Paying for Goods and Services Using a Mobile Phone: Exploring Mobile Payment Use and Adoption

Dissertation submitted to
Auckland University of Technology
in partial fulfilment of the requirements
for the degree of
Master of Computer and Information Sciences (MCIS)

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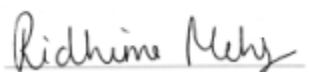
Attestation of Authorship

"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."

Ridhima Mehra



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Acknowledgements

I wish to show gratitude to Krassie Petrova for her unwavering support and valuable advice. Krassie has been an inspiration to reach excellence and helped me complete this dissertation at a time my personal circumstances were very fragile, above all agreeing to a remote supervision when I decided to move to Australia.

I would also like to thank Leo Hitchcock for providing valuable advice and Gordon Grimsey for allowing me to take the laptop overseas and for the prompt resolution of all technological issues during the dissertation.

I would like to show appreciation to all the lecturers at AUT for the learning they have imparted and for being a constant source of encouragement and helping me achieve what I wanted to.

On a personal note I would like to thank my husband, Prashant Sood and a friend Mili Makan for giving up their weekends to help me during the data gathering process. I would also like to say thank you to my sister Karishma Mehra, for proof reading this dissertation for me.

Lastly, a big thank you to all those respondents who agreed to participate in this survey for nothing in return and in their own personal time.

Without the support of everyone this dissertation would not have been possible.

Abstract

Mobile payment is an application of mobile commerce which provides the user with an ability to pay for goods and services using their mobile device. It is a payment mechanism that gives the consumer an 'anytime anywhere' freedom to perform a transaction. The purpose of this exploratory study is to understand what factors inhibit or facilitate adoption of mobile payment, in a New Zealand context. To study the potential links between these factors and mobile payment adoption a hybrid of two adoption models (the Technology Acceptance Model – TAM, and the Input Output Process model – IPO) were used to build the research framework. A corresponding questionnaire was designed and data were gathered from a total of 267 respondents. The findings about 'control relationships' such as between perceived ease of use and perceived usefulness, or perceived usefulness, perceived ease of use, and intention to use were compliant with prior work. The study identified service awareness as an important factor affecting the adoption of mobile payment. It was also found that consumer demographic characteristics such as income, professional status, ethnicity, and mobile phone spending may play significant moderating roles. The study contributes to the understanding of the dynamics of mobile payment adoption in the local context, and identifies avenues for future work in the area.

Chapter 1: Introduction

1.1 Chapter Overview

This chapter describes the focus of the research, states its objective, formulates the questions to be investigated, and presents the research approach. The structure and the organization of the dissertation are outlined, with a summary of each subsequent chapter included.

1.2 Research Focus and Significance

Zheng & Chen (2003) define mobile payment as "any transaction with a monetary value that is conducted via a mobile telecommunications network." This dissertation focuses on the analysis of the adoption factors and demographics that encourage or impede mobile payment adoption by proposing an adoption model and exploring the relationships between the model variables.

Venkatesh, Ramesh, and Massey (2003) mention that despite the technological advancement, mobile payments still face many obstacles. Prior research in the area has investigated and examined the adoption factors and impediments for mobile payments (E.g. Petrova, 2005; Pousttchi, 2003; Scharla, Dickingerb, & Murphy, 2005; Teo, 2005). The literature on mobile commerce adoption also highlights many important issues related to adoption such as demographics, technological and usability issues (Siau, Lim, & Shen 2001; Venkatesh, Ramesh, & Massey, 2003; Chen & Yang, 2006; Scarpi & Olmo-Riley, 2006).

Compared to other countries New Zealand ranks very low with respect to mobile payment adoption (Dholakia & Dholakia, 2002). Therefore it would be of interest to find more about the factors driving or impeding the adoption mobile payment in a New Zealand context. Drawing on the literature findings and on the analyses of primary data the dissertation investigates the issue in the hope that the results may be used to provide useful recommendations for all industry players involved in developing and deploying mobile payment systems.

1.3 Research Objective

The objective of this study is to identify the important factors which encourage or hinder the use of mobile payments among New Zealanders. To address the objective, the study

investigates how service oriented features such as user mobility support, and technology features such as transaction security, network coverage and technological friendliness may impact adopting mobile payment, as well as how demographic factors such as professional and economic status may influence customers in forming their attitude to mobile payment. The following research questions are addressed:

1. What is the role of service oriented features such as mobility support in mobile payment adoption?
2. What is the role of technology features such as transaction security and device interface in mobile payment adoption?
3. What is the role of demographic factors such as profession and economic status in mobile payment adoption?

1.4 Research Approach

An extensive literature review was conducted to identify key mobile payment facilitators and impediments and approaches used to study the adoption of mobile payment and other innovative services and technologies. A model including variables related to the research questions was developed as facilitated by the review of current technology adoption models. Next a survey questionnaire was developed and used to gather data from a randomly selected sample of respondents drawn from amongst the visitors to two Auckland public shopping centres and two Auckland beaches. The results from the survey were analysed in order to address the research questions and identify the impediments and facilitators of mobile payment emerging from the analysis.

1.5 Dissertation Outline

The thesis consists of six chapters including the current one.

Chapter 2 presents background information about mobile payments, followed by a practical implementation in NZ and a literature review on adoption models. Chapter 3 presents mobile commerce facilitators and impediments, from an extensive literature review. It evaluates the various technology adoption frameworks discussed in chapter 2.

Chapter 4 of the dissertation discusses the research objective, research approach, proposed research model and the relationships to be evaluated. It outlines the research instrument and data collection. Chapter 5 analyses the data gathered from the questionnaire with respect to the identified relationships. Chapter 6 concludes the

dissertation with a summary of analysis results from chapter 5. A section of the chapter also identifies avenues for further research work.

Chapter 2: Literature Review: Definitions and Background

2.1 Introduction to Chapter

This chapter defines mobile payment examining a practical example of Txt-A-Park, i.e. paying for parking using a mobile device. The example in section 2.4 is explained using the mobile payment adoption framework discussed in section 2.3.

Section 2.5 and 2.6 look at mobile payment adoption trends in various countries and NZ respectively. Section 2.7 reviews a number of technology adoption and acceptance models and broadly comments on their applicability to the study of mobile payment adoption.

2.2 What is Mobile Payment?

Zheng & Chen (2003) define mobile commerce as, "any transaction with a monetary value that is conducted via a mobile telecommunications network." It may use a mobile device (Zheng & Chen, 2003; Pousttchi, 2004).

Pousttchi (2004) defines mobile payment (MP) as, "that type of payment transaction processing in the course of which – within an electronic procedure – (at least) the payer employs mobile communication techniques in conjunction with mobile devices for initiation, authorization or realization of payment."

For the purpose of this dissertation, mobile payment is a monetary transaction that uses a mobile device. This mobile device may vary from a mobile phone to any wireless enabled device like PDA and laptop.

2.3 Mobile Payment Framework

The framework in Figure 1 below illustrates the definition as above. It has been constructed as a hybrid of two mobile-payment framework models by - Herzberg (2003) and Lehner & Watson (2001). Mobile payments include the following participants:

- Consumer or User; and mobile device like a PDA and handhelds.
- Equipment vendors that provide the equipment like PDA and handhelds.
- Application Developers that provide the infrastructure, hardware and software platforms necessary for mobile payments.

- Content Providers that take the initiative of providing a product or service using the mobile payment technology.
- Merchant supporting the mobile payment
- Mobile transaction provider for the customer and the merchant which maybe a cellular operator (i.e. Telecom, Vodafone) or a bank or a combination of both.

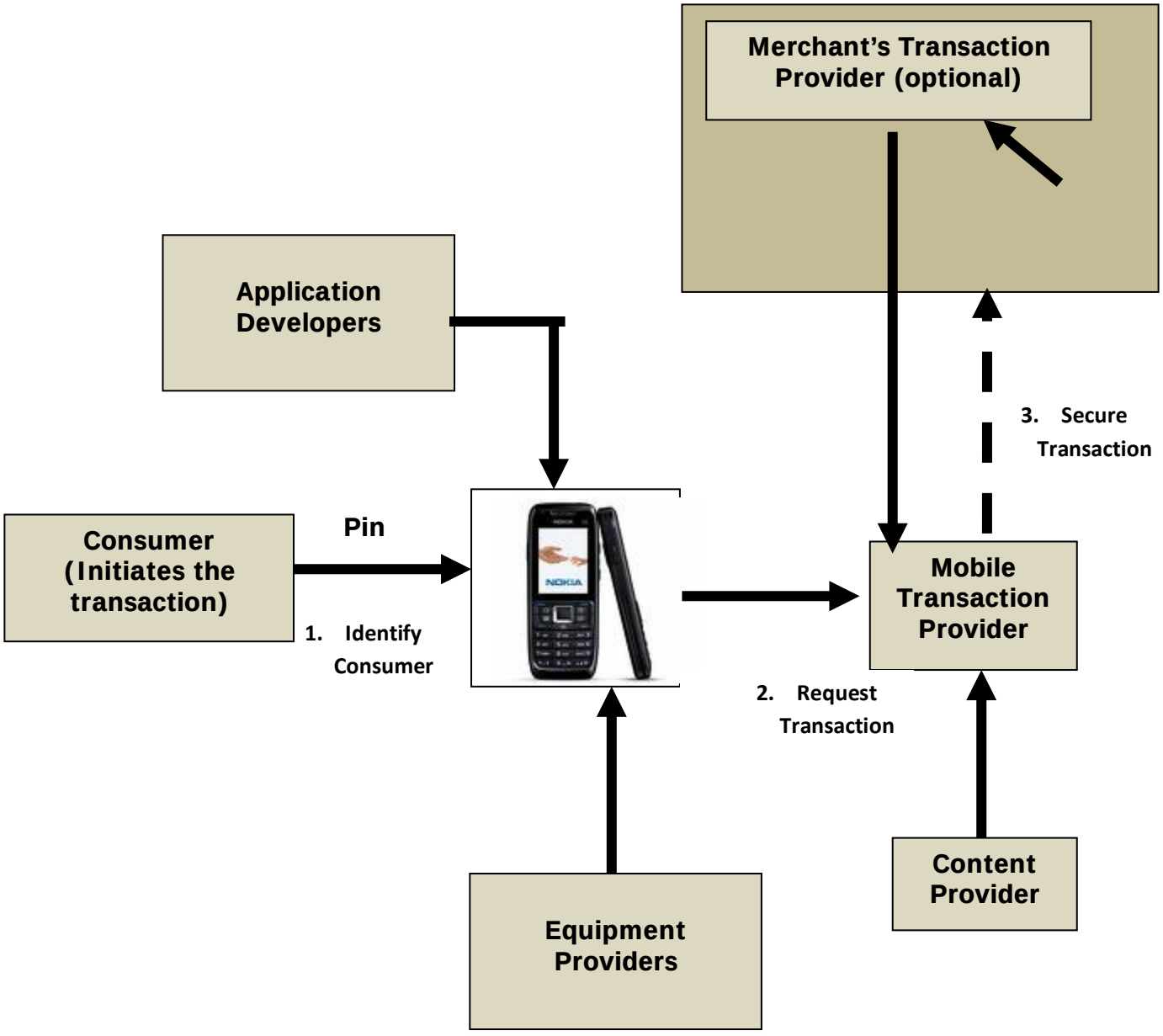


Figure 1: Mobile Payment Participants – (Adapted from: Herzberg (2003); Lehner & Watson (2001))

The consumer initiates the mobile payment on a product or service provided by the content provider, using the infrastructure, hardware and software platform provided by the application developers. The transaction is conducted between the consumer and the merchant. The mobile network used to do this comprises elements as a mobile device and a mobile transaction provider. However, the merchant's transaction provider could be different to the consumer therefore the two transaction provider's have to be able to interoperate.

The solid arrows in Figure 1 represent a relatively long term relationship between participants whereas the broken arrows represent a transaction specific relationship. For example: the relationship between the consumer and the mobile transaction provider represented in a solid arrow is relatively long term relationship whereas the relationship between the mobile transaction provider and the merchant is a transaction specific relationship.

As mentioned by Herzberg (2003), a secure mobile payment transaction comprises of three independent processes:

1. Identification, which can be physical identification i.e. possessing the mobile device or use of passwords, biometrics and other identifying methods.
2. Authentication, where the mobile provider authenticates the transaction from the mobile device.
3. Secure Performance, where the transaction is performed by the transaction provider possibly involving the merchant's transaction provider and/or other transaction providers.

The example in section 2.4 illustrates the above mobile payment framework.

2.4 Txt-A-Park

The framework in Figure1 is explained using "Txt-a-park" as an example. "Txt-a-park" refers to the payment of parking using a text message sent from a mobile device. Figure 2 is a diagrammatic representation of the "Txt-a-park" mobile payment service as adapted from Lehner & Watson (2001). It depicts the information flows and interactions between various players facilitating a mobile payment.

The various interactions are related back to the mobile payment framework presented in Figure 1(highlighted in bold in Figure 2).

In Figure 2 (following page), the Auckland City Council is the **"content provider"** and the **"Merchant"**, providing the service of paying for parking using a mobile device.
The "**consumer"** initiates the transaction by sending an SMS to the number on the parking meter.

The "**mobile transaction provider"** in this case is the consumer's subscribed mobile operator – Telecom or Vodafone and/or the financial institutions – the banks supporting and clear the financial transaction. Mobile Operators are an important part of this life-cycle because they have an established customer base, effective billing systems (either pre-paid or monthly billings (post-paid)) and established business processes for splitting of revenues with the banks. On the other hand, banks possess information about the consumer's creditworthiness and financial position.

The "**application developers"** – CHS, DPS and Synergy and/or mobile handset manufactures like Nokia, Sony etc. provide the hardware and software platform necessary to facilitate the mobile payment.

The relationships between the consumer, the mobile transaction provider, content provider and the application provider are long term relationships. In the case where the user has a prepaid phone account, the parking fee is debited from their prepaid balance.

If the user has a Vodafone or Telecom account, the cost of the parking is itemised on their next Telecom /Vodafone bill, and clearly identified as "Txt-a-Park". The relationship between the merchant and the mobile transaction provider is a transactional relationship.

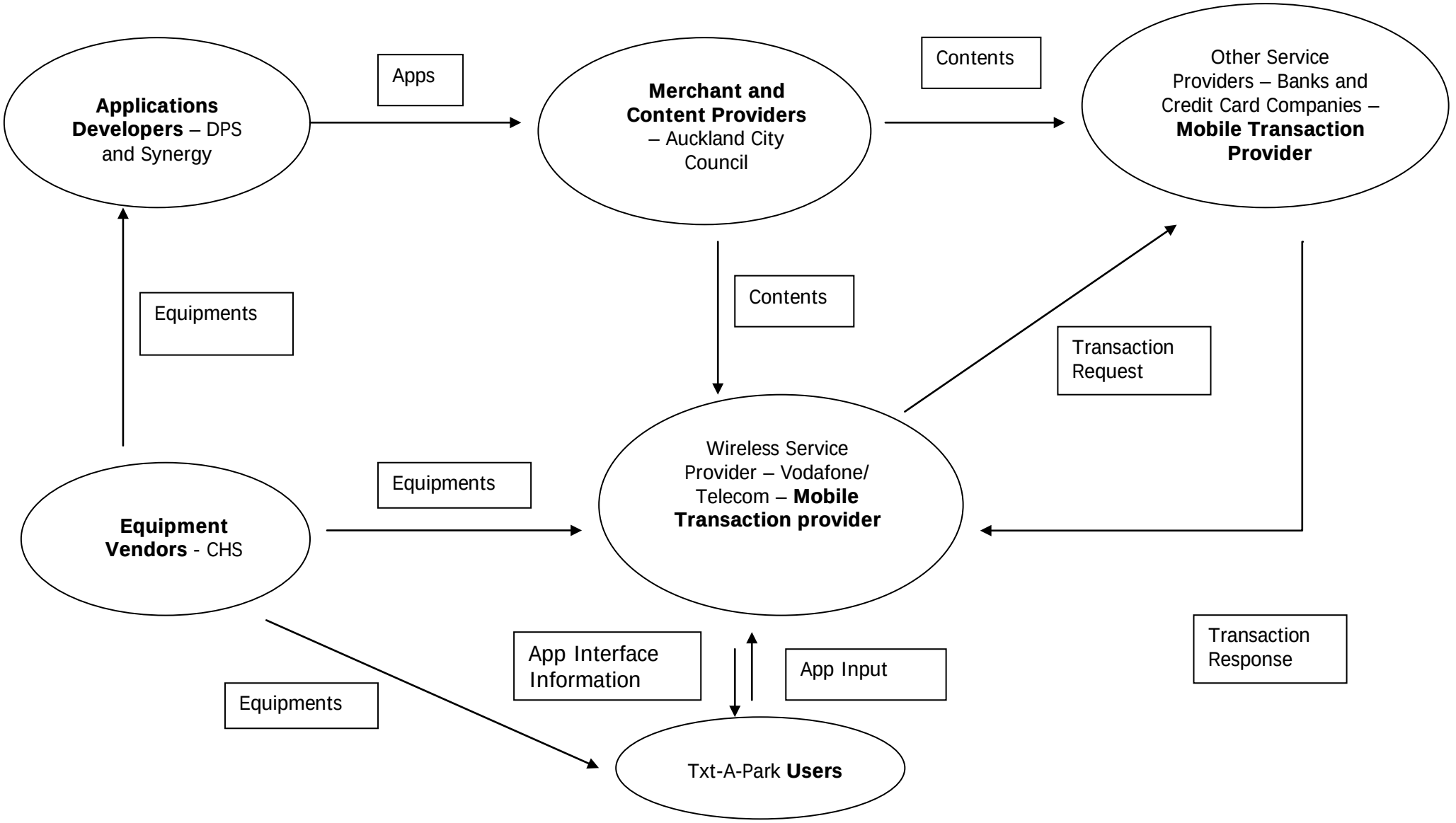


Figure 2: The Txt-A Park mobile payment cycle (Source: Lehner & Watson ,2001)

2.5 Global Mobile Payment Trends

Global mobile payment trends have been studies both by industry and by academic researchers; predictions about the diffusion of mobile services, including m-banking/m-payments.

The reputable commercial research firm Gartner predicts that the number of people using mobile payment to purchase goods and services will double by 2012 globally. According to their findings, “Mobile payment users will reach 74.4 million in 2009, an increase of 70% over the 43 million users in 2008, the firm said. In 2012, that number should exceed 190 million users” (Hamblen, 2009). It is also mentioned that mobile payment growth will be highest for the Asia Pacific region and Japan, followed by Eastern Europe, the Middle East and Africa, and then Latin America. U.S. and Western Europe will follow behind these regions (Hamblen, 2009).

Several studies have also looked at mobile payment adoption trends in various countries. According to Lee, Kou, & Hu (2005), by 2006, 50 million wireless phone users in United States were projected to use handheld devices to authorize payments (a total of 17% of the total projected population increase, and about 26% of all wireless users). Where countries like Sweden and Finland are looked on as mobile pioneers in the adoption of all mobile services (Aarnio, Enkenberg, Heikkila, & Hirvola, 2002), the adoption of mobile payment in other countries has been significant, too. For example, in Italy where 56 million of its 58 million population are mobile phone owners/users, 2 million Italians used m-payment in 2004, and 5 million - in 2005 (Dholakia, Rask, & Dholakia, 2006). Asian countries like Thailand, Vietnam and Hong Kong seem to lead the m-payment adoption rate. Banks in Thailand started offering m-banking services as early as 2000 and had approximately 6 million mobile payment subscribers by mid 2000 (Dholakia, Rask, & Dholakia, 2006). Russia has also become a centre of mobile payment applications development (Dholakia, Rask, & Dholakia, 2006). Laforet & Li (2005) investigated the status of online/mobile

banking in China. It was found that mobile banking and mobile financial services was at its very early stages. Cost, demographical factors and security were major hindrances to mobile payment adoption. Kreyer, Pousttchi, & Turowski (2007) conducted a study in Europe and found that out of a total of 16,000 respondents, two-thirds stated they would use or consider using m-payments

Almost a decade ago Dholakia & Dholakia (2002) ranked 25 select North American, European and Asian countries in order of mobile payment adoption. Hong Kong was a leader followed by Finland and Sweden. The United Kingdom ranked 14, Australia ranked 17 and USA ranked 19. (Refer to appendix 1 for more information). A more recent study on mobile payment adoption in Australia by Teo (2005) found that mobile payment adoption was still not widely accepted in Australia despite the fact that Australia was ahead of the USA at the time.

It is interesting to note that New Zealand was in the bottom three countries, followed only by Canada and then Argentina being the slowest adopter of mobile payments. It is of interest to see why mobile payment adoption in New Zealand ranks it among the bottom three. This dissertation attempts to investigate the issue. The next section discusses the adoption trends in New Zealand.

2.6 New Zealand Mobile Payment Trends

Kreyer, Pousttchi, & Turowski (2007), in their study found that the number of subscribers is directly proportional to the adoption of mobile payments technology. Figure 3 below predicts the number of mobile subscribers in New Zealand. It has been also shown that the increasing popularity of interactive marketing options e.g. using SMS also contribute to mobile payment adoption (Dholakia, Rask, & Dholakia (2006). Similar trends are observable in New Zealand; Figure 3 below shows the predicted number of mobile subscribers in New Zealand.

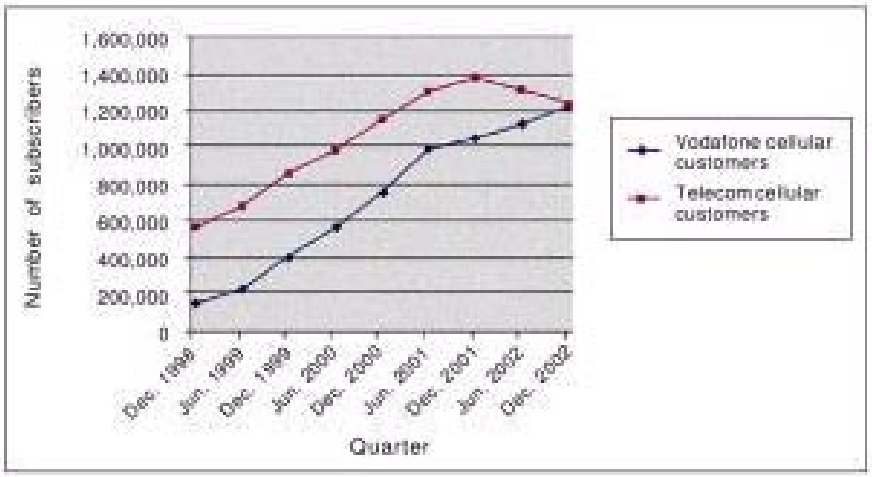


Figure 3: Mobile subscriber numbers in New Zealand (Source: Dholakia, Rask, & Dholakia, 2006)

In 2004, NZ's mobile usage rate was 75% and still predicted to go up. An approximate of 1.2 million people had access to a WAP enabled phone. Of these approximately 165,000 were WAP subscribers and approximately 10,000 of these WAP-capable subscribers. A quick analysis of these numbers in percentage suggests that as of late 2004, the estimated population for NZ was 4.07 million (Stats NZ, 2004); approximately 29% people had access to WAP enabled phone. Of these 29%, 13.75% were WAP subscribers and another 0.83% were WAP capable.

In summary an increase in the adoption of mobile payment and mobile services has been identified. Even though Dholakia, Rask, & Dholakia (2006) suggest caution in interpreting predicted numbers, these still indicate a trend toward an increase of the use of mobile devices in New Zealand.

Dholakia, Rask, & Dholakia (2006) suggest that New Zealand has the potential to succeed with expansion of next generation mobile services. For this to happen, the prices of mobile handsets and services need to decrease and quality of transmission coverage to increase.

