix 2). The values along the diagonal (presented in bold in Table 11 in Appendix 2) indicate that the squares root of AVE exceed the off-diagonal correlations between the constructs. We can then conclude that discriminant validity is confirmed.

Formative construct validation

First, we examine each indicator's weight and loading and its significance. If all the indicator weights are significant, there is empirical support to keep all the indicators. The results are presented in Table 12 (see Appendix 2). As seen from the results, all indicator weights are highly significant ($p < 0.001$). Thus, we have evidence to keep all the indicators.

Second, we examine multicollinearity among indicators by calculating the variance inflation factor (VIF). Multicollinearity poses a greater problem with formative indicators than with reflective indicators (Vance et al., 2008). The acceptable value of VIF is 5 or lower (Hair et al., 2011). The results of VIF are presented in Table 13 (see

Appendix 2). The values of VIF range from 1.10 to 1.83, indicating that multicollinearity is not a problem with the formative construct.

In summary, based on the results of the evaluation of reflective and formative constructs, we can conclude that the measurement model is validated.

4.3 Common Method Bias

There is potential for common method bias for studies that use a self-reported survey (Podsakoff et al., 2003). To evaluate whether common method bias is an issue in this study, we conducted Harman's single factor test (Podsakoff & Organ, 1986). Common method bias exists if "a single factor emerges from unrotated factor solutions or a single factor explains the majority of the variance in the variables" (Podsakoff & Organ, 1986, p.536). Factor analysis results suggest the presence of thirteen factors accounting for a total of 74.8% of the variance, of which the first factor accounted for 20.6% of the variance (see Appendix 3). Since a single factor does not emerge and does not account for the majority of variance in the variables, we conclude that common method bias is not a significant problem with this study (Malhotra et al., 2006; Podsakoff et al., 2003).

4.4 Structural Model

The primary evaluation criteria for the structural model are the R^2 measures and the level and significance of the path coefficients (Hair et al., 2011). The R^2 values of 0.75, 0.50, or 0.25 for endogenous latent variables in the structural model can be described as substantial, moderate, or weak respectively. The results of the structural model are presented in Figure 2 and Table 5.

As shown in Figure 2, R^2 for TRUST and INTENTION are 0.56 and 0.40 respectively. The results indicate that the structural model has a moderate level of R^2 values. This suggests a moderate explanatory power of the theorised antecedents of mobile payment trust and mobile payment adopting intention. Hence, this provides empirical validation for the research model. For the proposed research model, 56% variance of mobile payment trust could be explained by trust antecedents and, 40% variance of mobile payment adopting intention could be explained by mobile payment trust.

Consumer trust in mobile payment and intention to adopt mobile payment

As seen from Table 5, we find a strongly significant relationship between *consumer trust in mobile payment* and *intention to adopt mobile payment* (path=0.63, $t=16.40$, $p<0.001$). Hence H1 is supported.

The characteristics of mobile service provider

As seen from Table 5, we find a significant positive relationship between *perceived reputation of the mobile service provider* and *consumer trust in mobile payment* (path =0.12, $t=2.23$, $p<0.05$). Hence H2a is supported. The relationship between *perceived opportunism of the mobile service provider* and *consumer trust in mobile payment* is not supported (path=0.04, $t=1.15$, ns). Hence H2b is not supported. This result is consistent with Chandra et al.'s (2010) finding. A significant negative relationship between *perceived reputation of the mobile service provider* and *perceived opportunism of the mobile service provider* is established (path=-0.17, $t=2.79$, $p<0.01$). Therefore H2c is supported.

The characteristics of mobile payment vendor

As seen from Table 5, we find a highly significant positive relationship between *perceived reputation of the mobile payment vendor* and *consumer trust in mobile payment* (path=0.22, $t=4.14$, $p<0.001$). Hence H3a is supported. The relationship between *perceived opportunism of the mobile payment vendor* and *consumer trust in mobile payment* is found to be insignificant (path=-0.05, $t=1.19$, ns). Therefore H3b is not supported. A highly significant negative relationship is found between *perceived reputation of the mobile payment vendor* and *perceived opportunism of the mobile payment vendor* (path=-0.34, $t=6.04$, $p<0.001$). Therefore H3c is supported.

The characteristics of mobile technology

As seen from Table 5, a highly significant positive relationship is found between *perceived structural assurance* and *consumer trust in mobile payment* (path =0.30, $t=5.21$, $p<0.001$). Hence H4a is supported. A highly significant negative relationship is found between *perceived environmental risk* and *consumer trust in mobile payment*

(path= -0.18, $t=3.67$, $p<0.001$), supporting H4b. The relationship between *perceived structural assurance* and *perceived environmental risk* is found to be negative and highly significant (path=-0.38, $t=7.90$, $p<0.001$), supporting H3c.

The characteristics of mobile payment consumers: uncertainty avoidance and disposition to trust

As seen from Table 5, the relationship between *espoused uncertainty avoidance* and *consumer trust in mobile payment* is found to be negative and significant (path=-0.11, $t=2.03$, $p<0.05$), supporting H5. A significant positive relationship is found between *disposition to trust* and *consumer trust in mobile payment* (path=0.10, $t=2.05$, $p<0.05$), supporting H6.

Control variables

Among three control variables, we find a significant relationship between *ethnicity* and *consumer trust in mobile payment* (path=-0.11, $t=2.38$, $p<0.05$) and *experience with mobile banking* has a significant relationship with *consumer trust in mobile payment* (path=0.13, $t=3.05$, $p<0.01$). The relationship between *gender* and *consumer trust in mobile payment* is insignificant (path=, $t=1.63$, ns).

