Factors influencing the use of Mobile Banking: The case of SMS-based Mobile Banking

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Abstract

Mobile banking is an application of mobile computing which provides customers with the support needed to be able to bank anywhere, anytime using a mobile handheld device and a mobile service such as text messaging (SMS). Mobile banking removes space and time limitations from banking activities such as checking account balances, or transferring money from one account to another. In recent research and studies it was found that while mobile banking and more specifically SMS-based mobile banking applications have become popular in some countries and regions, they were still not widely used.

This study identifies and investigates the factors which influence customers' decision to use a specific form of mobile banking, and specifically focuses on the evaluation of SMS-based mobile banking in the context of New Zealand. The research model includes the basic concepts of the Technology Acceptance Model (TAM), as well as some constructs derived through a focus group discussion. The model is tested to determine its predictive power with respect to individual's behaviour when considering the use of SMS-based mobile banking. A survey questionnaire was developed and employed to collect data from 250 AUT university students in New Zealand. The results of the data analysis contributes to the body of knowledge in the area by demonstrating that context specific factors such as service quality and service awareness are influencing user perceptions about the usefulness of SMS mobile banking which in turn affect intention to use and adoption. Secondly, the study demonstrates, on the example of SMS-based mobile banking, how a hybrid approach involving qualitative data collection and a subsequent quantitative survey can help investigate how user perceptions about usefulness and ease of use are formed. Although the study has its limitations, the implications of the results allow providing practical recommendations to the banking industry, and directions for further work.

Statement of Originality

‘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 or material which has been accepted for the qualification of any other degree or diploma of a university or other institute of higher learning.’

Yours sincerely,

_____

Shi Yu (Jimmy)

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AL: Alternative

AT: Advertising

COMP: Compatibility

DIT: Diffusion of Innovation Theory

EPEOU: Estimated perceived ease of use

EPU: Estimated perceived usefulness

FN: Functions

INT: Intention to use

MA: Mobility access

PC: Perceived cost

PEOU: Perceived Ease of Use

PR: Perceived risk

PU: Perceived usefulness

SE: Self efficacy

SMS: Short message service

SP: Speed

TAM: Technology Acceptance Model

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AUTEC Approval

The Research conducted as a part of the thesis has been approved by The Auckland University of Technology Ethics Committee (AUTEC), Reference Number: 08/54，on 08/08/2008(Stage One) and 15/09/2008 (Stage Two)

CHAPTER 1 Introduction

1.1 Chapter overview

This chapter underlines the importance of the research, formulates its objectives, explains the rationale and discusses its significance and potential value. The structure of the thesis is outlined with a brief description of each chapter provided.

1.2 Importance of the research

A number of new information and commercial technologies and applications have been explored in the past and mobile technology is one of them. Mobile applications have been developed and used in different areas. Pervasive and ubiquitous mobile technology has penetrated both the personal and business domains. Mobile services have an impact on consumers because they allow ubiquitous and universal access to information and services, as well as a possibility for a unique and personalized exchange of information (Watson et al., 2002). As a result, using mobile devices is now a part of daily life, and a way to keep in touch with the rest of the world as well as to communicate and network. New technology is said to be inseparable from everyday life (Weiser, 1991).

Newbery (2005) found that New Zealand ranks highly among OECD countries in terms of multimedia mobile phone saturation (69% compared to the global average of 53%). A survey done by the Vodafone New Zealand Ltd on November 23, 2008 found that the mobile phone was used to do everything from banking and paying for parking, to downloading music and finding (or dumping) partners (Hudson, 2008).

Mobile banking is one developing mobile technique used in the commercial domain. It has combined information technology and commerce applications together. Since mobile banking was introduced, consumers have been able to use it to obtain special services 24 hours a day without having to visit the traditional bank branch for personal transactions.

Short message service (SMS) is used to support mobile banking service as the main medium. Reasons for mobile and SMS usage are largely saving time, varying location and convenience (Venkatesh et al, 2003). It is quick and easy for users to become familiar with the mobile banking service. A recent survey done by the Vodafone New Zealand Ltd (Hudson, 2008) found that New Zealanders send messages using mobile phones at least 600 million times per month. It was found that texting is not only used for general conversation, and greetings in New Zealand, but also for solving embarrassing situations such as firing employees, marriage proposals, asking for a date, and even gathering evidence of cheating. Paul Brislen, of Vodafone NZ said Kiwis were also world leaders when it came to downloading tunes to their handsets (Hudson, 2008). This implied that New Zealanders are more likely to use texting than many other populations in the world. This might make it quite easy for New Zealanders to use SMS-based mobile banking.

In Korea, in a survey done by Yong and Gorman (2002) it was found that there was a nearly 400 percent increase in the level of mobile banking service use within 15 months, as shown in Figure 1.1:

Table XIV Use of mobile banking services (unit: cases)

Service	December 2000	December 2001	March 2002
Inquiry	200,552	691,883	817,111
EFT	1,746	18,319	25,241
Total	202,298	710,202	842,352
Change		251.1	18.6

Note: Transaction cases during the month indicated

Source: The Bank of Korea (2002)

Figure 1.1: use of mobile banking in Korea

Source: Journal of Online Information Review, Yong & Gorman (2002)

The functionality of a mobile banking service increases user's satisfaction. Furthermore, it creates the value for customers' banking transaction as a wireless service delivery channel.

However, it is a still minority of people using mobile banking in the market; a recent research has found that in Ireland approximately 1% of consumers use mobile banking while nearly 90% of the population have mobile phones (Foley,

2005). The use of mobile banking only focuses on basic functions provided by the mobile banking service rather than more complex ones. A recent Forrester research survey question asked: *"What mobile banking activities would you mostly be interested in?"* as seen in Figure 1.2 (Foley, 2005).

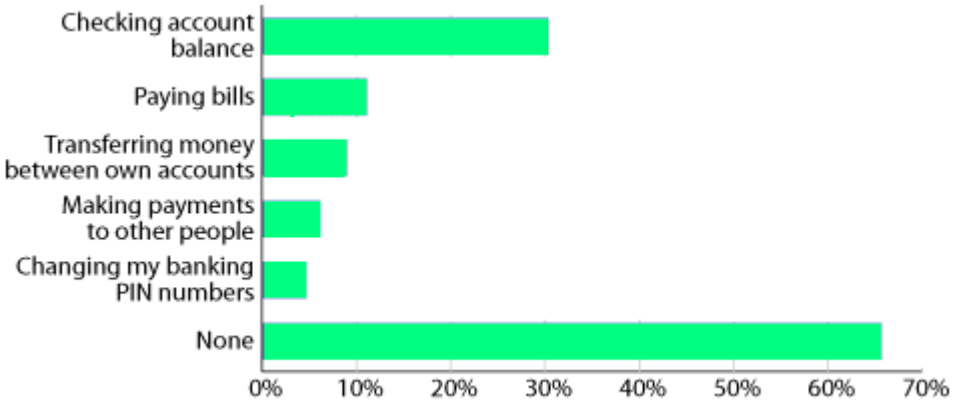


Figure 1.2 mobile banking activities

Source: ireach, www.ireach.ie

As figure 1.2 shows, most consumers did not use mobile banking at all. Those that used this service used it only for simple functions like checking account balances. More complicated functions of mobile banking have not been considered.

1.3 Research objective

The main objective of this research is to find out why SMS-based mobile banking is not as popular as it might be expected in New Zealand, to identify the issues related to the slow adoption process, and to suggest ways of resolving them. The study will focus on two main questions in New Zealand:

1) What are the factors which influence the use of SMS-based mobile banking?
2) How is it best to evaluate a mobile banking application or service in terms of its adoptability?

1.4 Research rationale

Some prior work in the area of mobile business models and mobile services including mobile banking, has highlighted some of the more general issues

related to the spread of mobile services and the shaping of the mobile business 'landscape' (Petrova, 2004; Petrova, 2005; Petrova & Qu, 2006). However, there is a still need to explore factors which influence the use of mobile banking in New Zealand and more specifically, the factors limiting the use of the corresponding services available, as research results obtained in other regions and countries may not be entirely relevant to the New Zealand context due to cultural and behavioural differences as well as to socio-economic factors. The outcomes of the study might serve to provide recommendations to the mobile banking sector and to the banking industry as well as the mobile phone industry.

1.5 Significance and potential Value

The outcomes and results of this research may be of potential value to the industry (e.g. banks) and to other researchers (e.g. social scientists). Based on the factors found to be influencing user decision on mobile banking, the study may provide recommendations for banks about changes needed in order to accelerate user adoption of the services offered. Social scientists may find the results useful for their study of human behaviour and motivation, and how they may affect attitudes towards the adoption and use of an innovative service.

1.6 Outline of the thesis

This thesis consists of five chapters. The introduction outlines the objectives, emphasizes the importance of the study, and formulates the research questions. Chapter 2 presents findings from a literature review with a focus on the issues and problems found in the research, shows how a research model is derived from the literature review, and briefly reviews the research approach of this study. In Chapter 3, a hybrid approach (using both qualitative and quantitative methods) is applied and discussed in order to develop the research model. Furthermore, it outlines the research process, data collection method and questionnaire. Chapter 4 presents the findings and analysis of the data collected from the survey using the SPSS (statistical package for social science) tool. Chapter 5 discusses the results from the previous chapter. Finally the thesis concludes with a summary of the research findings and their implications with suggestions for future work.

CHAPTER 2 Background and approach

2.1 Chapter overview

This chapter reviews the existing literature on factors influencing user behaviour in regard to use and adoption of mobile banking services or other IS/IT applications, as well as some of the relevant research models used in IS/IT research. In addition, it briefly reviews the research approach of this study.

2.2 Overview of factors influencing mobile banking

User adoption of mobile commerce applications has been hindered by many factors. Literature findings identify some of the issues and factors associated with mobile banking, which are also related to other IS/IT applications; these factors are further used to generate the constructs applicable to this research in order to build the initial research model and investigate the research objectives. The factors can be organized into five categories: risk and security, socio-economic background and culture, service characterization, cost of service and device, and device features.

2.2.1 Risk and security

Security and trustworthiness of a service was identified as one of the most important factors within every target customer segment when deciding on the use of a banking service delivery channel. Some agreed that “using mobile phone in banking is trustworthy" (Mattila, 2002, p.10). Fain and Roberts (1997, p.53) defined “risk is a perception of consumer, not a characteristics of a product”. It was found that the security factor could influence consumers’ attitudes towards online banking in China (Laforet & Li 2005). Furthermore, it was considered to be one of the greatest concerns in adoption of mobile banking services (Luarn & Lin, 2004; Brown et al, 2003), as individuals may worry about security issues during mobile banking service transactions such as data input and output mechanisms (Laukkanen & Lauronen, 2005), loss of connection risk (Kuisma et al., 2007; Black et al, 2001) and personal performance mistakes (Laukkanen & Lauronen, 2005; Kuisma et al., 2007). As a result, many people may decide not to use this service and ignore the extra benefits of using mobile banking. However, some previous studies have argued

that, on the contrary, security issues were not major obstacles for consumers in adopting mobile banking (Suoranta, 2003; Laukkanen & Lauronen, 2005). It can be concluded that the security aspect is to be investigated as an important element which influences the use of mobile banking. As an example, Soroor (2005; 2006) focused on the security issue in mobile banking and proposed some evaluation techniques which could be used to improve the system in Iran and elsewhere:

1) First, the establishment of a secure channel to provide data confidentiality and integrity between the client and the bank service.

2) Secondly, the authentication of the client at the beginning of a mobile banking session (e.g. entity authentication, transaction authentication).

2.2.2 Socio-economic background and culture

Laforet and Li (2005) found that the lack of understanding of the concepts and benefits was a main barrier to consumers using mobile banking, subsequently, users of mobile banking were not intended to be highly educated and were typically younger people in China; this was in contrast to the situation in the western countries as discussed by Karjaluoto, Mattila, and Pento, (2002). As discussed by Trappey and Trappey (2001), the Chinese are used to carrying cash, and have little confidence in traditional financial management. Compared other Asian consumers, Chinese consumers seem to be more traditional and less affected by new technology advancements. Heinonen (2004) and Forman and Sriram (1991) found that some customers simply prefer to deal directly with a bank clerk instead of utilizing “arms-length technology” (e.g. mobile banking). In addition, Singh (2004）outlined that males used mobile banking more than females, and mobile banking users tended to come from high-income groups such as small business owners, salaried employees and senior managers. Furthermore, a negative, hard-to-use image (Fain & Roberts, 1997) of technologies and computers may have been perceived by consumers when thinking about using mobile banking. Therefore, the socio-economic background and culture of potential users could be factors that influence the usage of mobile banking.