In summary a trend towards the increase in the adoption of mobile device use has been identified, and as consequence increase in the use of mobile payment and mobile services is expected. A significant body of literature devoted to the

study of the factors affecting mobile payment systems adoption was developed, applying and extending some existing models such as the Technology Acceptance Model and the Diffusion of Innovations model

The next section reviews technology adoption frameworks and summarises the most important features of the models used in technology adoption studies including mobile payment and other mobile business services and applications, with the aim to inform the development of a research model meeting the objectives of this study

2.7 Adoption Models

This section reviews a number of models selected as explained above and discusses their relevance to the study of mobile payment adoption.

2.7.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was developed by Fishbein and Ajzen in 1975. TRA posits that the best predictor of adoption of a technology is the "intention" to adopt (Lam & Hsu, 2004). The concept of "behavioural intention" is central to TRA with two basic determinants for intention – attitude towards act or behaviour and subjective norm.

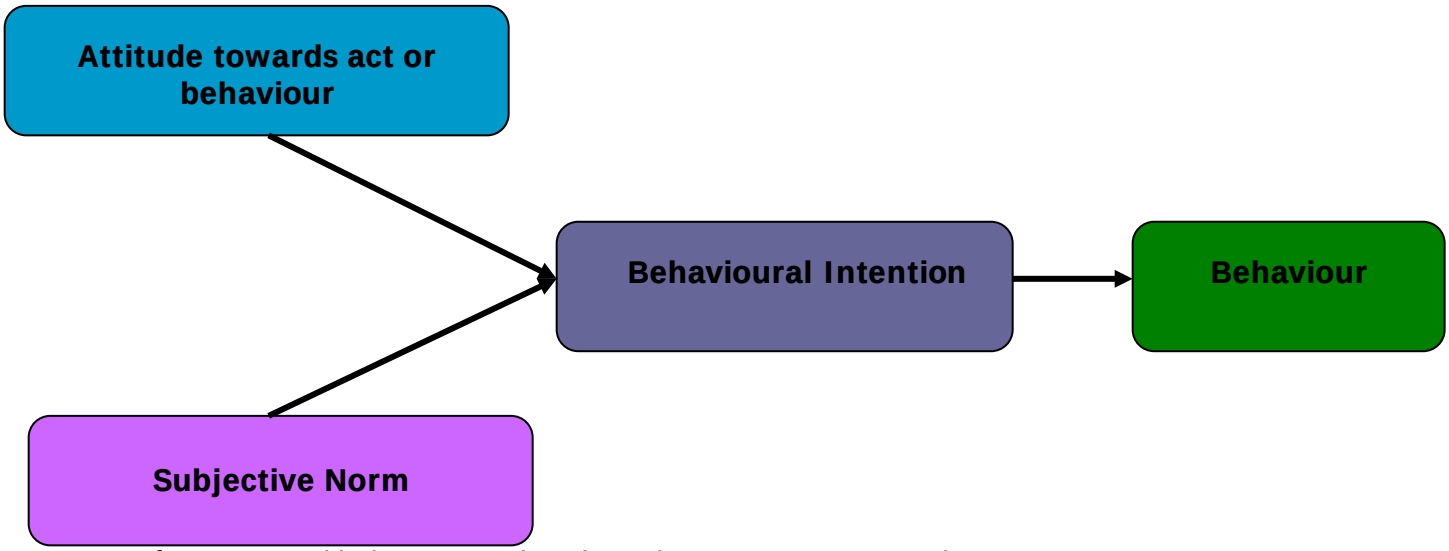


Figure 4: Graphical representation of TRA (Source: Furneaux, 2005)

Attitude as defined by Lam & Hsu (2004), is the individual's behaviour positive or negative feelings about performing an act while subjective norm is defined as individual's perception of whether people important to the individual think the behaviour should be performed or not. Subjective norm is often defined as 'individual perception x motivation' (Lam & Hsu, 2004).

From a mobile payment adoption perspective, subjective norm and attitude may be important factors in helping to study an individual's behaviour in a social atmosphere. It must be noted that TRA is concerned only with behaviours and not with the outcomes as a result of these behaviours. Therefore, the TRA model may be helpful in studying factors affecting behaviour that may lead to mobile payment adoption, it does not provide variables to study the consequence of these behaviours – i.e. whether they encourage adoption or inhibit adoption (Sheppard, Hartwick, & Warshaw, 1989).

A second limitation of TRA is the assumption that when an individual has an intention to act, they will be able to do so. This assumption does not consider limitations such as time, ability, alternate choices, demographics and technological environmental and the organizational environment. However, these factors explicitly or implicitly might play a significant role in the adoption of mobile payment services (Nysveen, Pedersen, & Thorbjørnsen, 2005).

2.7.2 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) proposed by Ajzen (1991) is an extension of TRA. TPB was proposed to take into consideration conditions under which people do not have complete control over their behaviour (Nysveen, Pedersen, & Thorbjørnsen, 2005).

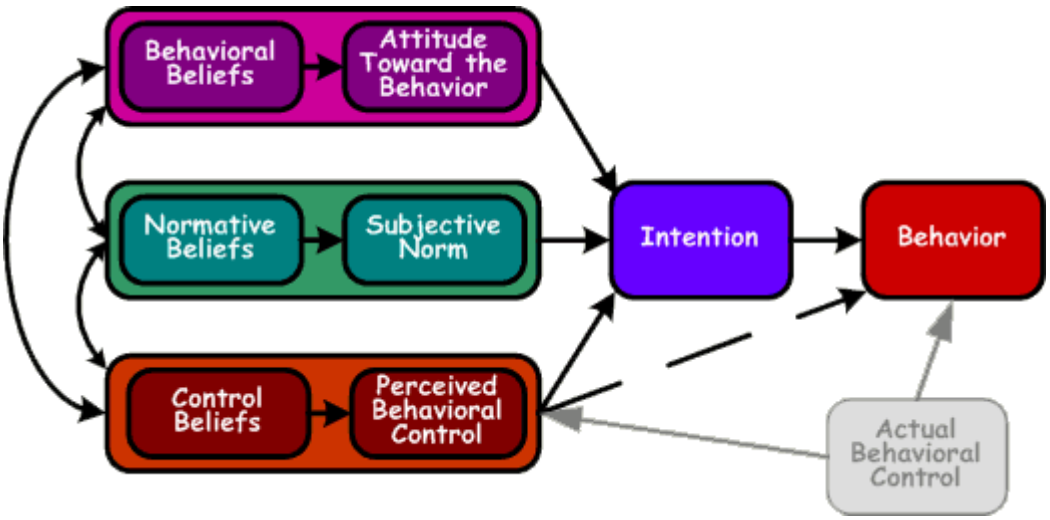


Figure 5 : Theory of Planned Behaviour (Source: Ajzen, 1991)

Figure 5 above is a diagrammatic representation of TPB. As evident from Figure 5, Azjen introduces two new variables: control beliefs and perceived behavioural control, which influence behavioural intention and ultimately the likelihood of performing the act, which could be performing the act to adopt a new technology.

Control beliefs and perceived behavioural control may be used as additional measures of determining the user adoption of mobile payment technology.
According to Nysveen, Pedersen, and Thorbjørnsen (2005) TPB can be used to investigate whether or not consumer use of mobile services depends on their available resources.

2.7.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) was proposed by Davis (1989). The model assumes that Perceived Usefulness (PU) and Perceived Ease of Use (PeU) are the main drivers of technology and determine an individual's intention to adopt a technology. The intention to use serves as mediator of the actual adoption of technology (Davis, 1989).
TAM is another adaptation of the Theory of Reasoned Action explained in section 2.7.1. To study technology adoption, TAM introduces two new concepts – external variables and actual use as shown in Figure 6.

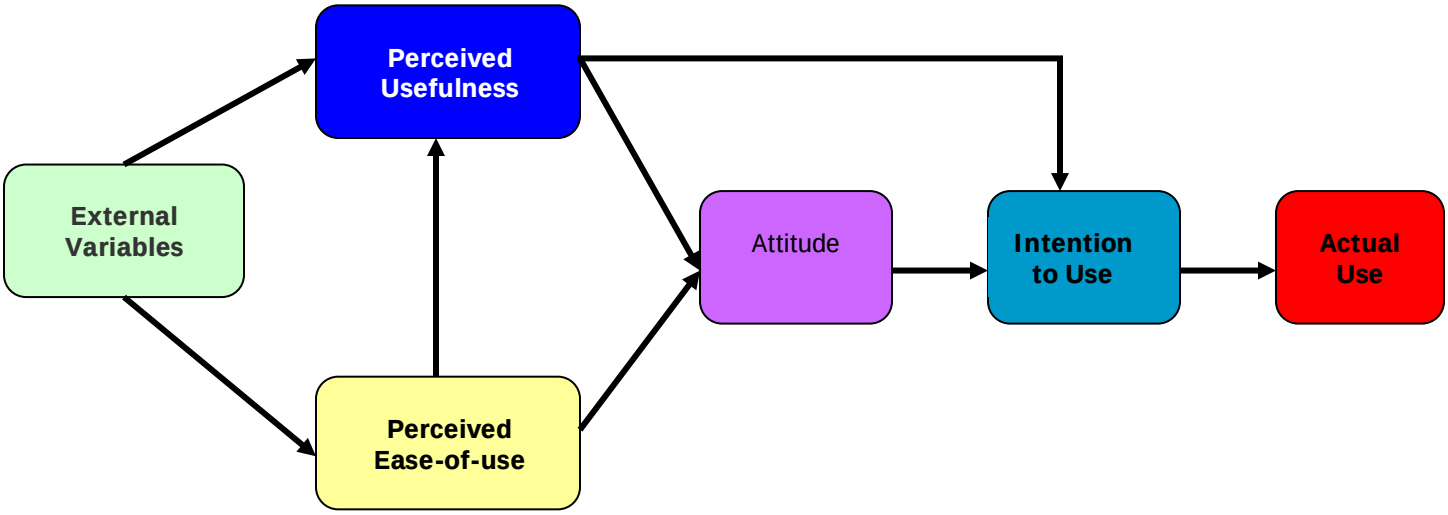


Figure 6: Technology Acceptance Model (Source: Davis, 1989)

According to TAM, the decision to adopt a technology follows the four stages, explained below (Burton-Jones & Hubona, 2005):

1. External Variables such as individual users' beliefs or differences with IT. Their evaluation is reflected in Perceived Usefulness (PU) and Perceived Ease of Use (PeU).

    1a. Perceived Usefulness is a user perception that using the new system will increase his/her performance in the organization.

    1b. Perceived Ease of Use is the extent to which using the new system will require minimal effort on a user's behalf.

Attitude: The consequence of the user's beliefs of using a technology drives the user's attitude towards accepting/rejecting the technology.

Intention: The attitude predicts the desirability of the user using the system and the extent of them using it.

Actual Use: Users' intentions determine how well they will actually use the system.

Several studies have used TAM to study m-payment adoption and its critical success factors and impediments (Cheong, Park, & Hwang, 2004; Zmijewska, 2005; Martínez-Torres et al., 2006; Dahlberg, Mallat, Ondrus, & Zmijewska, 2005).

Although popular, TAM has some limitations as a model to study customer adoption of m-payment: first it focuses on organizational acceptance of technology, and second it does not consider the social and economic factors that may help or inhibit the adoption of mobile payments (Baron, Patterson, & Harris, 2006).

2.7.4 Diffusion of Innovations

The Diffusion of Innovations (DOI) or Innovation Diffusion Theory (IDT) was proposed by Everett Rogers. Rogers (1995) classifies 'technology adopters as:

- Innovators
- Early Adopters
- Early Majority
- Late Majority
- Laggards

According to Rogers adopters' willingness and ability to adopt a technological innovation depends on the factors as illustrated in Figure 7.

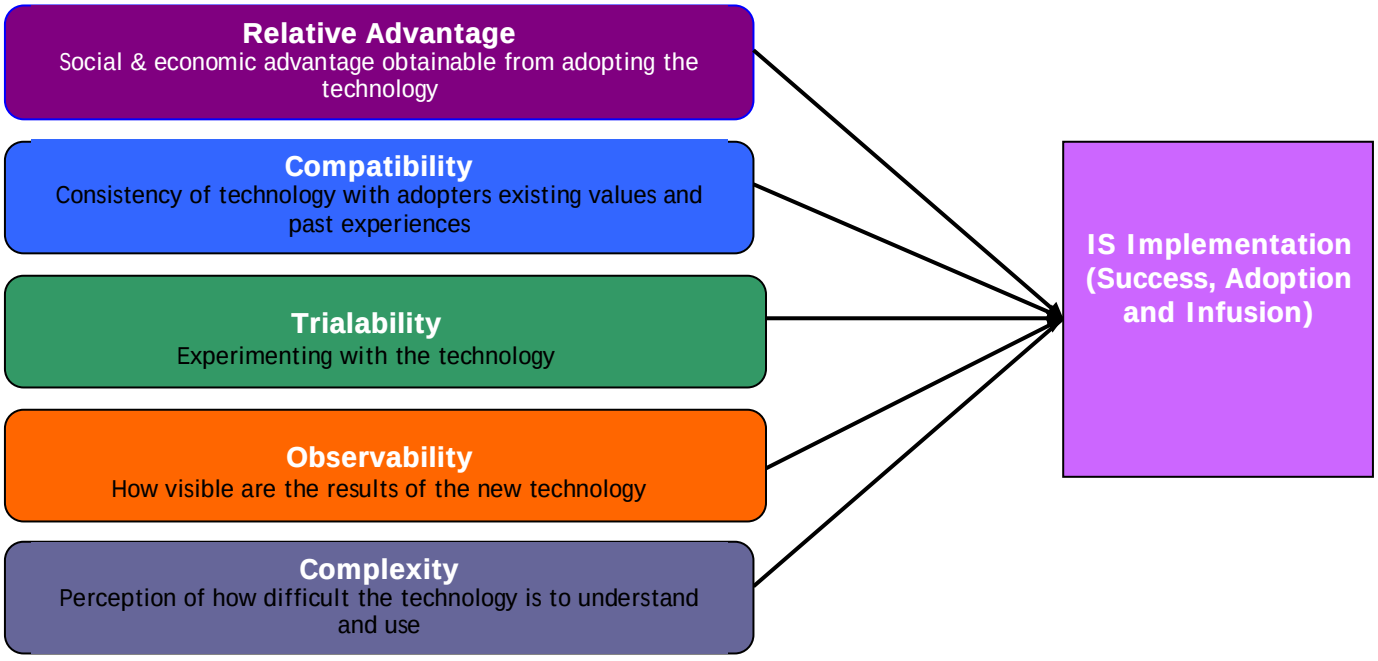


Figure 7 : Diffusion of Innovations (Source: Rogers, 1995)

In Figure 7, relative advantage, compatibility, trialability and observability are directly and; positively related to technology adoption i.e. mobile payment adoption whereas complexity is inversely related to mobile payment adoption.

Some of the prior studies on m-payment adoption found that the adoption of mobile payments was determined by both socio-human and technological factors (Mallat, 2007; Scharla, Dickingerb, & Murphy, 2005; Yang, 2005). As DOI assumes that successful integration/diffusion of a technology is determined predominantly by technology characteristics it may not represent a complete framework suitable to study mobile payment including the socio-human context.

2.7.5 Rational Expectations Hypothesis and Adaptive Learning (REH/AL)

All the models above – TRA, TPB, TAM and DOI assume that potential technology adopters and users have achieved a certain level of beliefs/expectations regarding the technology and study what, how and why these beliefs encourage or inhibit the adoption of technology, for example - mobile payments. However, the models do not focus on how potential adopters can reach this starting frame of mind.

The Rational Expectations Hypothesis and Adaptive learning (REH/AL) model proposed by Muth in 1961 addresses the issue since it combines the social and technological perspectives/beliefs with knowledge and learning to predict technology adoption.

According to Au & Kauffman (2005), to obtain a rational perspective about the technology the decision maker/potential technology adopter goes through an iterative cycle of learning, often referred to as “adaptive learning”. REH/AL focuses on adaptive learning as an iterative process, before technology adopters decide to adopt or not adopt a technology.

REH/AL assumes that people use all the information available to them efficiently. Therefore, it presents a scenario of technology integration in an ideal world and under fixed constraints as rational, adaptive and individualistic view.

From a mobile payment adoption perspective REH/AL may help understand 'rational behaviour and adaptive learning' for mobile payment users; however it does not address the issue as to which technological and socio-human factors might influence the rational behaviour and adaptive learning which in turn affects adoption.

2.7.6 Input Process Output Model

Sarker & Wells (2003) proposed the Input Process Output (IPO) model. This model specifically focuses on mobile device and mobile technologies and their use and adoption by individuals.

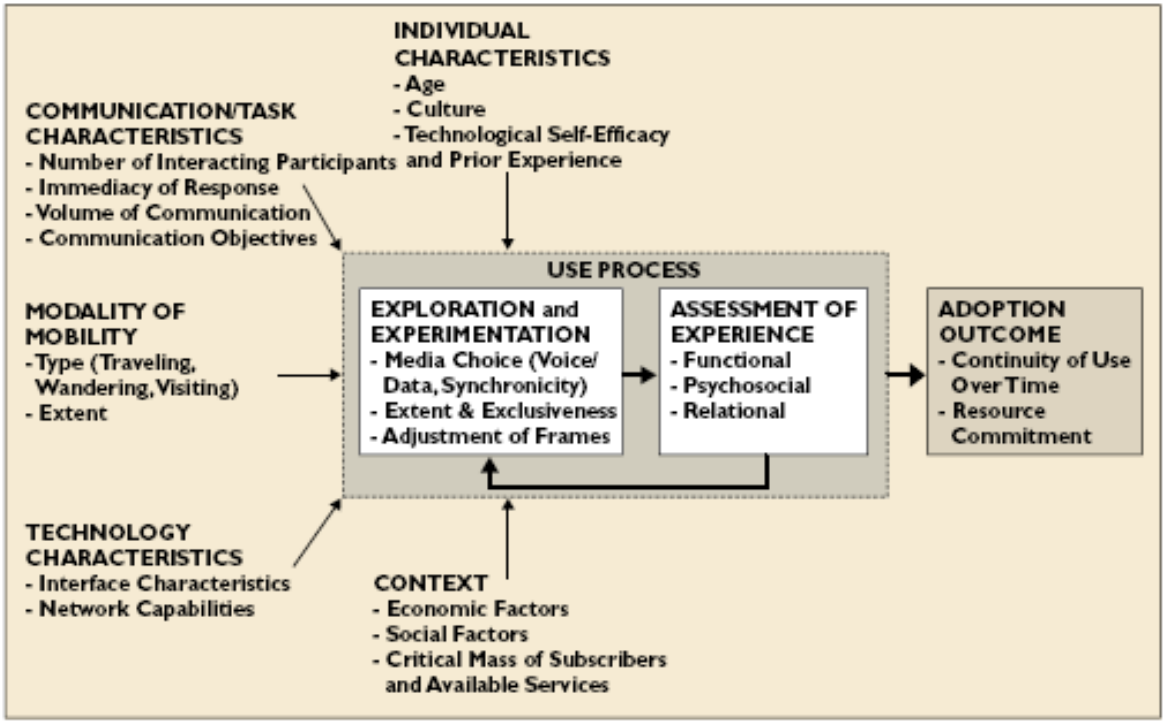


Figure 8 : Input Process Output Model (Source: Sarker & Wells, 2003)

The three key concepts of IPO are input, use process and output, as explained next below, and depicted in Figure 8.

Input: Input refers to factors influencing use, including individual characteristics, communication/task characteristics, and modality of mobility, technology characteristics, and context.

Use Process: The use process in the IPO model comprises two separate processes - exploration and experimentation, and assessment of experience.

Exploration and experimentation involves:

- *Choice of appropriate medium of communication and the level of synchronicity*, which refers to the communication medium used using the mobile device and the synchronicity of the chosen medium i.e. "the degree of delay involved in a bidirectional information exchange" (Sarker & Wells, 2003).
- *Choice of extent, mode, and exclusiveness of use,* which studies frequency and volume of communication with the wireless device, the extent to which the device is utilized and the role of the participant in mobile payment adoption.
- *Adjustment of cognitive frame regarding technology*, which helps understand the human behaviour of exploring and experimenting with new technologies/devices and adaptive learning in order to improvise limitations of the technology.

Assessment of experience focuses on studying how the mobile device is used. The user experience is evaluated in three dimensions - functional, psychosocial and relational.

Output: Output refers to the adoption outcome and is measured by the continuity of use over time, and by the degree of resource commitment. A positive experience with the use process, reflects favourable assessment, and may lead to an adoption outcome (Constantiou, Damsgaard, & Knutsen, 2007).

The IPO model proves useful in studying the technological adoption from a technical perspective. It also explains the role of external, social and demographic factors in technology adoption.

2.7.7 Model Extensions

As most of the models described above may have some deficiencies as well as advantages, attempts have been made to extend them or combine some of the variables in order to create a more useful and relevant model. Examples include:

Venkatesh & Davis (2000): The authors proposed an extension to TAM called TAM2, which included two new factors: i) Social influence processes comprising; subjective norm, voluntarism, and image; and ii) Cognitive instrumental processes comprising job relevance, output quality, result demonstrability and perceived ease of use.

Pedersen, Nysveen, & Thorbjørnsen (2002): The authors proposed to study mobile adoption by extending the TPB model to include motivational, attitudinal, and social factors, and the resource related influence on users' intention to adopt mobile services.

Wua & Wang (2005): The authors further extended TAM2 by integrating it with DOI and adding two other variables – cost and perceived risk.

Renaud & Biljon (2008): The authors introduced the MOPTAM model (mobile phone technology acceptance model) drawn on TAM. The model is based on the assumptions that acceptance is influenced by two groups of factors: i) Mediating factors such as demographic, socio-economic and personal characteristics, and ii) Determining factors such as social influence, perceived usefulness, perceived ease of use. The already discussed IPO model of Sarker and Wells (2003) is similar to MOPTAM in that it includes mediating factors

(context, technology characteristics, modality of mobility, communication/task characteristics) determining factors (individual characteristics as shown in Figure 9 in Chapter 4).

2.8 Chapter Summary

This chapter defines and explains mobile payments. A simplified mobile payment framework is used to discuss the illustrative example provided - a working implementation of a mobile payment system called “Txt-A-Park”, provided by the Auckland City Council. The chapter also evaluates these adoption frameworks and proposes a study model for this dissertation.

Chapter 3: Modelling Mobile Payment Adoption

3.1 Introduction to Chapter

This chapter discusses the research approach adopted in this study, and identifies success factors and impediments to mobile payment adoption which are later used when formulating the research questions. An evaluation matrix is used to compare the adoption models discussed in the previous chapter with respect to their treatment of success factors and impediments. The results of the evaluation are analysed and used to propose a research model for this study.

3.2 Critical Success Factors (CSFs) for Mobile Payment Adoption

This section summarizes the critical success factors for mobile payment.

From the paper by Teo (2005), critical success factors for mobile payment systems adoption by users can be divided into four categories as summarized in column 1 of Table 1.

The details under each impediment have been adapted from the literature by Thanh (2000); Tsalgatidou and Veijalainen (2000); Wrona, Schuba et al. (2001); Kreyer, Pousttchi et al. (2002); Varshney (2002), Teo (2005) and Gebauer & Shaw (2004).

CSFs	Details
Customer Proposition	• Convenient User Experience – perceived ease of use and usefulness • Wide Acceptance and Mass Market Penetration • Customer habituation • Technical and perceived security • Trust in the payment mechanism • Functionality offered by the services
Business Priorities	• Service Proposition offers value to all stakeholders

	• Inter-scalability of business processes/ solutions of various players • Network Externalities and Government Policies
Technical	• Usability of existing standards and solutions • Ease of Information Access and communication • Network connectivity • Standardized payment procedures • Technological solutions inter –operable between major stakeholders – financial service providers, mobile service providers, technology providers • End-to-end security and authentication • System performance and support
Implementation Issues	• Cost of implementing m-payment systems • Time-to-market the solutions

Table 1: Mobile Payment Critical Success Factors. Based on Thanh (2000); Tsalgatidou and Veijalainen (2000); Wrona, Schuba et al. (2001); Kreyer, Pousttchi et al. (2002); Varshney (2002) and Teo (2005)).