Figure 2: Results of proposed research model

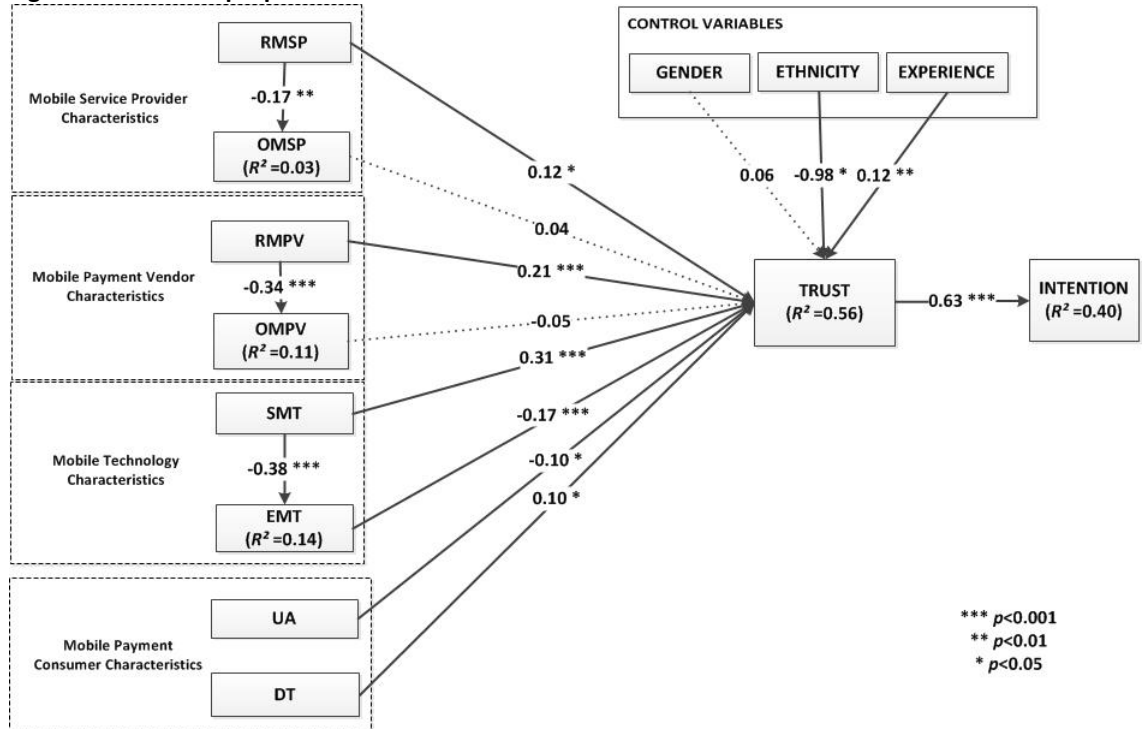


Table 5: Results of hypotheses

| Paths | Coefficient (β) | T-value (t) | R^2 | Supported? |
|--|----------------------------|----------------|-------|------------|
| H1: TRUST → INTENTION | 0.63*** | 16.39 | 0.40 | YES |
| H2a: RMSP → TRUST | 0.12* | 2.27 | 0.56 | YES |
| H2b: OMSP → TRUST | 0.04 | 1.00 | | NO |
| H2c: RMSP → OMSP | -0.17** | 2.79 | 0.03 | YES |
| H3a: RMPV → TRUST | 0.21*** | 4.14 | | YES |
| H3b: OMPV → TRUST | -0.05 | 1.19 | | NO |
| H3c: RMPV → OMPV | -0.34*** | 6.04 | 0.11 | YES |
| H4a: SMT → TRUST | 0.31*** | 5.21 | | YES |
| H4b: EMT → TRUST | -0.17*** | 3.67 | | YES |
| H4c: SMT → EMT | -0.38*** | 7.90 | 0.14 | YES |
| H5: UA → TRUST | 0.10* | 2.03 | | YES |
| H6: DT → TRUST | -0.10* | 2.05 | | YES |
| *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$ | | | | |

4.5 Post-hoc Analyses

To further test the robustness of the proposed model, we compared the competing models in terms of R^2 change for *consumer trust in mobile payment*. We compared our proposed model with Chandra et al.'s (2010) trust model to test if whether adding the characteristics of the mobile payment vendor and the characteristics of mobile payment consumers maximise the variance explained in *consumer trust in mobile payment* (TRUST). Then we performed multi-groups analyses to examine the different adoption behaviours in sub-groups based on their experience with mobile banking and their ethnic identity.

Competing models: the proposed model and Chandra et al.'s (2010) model

Chandra et al. (2010) examined the influence of characteristics of the mobile service provider and mobile technology on mobile payment trust. In this study, we added the characteristics of the mobile payment vendor and the characteristics of the mobile payment consumer (uncertainty avoidance and disposition to trust) as additional elements that may play a role in mobile payment trust formation. Several studies found that vendors have played an important role in e-commerce and mobile banking context (Gefen & Straub, 2004; Jarvenpaa & Tractinsky, 1999; Liu et al., 2009; McKnight et al., 2002). Previous IS research has shown that the formation of consumer trust in IT is influenced by uncertainty avoidance (Vance et al., 2008) and disposition to trust (McKnight et al., 2002). We believe that incorporating these variables will enhance the explanatory power of mobile payment trust. To examine this we compared Chandra et al.'s (2010) results (without mobile payment vendor characteristic variables and mobile payment consumer characteristics) with the results from the proposed research model in terms of change in R^2 for mobile payment trust. We followed a similar procedure used in Chandra et al. (2012) and Teo et al. (2008) for R^2 comparison. We used an *F-test* to test the statistical significance (Chin, 2010).

Effect size (f^2) (Cohen, 1988): is calculated by:

$$f^2 = (R^2_{\text{proposed model}} - R^2_{\text{Chandra et al. (2010)}}) / (1 - R^2_{\text{proposed research model}})$$

The F-test formula (Chin, 2010) is calculated by:

$$F = \frac{\frac{R_2^2 - R_1^2}{K_2 - K_1}}{\frac{1 - R_2^2}{N - K_2 - 1}} \quad (\text{With } K_2 - K_1 \text{ and } N - K_2 - K_1 \text{ degree of freedom})$$

Where R_1^2 is from the Chandra et al.'s (2010) model and R_2^2 is from the proposed research model. K_2 is the number of predictors in the proposed research model and K_1 is the number of predictors in Chandra et al.'s (2010) model, and N is the sample size.

The calculated effect size is 0.14 (See Table 6). According to Cohen (1988), an effect size between 0.02 and 0.15 indicates a small effect; an effect size between 0.15 and 0.35 indicates a medium effect; and an effect size greater than 0.35 indicates a large effect. Thus, we use 0.14 to indicate a small effect size. This could be explained from a small increase in explanatory power in R^2 values from 0.50 in Chandra et al. (2010) to 0.56 in the proposed research model (Chandra et al., 2012; Teo et al., 2008). The *F-test* for the change in R^2 is 9.98 ($p < 0.001$), indicating that the change in R^2 is statistically significant. Based on these results, we conclude that adding the characteristics of mobile payment vendor and the characteristics of mobile payment consumer has a small yet statistically significant increase in explanatory power to mobile payment trust. This means that there is a need to consider the characteristics of the mobile payment vendor and mobile payment consumer together with other variables when examining consumer trust in mobile payment.