2.2.3 Service characteristics

The account balance service is one of the most promising mobile banking services, and is designed to help customers check their account balance and latest transactions immediately anytime/anywhere (Laukkanen, 2007). Luakkanen and Lauronen (2005) found that location free access created convenience in requesting account balances. Furthermore, accessibility and portability are classified as dimensions of convenience in the consumer behaviour literatures (Yale & Venkatesh, 1986; Gehrt & Yale, 1993). Consequently the spatial and temporal distance between need recognition and need satisfaction can be considered important for doing banking via mobile phone.

The ability to allow consumers to have more control over their financial situation is one attraction of mobile banking services (Laukkanen & Lauronen, 2005), as the consumer prefers to act for himself/herself when dealing with his /her own monetary transactions through the mobile device. Luakkanen (2005) found that the flexibility of being able to use the service wherever and whenever the users want enables immediate completion of banking tasks (transferring money or paying a bill). This would save time and be perceived as convenient and efficient. The bank provides several services through mobile media, information-based, transaction–based and personal services (Laudon, & Laudon, 2002). The SMS service is the easiest way to check account balances and latest transactions via mobile phone (Laukkanen, 2007). Laukkanen et al (2007) found that speed of data transmission and the user interface impaired the added value of mobile services. Therefore, the characteristics of the service as perceived by the user and provided by the banking institution and service provider are important factors influencing the usage of mobile banking.

2.2.4 Cost of service and device

According to Nah, Siau, and Sheng (2005), the cost of mobile devices and mobile services was identified as an investment concern. Luarn and Lin (2004) argued that financial cost was one of the greatest concerns in adoption of mobile banking services. Furthermore, Ram and Sheth (1987; 1989) stated that it was not viable for consumers to change their way of performing their banking tasks without offering a strong performance-to-price advantage. The price of banking services may have an opposite effect with respect to the adoption of

mobile banking, which may result in consumers preferring the traditional banking services (Laukkanen et al, 2007). Users agree to pay a reasonable fee to use this service; however this would depend on the banking and service provider. Provision of a lower service cost is also a major benefit for users using mobile banking and performing banking transaction functions through a mobile device; so the "value for money" barrier may be another factor influencing the adoption of mobile banking services.

2.2.5 Device features

The somewhat limited input and display capability of current mobile devices is seen as limiting the use of mobile banking applications (Pousttchi, & Schurig, 2004; Laukkanen, & Lauronen, 2005). For example, a mobile phone's small screen cannot accommodate enough information about an account, and scrolling up and down would be needed. However, the mobile phone device itself may have little effect; Laukkanen (2007) found that when customers had experience in using a mobile phone service, they did not stress the importance of screen size in the service, but rather focused their attention on the spatial issues in the service consumption. Therefore device features may not be an issue for bank customers when considering using mobile banking.

2.3 Adoption models: TAM, Extended TAM and DIT

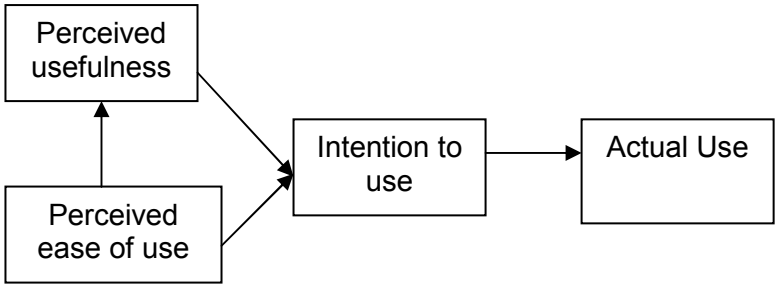
The Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) has been widely used and adopted to understand user acceptance of IT/IS. TAM was adapted from the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) which is a general theory of human behaviour. TAM is specific to IT/IS usage (Mathieson et al., 2001) and valid in predicting the individual's acceptance of various corporate IT systems (Adams, Nelson, & Todd, 1992; Chin & Todd, 1995; Doll, Hendrickson, & Deng, 1998; Segars & Grover, 1993).

"The Technology Acceptance Model (TAM) is an information systems (System consisting of the network of all communication channels used within an organization) theory that models how users come to accept and use a technology" (Mazha , 2006, p.1). TAM focuses on IS use based on social psychology theory, and has valid and reliable instruments (Luarn & Lin, 2004).

As defined by Davis (1989), two basic determinants – perceived usefulness and perceived ease of use are instrumental in explaining the users' intention and behaviour towards the use of new technology (Figure 2.1).

Perceived usefulness was defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Ibid, p.320), While perceived ease of use was defined as "the degree to which a person believes that using a particular system would be free from effort" (Ibid, p.320).

As noted by Davis (1989), future research of IS/IT usage has to address the other variables which affect usefulness, ease of use and user acceptance. Consequently these two determinants may not fully explain the factors which predict the acceptance of a technology application such as mobile banking. Prior studies have extended the original TAM with added constructs such as perceived playfulness (Moon & Kim, 2001), perceived enjoyment (Koufaris, 2002) and perceived credibility (Wang et al., 2003). Luarn and Lin (2004) added some constructs into the original TAM model to facilitate understanding of the intention to use mobile banking in Taiwan. The extended TAM (Figure 2.2) was adopted and used in this research. Luarn and Lin (2004) modified the original TAM by adding perceived credibility which was defined by Wang et al (2003), perceived self-efficacy which was confirmed by several prior studies (Agarwal, Sambamurthy, & Stair, 2000; Chau, 2001; Hong, Thong, Wong, & Tam, 2001; Johnson & Marakas, 2000), and perceived financial cost which was found in Mathieson et al (2001).



Technology Acceptance Model (TAM): Davis (1989), Davis, Bagozzi and Warshaw (1989)

Figure 2.1: TAM

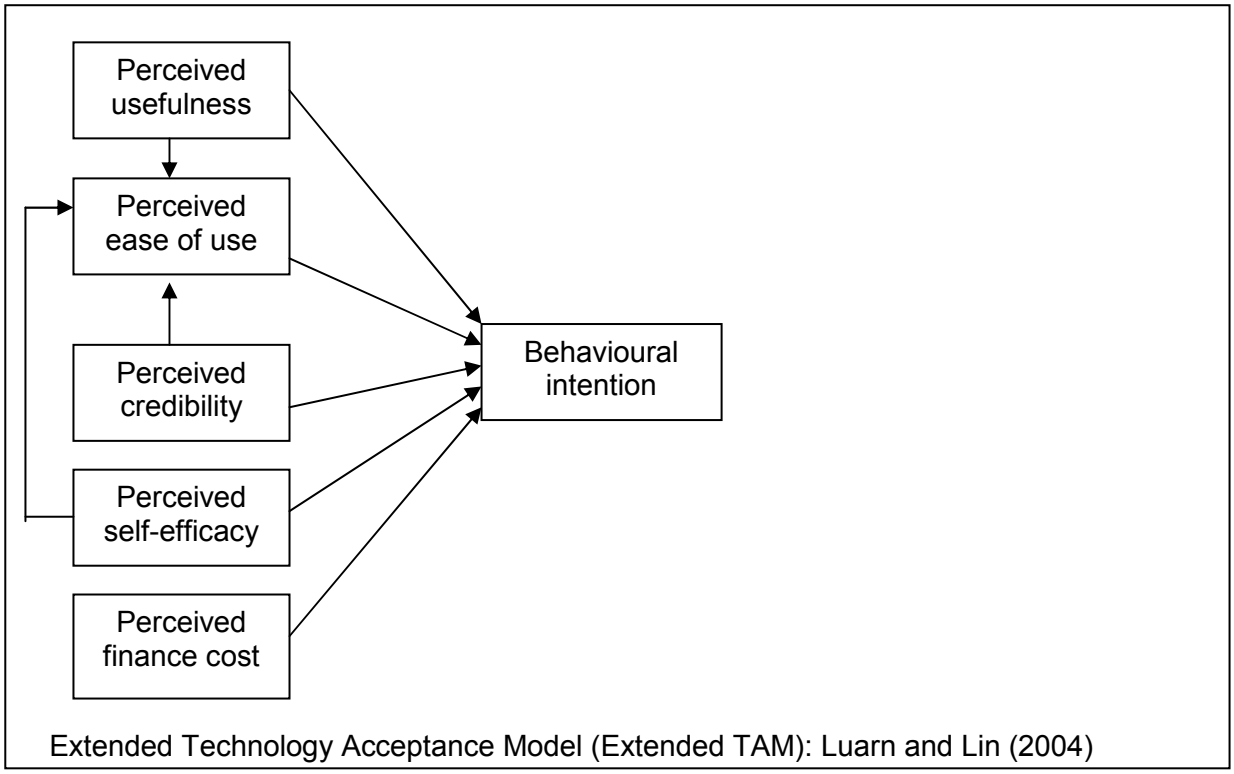


Figure 2.2: Extended TAM

Diffusion of Innovations Theory (DIT) was developed by Rogers (1995) to explain how the diffusion of innovations takes place in the social system. As defined by Rogers (1995), there are five stages of adoption process: knowledge, persuasion, decision, implementation and confirmation. Also, Rogers (1995) stated that three valuable insights – the quality of an innovation, peer to peer communication and understanding of the need of different user segments - might be useful to diffuse and adopt the innovation. Adopters of an innovation were classified into five categories: innovators (3.4%), early adopters (12.5%), early majorities (34%), late majorities (34%) and laggards (16%). The adoption of innovation curve can be represented in Figure 2.3. DIT has been widely used to address the issues about the individuals' adoption of various innovations (Moore & Benbasat, 1991; Tan & Teo, 2000). According to Rogers (1995), innovation compatibility with one's usual way of working and behaving is a factor to make individuals more likely to adopt the innovation.

In the further development of the model used in the research, all three models were considered when the dependent and independent variables were defined.

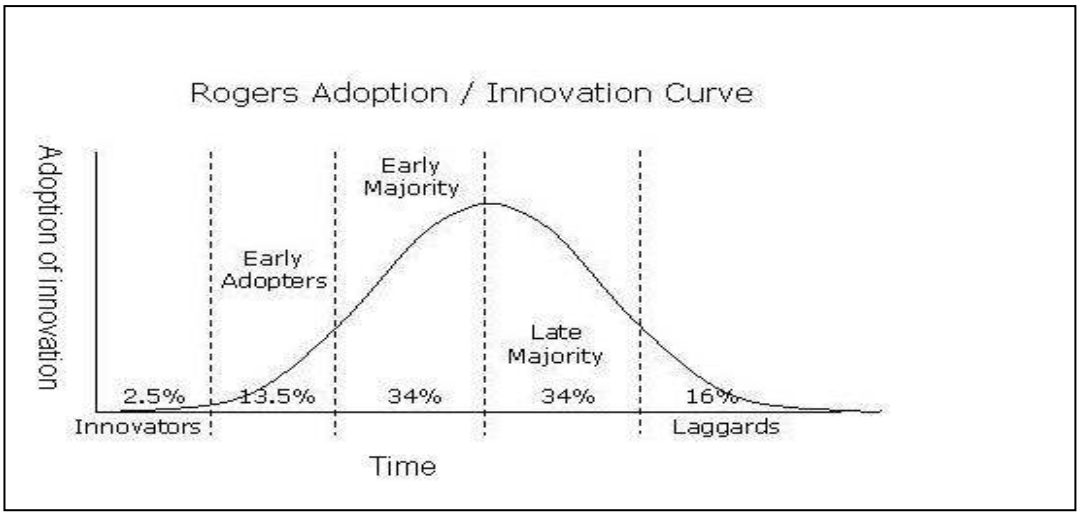


Figure 2.3: Adopters of Innovation curve

Source: Diffusion of Innovation, Rogers (1995)

2.4 Research approach

As mentioned in chapter one, the purpose of this project is to identify the factors which influence positively or adversely the use of mobile banking in New Zealand and more specifically, the factors limiting/promoting the use of the services available via SMS technology. In Section 2.2, some of the literature related indirectly and directly to mobile banking adoption trends across different countries was reviewed. Prior research results obtained in other regions and countries indicate that mobile banking may be more widely adopted in those countries compared to New Zealand; however findings from other countries may not be entirely relevant to the New Zealand context. Consequently this project attempts to identify factors specific to New Zealand, in order to gain an understanding of the reasons for the adoption gap identified. The study is based on the following two questions:

1) What are the factors which influence the use of SMS-based mobile banking?
2) How is it best to evaluate a mobile banking application or service in terms of its adoptability?

The research will involve qualitative and quantitative studies to explore the research objectives and findings. The use of a “mixed-methodology” approach, both qualitative and quantitative methods, will benefit the researcher by giving a wider view and more evidence to analyze the issues. It may elicit more research

directions and provide more flexibility and guidance to the achievement of the objective, as well as contribute to the reliability of the results.