3.3 Impediments to Mobile Payment Adoption

Varshney (2002) and Teo (2005) identify several major issues which may become impediments to the spread and adoption of mobile payment systems (shown in column 1 of Table 3). Each of the identified impediments may comprise a number of dimensions as shown in the second column of the table and also based on Thanh (2000); Tsalgatidou and Veijalainen (2000); Wrona, Schuba et al. (2001); Kreyer, Pousttchi et al. (2002).

Impediments	Details
Technological	• Security issues • Usability issues around the mobile device e.g. familiarity with device and portability

Financial	• Cost to users, including upgrades to device in order to support new m-payment features • Mobile payment transactional costs and surcharges • Division of revenue among various stakeholders – banks, mobile service providers and mobile operators
Demographical Structure	• Customer groups and habits – age, sex, culture, technological self-efficacy. • Significance of user's situation

Table 2: Impediments to Mobile Payment Adoption - Adapted from Thanh (2000); Tsalgatidou and Veijalainen (2000); Wrona, Schuba et al. (2001); Kreyer, Pousttchi et al. (2002); Varshney (2002) and Teo (2005)

3.4 Evaluating Adoption Models

The factors enhancing or impeding mobile payment adoption may be studied further in a specific context by incorporating them into an adoption model, based on one or more of the models reviewed in the previous chapter. In order to compare the models in terms of their applicability to this study, a model evaluation matrix was developed (Table 3) and used.

CSF's and Impediments	Adoption Models					
	TRA	TPB	TAM	DOI	REH/AL	IPO
CSF 1 - Customer Proposition	0.5	0.5	1	0	0.5	1
CSF 2 - Business Priorities	0.5	0.5	1	0.5	0	1
CSF 3 – Technical	0	0.5	1	0.5	0	1
CSF 4 - Implementation Issues	0.5	0.5	1	0	0.5	1
Impediment 1 – Technological	0	0.5	1	1	0.5	1
Impediment 2 – Financial	0	0.5	1	0.5	0.5	1
Impediment 3 – Demographical Structure	1	1	1	0	0	1

POINTS	**2.5**	**4**	**7**	**2.5**	**2**	**7**

Table 3: Evaluation matrix for various technology adoption models

Each of the adoption models discussed in Chapter 2 is evaluated with respect to the CSFs and Impediments summarised in sections 3.2 and 3.3, as explained below:

- A score of 0.5 is given where the model variables imply the specific CSF or impediment.
- A score of 1 is given where the model explicitly includes the specific CSF or impediment.
- A score of 0 is given when the model does not include the specific CSF or impediment.

The total scores are shown in the last row of the table, with IPO and TAM being the top two models, and REH/AL scoring the last. The evaluation results are discussed below.

TRA: The concept of "intention" is central to TRA. As seen in the matrix above customer proposition (e.g. user experience, perceived ease of use), business, priorities, implementation issues, and demographic factors (as in 'subjective norms' which encompass age, gender, and others) are all studied, however the model does not include CSFs like "Technical" and impediments like "Technological" and "Financial".

TPB: TPB is an extension of TRA and takes into account limitations of TRA that might affect the behavioural intention to adopt a technology. To this extent TPB induces a new factor PBC (Perceived behavioural control) which allows prediction of behaviours not under control such as CSFs like "Technical" and impediments like "Technological" and "Financial".

TAM: TAM is valuated as a comprehensive model, which includes all CSFs and impediments. TAM posits that external variables like usefulness, security and

trust influence users' beliefs about using a technology which in turn influence the intention to use, and the actual use of technology.

DOI: DOI focuses on the relative advantage of technology and the "Technological" impediment which comprises issues like usability and interoperability (complexity and compatibility). DOI does not take into account the social aspects and human behaviour that may inhibit or facilitate the adoption of a technology (i.e. the "Demographic" impediment or the "Customer Proposition" CSF). DOI is more applicable to technology adoption from a broader scale i.e. organizational or economic rather than at an individual level.

REH/AL: REH/AL as an adoption theory focuses on rational expectations and adaptive learning. It studies decision making to adopt or not adopt a technology from a rational perspective (e.g. security, trust, usability and cost) rather than focusing on social and human factors as "Customer Proposition" or "Demographics", for example.

IPO: IPO is a contemporary model specifically focusing on mobile device use and adoption by individuals. It uses concepts from theories like TAM and DOI. The model is particularly useful because it provides an integrated view of the key issues affecting mobile payment adoption looking at all CSFs and Impediments in the evaluation matrix. These input variables, together with user demographics and use process provide input to the assessment of the technology by the user, which affects the user's decision on whether or not to adopt the technology.

3.5 Proposing a Study Model

The evaluation matrix was used to develop the research model for this study, by choosing appropriate existing models as a foundation. This section provides a background explaining the choice of model for study by comparing IPO and TAM first.

TAM studies technology adoption from an organizational perspective. As shown in Figure 2 (Chapter 2), TAM posits that perceived usefulness and perceived ease of use are the two key variables that drive consumer intention to adopt or disregard a technology. The model does not consider technology adoption from an everyday life context. However, studying technology adoption from an individual's perspective is important with respect to mobile payments because users are charged and pay for the service (Nysveen, Pedersen, & Thorbjørnsen, 2005).

In contrast IPO brings to light a range of factors pertinent to the adoption of a mobile device technology from an end-user perspective; however IPO does not explicitly study perceived usefulness (PU) and perceived ease of use (PeU), which has been shown as important factors affecting mobile payment adoption.

With regards to the use process, TAM focuses on behavioural intention to use while IPO looks at both the exploration and experimentation of technology (behavioural intention to use) and then the assessment of this by the user which will consequently determine the adoption. TAM revolves around "intention to use" as a factor determining adoption of technology. On the other hand, IPO adopts a more pragmatic approach of studying the actual use process in order to determine the degree of integration of a technology in the user's day-to-day life.

Both TAM and IPO allow including all CFS and impediments discussed earlier however the discussion above shows that there are differences between the two. The study model is therefore proposed to include features of both TAM and IPO, in order to use the tested TAM constructs such as PU an PeU and at the same time strengthen the focus on factors related to the individual (IPO). The resulting hybrid model is discussed in detail in chapter 4 of this dissertation.

3.6 Chapter Summary

This chapter discussed success factors and impediments for mobile payment adoption and evaluates the previously identified adoption models with respect to these factors. The discussion is used to inform the design of the study model, presented in the next section.

Chapter 4: Research Methodology

4.1 Introduction to Chapter

This chapter formulates the research questions and provides details about the research model and how it is used in the study, including the research instrument (a survey questionnaire).

4.2 Research Objective and Questions

The objective of this study is to identify factors which encourage or hinder the adoption and use of mobile payments; it is assumed, based in previous findings that both service and the technology characteristics influence the adoption of mobile payment, and that the adoption process is also dependent on the characteristics of the individual user. Thus the study attempts to answer the following specific questions (Figure 10):

4. RQ1: What is the role of service oriented features such as mobility support in mobile payment adoption?
5. RQ2: What is the role of technology features such as transaction security and device interface in mobile payment adoption?
6. RQ3: What is the role of demographic factors such as profession and economic status in mobile payment adoption?

4.3 Research Approach

There are two main approaches to research – positivistic paradigm and a phenomenological paradigm. The positivistic paradigm is often referred to as 'quantitative' and the phenomenological as 'qualitative'. (Hussey & Hussey, 1997)

The positivistic paradigm deals with specific and précised data and often used for hypothesis testing; generalizing from a sample to a population. On the other hand, phenomenological paradigm deals with subjective data, developing theories.

This study focuses on user perceptions and behaviours as antecedents of attitude and subsequent mobile payment adoption. It involves a mix of positivistic and phenomenological paradigm to explore the research objectives and findings (Hussey & Hussey, 1997).

From a phenomenological paradigm the study proposes a hybrid IPO and TAM technology adoption model. From a positivistic paradigm, the study postulates mobile payment adoption hypothesis; explains the relationships among constructs and variables in a theoretical model and then uses quantitative analysis on survey data for testing.

4.4 Research Model

Based on the literature review and the evaluation of IS/IT adoption frameworks, the study adopted a research framework derived from two models – TAM and IPO. A number of variables, as shown in Figure 9, may influence directly or indirectly the adoption of mobile payments:

1. Individual characteristics (IPO)
2. Communication and task characteristics (IPO)
3. Modality of mobility (IPO)
4. Technology characteristics (IPO)
5. Context (IPO)
6. PeU – Perceived Ease of Use (TAM)
7. PU – Perceived Usefulness (TAM)

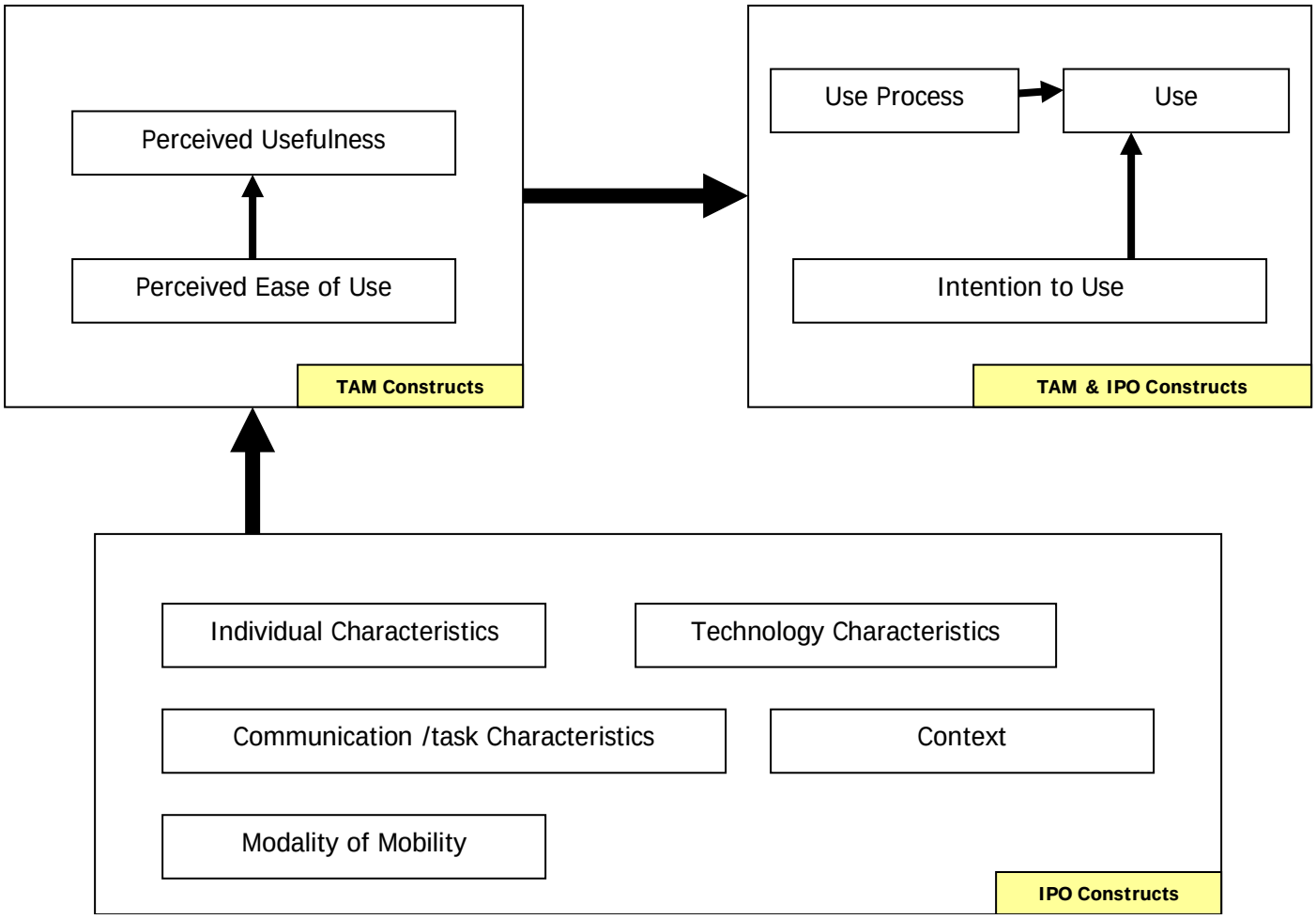


Figure 9 : A Hybrid IPO and TAM Model

It is hypothesised that IPO factors play a role in forming the perceptions of the customers (users or non-users of mobile payment), which in turn will strongly influence the intention to use the mobile payment service, and the actual use and future use of mobile payment. While prior research has validated the hypotheses about perceived usefulness and perceived ease of use influencing intention to use and actual use, this study focuses on exploring and testing empirically the relationships between the IPO factors and perceived usefulness and ease of use.

In order to address the research questions through an empirical investigation based on the research framework in Figure 9, the constructs derived from the hybrid TAM-IPO model defined as shown in Figure 10 will be used.

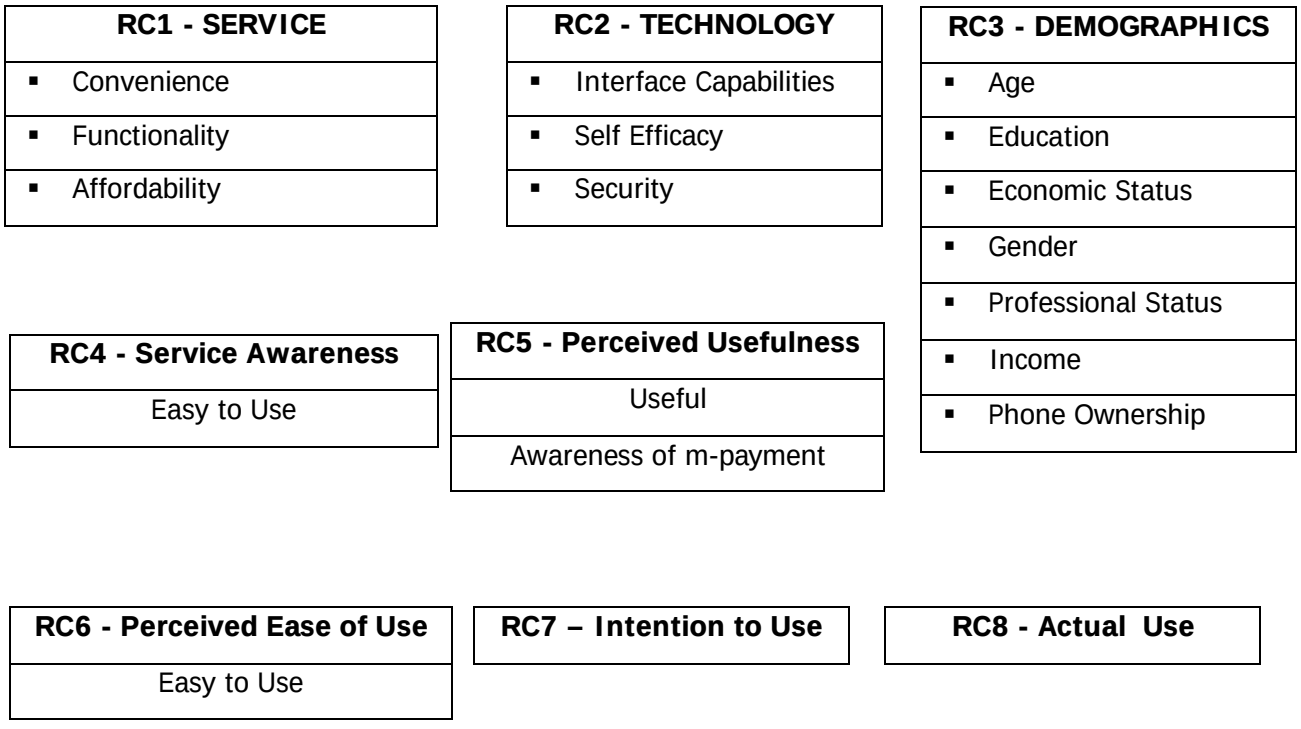


Figure 10: Research Constructs (RC1 – RC8)

Referencing the research constructs with respect to the hybrid research model, the research construct Service (RC1) relates to the Communication and Task Characteristics in the hybrid model. The construct Technology (RC2) relates to the Technology Characteristics. The construct Demographics (RC3) is derived from the Individual Characteristics in the hybrid model. The construct Service Awareness (RC4) is derived from Context. The constructs Perceived Usefulness (RC5) and Perceived Ease of Use (RC6) are TAM constructs. Intention to Use (RC7) and Actual Use (RC8) are found in both TAM and IPO.

In Figure 10,"service" and "service awareness" construct relate to RQ1. The "technology" construct relates to RQ2 and "demographics" refers to RQ3. Together with the perceived ease of use, perceived usefulness, use process and actual use, these constructs may impact adoption. The emerging conceptual model is shown in Figure 11.

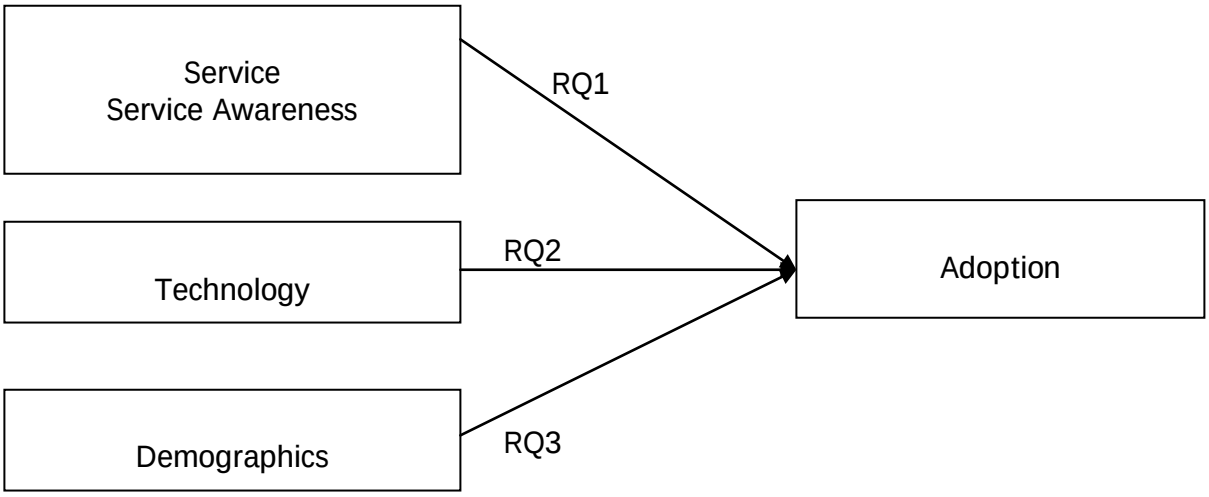


Figure 11: Conceptual Research Model

The empirical study explores a number of relationships between the constructs defined above and also perceived usefulness (PU), perceived ease of use (PeU), use, and intention to use. Conclusions about the significance of the constructs

in the adoption process can be made after testing the relationships defined in Figure 12. Relationships 1-7 refer to research questions Q1 and Q2. To address Q3 each relationship is tested also across the demographical construct (a moderating construct). Figure 12 represents the research model used in this study.

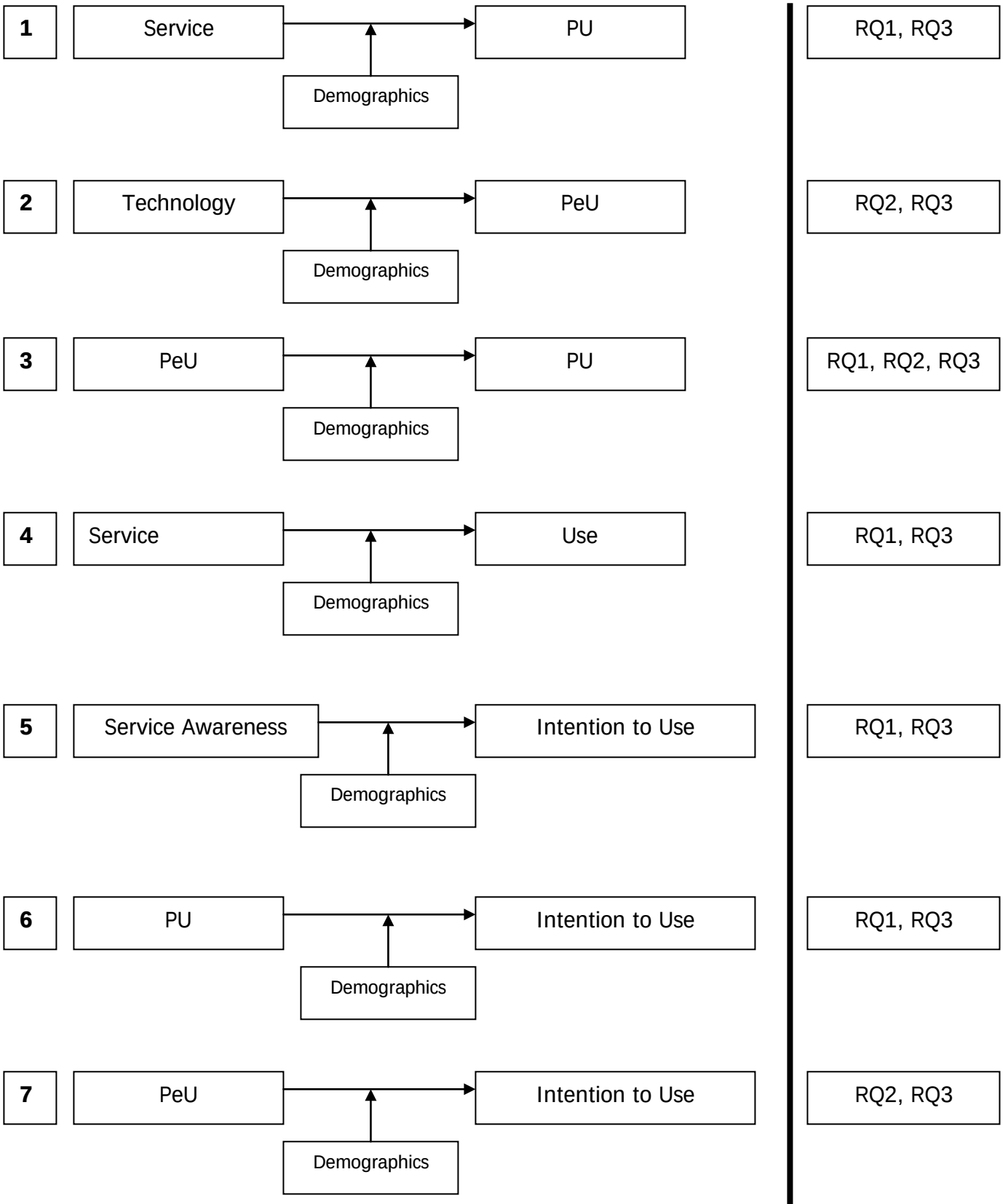


Figure 12: The Research Model

4.5 Research Instrument

A survey questionnaire with 38 questions was used as the research instrument designed to address the research questions formulated earlier (Figure 13). It consists of two parts. Questions 1-11 cover demographic information, while questions 12-38 capture the respondent's perceptions of mobile payment and its adoption

The demographic variables included employment status, occupational category, gender, age, and level of education, income level, relationship status and other demographic characteristics. The second section focuses on questions specific to mobile payment such as mobile phone usage and spending, technological friendliness, awareness of mobile payment services currently offered, and others – use versus usage of these services . (Please refer to appendix 2 for details of the questions included in the questionnaire.)