Table 6: Results of Chandra et al.'s (2010) model and the proposed model

| | Chandra et al. (2010) | Proposed Research Model |
|-----------------------|--------------------------|-------------------------|
| R^2 | 0.50 | 0.56 |
| Effect Size (f^2) | 0.14 (small effect size) | |
| <i>F-test</i> | 9.98 ($p < 0.001$) | |

Multi-group analysis: experience with mobile banking and ethnic identity

To have a better understanding of the difference in adoption behaviours among consumers with different ethnic identities and their experience with mobile banking, we conducted a multi-group analysis: one to compare consumers' ethnicity identified

as Asian and European and the other to compare users with and without mobile banking experience. We did not conduct group analyses for consumers whose ethnicity identity is Maori/Pacific, because we have a relatively small sample size from this population (53 respondents). It was not a sufficient sample size for testing the proposed research model. Henseler et al. (2009) advise that the sample size for PLS should be at least ten times the maximum number of arrows pointing to any latent construct in the research model.

Ethnic identity: Asian and European

The result is presented in Table 7 and the significant differences are highlighted using bold font.

In terms of variances explained by *intention to adopt mobile payment* (INTENTION), Asian ($R^2= 0.34$) and European ($R^2=0.37$) are similar, and also similar to the proposed model ($R^2=0.40$). For the variances explained by *consumer trust in mobile payment* (TRUST), Asians ($R^2= 0.59$) is similar to the proposed model ($R^2=0.56$). However, the result for Europeans is much higher ($R^2=0.79$). This may indicate that Europeans' trust in mobile payment is well explained by the proposed research model. Trust is also a strong predictor for consumers to adopt mobile payment for both Asian (path=0.59, $t=9.38$, $p<0.001$) and European (path=0.61, $t=9.20$, $p<0.001$), and this is consistent with the proposed model (path=0.63, $t= 16.39$, $p<0.001$)

For the characteristics of mobile service provider, we find that the result from the Asian group is similar to those found in the proposed model. Asian consumers consider the reputation of a mobile service provider when considering mobile payment (path=0.12, $t=2.27$, $p<0.05$) and they believe the reputation of mobile service providers is relevant to their opportunistic behaviour (path= -0.17, $t=2.79$, $p<0.01$), but the opportunism of mobile service providers is not a concern for them (path =0.04, $t=1.00$, ns). However unlike Asian consumers, Europeans do not consider the reputation of mobile service providers in relation to mobile payment trust (path=-0.01, $t=0.32$, ns). Similar to the proposed model and Asian consumers, the opportunism of the mobile service provider is not a concern for them (path=0.06, $t=1.32$, ns). Similar to the results

from the full model and Asian consumers, Europeans also believe the reputation of service providers is relevant to the opportunism of service providers (path = -0.45, $t=4.95$, $p<0.001$).

For the characteristics of mobile payment vendor, we find that the Asian group and European group think alike about the mobile payment vendors and the subgroup findings are consistent with the proposed model.

For the characteristics of mobile technology, the findings in the two ethnic groups are similar to the proposed model. Both groups consider the structural assurance and mobile payment environmental risks when conducting transactions and they also believe that structural assurance mitigates the risks in mobile payment.

For the characteristics of a mobile payment consumer, the findings in the European group are consistent with the proposed model. We find that Europeans espouse higher uncertainty avoidance and place less trust in mobile payment than those who espouse lower uncertainty avoidance (path = -0.17, $t=2.52$, $p<0.05$). The findings also suggest that dispositional trust also influences Europeans' trust in mobile payment (path = 0.17, $t=2.55$, $p<0.05$). The findings also reveal that dispositional trust influences Europeans' trust in mobile payment (path = 0.17, $t=2.55$, $p<0.05$). However, we find that uncertainty avoidance (path = 0.01, $t=0.07$, ns) and disposition to trust (path = -0.07, $t=1.13$, ns) have no influence on Asians' trust in mobile payment.

For the control variables, we find that mobile banking experience has significant influence on consumer trust in mobile payment for both Asians (path = 0.22, $t=3.25$, $p<0.01$) and Europeans (path = 0.10, $t=1.99$, $p<0.05$), and this is similar to the proposed model (path = 0.13, $t=3.05$, $p<0.01$). However, we find that gender plays a role in the formation of mobile payment trust among Europeans (path = 0.20, $t=3.54$, $p<0.001$). Female consumers show more trust in mobile payment than male consumers. For the Asian consumers, female and male consumers demonstrate no significant difference in the level of trust they place in mobile payment (path = 0.04, $t=0.78$, ns).

Table 7: Results of Asian groups and European groups

| Proposed Model | | | | | Asian groups (n=125) | | | | European Groups (n=90) | | | |
|--------------------------------|------------|-------|----------------|-----|----------------------|-------------|----------------|------|------------------------|-------------|----------------|-----|
| Paths | β | t | R ² | Y/N | β | t | R ² | Y/N | β | t | R ² | Y/N |
| H1: TRUST → INTENTION | 0.63*** | 16.39 | 0.40 | YES | 0.59 *** | 9.38 | 0.34 | YES | 0.61 *** | 9.20 | 0.37 | YES |
| H2a: RMSP → TRUST | 0.12* | 2.27 | 0.56 | YES | 0.14 * | 2.04 | 0.59 | YES | -0.01 | 0.32 | 0.79 | NO |
| H2b: OMSP → TRUST | 0.04 | 1.00 | | NO | 0.05 | 0.80 | | NO | 0.06 | 1.32 | | NO |
| H2c: RMSP → OMSP | -0.17** | 2.79 | 0.03 | YES | -0.25 ** | 2.70 | 0.06 | YES | -0.45 *** | 4.95 | 0.20 | YES |
| H3a: RMPV → TRUST | 0.21*** | 4.14 | | YES | 0.17 ** | 2.34 | | YES | 0.27 *** | 3.78 | | YES |
| H3b: OMPV → TRUST | -0.05 | 1.19 | | NO | -0.06 | 1.09 | | NO | -0.07 | 1.24 | | NO |
| H3c: RMPV → OMPV | -0.34*** | 6.04 | 0.113 | YES | -0.43 *** | 5.67 | 0.19 | YES | -0.45 *** | 5.90 | 0.20 | YES |
| H4a: SMT → TRUST | 0.31*** | 5.21 | | YES | 0.37 *** | 4.82 | | YES | 0.39 *** | 4.96 | | YES |
| H4b: EMT → TRUST | -0.17*** | 3.67 | | YES | -0.15 * | 2.11 | | YES | -0.23 ** | 3.04 | | YES |
| H4c: SMT → EMT | -0.38*** | 7.90 | 0.143 | YES | -0.27*** | 3.30 | 0.07 | YES | -0.61 *** | 10.42 | 0.37 | YES |
| H5: UA → TRUST | 0.10* | 2.03 | | YES | 0.01 | 0.07 | | NO | -0.17 * | 2.52 | | YES |
| H6: DT → TRUST | -0.10* | 2.05 | | YES | -0.07 | 1.13 | | NO | 0.17 * | 2.55 | | YES |
| CONTROL VARIABLES | EXPERIENCE | | | | 0.22 ** | 3.25 | | | 0.10 * | 1.99 | | |
| | GENDER | | | | 0.04 | 0.78 | | n.s. | 0.20 *** | 3.54 | | |
| ***p<0.001; **p<0.01; * p<0.05 | | | | | | | | | | | | |