A focus group and a survey were involved in the respective stages (qualitative and quantitative) of this research.

Firstly, focus group findings serve the purpose of providing information for the next stage. The data gathered from the focus groups was analysed to identify how New Zealand specific themes match the variables in the adoption models identified in the literature. These results were used to further refine the initial research question and the research model of the study and design a questionnaire addressing the variables of the research model. The discussion will be guided by questions about participants' experiences and perceptions in the area of mobile banking, SMS usage, and also E-banking which is a popular way to bank in New Zealand (Appendix D).

Secondly, a survey will be used to explore in depth the factors which influence the use of SMS-based mobile banking in New Zealand. The research model and the survey questionnaire will be designed to follow up on the results from the focus group sessions, which will allow the researcher to highlight relevant behavioural and other motivational factors. Data will be gathered from a detailed questionnaire, which will be analysed in order to identify factors and issues related to SMS-based mobile banking usage and adoption in New Zealand and provide recommendations.

2.5 Chapter summary

According to findings from the selected literature review, it can be concluded that the most important factors influencing the usage of mobile banking services are risk/security, quality of service, cost, and customer attitudes/habits. Building on literature findings from IS/IC research about models and factors influencing the adoption of mobile banking, the study will adopt the Extended TAM model as a starting point to create a research model with some added constructs. The initial research model and a detailed research approach are discussed in the next chapter.

CHAPTER 3 Developing the research model

3.1 Chapter overview

A mixed method of qualitative (focus group discussion) and quantitative (a survey with a questionnaire) approaches is applied to this study. An explanation and a description of the research design, data collection method and ethical considerations are presented in this chapter. Figure 3.1 depicts the steps followed in this study.

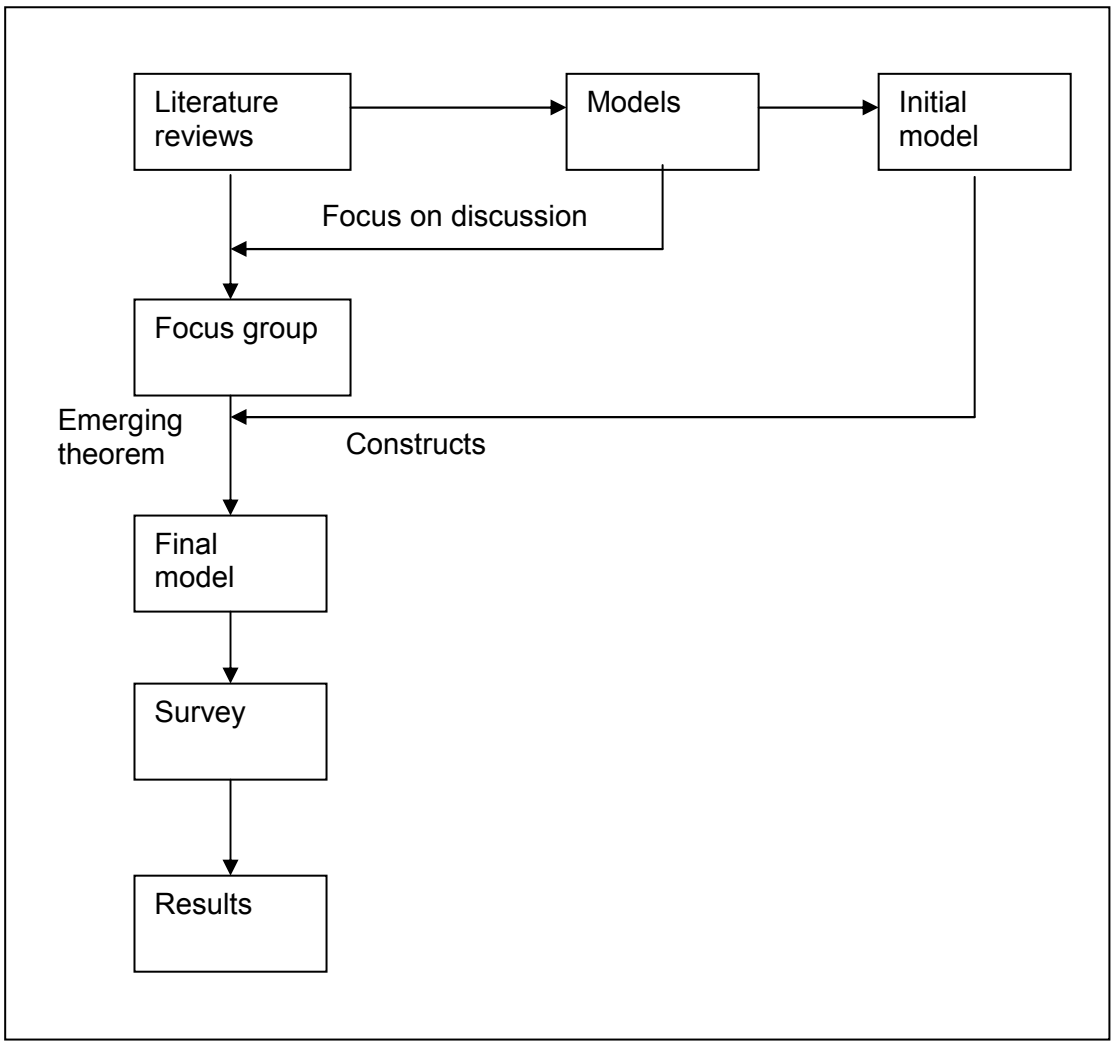


Figure 3.1: Study approach

3.2 Stage one: Focus group and discussion

A focus group method was used in this study to explore the research objectives because of its long history of use in market research, which has demonstrated it to be effective in identifying the participants' or respondents' attitudes, beliefs, feelings, experiences and reactions in a way that would not have been feasible using other methods (Gibbs, 1997).

Calder (1977) suggested that focus group interviews or discussions were a suitable method for explorative studies. Jarvenpaa and Lang (2005) have also demonstrated their feasibility in studying innovative mobile services. As discussed by Wilkinson (2004), it was found that the focus group's value lies in the group dynamics and interactions, which provide researchers with 'elaborated upon' perspectives of the topic under discussion.

Kontio, et al. (2004) mentioned that the benefit of the focus group was to produce mainly qualitative information about the object of study. Furthermore, focus groups could produce candid and insightful information, and it is also fairly inexpensive and fast to perform (Widdows et al., 1991). On the other hand, there could be some bias produced by the small sample size and group dynamics (Judd, et al., 1991).

3.2.1 Methodology

Four steps were conducted in the focus group stage of this study of mobile banking based on SMS, following prior research using focus groups (Edmunds, 1991; Krueger & Casey, 2000).

3.2.1.1 Defining the research focus

The objective of this study is to find out what influences the usage of mobile banking based on SMS and what factors currently exist in New Zealand society. The focus group method is also used to categorize the factors and problems in order to further develop the questionnaires required for the survey phase. From a small population of participants in a focus group discussion, it will try to get an idea of what the factors are exactly as perceived by participants and how they affect participants' decisions to use or not use mobile banking based on SMS.

The data collected from the in-depth discussions in focus groups is analysed and categorized into factors influencing SMS-based mobile banking use.

3.2.1.2 Selecting the participants

Two main criteria were used in selecting the focus group participants.
Participants were recruited from postgraduate students of computer and information sciences; they were eligible to participant and had a mobile phone and a bank account.

Stewart and Shamdasani (1990, p. 33) found that "the usefulness and validity of focus group data are affected by the extent to which participants feel comfortable about openly communicating their ideas, views or opinions". Bryman (2001) found that naturally formed groups were particularly relaxed and at ease in conversation. To this end, the participants were recruited from peer participants in the Master of Computer and Information Science (MCIS) Student Research Forum, AUT University, Auckland, as they were used to discussing issues about a particular topic, had similar backgrounds and knowledge.

Some authors, such as Krueger (2000) suggest that 7 to 10 participants is the optimum size of a focus group; Morgan (1988) recommended a size between 4 and 12 participants. Consequently the sample size was determined to be 10 participants in the group. The session was planned to last 30 minutes, made up of two parts: a brief pre-questionnaire, and a discussion.

3.2.1.3 Planning and conducting the focus group session

The focus group session was designed to consist of two parts (Appendix D). During the first part, participants were provided with questions to answer briefly. Closed-ended questions were used in the first part, and required participants to choose among a set of provided response alternatives (Krosnick, 1999) provided general information about participants in this focus group. It would take 5-10 minutes to complete the questionnaire.

The second part involved a discussion among the participants lead by the facilitator. There was free discussion about the given questions with some guidance in order to get feedback. Open-ended questions which respondents

answered in their own words (Converse, 1987) were applied in this part, which took about 30 minutes. The whole second part was recorded by audio-tape and note-taking was also employed to help the researcher analyse the discussion.

The two focus group sessions took 40 minutes in total. Each session started with an overview of the objectives and aims of the research and explained how the participants could discuss and act within the session. It was important to make sure all participants' ideas and opinions were well represented in focus group discussion, which would facilitate the questionnaire design in the later stage.

The researcher worked as facilitator to motivate and encourage the participants to contribute their ideas and opinions in the discussion. At the beginning of the discussion, the facilitator leads the discussion by introducing or addressing some issues regarding SMS-based mobile banking. The discussion was semi-structured; some questions were included but were not too detailed. Some questions were not entirely formulated prior to the focus group. Questions and answers were also recorded as they could be useful for the research.

3.2.1.4 Data analysis and reporting

Qualitative data analysis methods were used at this stage. According to the literatures (Bogdan & Biklen, 1982; Miles & Huberman, 1984; Patton, 1990; Taylor & Bogdan, 1984; Myers, 2004), qualitative data analysis methods were widely used to analyse the data in the qualitative study (i.e. face to face interviews, focus group discussions).

3.2.2 Findings and results

In order to better record information during the focus group session, two small focus groups with 5 participants each were conducted to discuss and debate the issues. All participants were students in the Postgraduate or Master program in computer and information science at AUT University. The sessions were held on 9th August 2008. There were two female and eight male students. Six of the ten students were international students; four students were domestic students.

The questions used in the focus group are shown in Appendix D. The sessions were divided in two parts - five closed-ended questions (part 1), and four open-ended questions (part 2). The responses to questions 1-5 (part 1) are summarized below:

Question 1: How often do you use text messaging by cell phone during the day?

Four out of ten students (40%) use text messaging by cell phone once a day; one out of ten students (10%) uses text messaging twice in one day; five out of ten students (50%) use text messaging three times or more per day.

Question 2: How often do you check your bank balance per week?

Three out of ten students (30%) check their bank account balance once per week; five out of ten students (50%) check their bank account balance three times per week; two out of ten students (20%) check their bank account balance over three times per week.

Question 3: Which bank services are you using now?

Four out of ten students (40%) currently use Internet banking and personal banking; one out of ten students (10%) currently uses internet banking and phone banking; three out of ten students (30%) currently use only internet banking; two of ten students (20%) currently use personal banking.

Question 4: In your own view, how good are you at starting to use new technology?

Most of the participants (89%) perceived themselves as good as using new technology.

Question 5: Please rank the potential benefits for you to use an electronic banking service (benefits: e.g. reduced cost, high security, convenience, high speed, high quality of service, big server coverage, and ease to use)

According to the rank, when deciding to use electronic banking, most of participants considered issues such as reduced cost, higher security and better service.

The points emerging from the discussion of the response to open ended questions 1-4 (part 2) are summarized below:

I) Mobile banking would be more convenient and more accessible than other banking if they were in a situation with limited transport, no internet access and/or in an isolated environment such as a village or a suburb.

II) Using the “code expired” function after a current transaction is complete. The code sent from the bank is only used for a transaction once after the current transaction is complete, the code cannot be used again.

III) Reasonable cost for mobile banking (SMS): The bank provides one or two free transactions a week using mobile banking (SMS), and charge extra 20-50 cents for more.

IV) Mobile banking (SMS) is arguably better and faster (better performance) for simple tasks compared to other banking services such as phone banking. For instance, phone banking needs a complex process regardless of whether the task is simple or complex. In contrast, it is easier to use mobile banking (SMS) for simple tasks compared to phone banking.

V) Young New Zealanders would be able to use mobile banking easily because they are good at typing messages in the mobile device using a small keyboard.

VI) Whether people have a knowledge of mobile banking or not, they seldom use mobile banking. People with no knowledge may not be using mobile banking because of their concerns about security. People with enough knowledge are even more aware of the security issues, as they know more about security, and they would like to have any potential security covered.

VII) Users would be able to access mobile banking services anywhere and anytime because of the higher coverage of mobile devices compared to broadband.