A section of the questionnaire focussed specifically on seeking respondent feedback to CSFs and impediments to mobile payments such as convenience, service quality, technology, security – as discussed in detail in chapter 3. Data for these were collected using a five point Likert-type scale, where "1 represented strongly disagree" and 5 represented "strongly agree".

Figure 13 shows the constructs, and the variables used in the empirical study. Each variable is also linked to the relevant questions in the survey questionnaire.

Construct	Variables	Questionnaire
Service – RQ1	Convenience(CON)	Q34
SER – RQ1		Q36/4
	Functionality(FUN)	Q36/2
	Affordability(AFF)	Q37/6
		Q37/7
Service Awareness		
SA – RQ1	Service Awareness(SA)	Q30
		Q25

Construct	Variables	Questionnaire
		Q23
Technology	Interface(INT)	Q37/9
TEC – RQ2		Q37/10
	Self-Efficacy(EFF)	Q20
		Q21
		Q22
		Q37/11
	Security(SEC)	Q36/3
		Q37/12
		Q37/8
Perceived Usefulness - PU		Q28
Perceived Ease of Use		Q29
PeU		Q36/1
Usage – USE		Q27
Intention to Use – IU		Q35
Demographics – DEM	Age(AGE)	Q11
RQ3		
	Phone Owner (PHO)	Q12
		Q13
		Q14
		Q16 – Q 19
	Experience(EXP)	Q24
		Q26
	Education (EDU)	Q3
	Professional Status(PRO)	Q1, Q7
	Economic Status (ECO)	Q10
	Social Status (SOC)	Q2, Q5, Q6
	Gender(GEN)	Q4

Figure 13 : Research Constructs, Variables and Questionnaires

4.5 Data Gathering

Once the initial questionnaire was generated, a pilot data collection was conducted to refine the questionnaire. Peers of the researcher, and academics form the researcher's school participated in the pilot study. The pilot enabled gauging the clarity of the questions, assess whether the instrument was capturing information as intended, and verify that important aspects had not been omitted. The feedback was used to correct, refine and enhance the questionnaire.

For example, a lot of the pilot respondents found the questions in the pilot questionnaire "If a simple and easy payment method was available with the transaction directly charged on your mobile carrier bill, would you use this service?" confusing and hard to understand. Subsequently in the final survey this was replaced by the following question: "If you could use your mobile phone to pay for a purchase or a service, with the transaction directly charged on your mobile phone bill or card, would you use this service?"

Another improvement was to put a simple scenario in front of the question which gave the respondents a clear understanding of the focus of the question.

Other changes involved restructuring the questionnaire to move similar questions together, and editing questions to facilitate the data gathering. For example: Q30 in the pilot questionnaire, "Do you think a formal training session would help you use this technology?" was replaced with a multi choice question as "What service would encourage use of this technology?" with various (one-on-one formal training session, video cd and user manual, online demos).

Despite this being a yes-no-not sure, question in the pilot, quite a few of the respondents had different answers and thoughts to this question in the pilot.

These were taken into account to change this question and the choices and helped enrich the data with other useful technology encouraging services which I otherwise would not have taken into account. In summary, the pilot was a very useful technique to refine the actual questionnaire.

4.6 Chapter Summary

This chapter discusses how the study approaches the investigation of the research questions. The research model is introduced and explained. The data collection method is outlined. The next chapter presents the survey findings and analyses them in detail.

Chapter 5: Findings and Analysis

5.1 Introduction

This chapter discusses the survey results, the data analysis procedures, and the results including the descriptive statistics of the sample. The data were analysed using SPSS©. The relationships presented in the research model in section 4.4 were tested.

5.2 Data Collection

The data was collected in Auckland, New Zealand in October -December 2007. To ensure a random sample from the population, the data was collected at the following places:

- The St Lukes Shopping Centre
- Mission Bay
- Auckland University of Technology
- Students and Lecturers in Auckland University of Technology
- Author's Workplace in Mount Eden, Auckland
- Mt Albert Park, Auckland

Is right?

The data was generally collected on weekends and late nights on Thursday and Friday. With the assistance of my husband and a couple of friends we were able to approach people and distribute questionnaires to them and get their feedback immediately. After the questionnaire was developed initially, the pilot phase took two weeks; it was followed by adjusting the questionnaire to accommodate changes, and obtaining an approval by the AUT Ethics Committee. The actual data gathering took six weeks. The data was then entered into MS Excel; the soft copy was used for analysis, with the actual questionnaires stored at AUT.

A total of 68 questionnaires were returned out of the 100 distributed during the pilot phase and 267 questionnaires were filled in during the actual data

collection. During the data collection questionnaires were handed over only to respondents who were willing to participate. However the number of people approached and asked whether they would be interested in participating was 350. 20 participants received a questionnaire but withdrew from participation. The sample details and the data analysis are presented further in this chapter. All tests were performed using the statistical package SPSS®.

5.3 Descriptive Statistics

This section summarizes the demographic characteristics of the respondents in the sample. A total of 267 questionnaires were gathered from the respondents. This sample size is considered satisfactory in social sciences research (Pinsonneault & Kraemer, 1993). Table 4 summarizes the demographic characteristics of the respondents.

Demographic Variables	Count	Percent
Gender		
Male	123	46.1
Female	143	53.6
Missing	1	0.4
Marital Status		
A Couple with children	75	28.1
A Couple without children	66	24.7
One parent with child(ren)	25	9.4
Single - No Children	101	37.8
Employment Status		
Beneficiary	8	2.89
Contractual	7	3.60
Home Maker	7	3.47
Charity Workers	2	0.61
Paid Employment (full-time)	161	56.64
Paid Employment (part-time)	23	8.42
Retired	7	2.23
Self-Employed	23	10.74
Student	23	8.85
Unemployed	6	2.55
Age		
20	1	0.4
21 – 30	101	37.8

Demographic Variables	Count	Percent
31 – 40	74	27.7
41 – 50	38	14.2
51 – 60	20	7.5
60+	10	3.7
Under 20	23	8.6
Education		
Missing	5	1.9
Certificate/Diploma Holder	53	19.9
Never attended school or only attended	1	0.4
School Leaver	51	19.1
University Postgraduate	64	24.0
University Undergraduate	93	34.8
Annual Income		
$1 - $10,000	31	11.6
$15,001 - $20,000	12	4.5
$20,001 - $30,000	16	6.0
$30,001 - $40,000	16	6.0
$40,001 - $50,000	57	21.3
$50,001 - $70,000	49	18.4
$70,000+	66	24.7
10,001 - $15,000	3	1.1
No Income	17	6.4
Occupation		
Manager	43	16.1
Professional	101	37.8
Clerical/Administrative Worker	25	9.4
Machinery Operator/Driver	5	1.9
Community/Personal Service Worker	8	3
Technician/Trades Worker	24	9
Sales Worker	13	4.9
Other	24	9
Missing	24	9
Residency Status		
Missing	3	1.12
Acquired Citizenship	37	13.86
Kiwi by birth	162	60.67
Permanent Resident	41	15.36
Student	6	2.25
Work Permit	18	6.74
Ethnicity		
Maori	32	12
Asian	41	15
NZ European	111	42
European	34	13

Demographic Variables	Count	Percent
Australian	6	2
American	2	1
MELAA	7	3
Pacific Islander	8	3
Other	24	9
Missing	2	1
Use Mobile Phone		
No	4	1.5
Yes	263	98.5
Mobile Provider		
Missing	5	1.9
Telecom	55	20.6
Vodafone	207	77.5
Pre-paid/On-Account		
Missing	4	1.5
On Account Customer	100	37.5
Pre-paid Customer	158	59.2
Both	5	1.9

Table 4 : Demographic Information of Respondents

As evident from Table 4, only four of the 267 respondents did not have a mobile phone. These respondents were excluded from the data analysis in the following sections as it was assumed that they would not have enough knowledge to answer the questions of the survey.

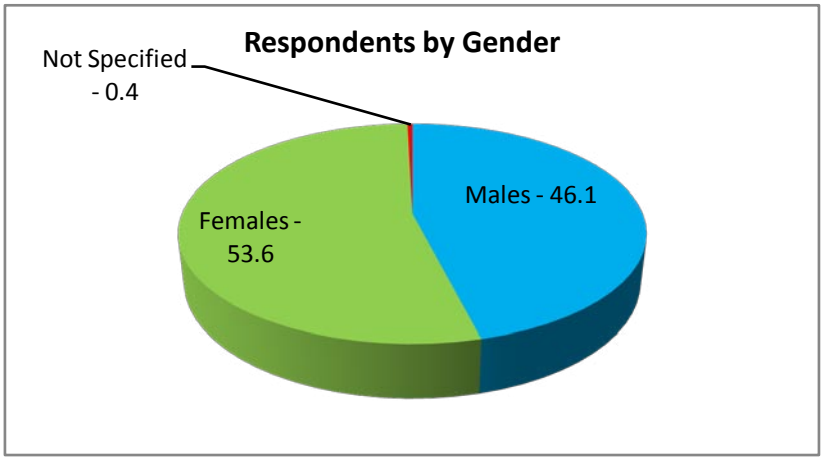


Figure 14 : Respondents by Gender

As evident from Figure 14 there were a slightly higher percentage of female respondents than male respondents, approximately 7.5% more. There was 1 respondent who did not specify their gender.

In terms of family status the largest group was was single (no children): 37.8% of the total population, followed by couples with children (28.1%), and couples with no children (24.7%). One parent with children was the least populated subgroup accounting for only 9.4% of the population. As the data was gathered around public places such as shopping malls and beaches, the low number of single parents may be attributed to the specifc lifestyle of the sinlge parent - work and care committmens and lack of time and resources. The spread among the other groups is relatively even.

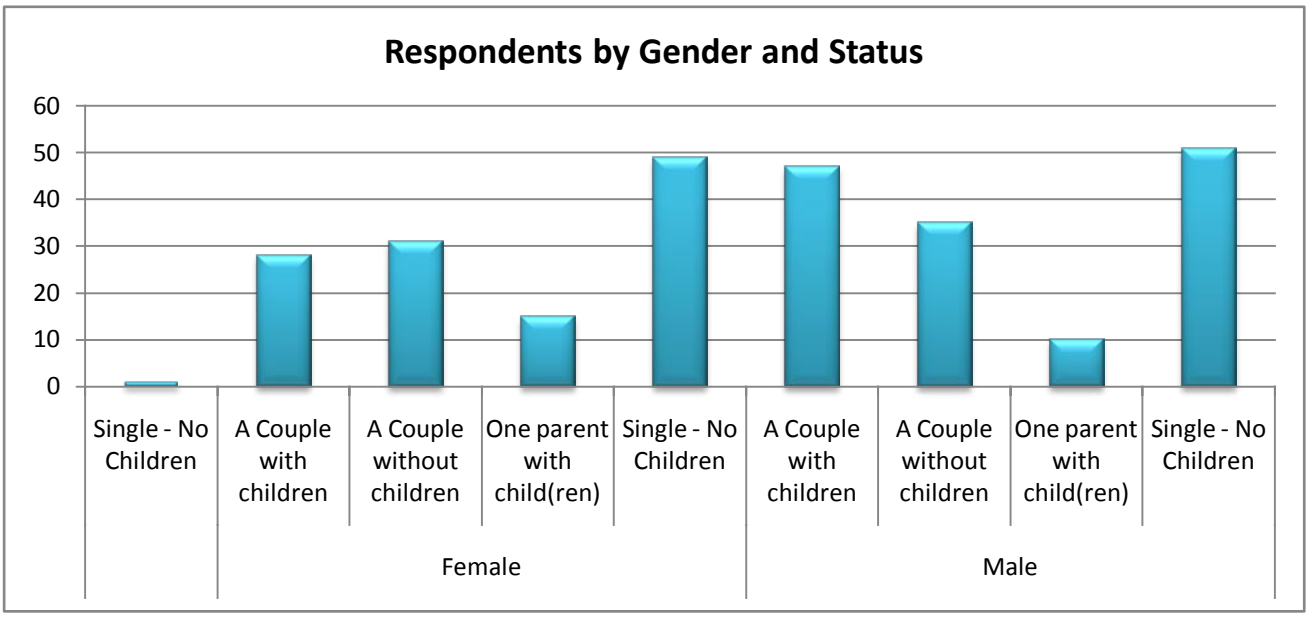


Figure 15: Respondents by Gender and Family Status

It is also evident from Figure 15 that the response rates for 'single with no children' were nearly equal between males and females. However, for couples with or without children the response rates for males was relatively higher than females, approximately 8.6% more. This may be attributed to the traditional role of females in society, where they are primarily home makers and therefore

may either be less interested in or lack the time to respond to surveys of such nature.

More than 50% of the respondents where employed full-time. The second highest group were part time employed and self employed followed by students and then retired, unemployed, and beneficiaries. Only 0.61% of the popluation were charity workers. Figure 16 illustrates the distribution.

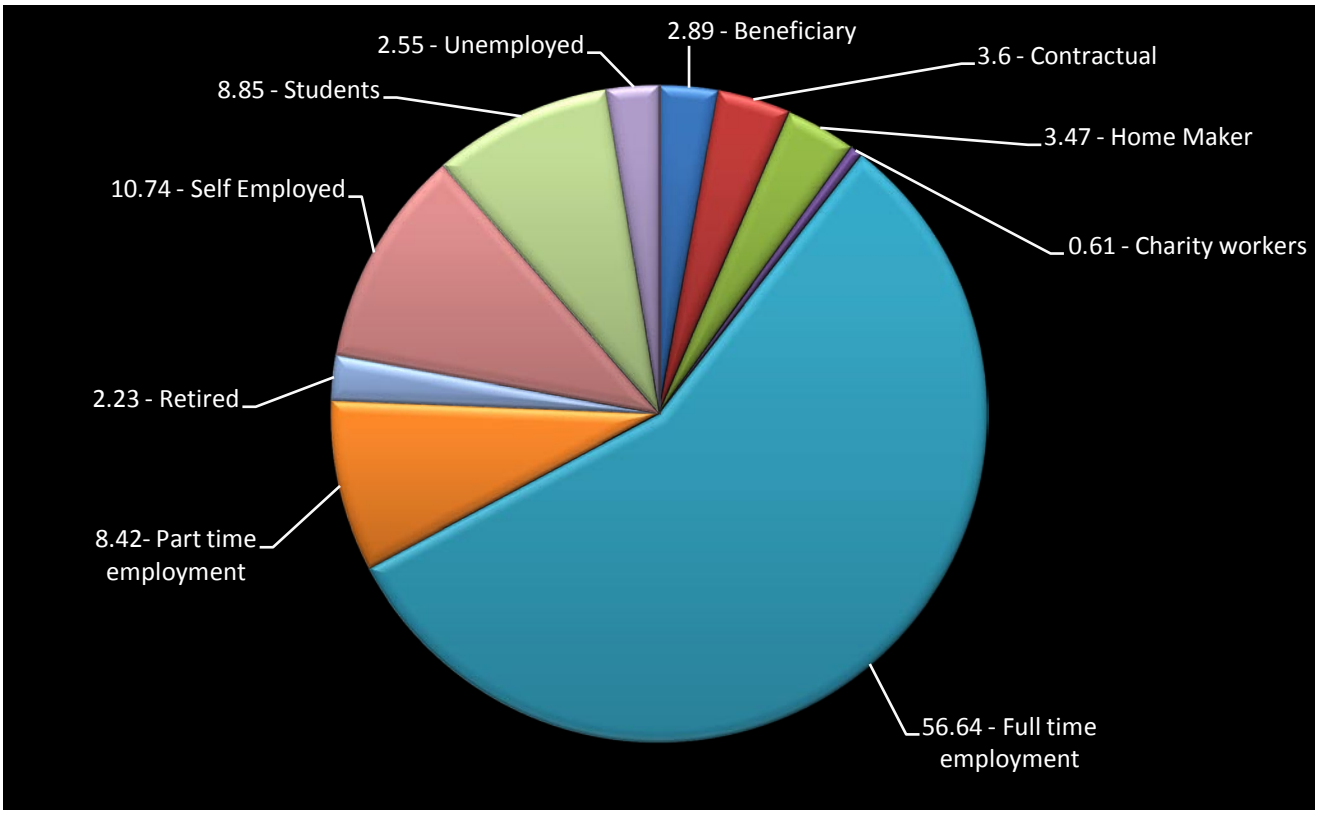


Figure 16: Respondents by Employment Status (in percent)

A similar trend was also seen in income levels where approximately 43.1% of the population earned equal to or greater than $50,000. A trend line on the graph in Figure 17 suggests that as the income bracket increased the number of respondents also increased. This could again be attributed to the fact that shopping malls, and beaches are more leisure places and therefore people with higher incomes seem to be able to afford such luxury in time and money.

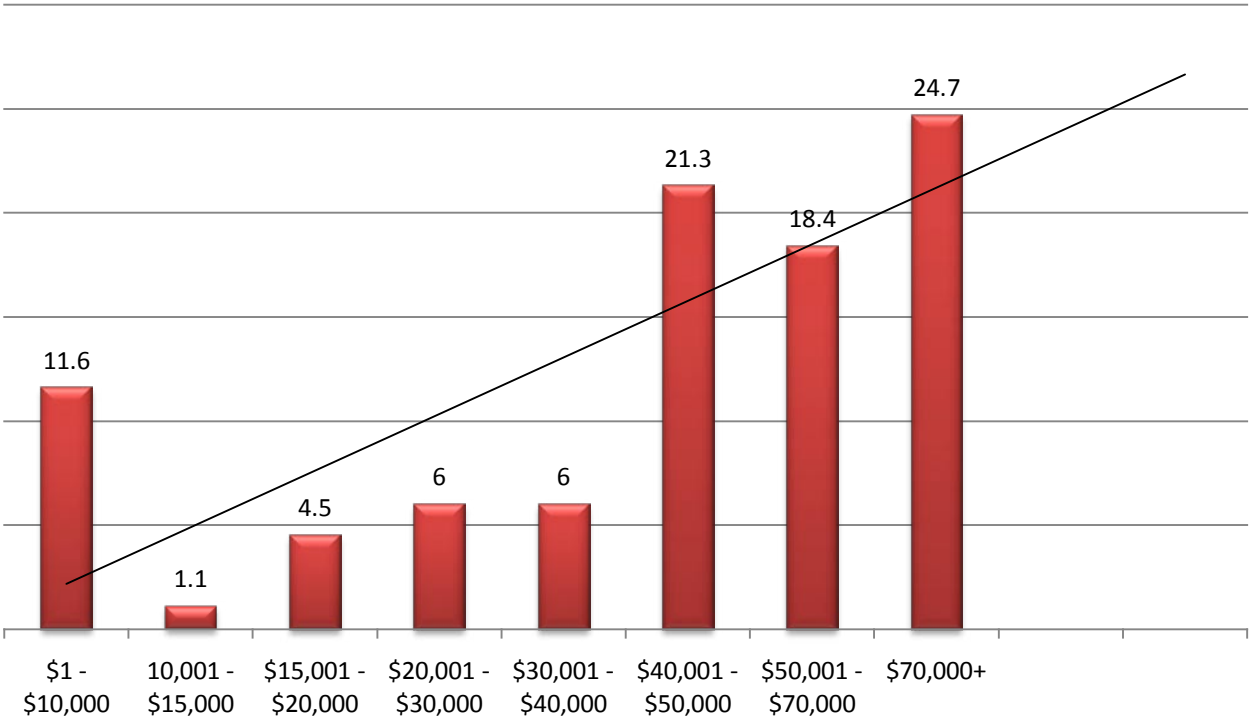


Figure 17 : Respondents by Income (in percent)

With respect to the qualification and professional status of the respondents, it can be observed that even though the number of female respondents was higher than the male respondents, the percentage of male respondents (30.34%) earning equal to or greater than $50,000 was much higher than percentage of female respondents in the same income bracket (12.73%). Interestingly, the number of female respondents between 0 - $49,999 was higher than the male respondents (Figure 18).

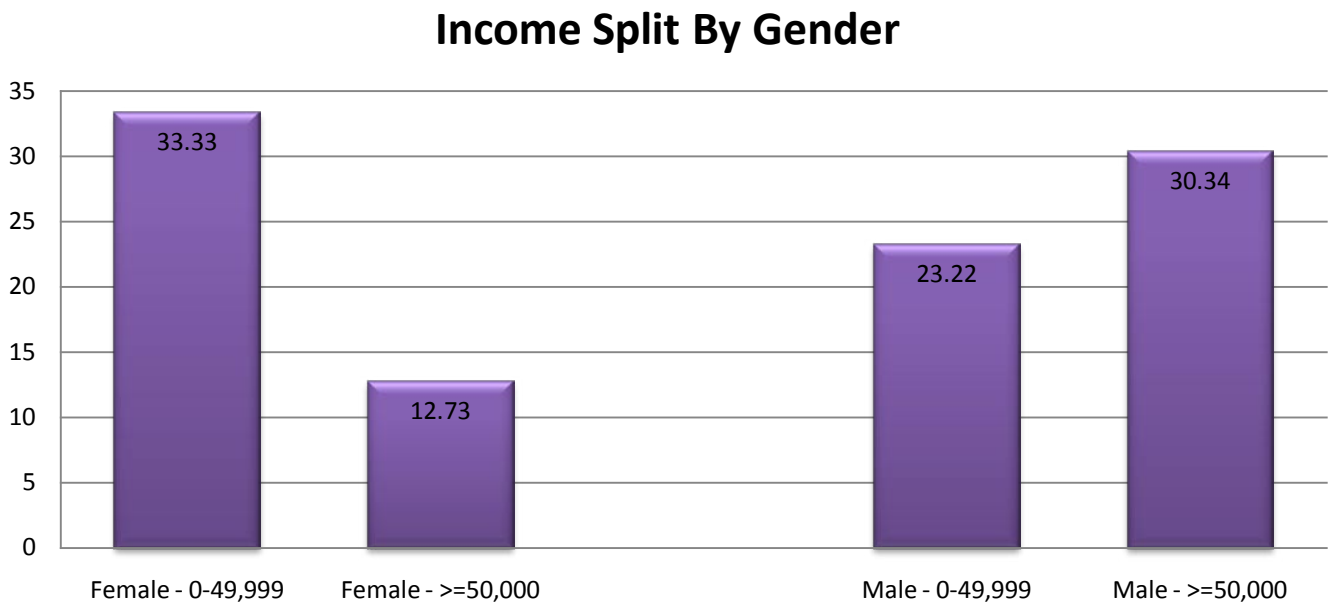


Figure 18: Income split between female and male respondents

Describing the respondents with respect to the choice of mobile operator in NZ – 79.01% of the respondents were Vodafone users. The Telecom users were only 20.99%. This could be attributed to duopoly dominating the New Zealand mobile communications market where until recently (and including 2007) consumers could only choose between Vodafone's GSM network or Telecom's CDMA technology (Li & McQueen, 2008). Figure 19 illustrates the distribution.