Multi-groups analysis: mobile banking experience

The result is presented in Table 8 and the significant differences are highlighted using bold font.

In terms of variances explained by *intention to adopt mobile payment* (INTENTION), the mobile banking users ($R^2=0.43$) is slightly higher than the non-mobile banking users group ($R^2=0.36$) and also the proposed model ($R^2=0.40$). For the variances explained by *consumer trust in mobile payment* (TRUST), the mobile banking users group ($R^2=0.63$) is higher than the non-mobile banking group ($R^2=0.51$), and the proposed model ($R^2=0.56$). Trust is a strong predictor for both mobile banking users (path=0.65, $t=13.47$, $p<0.001$) and non-mobile banking users (path=0.60, $t=8.34$, $p<0.001$).

For the characteristics of mobile service provider, the findings in the mobile banking user group are similar to the proposed model. However, we find the relationship between the reputation of the mobile service provider and mobile payment trust is not significant in the non-mobile banking user group (path=-0.10, $t=1.34$, ns). The non-mobile banking user group does not consider the reputation of the mobile service provider and the opportunism of the mobile service provider in the formation of trust in mobile payment (path=-0.18, $t=1.85$, ns).

For the characteristics of the mobile payment vendor, we find that the mobile banking and non-mobile banking user groups are similar to the proposed model except the relationship between the reputation of the mobile payment vendor and mobile payment trust is not supported in the non-mobile banking user group (path= 0.15, $t=1.82$, ns).

For the characteristics of mobile technology, the findings in the mobile banking user group and non-mobile banking user group are similar to the proposed model except the relationship between the perceived environmental risk and consumer trust in mobile payment is not supported in the non-mobile banking user group (path=-0.08, $t=1.08$, ns).

For the characteristics of mobile payment consumers, contrary to the proposed model, we find that uncertainty avoidance (path=0.03, $t=0.80$, ns) and the disposition to trust (path=-0.02, $t=0.45$, ns) have no influence on the mobile payment trust for the mobile banking user group. For the non-mobile banking user group, we find disposition to trust (path=0.08, $t=1.16$, ns) does not affect trust in mobile payment.

For control variables, we find that ethnicity (path=-0.19, $t=3.63$, $p<0.001$) has strong influence on consumer trust in mobile payment while gender (path=0.01, $t=0.36$, ns) does not affect mobile payment trust in the mobile banking user group. In the non-mobile banking user group, we find that both ethnicity (path=0.03, $t=0.50$, ns) and gender (path=0.08, $t=1.31$, ns) have no influence on consumer trust in mobile payment.

Table 8: Results of mobile banking users and non-mobile banking users

| | | Proposed Model | | | | MOBILE BANKING USERS (n=180) | | | | NON-MOBILE BANKING(n=110) | | | |
|-------------------------------|-----------|----------------|-------|----------------|-----|------------------------------|-------------|----------------|-----------|---------------------------|-------------|----------------|------------|
| Paths | | β | t | R ² | Y/N | β | t | R ² | Y/N | β | t | R ² | Y/N |
| H1: TRUST → INTENTION | | 0.63*** | 16.39 | 0.40 | YES | 0.65 *** | 13.47 | 0.43 | YES | 0.60 *** | 8.34 | 0.36 | YES |
| H2a: RMSP → TRUST | | 0.12* | 2.27 | 0.56 | YES | 0.19 ** | 3.10 | 0.63 | YES | -0.10 | 1.34 | 0.51 | NO |
| H2b: OMSP → TRUST | | 0.04 | 1.00 | | NO | 0.03 | 0.78 | | NO | -0.03 | 0.47 | | NO |
| H2c: RMSP → OMSP | | -0.17** | 2.79 | 0.03 | YES | -0.16 * | 2.26 | 0.02 | YES | -0.18 | 1.85 | 0.03 | NO |
| H3a: RMPV → TRUST | | 0.21*** | 4.14 | | YES | 0.30 *** | 4.52 | | YES | 0.15 | 1.82 | | NO |
| H3b: OMPV → TRUST | | -0.05 | 1.19 | | NO | -0.02 | 0.55 | | NO | -0.04 | 0.54 | | NO |
| H3c: RMPV → OMPV | | -0.34*** | 6.04 | 0.113 | YES | -0.36 *** | 5.05 | 0.13 | YES | -0.32*** | 3.50 | 0.10 | YES |
| H4a: SMT → TRUST | | 0.31*** | 5.21 | | YES | 0.27 *** | 3.79 | | YES | 0.38 *** | 3.87 | | YES |
| H4b: EMT → TRUST | | -0.17*** | 3.67 | | YES | -0.23 *** | 3.96 | | YES | -0.08 | 1.08 | | NO |
| H4c: SMT → EMT | | -0.38*** | 7.90 | 0.143 | YES | -0.42 *** | 7.58 | 0.18 | YES | -0.35*** | 4.35 | 0.12 | YES |
| H5: UA → TRUST | | 0.10* | 2.03 | | YES | 0.03 | 0.80 | | NO | -0.22 * | 2.27 | | YES |
| H6: DT → TRUST | | -0.10* | 2.05 | | YES | -0.02 | 0.45 | | NO | 0.08 | 1.16 | | NO |
| CONTROL | ETHNICITY | | | | | -0.19 *** | 3.63 | | | 0.03 | 0.50 | | n.s |
| VARAIBLES | GENDER | | | | | 0.01 | 0.36 | | n.s | 0.08 | 1.31 | | n.s |
| ***p<0.001; **p<0.01; *p<0.05 | | | | | | | | | | | | | |

Chapter 5: Discussion

The results reveal that consumers' trust in mobile payment significantly influences their intention to adopt mobile payment. This finding is consistent with previous mobile payment studies (Chandra et al., 2010; Keramati et al., 2012; Thair et al., 2010). This indicates that trust in mobile payment is a critical factor that consumers consider when making decisions on mobile payment adoption.