VIII) Advertising of mobile banking (SMS) should be more widespread with more information distributed to customers.

3.2.3 Ethical approval for conducting a focus group

An approval was granted by the Auckland University of Technology Ethics Committee (AUTEC) on 08/08/2008, reference number 08/54.

3.3 Stage two: Survey

3.3.1 The research model and its development

To address the research questions, an initial research model based on the Technology Acceptance Model (TAM) (Davis, 1989) and the Extended TAM (Luarn & Lin, 2004) was built (Figure 3.2). Some constructs from prior research were added (see Chapter 2.3). The research model was informed by the information gathered from the discussions in the focus groups (stage one of this research). The constructs are discussed in the following sections.

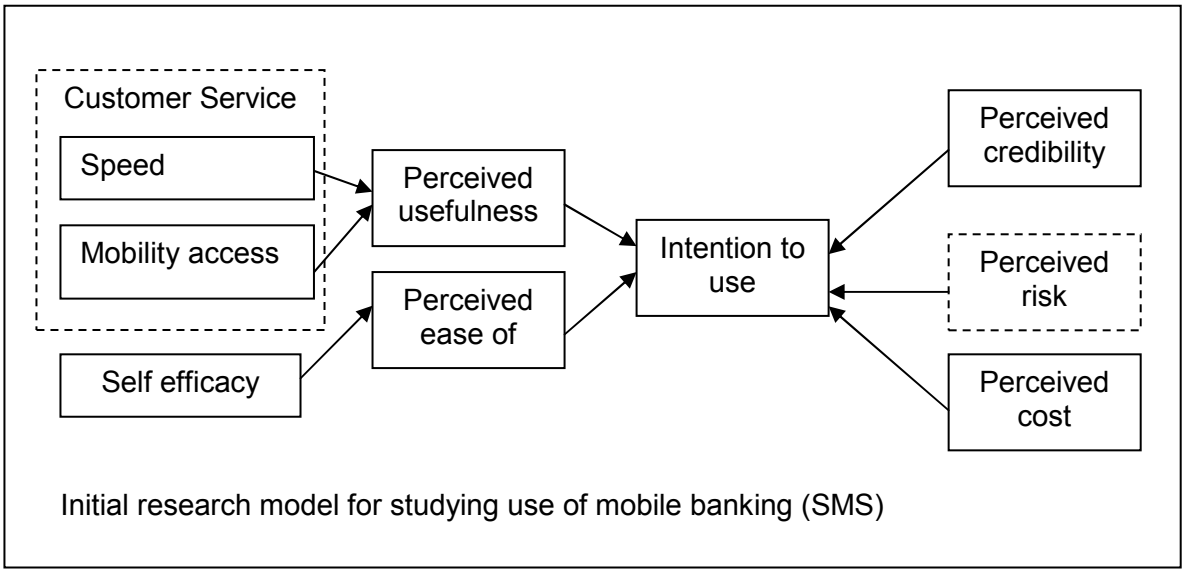


Figure 3.2: Initial research model

The initial model is based on the Extended TAM, with two added constructs: customer service and perceived risk (indicated by the dashed line boxes in Figure 3.2).

Customer service is used to indentify the characteristic of the service offered by banks and mobile service providers, to satisfy customer demands and needs. As also noted by Gefen (2002), customer service affects purchase decisions through vendor knowledge, responsiveness and reliability. The vendor and service providers anticipate and respond effectively to customer needs and requests by providing customers with the knowledge necessary to make a purchase (Jarvenpaa & Todd, 1996, 1997). Customer service has two sub variables: speed and mobility access. Higher speed of service is considered important for customers using any new technology application: Time saving was identified in the four preference clusters for self-service technology in a prior study (Hale & Thakur, 2006). Mobility access is another necessary element for the use of mobile banking. Laukkanen (2007) found that one of the most promising mobile banking services was that of checking bank account balance immediately anywhere at any time, to avoid, for example, queuing in front of an ATM to check an account balance.

Perceived risk is still a major factor affecting user behaviour when using new technology applications such as mobile banking. Soroor (2005) noted the security issues in mobile banking and proposed some techniques to improve the system in Iran. It was also found that potential risks could affect consumer's attitudes towards online banking in China (Laforet & Li, 2005). As discussed by Bhatnagar et al (2000), Jarvenpaa and Todd (1996) and Vijayasarathy (2002), privacy risk affected the degree to which a customer may sacrifice their privacy when they were requested to provide confidential details in making a security related retail transaction. Performance risk could cause consumers to fear "not getting what they want" when performing a retail transaction (Cox & Rich, 1964, p.33).

After completing the focus group sessions, it was found that the initial research model could not fully describe all possible factors and constructs. The model was developed further to include new constructs. Constructs which were not

well supported by the findings from the focus group discussion were removed. All constructs (Figure 3.3, p.27) in the developed model are discussed, and the hypotheses formulated, in the following section.

Customer service

Derived initially from the literature, this variable is relevant to the New Zealand context as seen in the focus group results.

All four sub-variables were mentioned during the focus group discussion, expressing specific concerns about mobile banking (SMS).

Speed

"*It is easy, convenient and faster process for mobile banking to do a simple task such as balance checking"; "Doing banking with mobile banking (SMS) costs more minutes than phone banking"; "I could use a phone to make a request to do any transaction immediately*" (Appendix O). Hung et al (2003) found that connection speed was a significant determinant in users adopting WAP services in Taiwan. In prior studies (Hale & Thakur, 2006) and within the focus group discussions, greater speed enhances the user's belief in the usefulness of mobile banking. The following hypothesis was formulated:

H1a: Speed will have a positive effect on the perceived usefulness of mobile banking.

Mobility access

"*When we are in the village with no ATM machine, and no transport, we could use mobile banking as a main option to do banking", "I think mobile banking should be good for elder or disabled people to use, because they are not able to walk and drive in a long distance to find ATM machine or banks", "I think we can access mobile banking service anywhere/anytime through mobile device, however, we need a work station to do banking for internet banking*"(Appendix O). Laukkanen and Lauronen (2005) suggest that mobile banking offers customers additional value in terms of location-independent access. According to the discussion in the focus group and prior studies, mobility access improves

the usefulness of mobile banking services. The following hypothesis was formulated:

H1b: Mobility access will have a positive effect on the perceived usefulness of mobile banking.

Advertising

"*I think the bank and server provider should post more advertising about mobile banking. I have not heard any information about mobile banking from the bank site", "I think some of the bank staffs do not have some knowledge about mobile banking, they should get more training for that and introduce mobile banking service to customers", "I know about the balance checking in mobile banking service, but I do not know more than this*" (Appendix O). According to the focus group, appropriate and specific advertising would enhance user belief in the usefulness of mobile banking. The following hypothesis was formulated:

H1c: Advertising will have a positive effect on the perceived usefulness of mobile banking.

Functions

"*I think the more functions added in Mobile banking should allow users to perform more functionality of banking", "as considering the competitive benefit of adaptation of mobile banking (SMS), the mobile banking should provide the more services and functions which could not found in the other banking service such as pay or transfer money to someone who is in overseas*" (Appendix O). According to the focus group, more functions would enhance the usefulness of mobile banking in the users' mind. The following hypothesis was formulated:

H1d: Enhanced functions will have a positive effect on the perceived usefulness of mobile banking.

Functions and advertising were clearly seen in the focus groups as constructs and the participants were interested to see how they would affect the results of the research. As a result these two variables were added into the developed research model as constructs of the New Zealand context, fitting the research objective.

Alternatives

This variable was defined based on the focus group discussion. As mentioned by some participants, “Alternatives” could be used to efficiently express the current environment or situation of consumers in regard to mobile banking.

“*If it is urgent or you can’t reach to ATM machine or go to Internet, you might want to use it”; “I do not think I need mobile banking service at this stage, I usually use the Bank card to pay my bill and make an expense”. “I think users satisfy the current internet banking or other banking service at this stage, users are still learning how to accept and use this new technology at the moment”, “I think mobile banking will be better for people who could not access internet and catch the transport”, “there are a lot of other options chosen to do banking such as internet banking, phone banking et*” (Appendix O).

There are grounds to assume that “Alternatives” could be one of the possible factors to enhance user beliefs about the usefulness of mobile banking, where mobile banking is one of the many possible ways to conduct a transaction. The following hypothesis was formulated:

H2: Alternatives will have a negative effect on the perceived usefulness of mobile banking.

Compatibility

This variable was defined in prior studies and the literature (Rogers, 1995). Individuals are more likely to adopt an innovation when they find it compatible with their past experience, beliefs and the way they are accustomed to work (Agarwal & Prasad, 1998; Tornatzky & Klein, 1982). Compatibility is viewed as an indicator of how well the service or technology fits with the way the customers manage and control their finances and how it suits their lifestyle. Lifestyle compatibility (Ratchford et al., 2001) encompasses the consumers’ lifestyles as well as shopping habits (Vellido et al., 2000), and may reflect consumers’ opinion of other e-commerce options (Goldsmith and Bridges, 2000). Compatibility is described to capture the consistency between an innovation and the experiences, values, as well as needs of potential adopters

(Rogers, 1995). It is an important aspect of compatibility that consumers are able to integrate services and technologies into their daily life (Jayawardhena & Foley, 1998; Lee et al., 2003; Shon & Swatman, 1998). The compatibility construct has provided a consistent explanation of technology adoption decisions (Tornatzky & Klein, 1982).

Perceived compatibility was found to indirectly influence the user's intention to use mobile banking through perceived ease of use, so compatibility was added into the research model and the following hypothesis was formulated:

H3: Compatibility will have a positive effect on the perceived ease of use of mobile banking.

Self-efficacy

This variable is referred in prior research (extended TAM, Luarn & Lin, 2004).The concept of "perceived self-efficacy" is concerned with judgments of how well one can execute courses of action required to deal with prospective situations (Bandura, 1982). The self efficacy of mobile banking (SMS) is defined "as a judgment of one's ability to use a mobile banking service" (Luarn & Lin, 2004, p.879). Self efficacy could include the knowledge, ability and skills needed to use the new IT. The existence of a relationship between perceived self efficacy and perceived ease of use was proposed by Davis (1989) and Mathieson et al (2001).

Regarding the experience and ability, there was some discussion in the focus group sessions. For instance, *"Mobile banking is particularly suitable for New Zealander. A lot of New Zealanders have a faster speed to text Message even without watching the keypad."* (Appendix O). Perceived self efficacy may indirectly influence the user's behaviour to use mobile banking through perceived ease of use. The following hypothesis was formulated:

H4: Self-efficacy will have a positive effect on the perceived ease of use of mobile banking.

Perceived cost

This variable was used in prior research on mobile banking adoption (extended TAM, Luarn & Lin, 2004). The cost consideration may prevent many people from choosing this mobile banking service (Luarn & Lin, 2004). Moreover, hardware/software and financial resources were important for users of an information system (Mathieson et al, 2001).

It was also mentioned in the focus group discussion that "*mobile banking has a higher cost to receive and send the request based on Text format*" (Appendix O) meaning that the users would accept a reasonable cost charge for frequent usage of a mobile banking service. For example, it costs 20-30 cents for any additional transactions using mobile banking per week, otherwise it is free. This is one way to get more customers to use this new m-commerce technology. Based on the literature and the focus group, perceived cost was likely to directly influence the user's intention to use mobile banking. The following hypothesis was formulated:

H5: Perceived cost will have a negative effect on behavioural intention to use mobile banking.

Perceived risk

This variable is defined in prior studies and focus group discussion. Wong and Chang (2005) posited that risk usually arises from an uncertainty that consumers face when they can not foresee the consequences of their purchase decision. It is obvious that users' intention or adoption to using new technology is affected by their perception of risk, whether or not such risk actually exists. Featherman (2002) found the service performance risk (i.e. the risk related to the service) is the prime determinant of e-service adoption.

From the focus group discussion, the risk in mobile banking (SMS) is a major factor influencing customers' adoption behaviour, and their decision whether or not the service is suitable for their needs. "*If the mobile banking has a high security, I might trust it and have an opportunity to use it". "I think the mobile banking is not secure enough to keep passwords or codes safely"; "if I lost the mobile phone, I would lose the money, because all codes to access my bank are stored in my mobile phone"; "short message service (SMS) is a main*

technology and medium used in mobile banking service, this would easily allow other people to read these messages in mobile phone" (Appendix O). Participants preferred other means of banking to mobile banking. *"Internet banking is more security than mobile banking, because it has a security layer to protect the risk on internet."* (Appendix O) Based on the literature and the focus groups, perceived risk may directly influence user intention to use mobile banking and the following hypothesis was formulated:

H6: Perceived risk will have a negative effect on behavioural intention to use mobile banking.