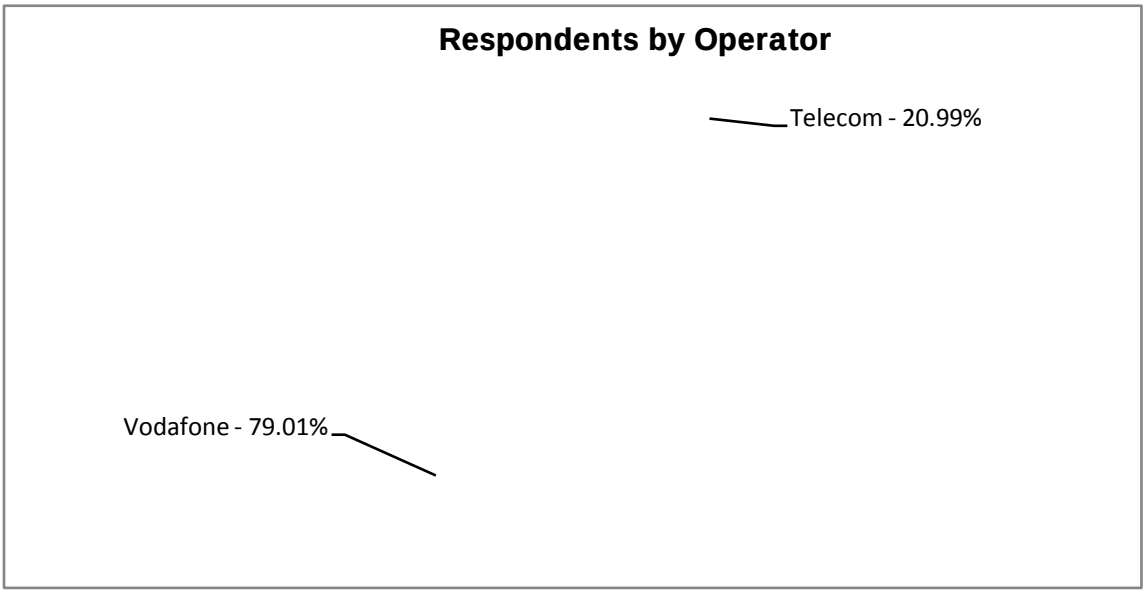


Figure 19: Respondents by Operators

The majority of respondents – 60.08% were pre-paid customers (Figure 20). This can again be attributed to lack of mobile operator competitiveness in the New Zealand market which leads to relatively expensive subscription plans and limited choice.

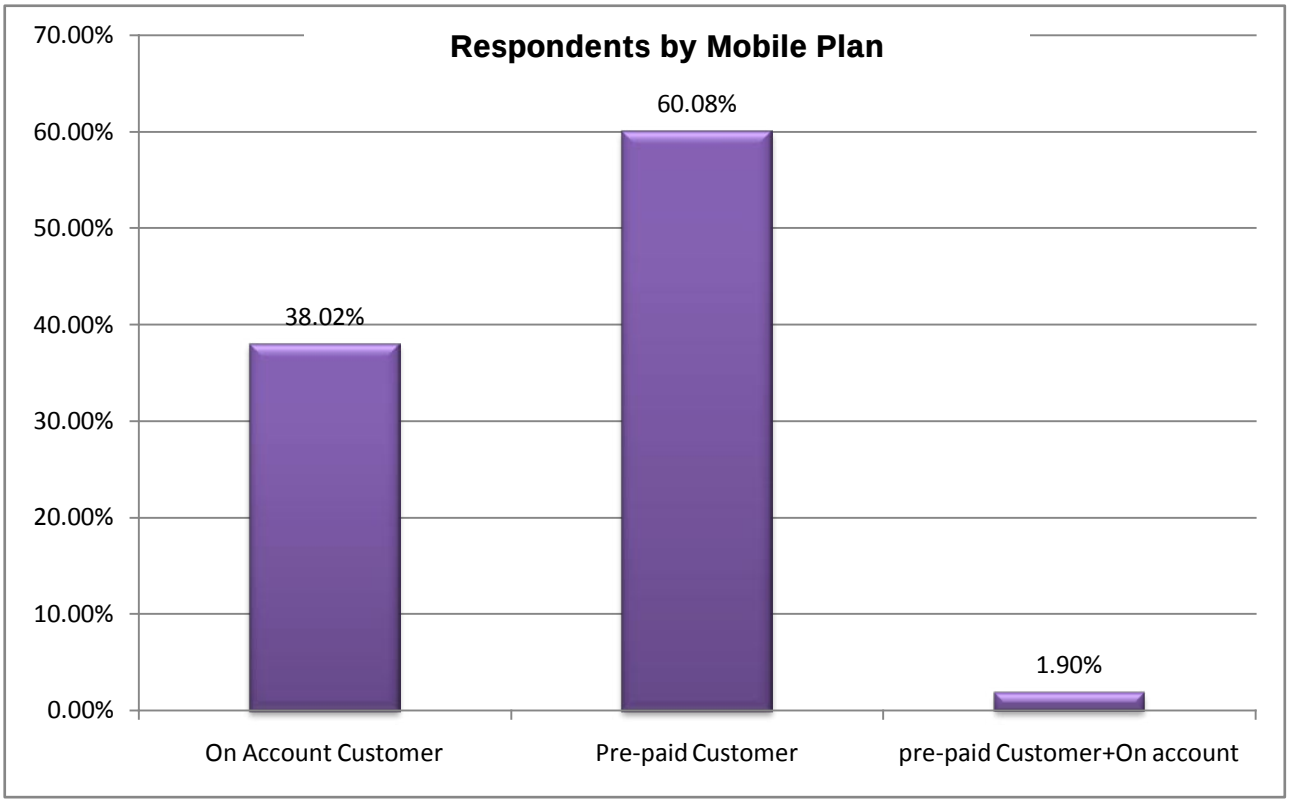


Figure 20: Respondents by Mobile Plan

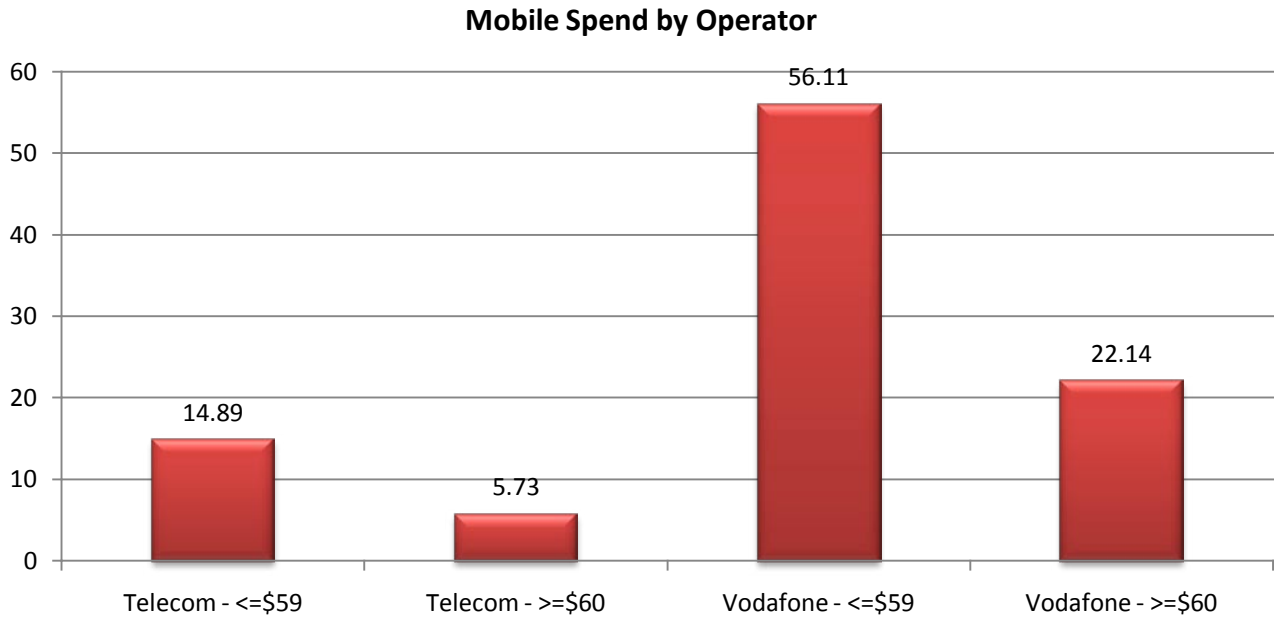


Figure 21: Mobile Monthly Spend by Operator (in percent)

Figure 21 groups the respondents by mobile operator and spend. As evident the majority of the respondents spend under $60 a month on their mobile phone usage (71% of the respondents), with only 29% of the respondents spending over $60 a month.

How the demographics characteristics of the sample identified here may affect mobile payment adoption is discussed in the following sections which explore the various relationships in the research model first over the whole sample and then across some of the demographic descriptive discussed above. It is important to mention that of the total of 267 respondents, 4 respondents did not have a mobile phone therefore were excluded from this analysis

5.4 Relationship 1: Service and Perceived Usefulness (PU)

This section analyses the effects of the construct service on the perceived usefulness of mobile payment. The construct service is comprised of the following independent variables:

- Convenience
    - Variable CON1: Importance of Convenience in forming PU of mobile payment
    - Variable CON2: Mobile payment providing convenience
- Functionality
    - Variable FUN1: Wide range of convenient services available
- Affordability
    - Variable AFF1: Mobile data plan cost
    - Variable AFF2: High inter-operator SMS and mobile call prices

Dependent variable:

- Perceived Usefulness
    - PU: Mobile payment perceived as useful

The average sample means of the variables were in the range of 3.59 – 4.39 (on a scale from 1 to 5). The histogram plots showed normal distribution for all variables except for CON1 (slightly skewed to the left) (refer appendix 3).

Linear stepwise regression was used to determine how strongly 'service' related to PU. The regression technique used helped eliminate variables that did not contribute to explaining the variance in the dependent variable.

The dependent variable is perceived usefulness. The respondents were asked the "do you currently use mobile payments" (Q27) and then "if no, do you perceive 'mobile payment' as something you would use?" (Q28) Therefore only the non-users responded to Perceived Usefulness.

Due to this, the relationship was tested using two approaches as explained below.

Approach 1: It was assumed that all users who are mobile payment users and have not responded to Q28 and have responded yes to Q27 perceive mobile payment as useful. (Sample size = 267; refer appendix 3 for details)

The adjusted R-square was 9.2%. The regression analysis showed that CON1 (importance of convenience) and AFF1 (costly data plans) were the only significant variables affecting PU with the regression coefficient for CON1 is -0.283 and AFF1 is -0.137.

Approach 2: Results for all respondents who responded to this question were analysed. (Sample size = 203)

The adjusted R-square was 7.2%. The regression analysis showed that CON1 (importance of convenience) and AFF1 (costly data plans) were the only significant variables affecting PU. The regression coefficient for CON1 is -0.254 and AFF1 is -0.134.The result for the impact of affordability is in accordance with the literature on mobile payment adoption, i.e. Costly data plans negatively influence mobile payment adoption (Li & McQueen, 2008). As with approach 1 the results were contrastingly different to the expected outcome for CON1.

For both approach 1 and approach 2, the result for the impact of affordability is in accordance with the literature on mobile payment adoption, i.e. Costly data plans negatively influence mobile payment adoption (Li & McQueen, 2008). However the results were contrastingly different to the expected outcome for CON1 i.e. convenience negatively influences perceived usefulness of mobile payment.

Following is a discussion on why the results for CON1 might be different to the expected outcome.

Of the total 267 respondents, 79 respondents were using mobile payment and 188 respondents were not. Respondents were asked if they use mobile payments. For those who did not use mobile payments were asked to answer another question “if no, do you perceive ‘mobile payment’ as something which you would use’. In the ideal scenario there should have been 188 responses but there were 203 responses to this question. A few of the respondents using mobile payments still answered the question (Figure 22). It is very interesting to mention here that of those 79 respondents 2 respondents answered that they do not perceive mobile payments to be useful. As a further step to this exploratory study, finding the reasons as to why mobile payment users don’t perceive mobile payments useful would be worthwhile.

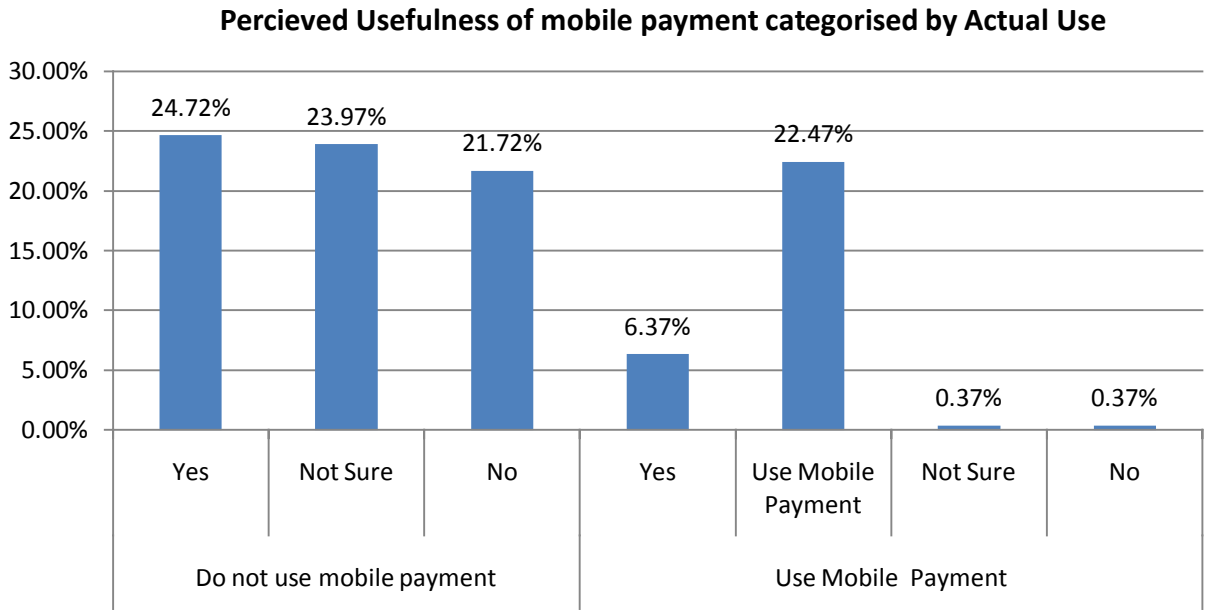


Figure 22: Perceived Usefulness of mobile payments grouped by Actual Use

It is important to highlight that of the 188 respondents who responded to this question, only 21.7% respondents perceived mobile payments to be useful. The small regression R-square and the unexpected result may be due to the small sample size.

Another major factor contributing to this is also respondent demographics. A thorough cross tabulation analysis of PU revealed that certain demographics-consumer's mobile operator, monthly mobile spending, the variations of this spending, experience with online payments, and experience with mobile payment, ethnicity and age - strongly influence perceived usefulness. These factors may play a big role in explaining the regression results mentioned previously. Figure 23 provides an example showing where monthly phone spending (>=$60) and variance on this amount is plotted against the response to the question about the perceived usefulness of mobile payment.

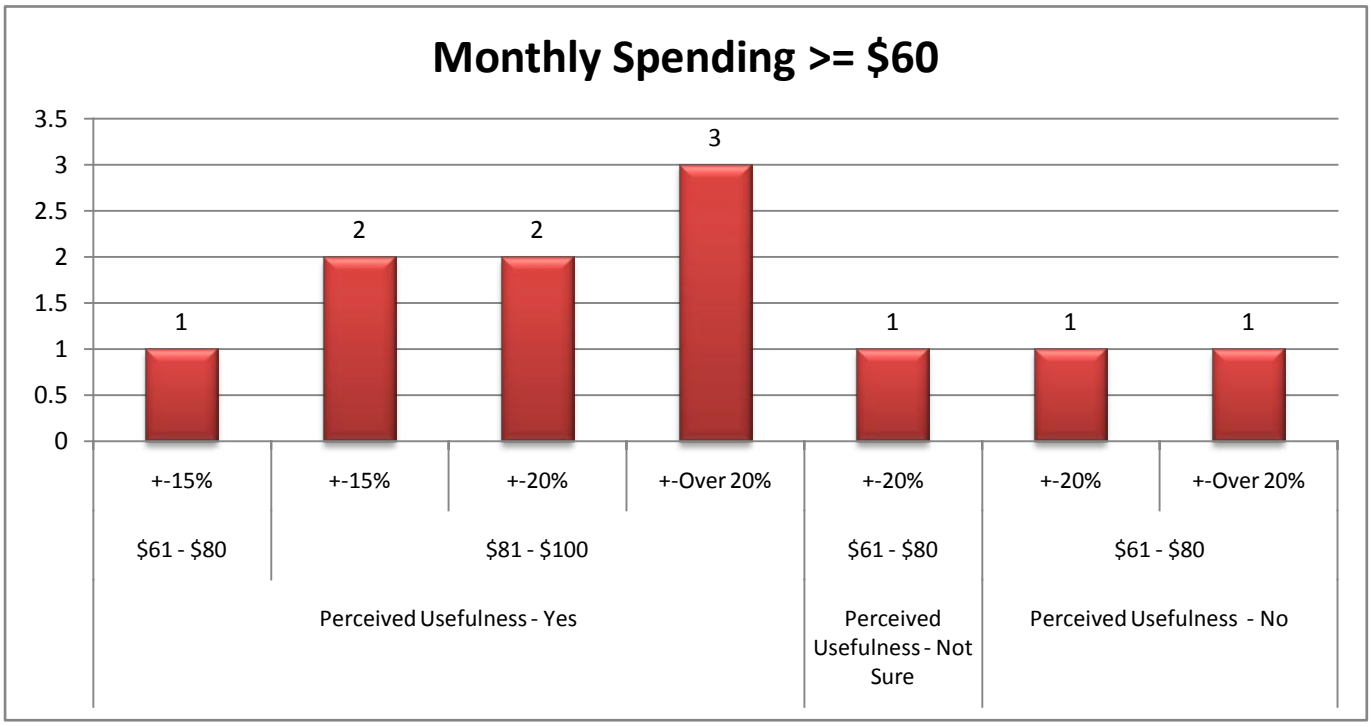


Figure 23: Perceived Usefulness compared with Mobile Phone Spending and Variance

As evident from Figure 23, the number of respondents spending over $60 on phone bills was highest in the group who perceived mobile payments to be useful (N= 7), followed by respondents who were not sure (N=5), followed by respondents who did not perceive mobile payments to be useful (N=3). Also evident from Figure 23 is that mobile phone spending variance follows similar trends, demonstrating that such demographics may play a significant role in forming perceptions about the usefulness of mobile payments.

The results of the investigation of this relationship are not consistent with other mobile payment adoption studies where it has been established that mobile payment services are perceived as useful for the convenience they offer. Other adoption studies have proposed that the costs of subscription services and data plans are an important factor affecting perceived usefulness and actual use of mobile payments (Li & McQueen, 2008). This was evident in the sample data. However, the IPO model places a strong emphasis on demographics influencing mobile payment adoption and the data analysis suggests that certain demographics were more influential than others. Li and McQueen (2008) also

mentioned that demographics and cultural influences may play a significant role in mobile payment adoption. As an extension to this exploratory study, it would be of interest to explore perceived usefulness with respect to each of these demographic variables.

5.5 Relationship 2: Technology and Perceived Ease of Use (PeU)

This section analyses the effects of the construct technology on the perceived ease of use of mobile payment. The construct Technology is comprised of the following independent variables:

- Interface
    - Variable INT1: Inconsistency in broadband speeds
    - Variable INT2: Inconsistency in network coverage
- Self-Efficacy
    - Variable EFF1: Technologically friendly
    - Variable EFF2: Love adopting new technology
    - Variable EFF3 :Take time to adopt new technology
    - Variable EFF4: Find technology hard to use
- Security
    - Variable SEC1: Use or would use mobile payment because they are confidential and secure
    - Variable SEC2: Do not use mobile payments because they are not confidential and secure
    - Variable SEC3 : Threat of hackers and fraud

Dependent variables:

- PEU1: Use or would use mobile payments because it is easy to use(this question was asked for both users and non users of mobile payment)
- PEU2: Perceive Mobile payment easy to use(this question was asked to both users and non users of mobile payment)

This relationship is investigated with the aim to establish which of the technological variables proposed in the research model, affect the perceived ease of use of mobile payment.

Descriptive statistics revealed a slightly skewed sample which is to be expected in relatively small data set sizes. The variable averages across the sample range from 3.1 to 4.07. Each of the dependent variables was tested individually in a separate regression model.

Peu1: Use or would use mobile payments because it is easy to use

The first regression analysis studied the impacts of the various technological variables on PEU1. A linear stepwise regression was performed which revealed that only two of the nine variables had a significant impact on PEU1: SEC1 and EFF4; SEC1 had a positive impact on ease of use with a regression coefficient of 0.602 while EFF4 had a negative impact on ease of use with a regression coefficient of -0.179. In other words, adoption of mobile payments is positively influenced by security and confidentiality of mobile payments. The analysis also revealed that respondents thought mobile payments were hard to use and still a very new technology which negatively influences the use of mobile payments. (Refer appendix 4 for details)

Peu2: Perceive Mobile payment easy to use

The second regression analysis studied the effects of each of the independent variables above on the dependent variable PEU2. The model had an adjusted R-square of 8.1%. The linear stepwise regression revealed that only two of the nine dependent variables had an impact on the perceived ease of use – SEC3 (regression coefficient: -0.194) and EFF2 (regression coefficient: -0.121). (Refer appendix 4 for details)

The model revealed that threat of hackers and fraud had a negative influence on the perceived ease of use, and that people who loved adopting technology did not perceive mobile payment as easy to use.

Overall the results are consistent with published results (Pousttchi, 2004; Li & McQueen, 2008). It can be concluded that technology affects perceived ease of use. Both groups' perceptions were positively influenced by the perceived security and confidentiality of the service. Users who perceived themselves as not self-efficient with new technologies perceived mobile payment as not easy to use. Moreover the technology was not perceived as easy to use by technology-savvy non-users. These results may be explained by the fact that mobile payment systems are still at an evolutionary stage and from a user perspective the service is not well integrated (Pousttchi, 2004). For example only certain banks and mobile operators support mobile payment mechanisms – i.e. Bank of New Zealand allowing paying for parking using a Vodafone mobile phone.

5.6 Relationship 3: Perceived Ease of Use and Perceived Usefulness

This relationship is explored in order to test the impact of perceived ease of use on perceived usefulness.

The independent variable is PeU comprising the following:

- PeU1: Easy to use
- PeU2: Perceive easy to use

The dependent variable is perceived usefulness. The respondents were asked the "do you currently use mobile payments" (Q27) and then "if no, do you perceive 'mobile payment' as something you would use?" (Q28) Therefore only the non-users responded to Perceived Usefulness.

Due to this, the relationship was tested using two approaches as explained below.

Approach 1: It was assumed that all users who are mobile payment users and have not responded to Q28 and have responded yes to Q27 perceive mobile payment as useful. (Sample size = 267; refer appendix 5 for details)
The linear stepwise regression model had an adjusted R-square of 31.9%. The impact of PEU2 on PU was significant with a regression coefficient of 0.524 i.e. perceived ease of use has a significant impact on perceived usefulness.

Approach 2: Results for all respondents who responded to this question were analysed. (Sample size = 203)
The linear stepwise regression model had an adjusted R-square of 25.2%. The impact of PEU2 on PU was significant with a regression coefficient of 0.479 i.e. perceived ease of use has a significant impact on perceived usefulness.

It is of interest to notice that the R-square of the actual sample was lower than the assumptions made for users of mobile payment regarding perceived usefulness. This can possibly be because even though customers have used or are willing to use mobile payment mobile payment service the technology is not well established payment system (Pousttchi, 2003).

5.7 Relationship 4: Service and Actual Use

This relationship test explores the significance of the influence of the construct service on the actual use of mobile payment among respondents.
The construct Service is comprised of the following independent variables:

- Convenience
    - Variable CON1: Importance of Convenience in forming PU of mobile payment
    - Variable CON2: Mobile payment providing convenience
- Functionality
    - Variable FUN1: Wide range of convenient services available
- Affordability
    - Variable AFF1: Mobile data plan costs

- Variable AFF2: Costly inter-operator SMS and mobile call prices

Dependent variable:

- USE - Actual Use of mobile payment

Of a total of 267 respondents, 28.3% of the respondents used or had used mobile payments. The linear stepwise regression had an adjusted R^2 of 4.1% which is very low. It also suggested that only two variables were significant at a significance level of 0.01 – CON1 (regression coefficient = -.102) and AFF1 (regression coefficient = -.057). Both negatively influence actual use of mobile payments. (Refer appendix 6 for details)

Similar to the results from the test of the relationship between perceived usefulness and service, it may be concluded that less costly data plans would encourage actual use of mobile payments. However the result regarding CON1 contradicts prior findings. The negative impact of convenience may be attributed to the demographic and cultural differences of the respondents as also suggested in (Li & McQueen, 2008). Gartner research findings also identify demographic factors as influencing the mobile payment adoption (Basso, 2009). The cross tabulation analysis of the sample data also suggested that demographics (age, experience with online payments, experience with use of mobile payment services and monthly mobile phone spending) have an impact on actual use of mobile payments (Figure 24). It can be seen that that perceived usefulness is highly influenced by ethnicity, mobile phone spending and type of spending.