The findings suggest that trust in mobile payment is developed through four sets of trust building elements: characteristics of the mobile service provider, characteristics of the mobile payment vendor, characteristics of mobile technology and the characteristics of consumers.

In relation to characteristics of mobile payment consumers, we find a positive relationship between disposition to trust and consumer trust in mobile payment and consumers generally have a high disposition to trust (mean=4.44). This implies that consumers are willing to trust mobile payment without taking into consideration behavioural, institutional and technological risks associated with mobile service providers, mobile payment vendors, and mobile technology (Gefen & Straub, 2004). A significant negative relationship is found between espoused uncertainty avoidance and consumer trust in mobile payment. Consumers in our sample generally have a relatively strong uncertainty avoidance (mean=4.75). The finding suggests that the higher the level of uncertainty avoidance, the lower the levels of trust consumers have in mobile payment. These consumers may require regulations and rules on mobile payment to be in place to reduce uncertainties that they perceive. In addition, since consumers with a high degree of uncertainty avoidance may be reluctant to learn new skills, a mobile payment usage procedure based on existing users' knowledge is needed (Lee et al., 2010).

Mobile service providers and mobile payment vendors are both important entities in a mobile payment system. The results show that the perceived reputation of mobile service providers and mobile payment vendors are positively related to trust in mobile

payment. These findings are in line with previous studies in mobile payment (Chandra et al., 2010). In a recent study, Andreev et al. (2012) also demonstrate that vendor trust increases consumers' willingness to use mobile payment. This significant positive relationship between reputation of trading partners and trust is also supported in other IS contexts. For example, Connolly & Bannister (2008) identify that the trustworthiness of Internet vendors increases the level of trust in Internet shopping. Liu et al. (2009) report the significant relationship between mobile service providers and consumer trust in mobile banking.

The perceived opportunism of mobile service provider and mobile payment vendor are found not to be relevant to consumers' trust in mobile payment. This finding is in consonance with Chandra et al.'s (2010) study in Singapore. In their case, they argue that the strict law-enforcement environment in Singapore and mobile service providers' unwillingness to involve in opportunistic conducts as a potential explanation. In this study, a plausible reason might be that, according to a mobile payments readiness index report (MasterCard, 2012b), consumers have strong confidence in the New Zealand legal system and its regulation of business. The law relating to information and technology communication (ICT) is well developed and consumers believe their financial assets and transactions are being well protected. As a result, consumers may believe that mobile service providers and vendors are less likely to violate the law by conducting opportunistic behaviours. Hence, the perceived opportunism of the mobile service provider and mobile payment vendor in New Zealand may not be significant factors to mobile payment trust.

The findings suggest that characteristics of mobile technology are the most significant trust building element to consumer trust in mobile payment. This indicates that when consumers make their transactions, mobile technology is the biggest concern to them. The perceived structural assurance as one characteristic of mobile technology is found to be the most significant factor affecting mobile payment trust. This finding is in line with Chandra et al.'s (2010) mobile payment study and is also consistent with previous studies in mobile banking (Liu et al., 2009; Yang et al., 2011a). This finding highlights that mobile technology-related regulations and safeguards are crucial for consumers to

believe that their financial transactions and confidentiality of personal data are being protected.

The findings highlight that the perceived environmental risk of mobile technology has a significant negative relationship with mobile payment trust. This finding is in line with Chandra et al.'s (2010) mobile payment study. This result indicates that consumers take the environmental risk related to mobile technology seriously when considering whether they will trust mobile payment.

We observe a highly significant negative relationship between perceived structural assurance and perceived environmental risk. This indicates that developing adequate structural assurance can reduce the level of technological risk that consumers perceive. Structural assurance including government regulations on ICT-related transactions, the enforcement of ICT-related law, and an establishment of trusted institutions acting as guarantors (Chandra et al., 2010).

Asian vs. European

From the sub-group analyses, we find that consumers with different ethnic identities have different adoption behaviours in mobile payment.

Similar to the full sample results, a positive relationship is found between the mobile payment trust and the intention to adopt mobile payment in both ethnic groups. This implies that for both Asians and Europeans, mobile payment trust is a significant predictor of their intention to adopt mobile payment.

Results show that for Asians, mobile payment trust is developed through their perceived reputation of mobile service provider and mobile payment vendor as well as perceived structural assurance and perceived environmental risk associated with mobile technology. However, the disposition to trust and uncertainty avoidance have no influence on their trust in mobile payment. This implies that Asian consumers build their mobile payment trust under specific situations. Their trust is developed through interpersonal trust with mobile service providers and mobile payment vendors and institutional trust (structural assurance).

For European consumers, results reveal that their mobile payment trust is mainly formed through their perceptions of mobile payment vendors and mobile technology, and their disposition to trust and uncertainty avoidance. The results show that the characteristics of mobile service provider are not a big concern for them to trust mobile payment. A plausible explanation could be due to their familiarity with mobile service providers. Most European consumers in this study are native residents. They may have dealt with mobile service providers for many years and have developed strong trust towards their service providers.

Results also highlight that gender plays a role in Europeans' trust in mobile payment. Compared to males, females have more trust in mobile payment. Our finding is in line with previous studies in gender differences on IT adoption (Gefen & Straub, 1997; Venkatesh et al., 2000). Awad and Ragowsky (2008) conducted a study to examine whether gender affects trust and e-commerce adoption and they find that women are more affected by trust than men in online transactions. However, we do not have sufficient sub-group sample sizes to further investigate how females and males differ in their formation of trust in mobile payment.

Mobile banking users vs. non-mobile banking users

Results reveal that consumers who have experiences with mobile banking develop their trust through their perceived reputation of mobile service provider and payment as well as perceived structural assurance and perceived environmental risk of mobile technology. However, their disposition to trust and uncertainty avoidance do not influence trust in mobile payment. This may indicate that consumers who have experiences with mobile banking form their trust through interpersonal trust and institutional trust.