Perceived usefulness

Several prior studies have shown that perceived usefulness is an important antecedent to intention to adopt and use a technology (Davis et al, 1989; Venkatesh, 1999, 2000; Venkatesh & Davis, 2000). The following hypothesis was formulated:

H7: Perceived usefulness will have a positive effect on the behavioural intention to use mobile banking.

Perceived ease of use

Prior studies have also shown while the direct effects of perceived ease of use remain important over time, the indirect effect of perceived ease of use becomes stronger (Venkatesh & Morris, 2000). A system which is easier to use will facilitate more system use and task accomplishment than systems that are hard to use (Venkatesh & Morris, 2000). The following hypothesis was formulated:

H8: Perceived ease of use will have a positive effect on the behavioural intention to use mobile banking.

Perceived credibility

Perceived credibility was not mentioned in the focus group for these participants. It has apparently little power to influence the use of mobile banking in New Zealand. However it was mentioned in prior studies in Taiwan (Luarn &

Lin, 2004). In regard to the New Zealand context, credibility was eliminated from this study. It may be reused and tested in further studies.

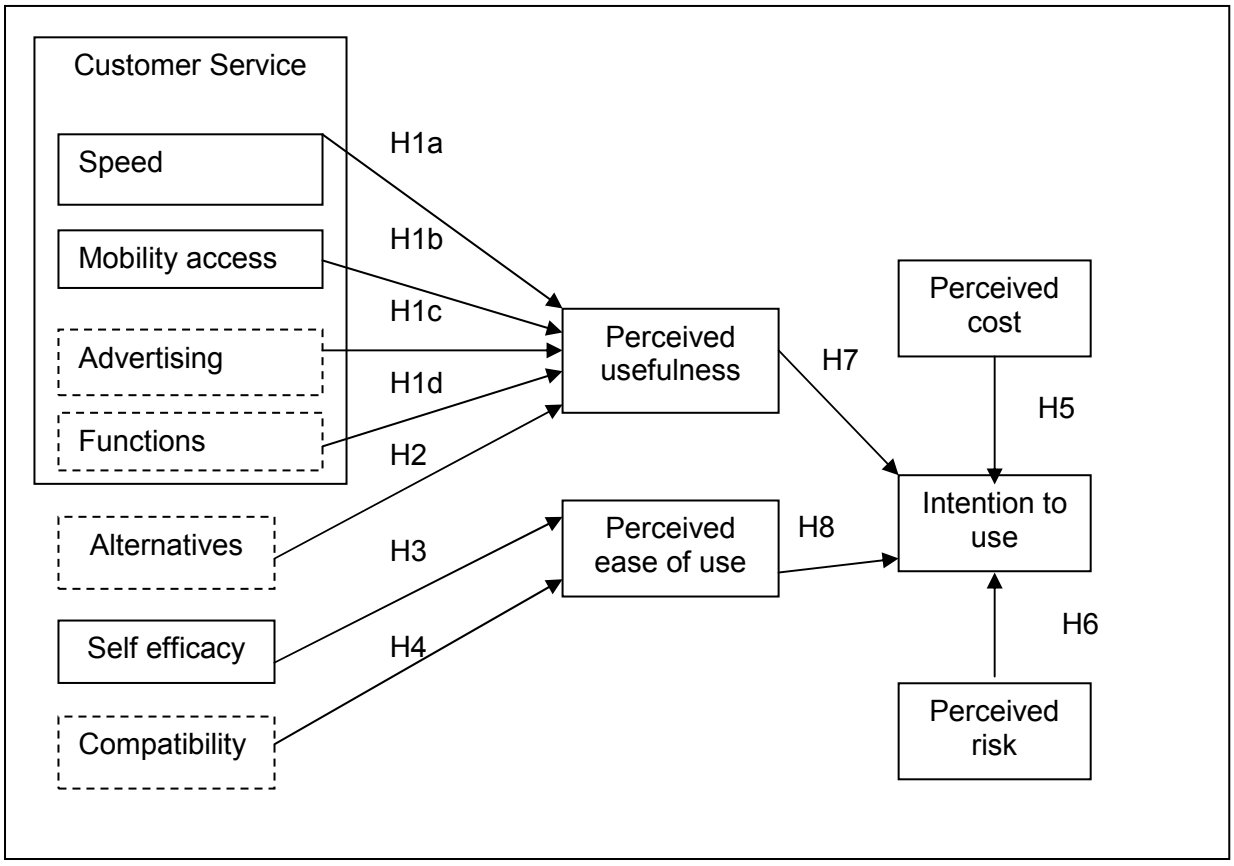


Figure 3.3: Proposed research model

In summary, the research model used in this study was initially based on the TAM and Extended TAM models, as used in prior literature. It was modified to reflect the focus group discussions and the New Zealand context. The hypotheses linking independent and dependent variables as formulated are further tested and analysed.

3.3.2 Data gathering

In the previous section the constructs and the hypotheses for the research model were introduced. Next the data gathering method (survey) is described.

3.3.2.1 Overview

A survey is a powerful and effective tool that can be used to collect data about human attitudes, behaviours, and characteristics. The survey questionnaire is often adopted by researchers as an effective hypothesis testing method

(Cavana et al., 2001). For example, in their prior study on mobile banking in Taiwan, Luarn and Lin (2004) used a questionnaire in the data collection phase.

3.3.2.2 Data collection method

Data was collected via personally-administered questionnaires from different sources such as classes, students' lounges, students' labs, and the AUT library and study groups. The advantage of this method was that both the cost and the time required were low (Cavana et al., 2001). Data collection was conducted in October 2008 at Auckland University of Technology. Different students with different backgrounds were randomly invited to volunteer to do the survey questionnaires. The sample exclusively considered of AUT students.

3.3.2.3 Survey instrument

Reviewing prior studies on mobile banking, e-commerce and information systems, it was found that many studies used questionnaires to collect data for analysis and research objective investigation. In this study a survey with questionnaires was implemented to explore user behaviour and intention to use mobile banking (SMS) (refer to Appendix F). In order to facilitate participants' understanding of this research, a brief introduction of the research purpose and a definition of mobile banking (SMS) were provided at the beginning of the questionnaire. Furthermore, confidentiality and anonymity were afterwards. The demographic questions for this research were placed at the end of the questionnaire. According to Sudman and Bradburn (1982), it was better to keep participants' minds on the purpose of the survey at the beginning.

There were no technical jargon or difficult words in the questions, and closed-ended questions were used throughout the whole questionnaire. This was quite helpful as respondents could make a quick decision when answering (Cavana et al., 2001), and it provided greater uniformity, thereby making data processing easier (Babbie, 1990).

3.3.2.4 Items and measurement

The questionnaire items were selected from previous research and the results of focus group sessions, and were rephrased to suit the context of the study and to represent the variables in the research model.

Items measured on a scale for perceived usefulness, perceived ease of use and intention to use were adapted from the original TAM instrument (Davis, 1989) and their subsequent applications on mobile banking or other technology applications (Luarn & Lin, 2004; Davis et al., 1989; Agarwal & Prasad, 1997; Lederer et al., 2000; Tan & Teo, 2000; Venkatesh & Davis, 2000; Wang et al., 2003). Items for the speed sub-construct were adapted from prior studies (Agarwal & Prasad, 1997; Plouffe et al, 2001; Tan & Teo, 2000) and the focus group discussions. Items for mobility access, advertising, functions and alternatives were adapted from the focus group session and further developed. Items for self efficacy were adapted from the original instrument (Compeau & Higgins, 1995) and from other studies on mobile banking or other technology applications (Luarn & Lin, 2004; Tan & Teo, 2000; Wang et al., 2003). The items measured for perceived cost were adapted from a prior study on mobile banking (Luarn & Lin, 2004). Measures of perceived risk were adapted from several prior studies in different commercial areas (Tan & Teo, 2000; Jarvenpaa & Todd, 1997; Pavlou & Featherman, 2002) and the discussions in the focus group sessions. Items for compatibility were adapted from the studies of Taylor and Todd (1995), Moore and Benbasat (2001), and Agarwal and Prasad (1997).

A five-point Likert scale, with anchors ranging from “strongly disagree” to “strongly agree”, was used for all questions except the demographic ones. Pre-testing of the items and their measurement was conducted by going through the results of the focus groups and by asking the opinion of academics in the IS/IT area. All developed items were relevantly matched to the mobile banking context in New Zealand (Appendix E and Table 3.1).

Table 3.1: Variables list with prior studies

Variable	Sub-variable	Item	Source
Customer service	Speed	Three items: SP1, SP2, SP3	(Agarwal&Prasad,1997), (Plouffe et al, 2001), (Tan&Teo,2000),focus group
	Mobility access	Two items: MA1,MA2	(Agarwal&Prasad,1997), focus group
	Advertising	Two items: AT1,AT2	focus group
	Functions	Two items: FN1,FN2	focus group
Alternatives		Two items: AL1,AL2	focus group
Self efficacy		Six items: SE1,SE2,SE3,SE4,SE5,SE6	(Compeau&Higgins,1995) (Luarn&Lin,2004) (Tan&Teo,2000)(Wang et al.,2003)
Perceived cost		Three items: PC1, PC2, PC3	(Luarn&Lin,2004)
Perceived risk		Three items: PR1, PR2, PR3	(Tan&Teo,2000),(Pavlou &Featherman,2002),(Jarvenpaa&Todd,1997), focus group
Perceived usefulness		Three items: PU1, PU2	(Davis,1989),(Davis et al., 1989),(Venkatesh & Davis,2000),(Lederer et al,2000),(Luarn&Lin,2004),(Wang et al,2003)
Perceived ease of use		Four items: PEOU1,PEOU2,PEOU3,PEOU4	(Davis,1989),(Davis et al, 1989),(Venkatesh&Davis, 2000),(Luarn&Lin,2004)(Moore&Benbasat,2001),(Tan&Teo,2000)
Compatibility		Three items: COMP1,COMP2,COMP3	(Moore&Benbasat,2001),(Taylor&Todd,1995a), focus group
Intention to use		One item: INT1	(Davis,1989),(Venkatesh &Davis,2000),(Ledereretal.,2000),(Luarn&Lin,2004) , (Wang et al,2003)

3.3.2.5 Data collection procedure

A brief invitation and introduction to this research was provided to participants before they started filling out the questionnaires. If they accepted the invitation, questionnaires were handed out to them. Otherwise, they would not receive any questionnaires. After 30 minutes, the completed, anonymous questionnaires were directly collected by the researcher.

3.3.2.6 Ethical consideration in the survey

Ethical approval of the survey process was granted by Auckland University of Technology Ethics Committee (AUTEC) on 15/09/2008. The reference number is 08/54.

3.3.2.7 Sample selection

Selecting a sample is a very important step for a positivistic study. Hussey and Hussey (1997) note the sample should be unbiased and large enough to satisfy the needs of the research. It is impossible to survey the entire population of a particular study because of limited funding and time. Therefore it is necessary to survey a sample of the population as an alternative in order to formulate predictions about the entire population. University or college students were chosen as participants in most prior studies on IS/IT because they were easy to access and highly responsive to survey questionnaires. More importantly, prior studies showed that students were the most active mobile application users (M: Metrics, 2006). Subsequently it was decided that AUT students who had a mobile phone and a bank account were to be involved in this research as participants.

A complex process is normally involved in determining the sample size for a survey. If a sample size is small, the results may not properly represent the entire population. If the sample size is large, the survey may not be able to be carried out due to cost and time restraints. Taking cost and time into consideration, Newton and Rudestum (1999) suggested the following calculation to decide the sample size.

Sample size= $\frac{\text{Total response required}}{\text{Response rate}*(1-r^2)}$

(Assume: a multiple regression analysis with r^2 (effect size) of 0.1)

Following the above calculation, the research requires 300 subjects in order to get 250 responses, with 90% response rate and r^2 value of 0.1. The sample size of this research was estimated at 300 participants. In fact, a total of 260 questionnaires were returned. Six incomplete questionnaires were discarded, 254 questionnaires were found usable for later data analysis.

3.3.2.8 Data analysis method

Quantitative data is analysed by using descriptive statistics and other standard quantitative methods (Kontio, Lehtola & Bragge, 2004). Data collected from the survey is entered into the statistical package, SPSS (statistical package for social science) for analysis, discussion and presentation of the results in this research. Q-Q Plot for raw data was used to test the data distribution. To analyse the demographic information, the descriptive statistics are entered onto a Microsoft Excel sheet.

3.4 Chapter summary

This chapter represents the details of the mix approaches (qualitative and quantitative methods) employed in this study. The focus group (qualitative) method was applied to modify and develop the research model. The measurements of the constructs were developed from the literature and the focus group session discussions. Detailed data analysis of the survey will be described in the next chapter.