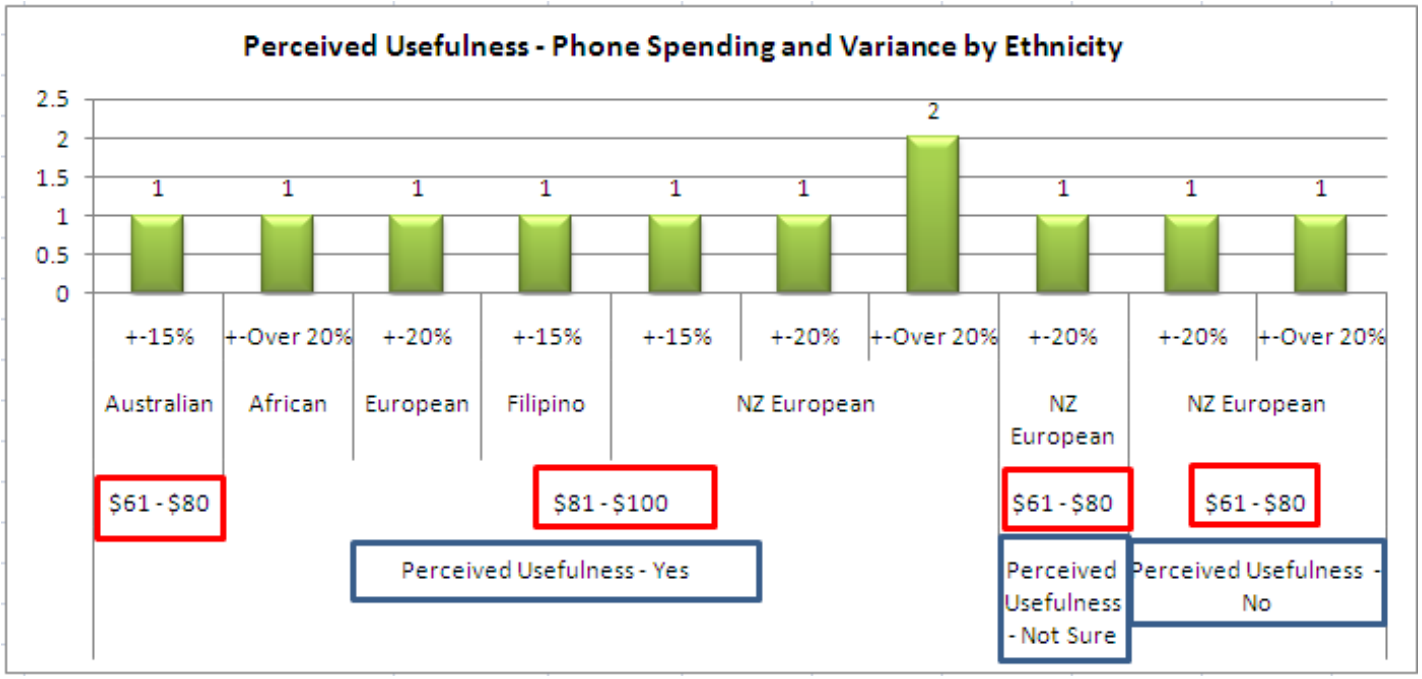


Figure 24: Perceived Usefulness - Phone spending, variance and ethnicity (The blue text boxes represent categories and the red boxes represent sub categories)

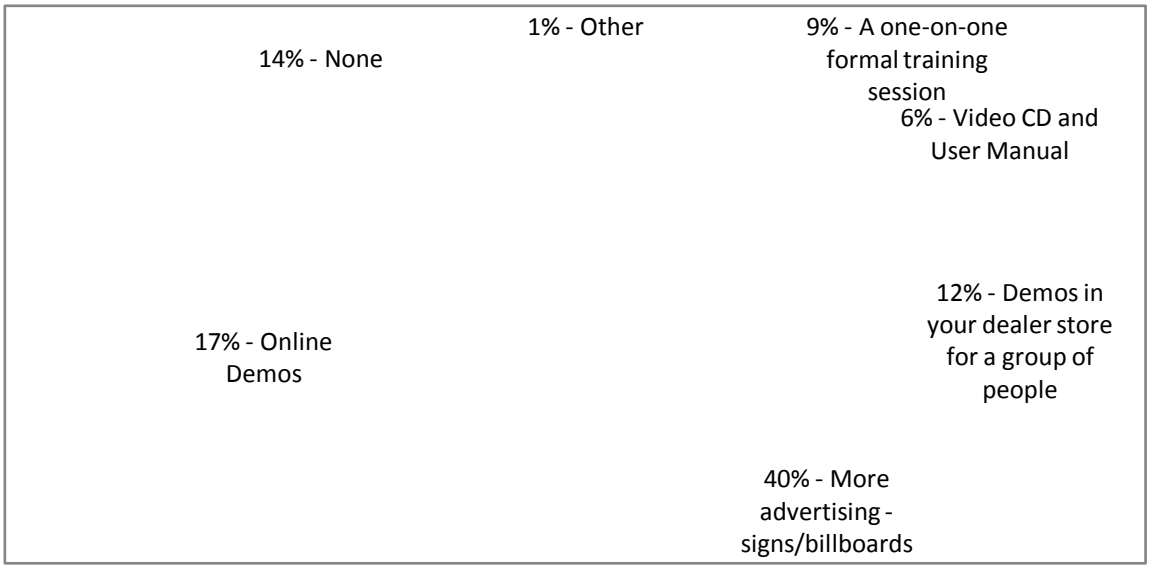
Li & McQueen (2008) mention that, another major reason for this could be the market size and dynamics of the New Zealand market where there are only two major mobile operators – Telecom and Vodafone. The main obstacle is the lack of coordination among the major stakeholders – mobile operators, banks and mobile commerce solution developers. Therefore it can be said that consumers who use mobile payments do not get the convenience the service claims to offer or should offer thus negatively impacting actual use of mobile payment as also confirmed by the sample data - major proportion of the respondents (71.6%) had not used mobile payment. It would be of interest to explore the relationship in an extension of this study.

5.8 Relationship 5: Service Awareness and Intention to Use

This relationship test explores the significance of the variable service awareness in making a decision about using mobile payment (intention to use). The following independent variables comprise service awareness:

- SA1: Higher awareness may encourage use
- SA2: Heard about mobile payment
- SA3: Understanding mobile payment

Dependent variable:


1% - Other
9% - A one-on-one formal training session
14% - None
6% - Video CD and User Manual
12% - Demos in your dealer store for a group of people
17% - Online Demos
40% - More advertising - signs/billboards

The results are consistent with prior research: Amin (2007) mentioned about the importance of service awareness with respect to affecting intention to use and actual use of mobile payment mechanisms like mobile credit cards. In their study of mobile payment and banking in China, Laforet & Li (2005) also found that awareness was significant.

5.9 Relationship 6: Perceived Usefulness (PU) and Intention to Use (IU)

In this relationship test the dependent variable is IU and the independent variable is PU. The following independent variables comprise PU:

- PEU1: Use or would use mobile payments because it is easy to use(this question was asked for both users and non users of mobile payment)
- PEU2: Perceive Mobile payment easy to use(this question was asked to both users and non users of mobile payment)

Dependent variable:

- IU – intention to use

Two approaches were used to test this relationship. The respondents were asked the "do you currently use mobile payments" (Q27) and then "if no, do you perceive 'mobile payment' as something you would use?"(Q28) Therefore only the non-users responded to Perceived Usefulness.

Due to this, the relationship was tested using two approaches as explained below.

Approach 1: It was assumed that all users who are mobile payment users and have not responded to Q28 and have responded yes to Q27 perceive mobile payment as useful. (Sample size = 267; refer appendix 8 for details)

A linear stepwise regression analysis showed that the PU (regression coefficient = 0.429) positively influenced IU. The adjusted R-square of the model was

17.2%. Figure 26 gives a breakdown of responses on IU grouped by various categories of PU. As evident from the figure, as the value of PU progresses from Yes to No, the percentage of respondents responding yes to IU also decreases.

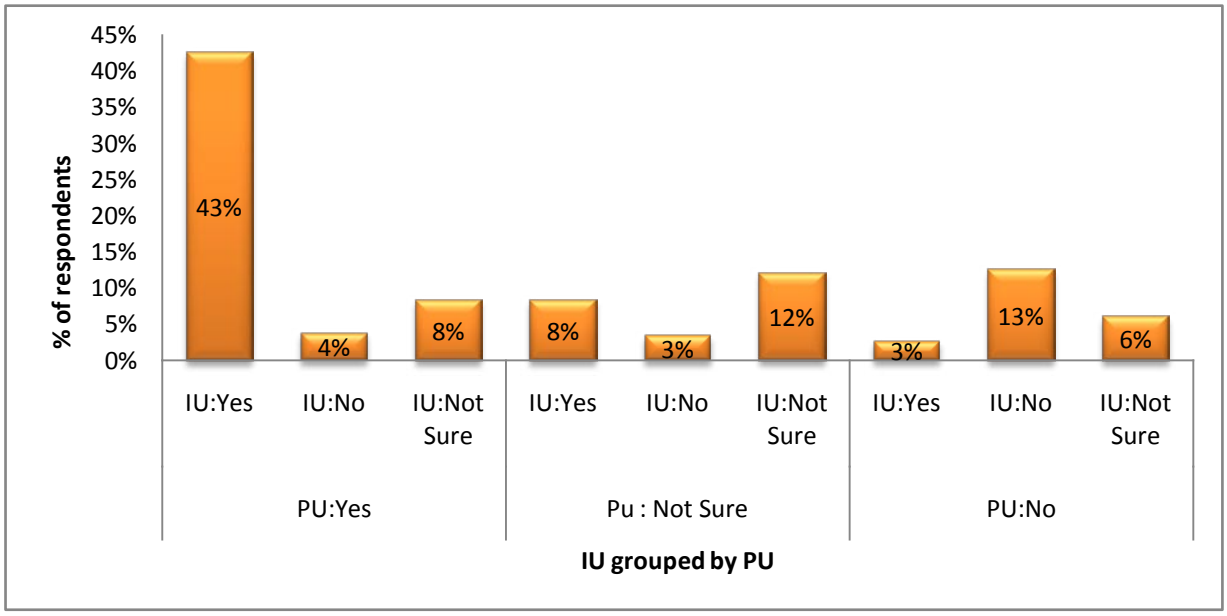


Figure 26: Respondent Percentage – IU grouped by PU

Approach 2: Results for all respondents who responded to this question were analysed. The regression analysis was conducted only for the respondents who responded to this question i.e. 203 of the total 267 respondents. The adjusted R-square of the model was 18.8%, with PU (regression coefficient = 0.442) positively affecting IU. The analysis shows a slight increase in the R-square for this approach.

This result is in line with theoretical models on mobile payment adoption (TAM, TPB). Several studies had reported similar results (e.g. Laforet & Li, 2005).

5.10 Relationship 7: Perceived Ease of Use – Intention to Use

This relationship aims to explore the effect of PeU on IU. In the study PeU is the independent variable measured by as below:

- PEU1: Use or would use mobile payments because it is easy to use(this question was asked for both users and non users of mobile payment)
- PEU2: Perceive Mobile payment easy to use(this question was asked to both users and non users of mobile payment)

Dependent variable is:

- IU – intention to use

The linear stepwise regression analysis showed an adjusted R-square of 11.7%. PeU2 (regression coefficient = 0.237) positively influenced the intention to use whereas PeU1 (regression coefficient = -.149) has a slight negative impact on the intention to use. (Refer appendix 9 for details)

The contradictory finding that ease of use does not positively influence intention to use, may be attributed to the nature of mobile payment in New Zealand where the technology is still in its early stages of deployment. This may also be attributed to the fact that only a very small percentage of the respondents were or had used mobile payment.

However because the result contradicts theories of technology adoption, as a future research direction this relationship needs to be explored in more detail. The issue may have also arisen from the questionnaire design where PeU is measured by two items thus introducing the possibility of disparate answers to the two questions, with respondents or a rush to finish off (respondents did not get any reward for the completing the questionnaire).

Figure 27 shows the percentage of respondents grouped by PeU1.

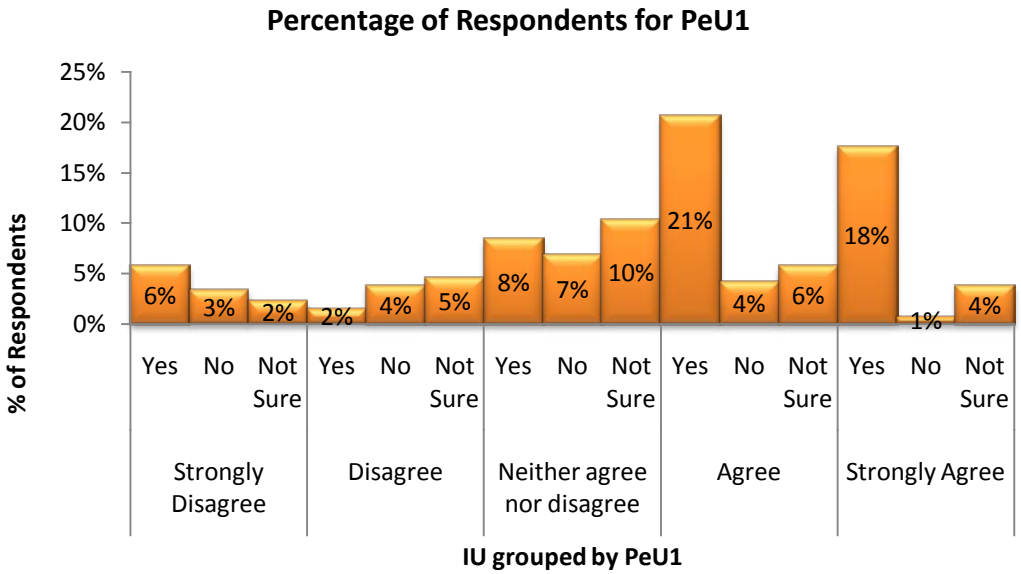


Figure 27: Percentage of Respondents – IU grouped by PeU1

On the other hand PeU2 positively influences the IU, as expected an in line with the assumptions underlying adoption models (TAM, IPO).

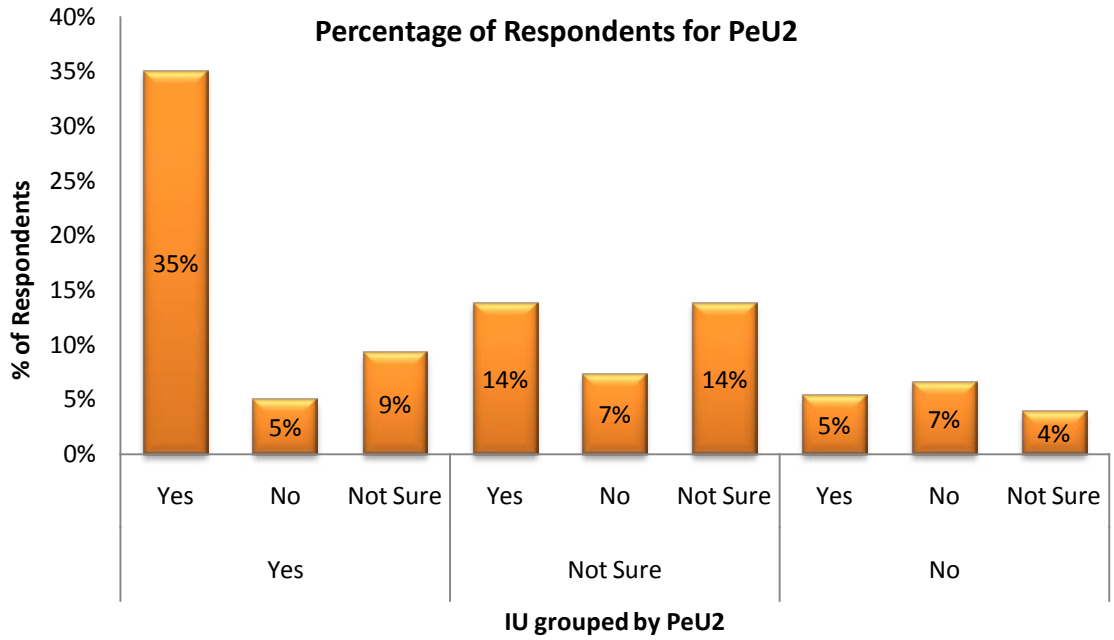


Figure 28: Percentage of Respondents – IU grouped by PeU2

As shown in Figure 28, as the IU response changes from yes to no, the percentage of the respondents for an answer yes to IU also decreases as predicted in the regression analysis.

5.10 Chapter Summary

This chapter presented the demographic characteristics of the data collected using the survey questionnaire. Statistical techniques like linear stepwise regression, descriptive statistics and cross tabulation were used to explore the relationships formulated earlier. The next chapter discusses the results, identifies the limitations of this exploratory study, and identifies avenues for further research

Chapter 6: Conclusion

This chapter provides a brief overall discussion of the findings and the data analysis results, outlines the study limitations, and suggests directions for further research.

6.1 Analysis Summary

As seen in the previous chapter, some of the results obtained are compatible with the outcomes of mobile payment adoption studies in other locations; other results are either contradicting earlier findings or are not conclusive.

The randomly selected sample was homogenous in terms of gender and localization. It consisted of almost equal number of male and females, among whom the mobile payment users were also equally distributed. All respondents lived and worked in New Zealand (a country where mobile payment systems are not yet widely used).

It was found that for the sample perceived ease of use positively affected perceived usefulness and that perceived usefulness positively affected the intention to use mobile payment systems. These results were expected and are consistent with the published literature and validate the model used in the study.

The model used in the study includes the construct technology, hypothesising about the existence of relationship between technology and both perceived ease of use and actual use of mobile payment. Among the various technological factors included two factors were most influential: concerns about the confidentiality and security of mobile payment, and mobile payment still being very new and hard to use. These results are in line with similar studies on mobile payment adoption in other countries (Teo, 2005; Yang, 2005).

Also in line with prior results was the finding that costly data plans negatively affected both perceived use and actual use of mobile payments. This factor was included in the model as part of the construct 'service'.

Finally it was established that service awareness and familiarity and understanding of mobile payment was an important factor motivating positively user intention to use mobile payments.

The model included a number of variables related to demographics and background. It was found that people who on an average spent 60 dollars or more a month on their phone bill and had some form of formal university qualification were more likely to use and adopt mobile payment. The profession and professional status also had a very high impact on mobile payment adoption. It was also interesting to see that ethnicity played an important role in determining perceived usefulness of mobile payment, for this sample.

In summary, it was found that demographic and external variables may play a significant role in influencing mobile payment adoption. The outcomes of this exploratory study highlighted a few important relationships. Further research may provide more conclusive results.

6.2 Research Limitations

The study presented here has a number of limitations. First the data were gathered in one city only. The homogeneity of the sample implies that the findings about mobile adoption may be valid for Aucklanders only. Similar data may need to be gathered for other regions in order to draw conclusions about the New Zealand population as a whole, and including remote areas where network coverage and mobile operator choices are very limited.

Another limitation is the proportion of mobile payment users (29.5% of the total sample). The number of users was much smaller than non users, which may

have introduced some bias in the results. Selecting a random sample of users and non-users and comparing the relationship analysis for users and non-users may contribute to define more precisely the variables and the constructs of the model.

The proposed research model is a hybrid one, combining IPO and TAM constructs, attempting to provide insight into how consumer perceptions about the TAM constructs usefulness and ease of use are formed (Yang, 2005). Additionally, the research framework may also helps studying external factors such as the role of mobile operators, the role of financial institutions and market dynamics. As the focus of this study was on consumer perceptions and demographics, external factors were only briefly discussed and not analysed. Searching for new relationships and exploring the established ones with respect to external variables and demographics will certainly improve the accuracy and the adjusted R-square of the regression analysis.

6.3 Future Work

It is important to mention that this is only an exploratory study and much needs to be done to understand the adoption of mobile payment among New Zealanders. The Gartner Research summary by Basso (2009) highlights the importance of demographics in determining adoption of mobile payment technology. The relationships in the research model need to be explored further and studied in the context of the demographic variables. The questionnaire used for this study is very rich in demographic information of the respondents. This would be useful in explaining contradicting analysis like affect of convenience on perceived ease of use and actual use.

Based on the results from the exploratory study of various relationships it would be of interest to explore further the following results from the relationships with respect to demographic factors:

- Convenience and perceived usefulness of mobile payment.

- Mobile phone spending and variance on this amount and perceived usefulness of mobile payment.

It would also be beneficial to test the following relationships:

1. Relationship 1: Demographics influence, technological friendliness has a positive impact on the perceived ease of use of mobile payments.
2. Relationship 2: Demographics influence perceived security of mobile payments, therefore affecting adoption of mobile payments.
3. Relationship 3: Profession and professional status influence intention to use for mobile payments.
4. Relationship 4: Mobile payment is a luxury service; therefore a better lifestyle implies higher mobile-payment adoption.
5. Relationship 5: Perceived usefulness has a positive impact on adoption of mobile payments.
6. Relationship 6: Age and gender influence intention to use mobile payment.

The study briefly mentions the lack of mobile operator competitiveness and the virtual mobile market duopoly where consumers do not have too many mobile operators to choose from. As an extension to this exploratory study, it would be interesting to explore these factors and their role in determining adoption.

A study on user acceptance of mobile payment adoption by Huang, Lin, & Chuang (2006) shows that perceived mobility and perceived enjoyment may play an important role. It would be interesting to introduce these variables as an extension to the questionnaire and explore the relationships.

6.4 Conclusion

Despite its limitations and the many avenues for future research not explored, the study serves the role of an important pilot in the investigation of the factors influencing positively or negatively the adoption of mobile payment among New

Zealanders. The major contribution of this exploratory study is identifying some additional factors that may affect ease of use and usefulness and therefore mobile payment adoption, and proposing a comprehensive but scalable research framework. A more heterogeneous sample and a more in-depth survey based on the framework may yield representative results for New Zealanders as a whole. A recommendation to industry players involved in mobile payment is that promoting more actively mobile payment and providing information to the public may help increase its use.

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Appendix

Appendix 1: Mobile Payment Adoption Trends

Country	Mobile phones per 1000 (1999)	Rank order	GNP per capita in US$ (2000)	Rank order	Internet users per 1000 people (1999)	Rank order
Hong Kong	726	1	25950	6	205	14
Finland	667	2	24900	10	404	2
Sweden	578	3	26780	5	445	1
Italy	528	4	20010	18	158	18
Taiwan	521	5	16100	19	216	11
Austria	519	6	25220	7	203	15
South Korea	504	7	8490	24	213	12
Denmark	499	8	32020	4	394	3
Singapore	475	9	24740	11	289	6
Portugal	468	10	11060	23	80	24
Japan	449	11	34210	3	162	17
Netherlands	435	12	25140	8	258	8
Switzerland	420	13	38120	1	234	10
UK	408	14	24500	13	255	9
Ireland	378	15	22960	15	132	21
France	364	16	23670	14	121	22
Australia	344	17	20530	17	261	7
Belgium	315	18	24630	12	180	16
Spain	312	19	14960	20	91	23
Greece	311	21	11960	22	140	20
USA	312	19	34260	2	351	5
Germany	286	22	25050	9	149	19
New Zealand	230	23	13080	21	209	13
Canada	230	23	21050	16	369	4
Argentina	121	25	7440	25	14	25

Table 1: Mobile Penetration, per capita, GNP and Internet Use in descending order (Source : Dholakia & Dholakia, 2002)

Appendix 2: Questionnaire

Project title: Paying for Goods and Services Using a Mobile Phone:

A New Zealand Study into enabling mobile commerce applications

Project Supervisor: Krassie Petrova

Researcher: Ridhima Mehra

Dear Prospective Participant, completing this questionnaire indicates that you have understood the information provided about this research project, that you had been given the opportunity to ask any questions/ clarify any doubts and that you have given your consent to participate in this project.