Results highlight that consumers who do not have experience with mobile banking develop their trust mainly through their perceived structural assurance of mobile technology and their level of uncertainty avoidance. They do not consider the mobile service provider and mobile payment vendor when they make mobile payment adoption decisions. The perceived environmental risk is also not a concern for them

either. A plausible reason might be that as these consumers are not sufficiently exposed to mobile payment systems, they may not understand what specific roles mobile service providers and vendors play in this context. In addition, they are not aware of the risks related to mobile payment technology. These consumers rely on the third-party guarantees including government legal frameworks and regulations to mitigate the risks and protect their privacy and security of transactions. Results also show this group of consumers have strong uncertainty avoidance. This might imply that this group of consumers believe that mobile technology is associated with too many uncertainties. Therefore, they may resist accepting mobile payment as a new payment method. These consumers rely on structural assurance to reduce their uncertainties with mobile technology.

Chapter 6: Conclusion

This study aims to investigate the underlying factors of consumer's trust formation and the influence of trust on the intention to adopt mobile payment. Mobile payment involves sharing sensitive personal information and engaging in financial transactions. Therefore, trust plays a crucial role in promoting wider adoption of mobile payment. This research examines consumer trust in mobile service providers, mobile payment vendors, and mobile technology. In addition, we examine individual's cultural influence and trust dispositions on the formation of trust in mobile payment. The result of this research is based on 302 samples. PLS-SEM is employed for data analysis. Results strongly reveal that trust is a crucial factor to explain consumers' intention to adopt mobile payment. All four trust-building elements have significant influence on mobile payment trust. Sub-sample analyses show that cultural differences related to espoused uncertainty avoidance and mobile banking experience also have an influence on mobile payment trust. Results highlight that the structural assurance is one of the most significant factors affecting mobile payment trust among all groups of consumers.

Theoretical implications

This research has two theoretical contributions. First, this research extends the trust-theoretic model developed by Chandra et al. (2010) by adding the characteristics of mobile payment vendor as another set of trust-building elements and examining the consumers' trust disposition and espoused uncertainty avoidance on the formation of trust. We tested the robustness of the model by conducting post-hoc analyses. Results show that adding these two elements increases the explanatory power of trust and mobile payment adoption.

Second, the results highlight that the cultural propensity of uncertainty avoidance affects consumer trust in mobile payment. Ethnic identity also plays a role in the formation of consumer trust. Results show that Asians and Europeans have different adoption behaviours of mobile payment. The results strongly highlight that the trust building elements associated with mobile service providers, mobile payment vendors,

mobile technology, and consumer characteristics are important facilitators of mobile payment trust. The results also suggest that cultural differences are important to the individual's formation of trust and adopting intention.

Practical implications

Similar to Chandra et al. (2010), we find that the institutional trust reflected in structural assurance has the most significant impact on consumers' trust in mobile payment. This indicates that mobile payment designers and practitioners should incorporate relevant technology and services including "delivering mobile alerts and information services to consumers in the first instance to develop channel trust; providing and communicating service guarantees and real-time customer process; reinforcing safety and security within the aesthetics and syntax of the consumer's experience; and visibly delivering best practice payment technology elements, such as transaction identifiers and effective repudiation management" (Microsoft and M-com, 2012, p.12). These strategies will give mobile payment consumers a more safe and secure perception towards mobile transactions.

In addition, the results show that a culture propensity of uncertainty avoidance affects consumer trust in mobile payment. Mobile payment designers should focus on the ease of use of the procedures of mobile payment as consumers with high uncertainty avoidance may resist learning new skills (Lee et al., 2010).

The results suggest that Asian and European consumers exhibit different adoption behaviours. The difference between Asian and Europeans might provide some implications for mobile service providers when they develop globalisation plans for mobile payment diffusion. Since users who have no mobile banking experience may be reluctant to adopt mobile payment, mobile payment practitioners may want to highlight the maturity of mobile technology and safeguards to protect consumers' privacy and security of transactions in marketing campaigns to promote mobile payments. In summary, it is important for mobile payment designers, marketers and practitioners to develop respective mobile payment trust mechanisms to foster

consumers' confidence in mobile payment in order to promote wider adoption of mobile payment.

Limitations and Future Research

There are a few limitations in this study. First, there is a possibility of common method bias as we use a self-reported survey. Although we tested and found that it was not a significant problem with this study, common method bias is always a potential problem (Vance et al., 2008). Therefore readers should keep this issue in mind when interpreting the results from this study. Second, this study targeted a set of potential consumers of mobile payment in Auckland, New Zealand. Therefore, readers should exercise caution to the generalisability of the results (Chandra et al., 2010; Vance, 2008). Third, mobile payment has not been implemented in Auckland yet. Therefore most of our informants have not had actual experience or know people who have experiences with mobile payment. Thus this implies that our study focuses on the early stage of trust formation in mobile payment. Despite the lack of direct experience with mobile payment, we design the survey instrument to ensure that respondents are aware of what a mobile payment transaction involves. In the survey instrument, we provide contextual details to explain various mobile payment parties along with examples. In addition, most informants (62.1%) are familiar with mobile banking. Therefore, we believe that their responses are reliable and valid. However, it is important to point out that trust building is a complex and time consuming process. Our study focuses on the initial trust formation. There is a possibility that consumers may demonstrate different trust behavioural patterns in the future. We suggest that future research compares pre-adoption and post-adoption of mobile payment trust behaviour and identify whether and how trust behaviours change over time.

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Appendices

Appendix 1: Content Validity

| Constructs | Code | Indicators | SOURCE |
|---|-------|---|----------------------|
| Intention to adopt Mobile Payment (INTENTION) <i>-Reflective</i> | INT1 | Given a chance, I intend to adopt mobile payments in the future. | Chandra et.al.(2010) |
| | INT2 | Given a chance, I predict that I will frequently use mobile payments in the future. | |
| | INT3 | I will strongly recommend others to use mobile payments. | |
| Mobile Payment Trust (TRUST) <i>-Reflective</i> | T1 | I trust mobile payment systems to be reliable. | |
| | T2 | I trust mobile payment systems to be secure. | |
| | T3 | I believe mobile payment systems are trustworthy. | |
| | T4 | I trust mobile payment systems. | |
| | T5* | Even if the mobile payment systems are not monitored, I would trust them to do the job correctly. | |
| Perceived Reputation of mobile service provider (RMSP) <i>-Reflective</i> | RMSP1 | I believe MOBILE SERVICE PROVIDER has a good reputation. | |
| | RMSP2 | I believe MOBILE SERVICE PROVIDER has a reputation for being fair. | |
| | RMSP3 | I believe MOBILE SERVICE PROVIDER has a reputation for being honest. | |
| Perceived Opportunism of mobile service provider (OMSP) <i>-Reflective</i> | OMSP1 | I believe that MOBILE SERVICE PROVIDER may use customer information without permission. | |
| | OMSP2 | I believe that MOBILE SERVICE PROVIDER might alter information in its own self-interest. | |
| | OMSP3 | I believe that MOBILE SERVICE PROVIDER may promise things without actually doing them. | |
| Perceived Reputation of mobile payment vendor (RMPV) <i>-Reflective</i> | RMPV1 | I believe MOBILE PAYMENT VENDOR has a good reputation. | |
| | RMPV2 | I believe MOBILE PAYMENT VENDOR has a reputation for being fair. | |
| | RMPV3 | I believe MOBILE PAYMENT VENDOR has a reputation for being honest. | |
| Perceived Opportunism of mobile payment vendor (OMPV) <i>-Reflective</i> | OMPV1 | I believe that MOBILE PAYMENT VENDOR may use customer information without permission. | |
| | OMPV2 | I believe that MOBILE PAYMENT VENDOR might alter information for its own self-interest. | |
| | OMPV3 | I believe that MOBILE PAYMENT VENDOR may promise things without actually doing them. | |
| Perceived | SMT1 | I believe mobile technology has enough | |