CHAPTER 4 Research findings and analysis

4.1 Chapter overview

This chapter analyses the responses and represents the research findings from the data collected from the survey. The data collected is ordinal, quantitative and numerical, thus data analysis is based on a quantitative method. The outputs are generated using the SPSS package.

A 5-point Likert scale is used to measure the output of each item answered by the participants.

Negatively stated items from the survey are reversely coded. These items are Item 2 and Item 3 of perceived of ease of use, Item 2 of advertising, Item 1 of functions, and Item 3 of compatibility i.e. question numbers 4,5,13,14, and 32 (Appendix E,F). In addition, computing the average scores of items is applied to the numerical data set for each variable or factor predicted as discussed earlier. Piguet and Peraya (2000) state that averaging of the items would enhance the flexibility of the scale without affecting the statistical properties of the scores.

4.2 Background information

This section provides background information for the survey questionnaires.

4.2.1 Sample characteristics

Questionnaires were distributed to students who were undertaking studies at Auckland University of Technology. 280 questionnaires in total were handed out to participants on campus and 260 questionnaires were returned. 254 of the returned questionnaires were complete and usable, with an overall response rate of 90%. This sample size satisfies the requirement of social science research as stated by Pinsonneault and Kraemer (1993). It needs to be noted that the survey responses from the participants were in general more complete than the researcher had initially expected. Only five participants did not answer one or two items in the questionnaire, with the rest of the items answered.

Table 4.1: Summary of background information

Variables		All respondents		Mobile Banking user		Non-mobile banking user	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Response Type	User	80	31.5	80	100	174	68.5
	Non-user	174	68.5				
Gender	Male	133	52.4	40	50	93	53.4
	Female	121	47.6	40	50	81	46.6
Age	<20 years	54	21.3	19	23.8	35	20.1
	20-24 years	128	50.4	38	47.5	90	51.7
	>24 years	72	28.3	23	28.7	49	28.2
Mobile phone use	Never	17	6.7	0	0	17	9.8
	<1 year	13	5.1	10	12.5	3	1.7
	1-2 years	12	4.7	8	10	4	2.3
	3-5 years	66	26	17	21.3	49	28.2
	>5 years	146	57.5	45	56.2	101	58
Txt message use daily	Never	8	3.1	0	0	8	4.6
	Once	18	7.1	8	10	10	5.7
	Twice	12	4.7	6	7.5	6	3.4
	Three times	21	8.3	14	17.5	7	4
	>three times	195	76.8	52	65	143	82.3
Do Banking weekly	Never	21	8.3	0	0	21	12.1
	Once	70	27.6	23	28.8	47	27
	Twice	61	24	25	31.2	36	20.7
	Three times	40	15.7	15	18.8	25	14.4
	>Three times	62	24.4	17	21.2	45	25.8
Mobile banking(SMS) use	Non-user	174	68.5	0	0	0	0
	<1 year	49	19.3	49	61.3	0	0
	1-2 years	16	6.3	16	20	0	0
	3-5 years	7	2.8	7	8.7	0	0
	>5 years	8	3.1	8	10	0	0

4.2.2 Demographics

Table 4.1 provides data about participants' demographic profiles. The data shows that the number of male respondents is slightly higher than the number of female respondents, with males accounting for 52.4% and females 47.6% of the responses. One possible explanation for more male respondents could be that males are more likely to be interested in the usage and adoption of technology such as mobile phones; for example Singh (2004）found that more males used mobile banking than females.

The proportion of mobile banking users in terms of gender is generally equal; females are 50% and males are 50%. However, the percentage of males among non mobile banking users is higher than that of female ones: males are 53% and females are 46%.

Mobile banking users are relatively young in the sample. Nearly half of the mobile banking users (48%) are aged between 20 and 24 years. Few mobile banking users were less than 20 years or over 24 years, 24% and 29% respectively.

4.2.3 Mobile phone and SMS use

About 93% of respondents (237 out of 254 respondents) are mobile phone users. Most of the respondents have had experience in the adoption and use of mobile phone for more than one year. This indicates that wireless device technologies have become a part of people's everyday life. Without a mobile device, people might no longer work, or live well. Mobile phone technologies have provided a lot of convenient services to users such as voice communication, time checking, and entertainment. A survey done by Vodafone New Zealand in 2008 found that nearly three-quarters of respondents (73.8 %) preferred to call on mobiles or use text messages in order to keep in touch with friends (Hudson, 2008)

Among these users, 83% have used a mobile phone for more than three years, while 57.5% have used it for over 5 years. This shows that New Zealanders are generally experienced mobile phone users, and that the sample is representative of the New Zealand population.

About 96.9% of respondents (246 out of 254 respondents) are daily SMS users. Among these users, 76.8% use SMS more than three times daily. A recent survey states that New Zealanders send short messages at least 600 million times a month using mobile phones (Hudson, 2008). This shows that the sample behaviour is similar to typical New Zealand user behaviour.

In regard to mobile banking usage, 82.5% of all mobile banking users use SMS more than twice a day. This suggests that mobile banking may be compatible with a user's daily life.

4.2.4 Banking and mobile banking use

Table 4.1 shows that 91.3% of respondents (233 out of 254 respondents) regularly bank more than once a week. Most mobile banking users normally bank more than once a week. It shows that mobile banking is a frequent task for those using it.

About 61.3% of all mobile banking users have used these services for only less than one year, 20% have used these services for between one and two years, and about 18.7% have used mobile banking services for more than three years. This shows that mobile banking users have not used and adopted these mobile banking services for a significant period of time, and that they are still learning about this kind of new mobile technology (Appendix O). However, there will probably be more experienced mobile banking users in the future.

Table 4.2: Intention to use Mobile banking services –mean and median

	All participants (N=254)	User (N=80)	Non user (N=174)
Mean	3.44	3.89	3.24
Median	4	4	3

Table 4.3: Intention to use Mobile banking services-gender

Intention to use	Respondents	Male	Female	Users	Male	Female	Non users	Male	Female
1	22 (8.7%)	8	14	3(3.8%)	0	3	19(10.9%)	8	11
2	30 (11.8%)	15	15	4(5%)	3	1	26(14.9%)	12	14
3	69 (27.2%)	39	30	22(27.5%)	11	11	47(27%)	28	19
4	80 (31.5%)	40	40	21(26.2%)	9	12	59(33.9%)	31	28
5	53 (20.9%)	31	22	30(37.5%)	17	13	23(13.3%)	14	9
Total	254 (100%)	133	121	80(100%)	40	40	174(100%)	93	81

1=strongly disagree, 5 =strongly agree

4.2.5 Intention to use

Data about intention to use mobile banking in the future is provided in Table 4.2 (mean and median) and Table 4.3 (gender). Mobile banking users are intending to use services in the future with a mean of 3.89 on a 5 point scale, while non-users are not very likely to use mobile banking with a mean of 3.24 on a 5 point scale. The scale mean of non-users representing the usage or adoption of services for non-users is relatively low, but it states that non-users may still be likely to attempt new mobile applications or technologies in future.

The overall scale mean is 3.44 out of 5, which suggests not a very high intention to adopt or use mobile banking services in the future. On the other hand, participants may like to try these services as new applications and technologies. About 52% of the respondents agree and strongly agree that they would adopt mobile banking services in the future, of which 53% are males and 47% are females. In addition, 47.2% of non-users also responded “agree” and “strongly agree” in regards to the intention to use mobile banking in the future. This is a surprising outcome from the non-users and it implies non-users’ expectations of this new mobile technology and application. Those non-users may accept these services because they are fast learners and represent a new technology acceptance group within the population. This conclusion might be a limited one as the participants are students. However, it demonstrates the student group’s motivation and expectations about new communication technologies.

About 25.8% of non-users disagree and strongly disagree that they would use mobile banking in the future, compared to 8.8% of users in table 4.3. Only one

quarter of non-users do not intend to use or adopt this channel in the future, one quarter of non-users (27%) do not agree or disagree that they would use this service in future, nearly half of non-users agree to the usage or adoption of mobile banking in future. From the above, it can be said that not only existing users are likely to continue using mobile banking services: non-users also express an expectation and intention to use mobile banking services.

Table 4.4: frequency and actual use of mobile banking within the last month

Frequency of use	None	Once	Twice	Three times	>three times	Total
1	31	0	0	0	0	31
2	3	4	2	1	1	11
3	2	4	6	5	5	22
4	0	2	0	2	5	9
5	2	2	0	1	2	7
Total	38(47.5%)	12(15%)	8(10%)	9(11.3%)	13(16.2%)	80(100%)
Male	20(25%)	3(3.8%)	2(2.5%)	6(7.5%)	9(11.2%)	40(50%)
Female	18(22.5%)	9(11.2%)	6(7.5%)	3(3.8%)	4(5%)	40(50%)

4.2.6 Frequency and actual mobile banking use

The data in Table 4.4 shows the frequency and actual use of mobile banking within the last month.

The data is recorded with a 5-point Likert scale measurement. It shows that 47.5% of users have not used mobile banking in the last 30 days, with 25% males and 22.5% females. About 27.5% of users have used mobile banking three times and more than three times in the past 30 days, with 18.7% males and 8.8% females. It shows that the number of males using mobile banking more than two times is more than the number of females in the last 30 days. This may indicate that males are more likely to be interested in a technology application such as mobile banking (Singh, 2004).

4.3 Data normality

To assess the quality of the raw data from the survey, a normal probability plot (Q-Q Plot) is applied to inspect the normality of the data distribution. All items have been examined on the plot with a normal Q-Q plot. From the plots shown

in Appendix C, all variables and items show high normality of distribution. This confirms the quality of the raw data collected and analysed.

4.4 Hypothesis test

To test the hypotheses formulated in Chapter 3, a simple linear regression is used. Linear regression is a useful method to find the relationship between one dependent variable and an independent variable (Hair et al, 2006).

Linear regression is widely used to explore a relationship between variables in social science research (Bryman, 2001). Hypothesis testing is based on the standardized path coefficient (r-path coefficient). To support the hypothesis, the p-value of the r-path coefficient should be significant at the 0.05 level. In this research, r-path coefficient calculation is conducted through the following steps:

1) Independent variables: speed, mobility access, advertising, functions and alternatives are individually correlated against the dependent variable perceived usefulness (Hypotheses H1a, H1b, H1c, H1d, and H2)

2) Independent variables: compatibility and self-efficacy are individually regressed against the dependent variable perceived ease of use (Hypotheses H3, and H4)

3) Independent variables: perceived cost, perceived risk, perceived usefulness and perceived ease of use, are individually regressed against the dependent variable intention to use (Hypotheses H5, H6, H7 and H8)

Table 4.5: Regression analysis-hypotheses and results

Hypothesis	Dependent variable	Independent variable	r-path coefficient	p-value
H1.a	Perceived usefulness	Speed	0.479	0.000
H1.b	Perceived usefulness	Mobility access	0.286	0.000
H1.c	Perceived usefulness	Advertising	0.310	0.000
H1.d	Perceived usefulness	Functions	0.153	0.015
H2	Perceived usefulness	Alternatives	0.033	0.603
H3	Perceived ease of use	Compatibility	0.325	0.000
H4	Perceived ease of use	Self-efficacy	0.318	0.000
H5	Intention to use	Perceived cost	0.013	0.838
H6	Intention to use	Perceived risk	0.008	0.896
H7	Intention to use	Perceived usefulness	0.404	0.000
H8	Intention to use	Perceived ease of use	0.338	0.000

The results shown in Table 4.5 are discussed in the following sections.

Speed and perceived usefulness

Hypothesis H1a, that speed has a positive effect on the perceived usefulness of mobile banking, is supported($r=0.479$, $p<0.001$). This result is consistent with the findings of the focus group discussion about factors influencing the usage of mobile banking. "*It is an easy, convenient and faster process for mobile banking to do a simple task* "(Appendix O). This states that mobile banking is useful for customers as it means faster transactions without any queues or delays in the bank or at the ATM when the corresponding simple transaction could be performed using mobile banking services,

Mobility access and perceived usefulness

Hypothesis H1b, that mobility access has a positive effect on the perceived usefulness of mobile banking, is supported($r=0.286$, $p<0.001$). This result is

consistent with the findings from the focus group discussion about factors influencing the usage of mobile banking. "*I think mobile banking will be better for people who could not access internet and catch the transport", "I think we can access mobile banking service anywhere/anytime through mobile device, however, we need a work station to do banking for internet banking*" (Appendix O). This suggests that mobile banking is useful for users as they are able to access their bank account and do banking anywhere at any time.