If you would prefer to take the questionnaire with you and compete it in your own time, please send it back to me using the prepaid envelope provided.

1. How would you categorize your employment status? (Please choose one or more)

☐ Paid employment (full-time)
☐ Paid employment (part-time)
☐ Beneficiary
☐ Self-employed
☐ Contractual
☐ Student
☐ Unemployed
☐ Home maker
☐ Retired
☐ Non-paid work such as voluntary/charity
☐ Other: *(Specify)*_____

2. Are you:

☐ Single – No Children
☐ A Couple without children
☐ A Couple with children
☐ One parent with child(ren)

3. What is the **highest grade** or year of school you completed? (Choose one)

☐ Never attended school or only attended kindergarten

☐ University Under Graduate

☐ University Postgraduate

☐ School Leaver

☐ Certificate/Diploma Holder

4. Are you?

☐ Female

☐ Male

5. Are you?

☐ Kiwi by birth

☐ Work Permit

☐ Acquired Citizenship

☐ Student

☐ Permanent Resident

☐ None

☐ Other: *(Please Specify)*_____

6. What ethnic group/nationality do you belong to? *(Check one or more)*

☐ Maori

☐ American

☐ Asian

☐ MELAA – Middle Eastern, Latin America and Africa

☐ NZ European

☐ Pacific Islander

☐ European

☐ Australian

☐ Other: *(Please Specify)*_____

7. How would you categorize your occupation? (Choose one or more)

☐ Manager

☐ Technician/Trades Worker

☐ Professional

☐ Clerical/Administrative Worker

☐ Sales worker

☐ Machinery Operator/Driver

☐ Community/Personal Service Worker

☐ Other: *(Specify)*_____

8. Your household is:

☐ One-Family household ☐ Two-family household

☐ One-person household

☐ Three or more family household

9. How many people are there in your household? _____

10. What income group would you categorize yourself in?

☐ No income ☐ $30,001 - $40,000

☐ $1 - $10,000 ☐ $40,001 - $50,000

☐ $10,001 - $15,000 ☐ $50,001 - $70,000

☐ $15,001 - $20,000 ☐ $70,001+

☐ $20,001 - $30,000

11. What age group do you fall under?

☐ Under 20 ☐ 21 – 30

☐ 31 – 40 ☐ 41 - 50

☐ 51 - 60 ☐ 60+

12. Do you have a cell phone?

☐ Yes ☐ No

13. If yes, how long have you had a mobile phone for? _____(specify in years)

14. What mobile provider are you with:

☐ Vodafone ☐ Telstra Clear

☐ Telecom

☐ Other :*(Specify)* _____

15. Are you a:

☐ Pre-paid customer ☐ On Account customer

16. What is your monthly mobile phone spending?

☐ $ 20 or less ☐ $61-80

☐ $21-$40 ☐ $81-100

☐ $41-$60 ☐ $100+

17. If $100+, then how much is it on an average per month? _____

18. How much is the variance on this amount if any?

☐ +-5% ☐ +-20%

☐ +-10% ☐ +-Over 20%

☐ +-15%

19. What is the maximum you could stretch this spend by?

☐ 0-5% ☐ 16-20%

☐ 6-10% ☐ 21% and above

☐ 11-15%

20. I would describe myself as technologically friendly:

☐ Strongly Agree

☐ Agree

☐ Neither agree nor disagree

☐ Disagree

☐ Strongly Disagree

21. I love adopting new technology:

☐ Strongly Agree ☐ Neither agree nor disagree

☐ Agree ☐ Disagree

☐ Strongly Disagree

22. I take time to adopt new technology:

☐ Strongly Agree ☐ Disagree

☐ Agree ☐ Strongly Disagree

☐ Neither agree nor disagree

"Mobile Payment" refers to use of mobile devices such as your mobile phone, to pay directly for goods purchased or services provided.

23. Have you heard about 'mobile payment' / m-payment?

☐ Yes ☐ No ☐ Not Sure

24. Have you used online payments?

☐ Yes ☐ No ☐ Not Sure

25. Which of the following relates to your understanding of 'mobile payment'?

☐ Pay for my parking using cell phone

☐ Transfer money from my bank account to pay my phone bill using a cell phone

☐ Purchase movie tickets using my cell phone

☐ None

☐ Other :*(Specify)* _____

26. Which of the above services have you used?

☐ Pay for my parking using cell phone

☐ Transfer money from my bank account to pay my phone bill using a cell phone

☐ Purchase movie tickets using my cell phone

☐ None

☐ Other :*(Specify)* _____

27. Do you currently use “mobile payments”?

☐ Yes ☐ No

28. If no, do you perceive ‘mobile payment’ as something which you would use?

☐ Yes ☐ No ☐ Not Sure

29. Do you perceive ‘mobile payment’ as easy to use?

☐ Yes ☐ No ☐ Not Sure

30. Do you think a higher awareness about what mobile payment is would encourage you using it?

☐ Yes ☐ No ☐ Not Sure

31. What service would encourage use of this technology?

☐ More advertising – signs/ billboards

☐ A one-on-one formal training session

☐ A video CD and user manual

☐ Online Demos

☐ Demos in your dealer store for a group of people

☐ None ☐ Other: *(Specify)*_____

32. How much would you be willing to pay for your choice above?

☐ $0 - $10 ☐ $11 - $20

☐ $21 - $30 ☐ $21 - $30

☐ $41 - $ 50 ☐ None

☐ Other : *(Specify)*_____

33. Which of the following holds true in your case?(choose one)

☐ I have been provided a phone by my employer and the bill is paid by my employer

☐ My employer pays for only work related calls

☐ I pay for my phone bill

☐ My parents pay for my mobile bill

34. Convenience is an important factor to me encouraging use of the 'mobile payment' technology:

☐ Strongly Agree

☐ Agree

☐ Neither agree nor disagree

☐ Disagree

☐ Strongly Disagree

Convenience means one or more of the following:

- I can use this anytime anywhere
- I don't have to worry about having coins or change
- I can skip waiting in a long line

35. If you could use your mobile phone to pay for a purchase or a service, with the transaction directly charged on your mobile phone bill or card, would you use this service?

☐ Yes

☐ No

☐ Not Sure

36. I use/would use my phone to pay for goods and services because:

	Strongly Disagree				Strongly Agree
1. Is easy to use	1	2	3	4	5
2. Gives me a wide range of services like grocery shopping, shopping, paying for parking, paying for tickets	1	2	3	4	5
3. Confidential and secure e.g. only people with authorized access view the information, my details are not misused	1	2	3	4	5
4. Makes my life easier, gives me the much needed convenience	1	2	3	4	5

37. I do not use/would not use my mobile phone for direct payments because of:

	Strongly Disagree				Strongly Agree
5. Health reasons – afraid of the waves	1	2	3	4	5
6. Costly data plans	1	2	3	4	5
7. Costly inter-operator SMS and phone call prices	1	2	3	4	5
8. Threat of hackers and fraud ▪ I am afraid payment will not reach the vendor ▪ I am afraid someone will hack my account and steal my money	1	2	3	4	5
9. Inconsistency in broadband speeds	1	2	3	4	5
10. Inconsistency in network coverage	1	2	3	4	5
11. The technology is hard to use and still quite new	1	2	3	4	5
12.Confidential and secure e.g. anyone can view the information, my details are misused	1	2	3	4	5

38. Out of the 12 reasons provided in questions 36 and 37, which is the most important factor to you, and why?

Thank you for participating!

If you have taken the questionnaire away to complete it in your own time, please post it back to me using the pre addressed envelope included.

Appendix 3: Relationship 1: Service and Perceived Usefulness Approach 1

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q34:Con1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Q376AFF1v1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q28:PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.240[a]	.058	.054	.811
2	.314[b]	.099	.092	.795

a. Predictors: (Constant), Q34:Con1

b. Predictors: (Constant), Q34:Con1, Q376AFF1v1

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.316	1	10.316	15.690	.000[a]

	Residual	168.974	257	.657		
	Total	179.290	258			
2	Regression	17.669	2	8.835	13.994	.000[b]
	Residual	161.620	256	.631		
	Total	179.290	258			

a. Predictors: (Constant), Q34:Con1

b. Predictors: (Constant), Q34:Con1, Q376AFF1v1

c. Dependent Variable: Q28:PU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.911	.312		9.328	.000
	Q34:Con1	-.277	.070	-.240	-3.961	.000
2	(Constant)	3.292	.326		10.112	.000
	Q34:Con1	-.283	.069	-.245	-4.125	.000
	Q376AFF1v1	-.137	.040	-.203	-3.413	.001

a. Dependent Variable: Q28:PU

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q36(4):Con2	-.021[a]	-.347	.729	-.022	.960
	Q36(2):Fun1	-.051[a]	-.820	.413	-.051	.949
	Q37AFF2v1	-.190[a]	-3.185	.002	-.195	1.000
	Q376AFF1v1	-.203[a]	-3.413	.001	-.209	.999
2	Q36(4):Con2	-.036[b]	-.596	.552	-.037	.956
	Q36(2):Fun1	-.046[b]	-.752	.453	-.047	.948

Q37AFF2v1	-.073[b]	-.721	.471	-.045	.340

a. Predictors in the Model: (Constant), Q34:Con1

b. Predictors in the Model: (Constant), Q34:Con1, Q376AFF1v1

c. Dependent Variable: Q28:PU

Approach 2

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q34:Con1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Q376AFF_1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q28:PU

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.213[a]	.046	.041	.830
2	.284[b]	.081	.072	.816

a. Predictors: (Constant), Q34:Con1

b. Predictors: (Constant), Q34:Con1, Q376AFF_1

c. Dependent Variable: Q28:PU

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.507	1	6.507	9.453	.002[a]
	Residual	136.288	198	.688		
	Total	142.795	199			
2	Regression	11.550	2	5.775	8.668	.000[b]
	Residual	131.245	197	.666		
	Total	142.795	199			

a. Predictors: (Constant), Q34:Con1

b. Predictors: (Constant), Q34:Con1, Q376AFF_1

c. Dependent Variable: Q28:PU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.946	.347		8.492	.000		
	Q34:Con1	-.242	.079	-.213	-3.075	.002	1.000	1.000
2	(Constant)	3.331	.369		9.031	.000		
	Q34:Con1	-.254	.078	-.223	-3.266	.001	.997	1.003
	Q376AFF_1	-.134	.049	-.188	-2.751	.006	.997	1.003

a. Dependent Variable: Q28:PU

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	Q36(4):Con2	.003[a]	.039	.969	.003	.951	1.051	.951
	Q36(2):Fun1	-.038[a]	-.520	.604	-.037	.923	1.083	.923
	Q376AFF_1	-.188[a]	-2.751	.006	-.192	.997	1.003	.997
	Q377AFF_2	-.181[a]	-2.637	.009	-.185	.997	1.003	.997

2	Q36(4):Con2	.000[b]	-.005	.996	.000	.951	1.052	.949
	Q36(2):Fun1	-.035[b]	-.496	.620	-.035	.923	1.083	.921
	Q377AFF_2	-.078[b]	-.621	.535	-.044	.300	3.329	.300

a. Predictors in the Model: (Constant), Q34:Con1

b. Predictors in the Model: (Constant), Q34:Con1, Q376AFF_1

c. Dependent Variable: Q28:PU

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Q34:Con1	Q376AFF_1
1	1	1.986	1.000	.01	.01	
	2	.014	11.743	.99	.99	
2	1	2.851	1.000	.00	.00	.02
	2	.135	4.595	.02	.04	.92
	3	.014	14.488	.98	.95	.06

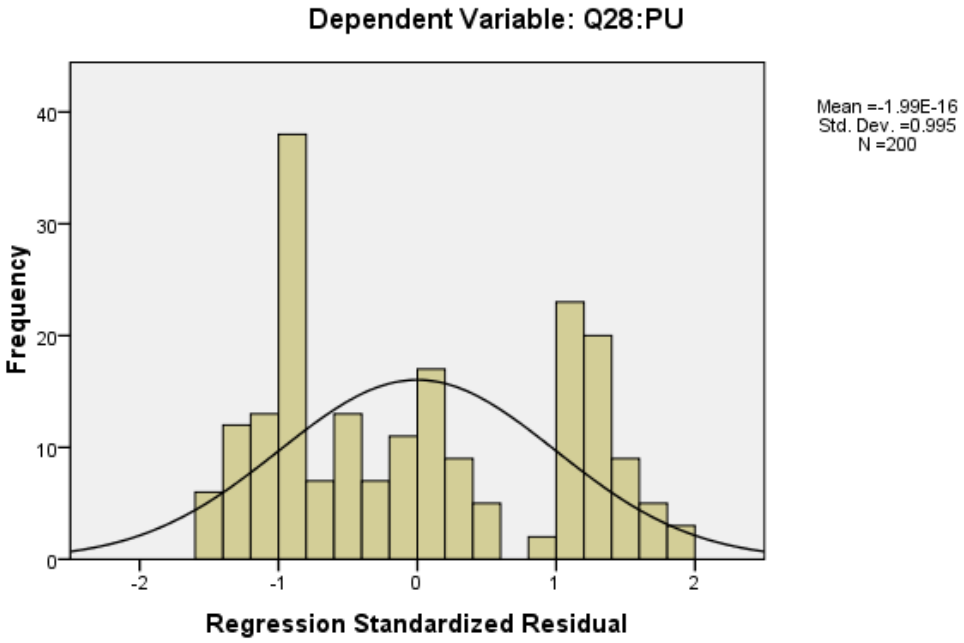
a. Dependent Variable: Q28:PU

Residuals Statistics[a]

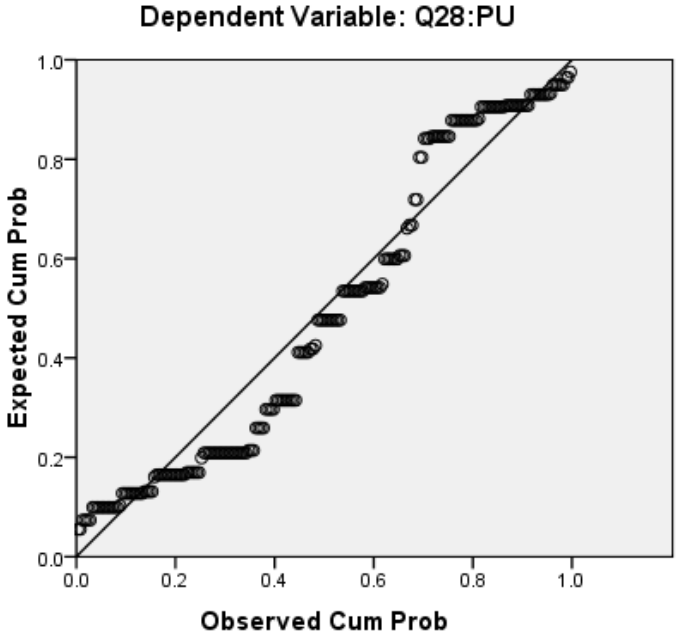
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.39	2.81	1.89	.241	200
Residual	-1.302	1.606	.000	.812	200
Std. Predicted Value	-2.081	3.796	.000	1.000	200
Std. Residual	-1.596	1.968	.000	.995	200

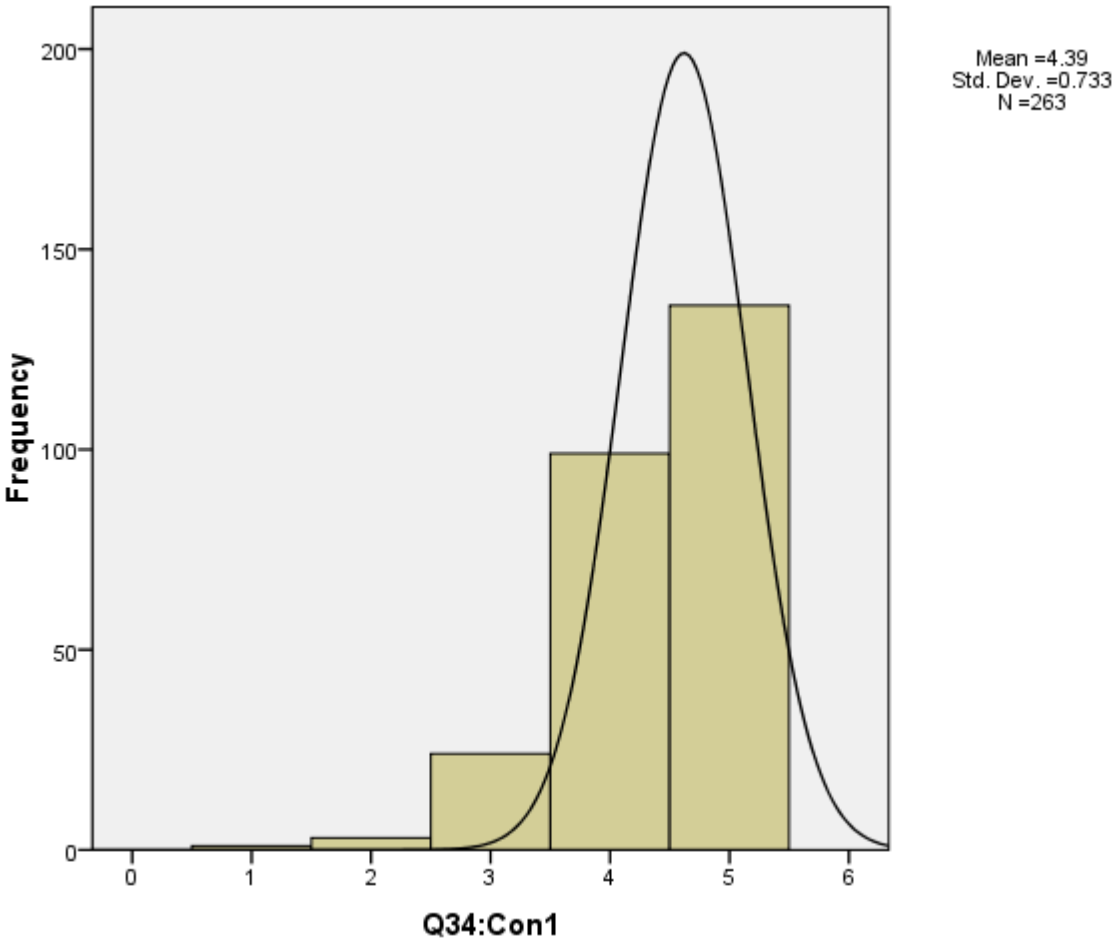
a. Dependent Variable: Q28:PU

Histogram



Normal P-P Plot of Regression Standardized Residual

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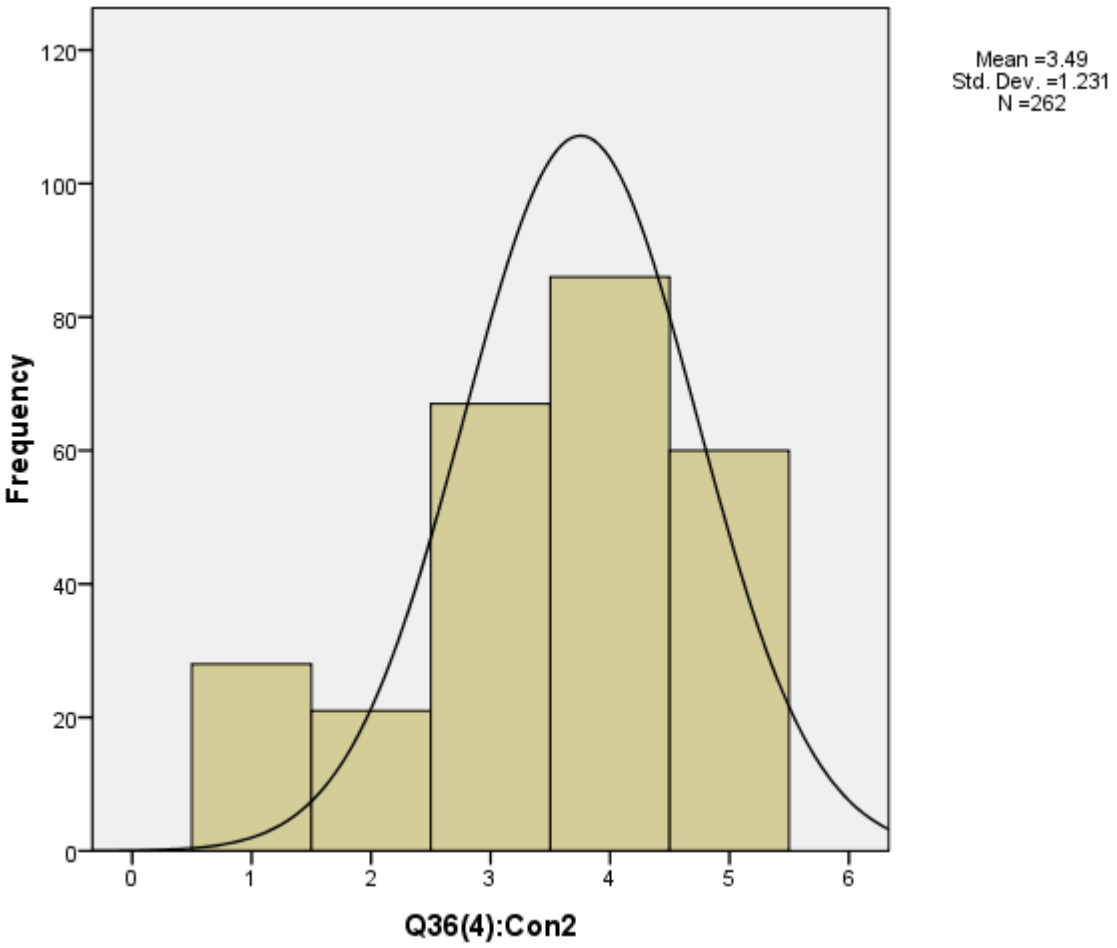
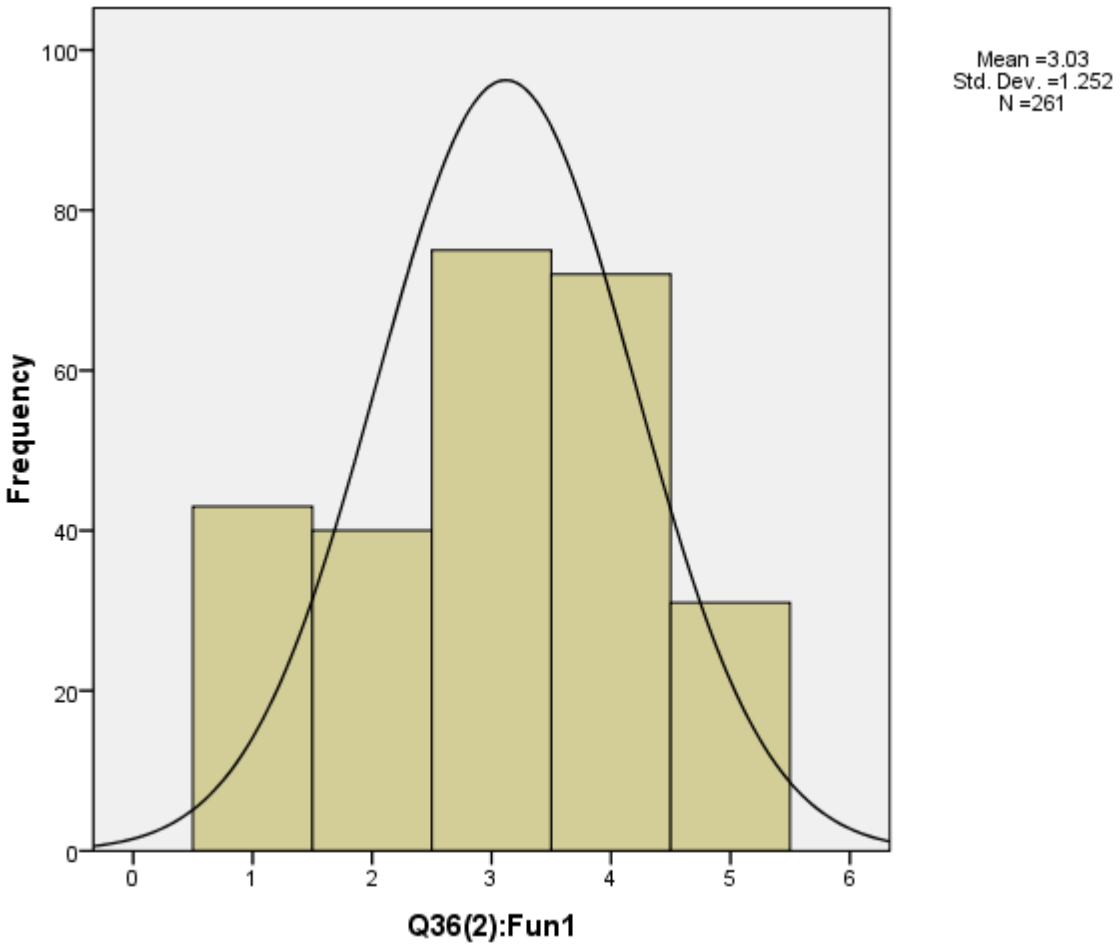
Std. Dev. =0.733
N =263
Frequency
200
150
100
50
0
0
1
2
3
4
5
6
Q34:Con1