| | | | | |
|--|-------------------|------------------|---|--------------------------|
| Structural Assurance(SMT) <i>-Reflective</i> | | | safeguards to make me feel comfortable using it to make mobile payments. | |
| | SMT2 | | I feel assured that legal and technological structures adequately protect me from problems on the mobile technology. | |
| | SMT3 | | I feel confident that encryption and other technological safeguards on the mobile technology make it safe for me to make mobile payments. | |
| | SMT4 | | In general, the mobile technology provides a robust and safe environment to perform mobile payments. | |
| Perceived Environmental Risk (EMT) <i>-Reflective</i> | EMT1* | | Information about my mobile payment transactions would be known to others. | |
| | EMT2 | | I believe mobile payment transactions may be modified or deleted by others. | |
| | EMT3 | | I believe there is a high probability of losing a great deal in using mobile payment systems. | |
| | EMT4 | | I would label adopting mobile payment systems as a potential loss. | |
| | EMT5 | | I believe that overall riskiness of mobile payment systems is high. | |
| Espoused Uncertainty Avoidance (UA) <i>-Reflective</i> | UA1* | | It is important to have instructions of using mobile payments spelled out in detail so that I always know what I am expected to do. | Quintal et al. (2010) |
| | UA2 | | I would use credit card or other payment method rather than mobile payments because I am more familiar with risks of credit cards and I have no idea what I shall do when things goes wrong with mobile payments. | Srite & Karahanna (2006) |
| | UA3 | | People should avoid using mobile payments because it is new and could get worse. | |
| Disposition to Trust (DT) <i>-Formative with 2 reflective sub constructs</i> | Faith in Humanity | DT1 (Integrity) | Most people are honest in their dealings with others. | McKnight et al.(2002) |
| | | DT2 (Competence) | Most of IT professionals in mobile technology are competent in their area of expertise. | |
| | Trusting Stance | DT3 | My typical approach is to trust new technologies until they prove I should not trust. | |
| | | DT4 | It is easy for me to trust mobile technology even if they are new to me. | |

(* items dropped due to low loadings)

Appendix 2: Measurement Model Validation

Table 9: Results summary of loadings, AVE and CR

| CONSTRUCTS | INDICATORS | LOADINGS | AVE | CR |
|------------------|------------|----------|------|------|
| EMT | EMT2 | 0.72 | 0.72 | 0.91 |
| | EMT3 | 0.89 | | |
| | EMT4 | 0.86 | | |
| | EMT5 | 0.91 | | |
| INTENTION | INT1 | 0.95 | 0.88 | 0.95 |
| | INT2 | 0.95 | | |
| | INT3 | 0.92 | | |
| OMPV | OMPV1 | 0.90 | 0.80 | 0.92 |
| | OMPV2 | 0.90 | | |
| | OMPV3 | 0.88 | | |
| OMSP | OMSP1 | 0.83 | 0.70 | 0.87 |
| | OMSP2 | 0.84 | | |
| | OMSP3 | 0.85 | | |
| RMPV | RMPV1 | 0.94 | 0.91 | 0.96 |
| | RMPV2 | 0.97 | | |
| | RMPV3 | 0.96 | | |
| RMSP | RMSP1 | 0.88 | 0.79 | 0.92 |
| | RMSP2 | 0.90 | | |
| | RMSP3 | 0.90 | | |
| SMT | SMT1 | 0.88 | 0.79 | 0.94 |
| | SMT2 | 0.87 | | |
| | SMT3 | 0.93 | | |
| | SMT4 | 0.89 | | |
| TRUST | T1 | 0.91 | 0.85 | 0.96 |
| | T2 | 0.90 | | |
| | T3 | 0.95 | | |
| | T4 | 0.93 | | |
| UA | UA2 | 0.83 | 0.68 | 0.81 |
| | UA3 | 0.82 | | |