Advertising and perceived usefulness

Hypothesis H1c, that advertising has a positive effect on the perceived usefulness of mobile banking, is supported($r=0.310$, $p<0.001$). This result is consistent with the findings from the focus group discussion about factors influencing the usage of mobile banking. "*I think the bank and server provider should post more advertisement about mobile banking. I have not heard any information about mobile banking from the bank site*" (Appendix O). This suggests that it would be useful for the customer to use mobile banking if they had enough information about how the service is to be utilized, and what kinds of new services from banks or service providers will improve the process. Consequently customers will be glad to use mobile banking given good service support and demonstration.

Functions and perceived usefulness

The result represents the support for Hypothesis H1d that functions have a positive effect on the perceived usefulness of mobile banking ($r=0.153$, $p=0.015$). This is consistent with the findings from the focus group discussion about factors influencing the usage of mobile banking. "*I think the more functions added in mobile banking should allow users to perform more functionality of banking*" (Appendix O). This suggests that increased mobile banking functions could lead to less perceived positive usefulness of mobile banking. The relationship is less strong. One possible reason is that customers do not have enough information about what kind of functions are provided by mobile banking services. Without any information, customers would hesitate to use or adopt a new technology application (mobile banking).

Alternatives and perceived usefulness

The result shows a lack of support for Hypothesis H2 that alternatives have a negative effect on the perceived usefulness of mobile banking (r=0.033, p=0.603). This conflicts with the findings from the focus group discussion about factors influencing the usage of mobile banking. "*When we are in the village with no ATM machines, and no transports, we could use mobile banking as a main option to do banking*." (Appendix O). This suggests that as an alternative choice, mobile banking may not be perceived as useful. One possible reason is that sample participants usually live in modern cities, with an abundance of electronic banking services, thus they have a lot of choices as to where to do their banking and mobile banking is lower on the list of options for many people. Another possible reason is that users choose to go to a bank for their banking rather than using mobile banking services when they live in rural areas, as mobile banking services are not yet developed due to limited resources in rural areas.

Compatibility and perceived ease of use

Hypothesis H3, that compatibility has a positive effect on the perceived ease of use of mobile banking, is supported (r=0.325, p<0.001). This result is consistent with the findings from the focus group discussion about factors influencing the usage of mobile banking. "*If people used to use the mobile device every day, so they should be comfortable and confident to use mobile banking as well*." (Appendix O). This suggests that the more integrated it is in an individual's lifestyle the more positively mobile banking's ease of use will be perceived.

Self-efficacy and perceived ease of use

The data in Table 4.5 supports Hypothesis H4 that self-efficacy has a positive effect on the perceived ease of use of mobile banking (r=0.318, p<0.001). This result is consistent with the findings from the prior study that uses extended TAM in the mobile banking context (Luarn & Lin, 2004). This implies that

individuals with higher self-efficacy will perceive more positive ease of use in mobile banking than those with lower self-efficacy.

Perceived cost and intention to use

The result shows a lack of support for hypothesis H5 that perceived cost has a negative effect on the intention to use mobile banking since the data is ($r=0.013$, $p=0.838$). This contradicts the findings from prior studies that use the extended TAM in a mobile banking context (Luarn & Lin, 2004; Nah, Siau & Sheng, 2005). Therefore perceived cost may not have a negative effect on the intention to use of mobile banking in the New Zealand context. However, perceived cost associated with mobile banking was found to have a significant effect on the intention to use mobile banking in Taiwan (Luarn & Lin, 2004). One possible reason is that sample participants might not be aware of the cost of mobile banking because they have yet to use and adopt mobile banking as a banking option. Another possible reason is that they have not been provided with enough information about mobile banking cost from banks. The issues may need to be investigated further.

Perceived risk and intention to use

The result demonstrates a lack of support for hypothesis H6 that perceived risk has a negative effect on the intention to use mobile banking ($r=0.008$, $p=0.896$). This contradicts the findings from prior studies (Soroor, 2005 and 2006; Mattila, 2002; Laforet & Li, 2005). This suggests that perceived risk may not have a negative effect on the intention to use mobile banking in the New Zealand context. One possible reason is that sample participants may not be aware of the risks of mobile banking because they have yet to use and adopt mobile banking as a banking option as indicated by sample result (80/254 users, 174/254 non-users).

Perceived usefulness and intention to use

Hypothesis H7, that perceived usefulness has a positive effect on intention to use mobile banking, is supported($r=0.404$, $p<0.001$). This result is consistent

and is within expectations of the findings from the prior studies that used TAM and extended TAM in the mobile or internet banking contexts (Chan & Lu, 2004; Luarn & Lin, 2004). This suggests and states that if customers perceive mobile banking to be a useful, faster and easier option with which to do bank transactions than traditional branch banking, they would use and adopt the mobile banking service.

Perceived ease of use and intention to use

The Table 4.5 shows support for hypothesis H8, that perceived ease of use has a positive effect on the intention to use mobile banking($r=0.338$, $p<0.001$). This result is consistent with and expected from the findings from prior studies that used TAM and extended TAM (Luarn & Lin, 2004; Mathieson et al., 2001; Moore & Benbasat, 2001; Tan & Teo, 2000). This implies that if customers perceive that a mobile banking system is easy to use, then they would use and adopt mobile banking services and systems.

4.5 Data analysis

In Chapter 3, a research model was developed to guide the study. The data was analysed according to the proposed research model.

Further analysis is conducted in three stages; each stage represents one part of the original research model. Multiple linear regressions are applied to test and inspect each stage's prediction capability in order to assess how well the model has been informed by prior research and by the focus group findings and to justify the use of the proposed constructs. Next, the analysis of each stage is presented, including independent and dependent variables, and their significance.

4.5.1 Stage one

Dependent Variable: perceived usefulness

Independent Variables: Speed, Mobility access, Advertising, Functions and Alternatives.

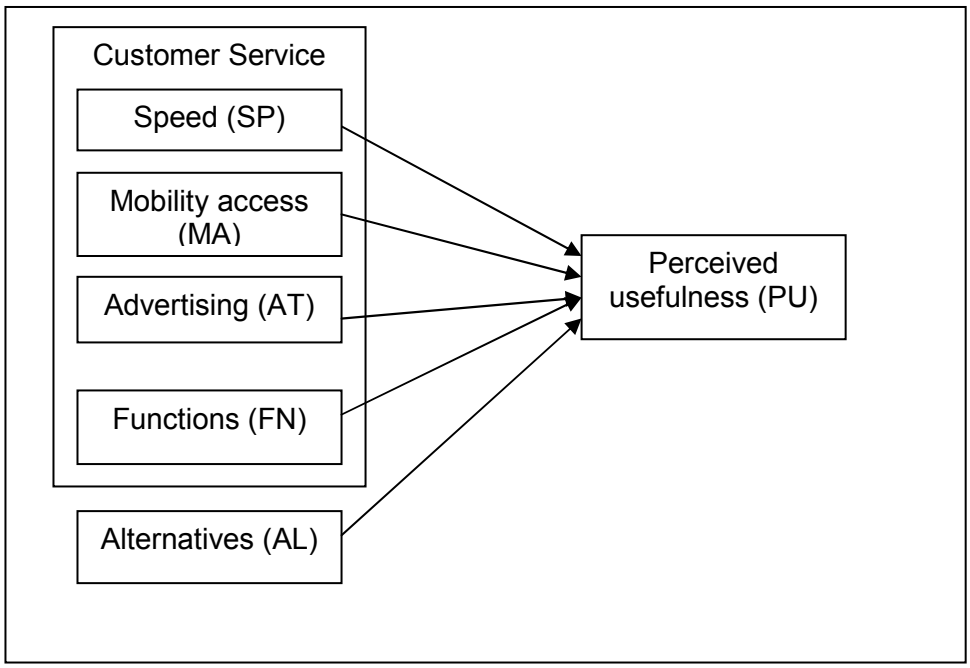


Figure 4.1: Model testing - Stage One

The four sub-variables, which are speed, mobility access, advertising, and functions, are combined together to represent the independent variable customer service (Figure 4.1). These four sub-variables are derived from the focus group discussion. Another independent variable (alternatives) was added by the researcher. The dependent variable is perceived usefulness which is explained in Chapter 3.

After hypothesis testing in Section 4.4, it can be concluded that four independent variables (speed, mobility access, advertising, and functions) are positively associated with the dependent variable (perceived usefulness); the other independent variable (alternatives) is not associated with this dependent variable (perceived usefulness).

To test the model‘s capability, a stepwise multiple linear regression test was run by adding the five independent variables and the dependent variable into SPSS statistical area. The results are shown below:

Table 4.6 Result of multiple regression analysis for stage one

Variables	Unstandardized Regression Coefficients	Significance
(Constant)	0.552	
Speed	0.509	0.000
Advertising	0.213	0.004

$R^2 = 0.255$

Table 4.6 displays the values of the coefficients in the regression equation and measures the probability that a linear relationship exists between each Independent variable and dependent variable. The regression coefficients for two Independent variables speed and advertising are 0.509 and 0.213 respectively. Their significance levels are 0.000 and 0.004, which are less than 0.05. It shows significant multiple linear relationships between them and the dependent variable perceived usefulness (PU).

25.5% of the variance in PU is explained by the two variables (speed and advertising). The other variables (mobility access, functions and alternatives) are not significant at this stage. As a result, they are not included in the regression equation. The resulting regression equation is:

Estimated PU= 0.552 +0.509*(Speed) + 0.213*(Advertising) with R^2=0.255

From the results so far, it can be seen that four sub-variables (speed, mobility access, advertising, and functions) are individually correlated or associated with perceived usefulness. However, when they are combined together in stage one to test the model's capability using stepwise multiple regression, only two sub-variables (speed and advertising) are significantly correlated with perceived usefulness.

4.5.2 Stage two

Dependent variable: Perceived ease of use

Independent variables: Compatibility and Self-efficacy

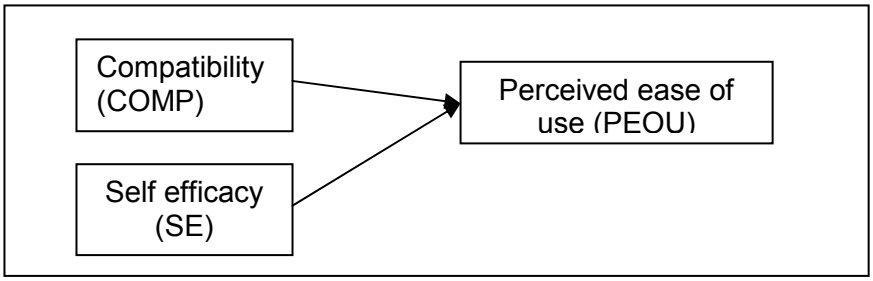


Figure 4.2: Model testing - Stage Two

There are two independent variables (compatibility and self efficacy) with one dependent variable (perceived ease of use) in stage two (Figure 4.2). Their definitions are provided in Chapter 3.

The hypothesis testing in Section 4.4 shows that the two independent variables (compatibility and self-efficacy) are positively associated or correlated with the dependent variable (perceived ease of use).

After running a stepwise multiple linear regression test for this stage by adding two independent variables and one dependent variable into SPSS statistical area, the statistical result is shown in Table 4.7:

Table 4.7 Result of multiple regression analysis for stage two

Variables	Unstandardized Regression Coefficients	Significance
(Constant)	1.990	
Compatibility	0.212	0.001
Self-efficacy	0.200	0.002

$R^2 = 0.141$

In Table 4.7, the regression coefficients for the two independent variables, compatibility and self efficacy are 0.212 and 0.200 respectively. Their significance levels are 0.001 and 0.002, which is less than 0.01 (and 0.05). This shows significant multiple linear relationships between them and dependent

variable perceived ease of use. 14% of the variance in perceived ease of use (PEOU) is explained by the two variables (compatibility and self-efficacy).

These two independent variables can be combined together to represent the dependent variable. Thus, the resulting regression equation is represented as:

Estimated PEOU= 1.990 + 0.212*(compatibility) +0.200*(self-efficacy) with R^2=0.141.

From the results so far, the two variables (compatibility and self efficacy) are individually correlated with perceived ease of use. Furthermore, the result is consistent with the finding when the two variables are combined together in stage two to test for the model's predicting capability using stepwise multiple regressions.

4.5.3 Stage three

Dependent Variable: Intention to use

Independent Variables: estimated perceived usefulness, estimated perceived ease of use, perceived cost and perceived risk.