Mean =3.49
Std. Dev. =1.231
N =262
Frequency
120
100
80
60
40
20
0
0
1
2
3
4
5
6
Q36(4):Con2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Std. Dev. =1.252
N =261
Frequency
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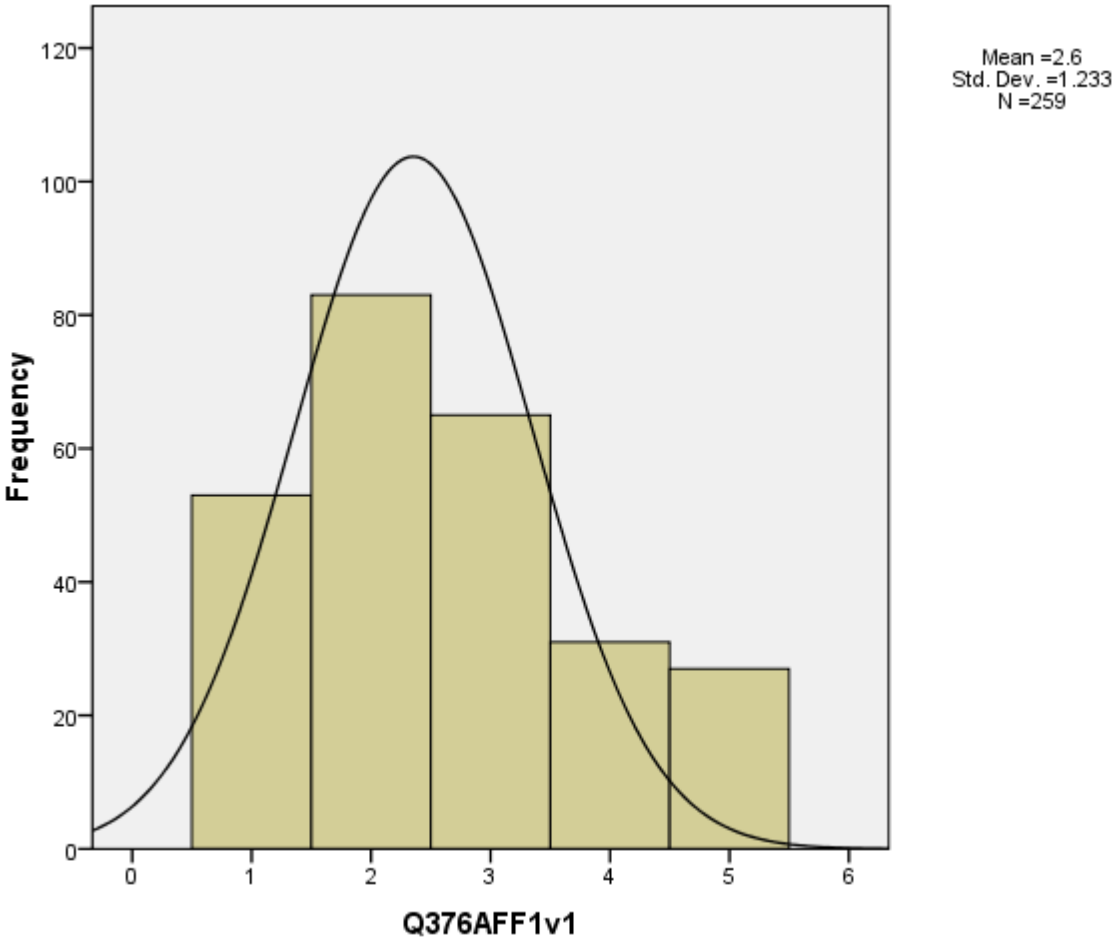
80
60
40
20
0
0
1
2
3
4
5
6
Q36(2):Fun1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Std. Dev. =1.233
N =259
Frequency
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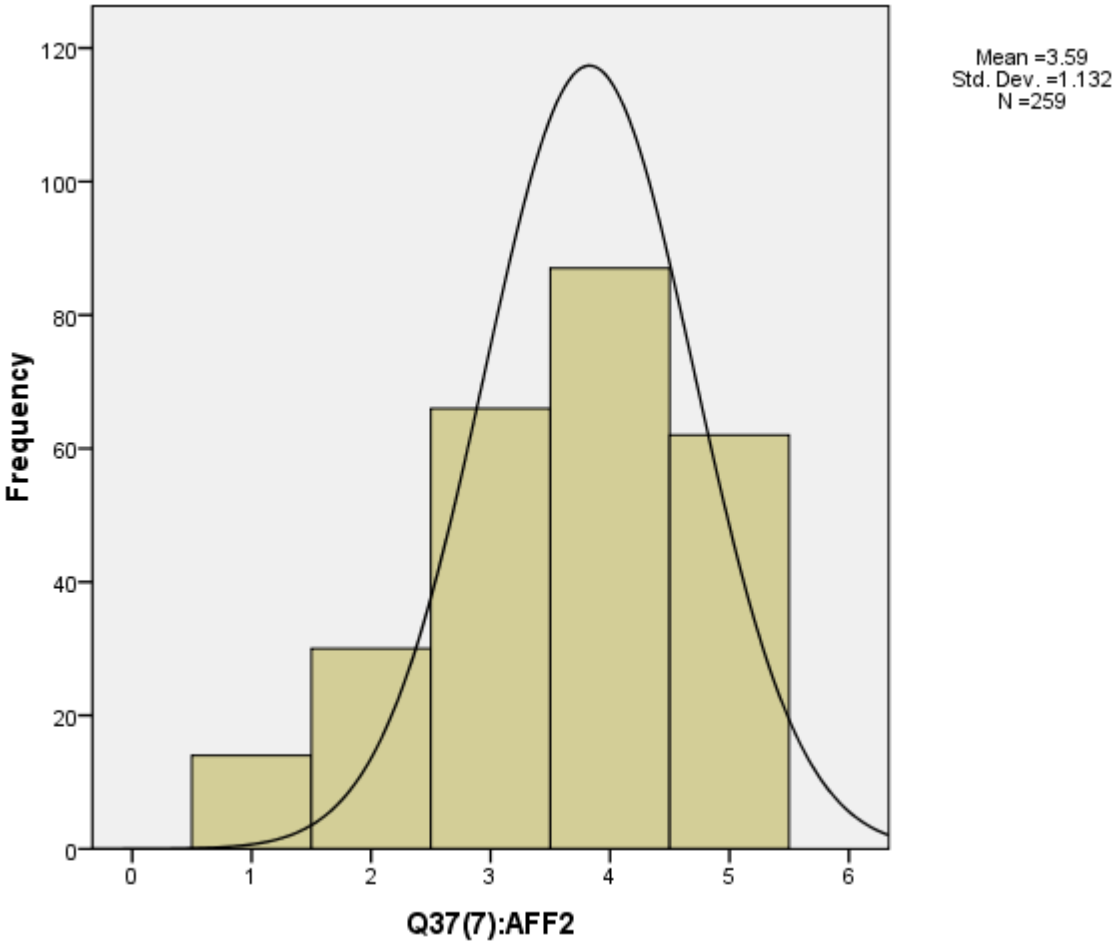
100
80
60
40
20
0
0
1
2
3
4
5
6
Q376AFF1v1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Std. Dev. =1.132
N =259
Frequency
120
100
80
60
40
20
0
0
1
2
3
4
5
6
Q37(7):AFF2

Appendix 4: Relationship 2: Technology and Perceived Ease of Use

Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Q37(9):INT1	259	1	5	3.26	1.152	-.266	.151
Q37(10):INT2	258	1	5	3.26	1.135	-.307	.152
Q20:EFF1	262	1	5	4.07	.905	-1.082	.150
Q21:EFF2	263	1	5	3.91	.937	-.941	.150
Q22:EFF3	263	1	5	3.50	1.066	-.605	.150
Q37(11):EFF4	259	1	5	3.10	1.169	.002	.151
Q36(3):SEC1	261	1	5	3.15	1.293	-.102	.151
Q36(12):SEC2	260	1	5	3.34	1.157	-.290	.151
Q36(8):SEC3	260	1	5	3.38	1.230	-.328	.151
Valid N (listwise)	257						

Regression – Q36 (1)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q36(3):SEC1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

2	Q37(11):EFF4	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q36(1):PeU1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.630[a]	.397	.395	.963
2	.652[b]	.425	.421	.943

a. Predictors: (Constant), Q36(3):SEC1

b. Predictors: (Constant), Q36(3):SEC1, Q37(11):EFF4

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	155.332	1	155.332	167.328	.000[a]
	Residual	235.790	254	.928		
	Total	391.121	255			
2	Regression	166.298	2	83.149	93.570	.000[b]
	Residual	224.823	253	.889		
	Total	391.121	255			

a. Predictors: (Constant), Q36(3):SEC1

b. Predictors: (Constant), Q36(3):SEC1, Q37(11):EFF4

c. Dependent Variable: Q36(1):PeU1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.521	.160		9.498	.000
	Q36(3):SEC1	.608	.047	.630	12.936	.000
2	(Constant)	2.096	.227		9.251	.000
	Q36(3):SEC1	.602	.046	.624	13.071	.000
	Q37(11):EFF4	-.179	.051	-.168	-3.513	.001

a. Dependent Variable: Q36(1):PeU1

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q37(9):INT1	-.103[a]	-2.114	.035	-.132	.995
	Q37(10):INT2	-.067[a]	-1.370	.172	-.086	.980
	Q20:EFF1	.084[a]	1.712	.088	.107	.983
	Q21:EFF2	.124[a]	2.562	.011	.159	.989
	Q22:EFF3	.055[a]	1.130	.259	.071	1.000
	Q37(11):EFF4	-.168[a]	-3.513	.001	-.216	.998
	Q36(12):SEC2	.000[a]	-.017	.987	-.001	1.000
	Q36(8):SEC3	-.001[a]	-.027	.978	-.002	1.000
2	Q37(9):INT1	-.051[b]	-.994	.321	-.063	.876
	Q37(10):INT2	-.015[b]	-.296	.767	-.019	.881
	Q20:EFF1	.044[b]	.876	.382	.055	.919
	Q21:EFF2	.085[b]	1.707	.089	.107	.917
	Q22:EFF3	.051[b]	1.074	.284	.068	.999
	Q36(12):SEC2	.085[b]	1.630	.104	.102	.820
	Q36(8):SEC3	.083[b]	1.583	.115	.099	.827

a. Predictors in the Model: (Constant), Q36(3):SEC1

b. Predictors in the Model: (Constant), Q36(3):SEC1, Q37(11):EFF4

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q37(9):INT1	-.103[a]	-2.114	.035	-.132	.995
	Q37(10):INT2	-.067[a]	-1.370	.172	-.086	.980
	Q20:EFF1	.084[a]	1.712	.088	.107	.983
	Q21:EFF2	.124[a]	2.562	.011	.159	.989
	Q22:EFF3	.055[a]	1.130	.259	.071	1.000
	Q37(11):EFF4	-.168[a]	-3.513	.001	-.216	.998
	Q36(12):SEC2	.000[a]	-.017	.987	-.001	1.000
	Q36(8):SEC3	-.001[a]	-.027	.978	-.002	1.000
2	Q37(9):INT1	-.051[b]	-.994	.321	-.063	.876
	Q37(10):INT2	-.015[b]	-.296	.767	-.019	.881
	Q20:EFF1	.044[b]	.876	.382	.055	.919
	Q21:EFF2	.085[b]	1.707	.089	.107	.917
	Q22:EFF3	.051[b]	1.074	.284	.068	.999
	Q36(12):SEC2	.085[b]	1.630	.104	.102	.820
	Q36(8):SEC3	.083[b]	1.583	.115	.099	.827

a. Predictors in the Model: (Constant), Q36(3):SEC1

b. Predictors in the Model: (Constant), Q36(3):SEC1, Q37(11):EFF4

c. Dependent Variable: Q36(1):PeU1

Regression – Q29

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q378SEC_3	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

2	Q21:EFF2	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q29:PeU2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.270[a]	.073	.069	.875
2	.296[b]	.088	.081	.870

a. Predictors: (Constant), Q378SEC_3

b. Predictors: (Constant), Q378SEC_3, Q21:EFF2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.201	1	15.201	19.853	.000[a]
	Residual	193.717	253	.766		
	Total	208.918	254			
2	Regression	18.335	2	9.168	12.122	.000[b]
	Residual	190.582	252	.756		
	Total	208.918	254			

a. Predictors: (Constant), Q378SEC_3

b. Predictors: (Constant), Q378SEC_3, Q21:EFF2

c. Dependent Variable: Q29:PeU2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.383	.130		18.359	.000
	Q378SEC_3	-.200	.045	-.270	-4.456	.000

2	(Constant)	2.837	.257		11.018	.000
	Q378SEC_3	-.194	.045	-.261	-4.321	.000
	Q21:EFF2	-.121	.059	-.123	-2.036	.043

a. Dependent Variable: Q29:PeU2

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q379INT_1	-.073[a]	-1.097	.274	-.069	.828
	Q3710_INT2	-.084[a]	-1.249	.213	-.078	.818
	Q3711EFF_4	-.099[a]	-1.492	.137	-.094	.832
	Q20:EFF1	-.105[a]	-1.730	.085	-.108	.980
	Q21:EFF2	-.123[a]	-2.036	.043	-.127	.995
	Q22:EFF3	-.016[a]	-.257	.798	-.016	.999
	Q36(3):SEC1	-.029[a]	-.475	.636	-.030	1.000
	Q3712SEC_2	.050[a]	.675	.500	.042	.679
2	Q379INT_1	-.065[b]	-.974	.331	-.061	.825
	Q3710_INT2	-.079[b]	-1.194	.234	-.075	.817
	Q3711EFF_4	-.065[b]	-.950	.343	-.060	.763
	Q20:EFF1	-.042[b]	-.524	.601	-.033	.556
	Q22:EFF3	.001[b]	.017	.987	.001	.981
	Q36(3):SEC1	-.015[b]	-.251	.802	-.016	.987
	Q3712SEC_2	.061[b]	.827	.409	.052	.676

a. Predictors in the Model: (Constant), Q378SEC_3

b. Predictors in the Model: (Constant), Q378SEC_3, Q21:EFF2

c. Dependent Variable: Q29:PeU2

Appendix 5: Relationship 3: Perceived Ease of Use and Perceived Usefulness

Approach 1

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q29:PeU2	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q28:PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.567[a]	.321	.319	.693

a. Predictors: (Constant), Q29:PeU2

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.235	1	58.235	121.244	.000[a]
	Residual	122.959	256	.480		
	Total	181.194	257			

a. Predictors: (Constant), Q29:PeU2

b. Dependent Variable: Q28:PU

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	.720	.098		7.338	.000
	Q29:PeU2	.524	.048	.567	11.011	.000

a. Dependent Variable: Q28:PU

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q36(1):PeU1	-.048[a]	-.915	.361	-.057	.979

a. Predictors in the Model: (Constant), Q29:PeU2

b. Dependent Variable: Q28:PU

Approach 2

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q29:PeU2	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q28:PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.506[a]	.256	.252	.739

a. Predictors: (Constant), Q29:PeU2

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.833	1	36.833	67.377	.000[a]
	Residual	107.147	196	.547		
	Total	143.980	197			

a. Predictors: (Constant), Q29:PeU2

b. Dependent Variable: Q28:PU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.919	.130		7.051	.000
	Q29:PeU2	.479	.058	.506	8.208	.000

a. Dependent Variable: Q28:PU

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q36(1):PeU1	-.082[a]	-1.324	.187	-.094	.993

a. Predictors in the Model: (Constant), Q29:PeU2

b. Dependent Variable: Q28:PU

Appendix 6: Relationship 4: Service and Actual Use

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q34:Con1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Q376AFF1v1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q27:USE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.157[a]	.025	.021	.453
2	.220[b]	.049	.041	.448

a. Predictors: (Constant), Q34:Con1

b. Predictors: (Constant), Q34:Con1, Q376AFF1v1

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.335	1	1.335	6.503	.011[a]
	Residual	52.773	257	.205		

	Total	54.108	258			
2	Regression	2.625	2	1.312	6.526	.002[b]
	Residual	51.483	256	.201		
	Total	54.108	258			

a. Predictors: (Constant), Q34:Con1

b. Predictors: (Constant), Q34:Con1, Q376AFF1v1

c. Dependent Variable: Q27:USE

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.142	.174		12.279	.000
	Q34:Con1	-.100	.039	-.157	-2.550	.011
2	(Constant)	2.301	.184		12.523	.000
	Q34:Con1	-.102	.039	-.161	-2.638	.009
	Q376AFF1v1	-.057	.023	-.154	-2.532	.012

a. Dependent Variable: Q27:USE

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q36(4):Con2	-.065[a]	-1.031	.303	-.064	.960
	Q36(2):Fun1	-.011[a]	-.167	.868	-.010	.949
	Q376AFF1v1	-.154[a]	-2.532	.012	-.156	.999
	Q37AFF2v1	-.111[a]	-1.804	.072	-.112	1.000
2	Q36(4):Con2	-.076[b]	-1.224	.222	-.076	.956
	Q36(2):Fun1	-.007[b]	-.105	.916	-.007	.948
	Q37AFF2v1	.043[b]	.414	.679	.026	.340

a. Predictors in the Model: (Constant), Q34:Con1

b. Predictors in the Model: (Constant), Q34:Con1, Q376AFF1v1

c. Dependent Variable: Q27:USE

Appendix 7: Relationship 5: Service Awareness and Intention to Use

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q30:SA1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Q23:SA2	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	Q25:SA3	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q35:IU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.356[a]	.127	.123	.801
2	.422[b]	.178	.172	.779
3	.438[c]	.192	.182	.774

a. Predictors: (Constant), Q30:SA1

b. Predictors: (Constant), Q30:SA1, Q23:SA2

c. Predictors: (Constant), Q30:SA1, Q23:SA2, Q25:SA3

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.018	1	24.018	37.420	.000[a]
	Residual	165.594	258	.642		
	Total	189.612	259			
2	Regression	33.825	2	16.912	27.900	.000[b]
	Residual	155.787	257	.606		
	Total	189.612	259			
3	Regression	36.364	3	12.121	20.249	.000[c]
	Residual	153.248	256	.599		
	Total	189.612	259			

a. Predictors: (Constant), Q30:SA1

b. Predictors: (Constant), Q30:SA1, Q23:SA2

c. Predictors: (Constant), Q30:SA1, Q23:SA2, Q25:SA3

d. Dependent Variable: Q35:IU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.106	.113		9.781	.000
	Q30:SA1	.410	.067	.356	6.117	.000
2	(Constant)	.632	.161		3.929	.000
	Q30:SA1	.412	.065	.358	6.329	.000
	Q23:SA2	.312	.077	.227	4.022	.000
3	(Constant)	.457	.181		2.519	.012
	Q30:SA1	.389	.066	.338	5.920	.000
	Q23:SA2	.247	.083	.180	2.964	.003
	Q25:SA3	.243	.118	.127	2.060	.040

a. Dependent Variable: Q35:IU

Excluded Variables[c]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q23:SA2	.227[a]	4.022	.000	.243	1.000
	Q25:SA3	.196[a]	3.390	.001	.207	.976
2	Q25:SA3	.127[b]	2.060	.040	.128	.835

a. Predictors in the Model: (Constant), Q30:SA1

b. Predictors in the Model: (Constant), Q30:SA1, Q23:SA2

c. Dependent Variable: Q35:IU

Appendix 8: Relationship 6: Perceived Usefulness and Intention to Use

Approach 1: Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q28:PU	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q35:IU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.438[a]	.192	.188	.770

a. Predictors: (Constant), Q28:PU

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.251	1	28.251	47.616	.000[a]
	Residual	119.256	201	.593		
	Total	147.507	202			

a. Predictors: (Constant), Q28:PU

b. Dependent Variable: Q35:IU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.970	.133		7.301	.000
	Q28:PU	.442	.064	.438	6.900	.000

a. Dependent Variable: Q35:IU

Approach 2: Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q28:PU	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q35:IU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.418[a]	.175	.172	.779

a. Predictors: (Constant), Q28:PU

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.533	1	33.533	55.288	.000[a]
	Residual	158.300	261	.607		
	Total	191.833	262			

a. Predictors: (Constant), Q28:PU

b. Dependent Variable: Q35:IU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.004	.109		9.224	.000
	Q28:PU	.429	.058	.418	7.436	.000

a. Dependent Variable: Q35:IU

Appendix 9: Relationship 7: Perceived Ease of Use and Intention to Use

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Q29:PeU2	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Q36(1):PeU1	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Q35:IU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.280[a]	.079	.075	.830
2	.352[b]	.124	.117	.811

a. Predictors: (Constant), Q29:PeU2

b. Predictors: (Constant), Q29:PeU2, Q36(1):PeU1

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.052	1	15.052	21.843	.000[a]
	Residual	176.409	256	.689		
	Total	191.461	257			

2	Regression	23.767	2	11.883	18.070	.000[b]
	Residual	167.695	255	.658		
	Total	191.461	257			

a. Predictors: (Constant), Q29:PeU2

b. Predictors: (Constant), Q29:PeU2, Q36(1):PeU1

c. Dependent Variable: Q35:IU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.232	.118		10.481	.000
	Q29:PeU2	.266	.057	.280	4.674	.000
2	(Constant)	1.800	.194		9.287	.000
	Q29:PeU2	.237	.056	.249	4.206	.000
	Q36(1):PeU1	-.149	.041	-.216	-3.640	.000

a. Dependent Variable: Q35:IU

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Q36(1):PeU1	-.216[a]	-3.640	.000	-.222	.979

a. Predictors in the Model: (Constant), Q29:PeU2

b. Dependent Variable: Q35:IU

Appendix 10: Cross tabulation – Available on Request from MCIS Programme Administrator