Table 10: Discriminant validity: cross loading

| | EMT | INTENTION | OMVP | OMSP | RMVP | RMSP | SMT | TRUST | UA |
|-------|-------|-----------|-------|-------|-------|-------|-------|-------|-------|
| EMT2 | 0.72 | -0.12 | 0.34 | 0.21 | -0.16 | -0.04 | -0.22 | -0.23 | 0.27 |
| EMT3 | 0.89 | -0.26 | 0.36 | 0.25 | -0.21 | -0.04 | -0.24 | -0.36 | 0.41 |
| EMT4 | 0.86 | -0.33 | 0.28 | 0.20 | -0.28 | -0.03 | -0.23 | -0.35 | 0.45 |
| EMT5 | 0.91 | -0.34 | 0.28 | 0.29 | -0.30 | -0.15 | -0.48 | -0.55 | 0.46 |
| INT1 | -0.37 | 0.95 | -0.19 | -0.02 | 0.46 | 0.28 | 0.36 | 0.61 | -0.35 |
| INT2 | -0.35 | 0.95 | -0.19 | -0.01 | 0.46 | 0.22 | 0.32 | 0.61 | -0.31 |
| INT3 | -0.20 | 0.92 | -0.18 | 0.00 | 0.40 | 0.27 | 0.28 | 0.56 | -0.25 |
| OMPV1 | 0.30 | -0.20 | 0.90 | 0.51 | -0.32 | -0.23 | -0.15 | -0.27 | 0.10 |
| OMPV2 | 0.31 | -0.19 | 0.90 | 0.51 | -0.27 | -0.16 | -0.07 | -0.21 | 0.17 |
| OMPV3 | 0.35 | -0.14 | 0.88 | 0.51 | -0.31 | -0.11 | -0.09 | -0.21 | 0.19 |
| OMSP1 | 0.16 | -0.04 | 0.44 | 0.83 | -0.08 | -0.16 | -0.12 | -0.13 | 0.12 |
| OMSP2 | 0.27 | -0.01 | 0.47 | 0.84 | -0.06 | -0.11 | -0.07 | -0.13 | 0.14 |
| OMSP3 | 0.30 | 0.02 | 0.51 | 0.85 | -0.10 | -0.16 | -0.15 | -0.16 | 0.22 |
| RMPV1 | -0.29 | 0.47 | -0.26 | -0.06 | 0.94 | 0.44 | 0.35 | 0.52 | -0.23 |
| RMPV2 | -0.29 | 0.46 | -0.33 | -0.09 | 0.97 | 0.42 | 0.37 | 0.52 | -0.23 |
| RMPV3 | -0.27 | 0.41 | -0.37 | -0.11 | 0.96 | 0.46 | 0.39 | 0.46 | -0.20 |
| RMSP1 | -0.11 | 0.32 | -0.19 | -0.08 | 0.50 | 0.88 | 0.35 | 0.43 | -0.07 |
| RMSP2 | -0.04 | 0.19 | -0.09 | -0.16 | 0.33 | 0.90 | 0.40 | 0.34 | -0.03 |
| RMSP3 | -0.10 | 0.22 | -0.22 | -0.23 | 0.40 | 0.90 | 0.37 | 0.34 | -0.07 |
| SMT1 | -0.35 | 0.30 | -0.01 | -0.02 | 0.33 | 0.30 | 0.88 | 0.52 | -0.26 |
| SMT2 | -0.25 | 0.24 | -0.11 | -0.14 | 0.33 | 0.40 | 0.87 | 0.44 | -0.22 |
| SMT3 | -0.35 | 0.26 | -0.15 | -0.19 | 0.33 | 0.37 | 0.93 | 0.52 | -0.30 |
| SMT4 | -0.38 | 0.39 | -0.13 | -0.15 | 0.39 | 0.42 | 0.90 | 0.61 | -0.29 |
| T1 | -0.47 | 0.66 | -0.27 | -0.14 | 0.47 | 0.37 | 0.51 | 0.91 | -0.37 |
| T2 | -0.38 | 0.51 | -0.18 | -0.17 | 0.45 | 0.35 | 0.58 | 0.90 | -0.33 |
| T3 | -0.44 | 0.58 | -0.26 | -0.17 | 0.48 | 0.38 | 0.54 | 0.95 | -0.37 |
| T4 | -0.45 | 0.59 | -0.23 | -0.14 | 0.53 | 0.41 | 0.56 | 0.93 | -0.39 |
| UA2 | 0.30 | -0.28 | 0.13 | 0.16 | -0.23 | -0.12 | -0.24 | -0.33 | 0.83 |
| UA3 | 0.49 | -0.25 | 0.15 | 0.16 | -0.14 | 0.01 | -0.25 | -0.32 | 0.82 |

Table 11: Discriminant validity: AVE diagonal

| | EMT | INTENTION | OMSP | OMPV | RMSP | RMPV | SMT | TRUST | UA |
|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| EMT | 0.85 | | | | | | | | |
| INTENTION | -0.33 | 0.94 | | | | | | | |
| OMSP | 0.29 | -0.01 | 0.84 | | | | | | |
| OMPV | 0.36 | -0.20 | 0.57 | 0.89 | | | | | |
| RMSP | -0.09 | 0.27 | -0.17 | -0.19 | 0.89 | | | | |
| RMPV | -0.29 | 0.47 | -0.09 | -0.34 | 0.46 | 0.95 | | | |
| SMT | -0.38 | 0.34 | -0.14 | -0.11 | 0.42 | 0.39 | 0.89 | | |
| TRUST | -0.47 | 0.63 | -0.17 | -0.26 | 0.41 | 0.53 | 0.59 | 0.92 | |
| UA | 0.48 | -0.32 | 0.20 | 0.17 | -0.07 | -0.23 | -0.30 | -0.40 | 0.82 |

The numbers in bold in the shaded cells of the diagonal rows are the square roots of the AVE.

Table 12: Formative construct: indicator weight and loadings

| Indicators | Weights | Loadings | T-statistics |
|------------|---------|----------|--------------|
| DT1 | 0.62 | 0.88 | 20.10*** |
| DT2 | 0.54 | 0.84 | 20.68*** |
| DT3 | 0.57 | 0.91 | 32.94*** |
| DT4 | 0.53 | 0.90 | 44.83*** |

* p<0.05; ** p<0.01; ***p<0.001

Table 13: Formative construct: VIF results

| Dependent Variable | D1 | D2 | D3 | D4 |
|--------------------|-------|-------|-------|-------|
| D1 | | 1.104 | 1.761 | 1.692 |
| D2 | 1.195 | | 1.832 | 1.694 |
| D3 | 1.405 | 1.350 | | 1.111 |
| D4 | 1.469 | 1.359 | 1.210 | |

Appendix 3: Common method bias: Harman's single factor results

| Total Variance Explained | | | | | | |
|--------------------------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 7.421 | 20.614 | 20.614 | 7.421 | 20.614 | 20.614 |
| 2 | 3.574 | 9.929 | 30.543 | 3.574 | 9.929 | 30.543 |
| 3 | 3.008 | 8.355 | 38.898 | 3.008 | 8.355 | 38.898 |
| 4 | 2.336 | 6.490 | 45.388 | 2.336 | 6.490 | 45.388 |
| 5 | 2.067 | 5.743 | 51.130 | 2.067 | 5.743 | 51.130 |
| 6 | 1.948 | 5.411 | 56.541 | 1.948 | 5.411 | 56.541 |
| 7 | 1.684 | 4.678 | 61.219 | 1.684 | 4.678 | 61.219 |
| 8 | 1.416 | 3.933 | 65.152 | 1.416 | 3.933 | 65.152 |
| 9 | 1.311 | 3.642 | 68.794 | 1.311 | 3.642 | 68.794 |
| 10 | 1.139 | 3.163 | 71.957 | 1.139 | 3.163 | 71.957 |
| 11 | 1.041 | 2.891 | 74.848 | 1.041 | 2.891 | 74.848 |

Extraction Method: Principal Component Analysis.