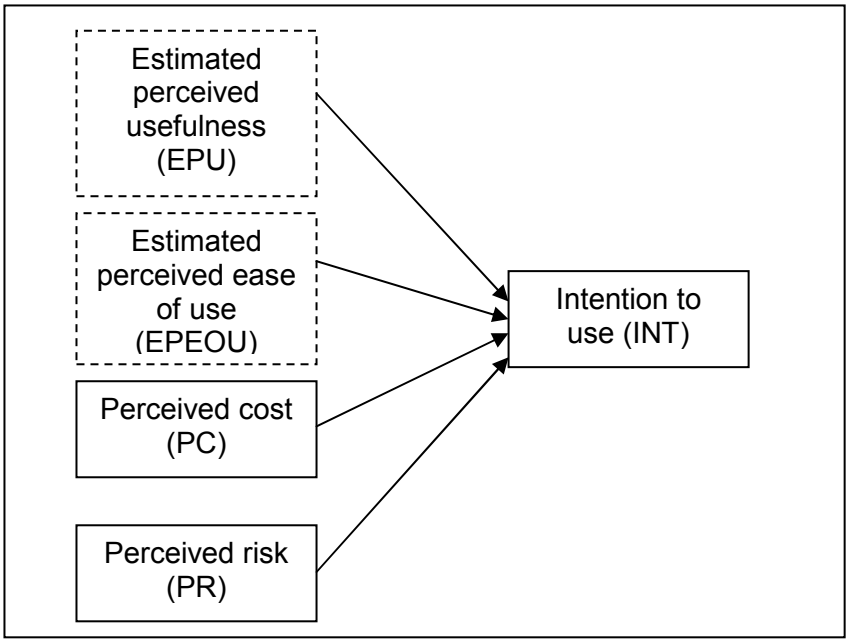


Figure 4.3: Model testing - Stage Three

There are four independent variables (estimated perceived usefulness, estimated perceived ease of use, perceived cost and perceived risk) with one dependent variable (intention to use) to be analysed in this stage (Figure 4.3). Estimated perceived usefulness and estimated perceived ease of use are new variables and are represented by the previous regression equations (stage one and two of the model in Section 4.5.1 and 4.5.2 respectively). The new variables introduced link the results arrived at stage one and stage two to represent the relationships tested in stage three. Stage three looks at the relationship between the other two stages of the model and two other independent variables in order to inspect and test the entire research model's prediction capability with respect to intention to use.

The inclusion of estimated perceived usefulness and estimated perceived ease of use allows to test the assumption underlying the research, that one or more of the variables (speed, mobility access, advertising, functions, alternatives,

compatibility, self-efficacy, perceived cost, and perceived risk) are important factors influencing the decision of the customer to use SMS mobile banking.

Table 4.8: Results of simple linear regression analysis for estimated perceived usefulness and estimated perceived ease of use against intention to use

Dependent variable	**Independent variable**	**r-path coefficients**	**p-value**
Intention to use	Estimated perceived usefulness	0.460	0.000
Intention to use	Estimated perceived ease of use	0.495	0.000

After running a simple linear regression (Appendix G), the results (Table 4.5 and Table 4.8) show that two new independent variables (estimated perceived usefulness and estimated perceived ease of use) are both positively associated with the dependent variable (intention to use). The other two independent variables (perceived cost and perceived risk) are not associated with this dependent variable (intention to use).

After running a stepwise multiple linear regression test for this stage by adding four independent variables and one dependent variable into SPSS statistical area, the statistical result is shown below:

Table 4.9 Result of multiple regression analysis for stage three

Variables	Unstandardized Regression Coefficients	Significance
(Constant)	-3.654	
Estimated PEOU	1.613	0.001
Estimated PU	0.656	0.002

$R^2 = 0.309$

In Table 4.9, the regression coefficients for the two independent variables estimated PU and estimated PEOU are 0.656 and 1.613 respectively. Their significance levels are 0.002 and 0.001, which are less than 0.01. This indicates

significant multiple linear relationships between them and the dependent variable (intention to use).

31% of the variance in intention to use is explained by the two variables estimated perceived usefulness and estimated perceived ease of use. It indicates a good prediction in the resulting equation. The independent variables perceived cost and perceived risk are not significant at this stage, thus they are not included. The resulting regression equation is represented as:

Estimated Intention= -3.654 +0.656*(estimated PU) + 1.613*(estimated PEOU) with R^2 = 0.31.

The results above suggest that the two variables (estimated perceived usefulness and estimated perceived ease of use) are individually correlated with intention to use. However, the other two variables (perceived risk and perceived cost) are not significantly correlated with intention to use. This result is consistent with the finding that only two variables (estimated perceived usefulness and estimated perceived ease of use) are regressed with independent variable (intention to use) when four variables are combined together into stage three to test the model's predicting capability using stepwise multiple regressions.

It can be concluded therefore that four variables (speed, advertising, compatibility, and self-efficacy) are factors influencing user's behaviour. It needs also be added that the regression analysis results involving estimated perceived usefulness, estimated perceived ease of use and intention to use discussed above provides results compatible with the outcomes of the earlier test of hypotheses H7 and H8 (which link perceived usefulness and perceived ease of use with intention to use).

The results of the tests in Sections 4.4 and 4.5 are shown in Figure 4.4.

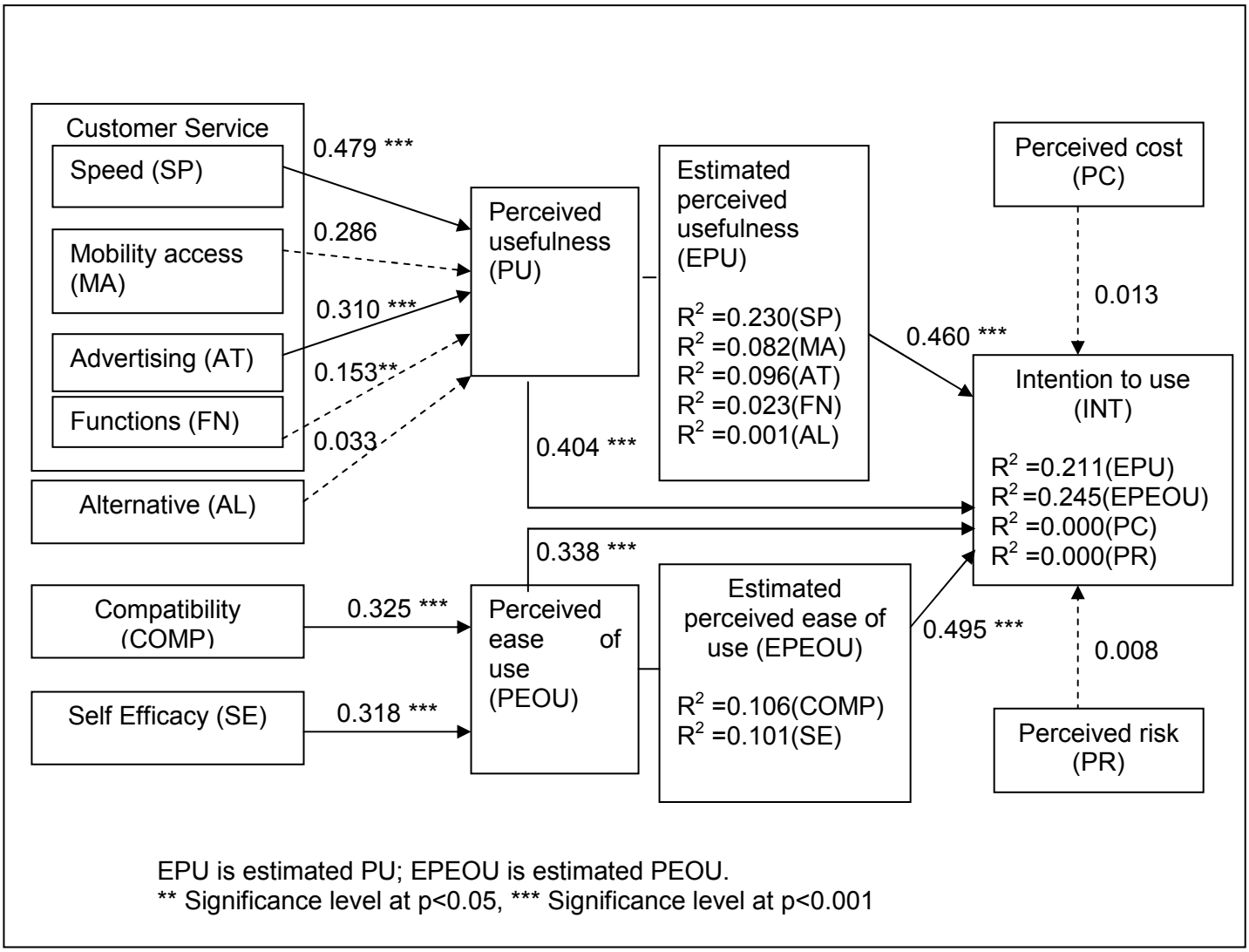


Figure 4.4: Regression analysis of the entire model

Note: All solid-line arrows indicate positive relationships; the dashed-line arrows indicate no relationships are found in the regression analysis.

4.6 Chapter summary

This chapter details the results of the data analysis based on the data collected from the survey conducted. The demographic profile and the perception of respondents are described. Regression analysis techniques are applied to test the predicting capability of the model and to investigate the research hypotheses.

The result of the hypothesis testing supports all variables in the research model except alternative, cost and risk. The results from the regression analysis (Figure 4.4) suggest that speed, advertising, compatibility, and self efficacy have the highest influence on the usage or adoption of mobile banking. The results indicate that both non-users and users are expecting to adopt or use mobile banking in the future.

CHAPTER 5 Discussion and conclusion

5.1 Chapter overview

This chapter discusses the results presented in Chapter 4 and identifies differences and similarities with prior studies and literature. Some findings support previous results, while some contradict prior findings. The findings of the study are reported in this chapter.

5.2 Background information

Results from the background information summarize the characteristics of the participants in this particular sample. Both males and females have used mobile banking at the same time. However, more males responded to this survey than females (52.4% males and 47.6% females), which means that the proportion of female users is slightly higher than that of male users in this sample. This differs from previous findings that more males use mobile banking than females (Singh, 2004), however the difference between males and females in this sample is not high so the issue may need be further investigated.

People in the younger age group are more likely to use mobile banking with 48% in the 20-24 year age group as indicated in the data described in Chapter 4. This suggests that young New Zealanders could easily handle and accept new technologies and applications; they are one of the first consumer groups to attempt to use these technologies. In addition, they are normally well educated and possess the knowledge to learn and master new technology quickly and easily. Their adventurous nature and curiosity about new things are two reasons why they are interested in attempting new technology applications. This was also demonstrated in the focus group discussions. However, they have not used mobile banking to a large extent. It would be necessary for them to have more opportunities to become familiar with the functions and services of mobile banking. This was discussed in the focus groups and the issue of the importance of information in mobile banking adoption was also considered.

The more experience the user has with SMS and the use of mobile phones or devices, the more likely the user is to adopt a mobile banking system. A higher proportion of SMS users and mobile phone users were to be found in the mobile banking users group in the survey. Referring to the focus group discussion," *the most of New Zealanders is good at texting message quickly with mobile phone*" (Appendix O). According to IDC New Zealand (2004), the average number of SMS messages sent per day in New Zealand during 2003 was 3.6 million and this was expected to rise to 13.8 million by 2008. Furthermore, mobile banking users are normally familiar with functions and SMS and mobile phone features. This supports the discussion from the focus group. " *Using mobile banking would be compatible for users because they used to do everything with mobile device.*"(Appendix O) There is also a survey done by Vodafone New Zealand Ltd, the results showing that people are used to using SMS to arrange dates with close friends, gather evidence of cheating, propose marriage, fire employees as well as solve embarrassing situations (Hudson, 2008).

Not only would current mobile banking users like to continue to use mobile banking services, non users also express their interest and intention to adopt this new technology application - mobile banking. This is a new finding. One possible reason is that the sample population are mostly students and young people; they are more inclined to accept new technology regardless of how well the technology actually works. A lot of rich feedback was received from them. This is valuable to researchers as it could be used to explore social issues in regard to how new technologies are accepted in society.

Table 5.1: Result of hypothesis testing with previous researches

Hypothesis	Dependent variable	Independent variable	This study	Reference
H1.a	Perceived usefulness	Speed	Supported	Focus group
H1.b	Perceived usefulness	Mobility access	Supported	Focus group
H1.c	Perceived usefulness	Advertising	Supported	Focus group
H1.d	Perceived usefulness	Functions	Supported	Focus group
H2	Perceived usefulness	Alternatives	Not supported	Focus group
H3	Perceived ease of use	Compatibility	Supported	Kolodinsky & Hogarth (2001) :supported
H4	Perceived ease of use	Self-efficacy	Supported	Luarn & Lin (2004): supported
H5	Intention to use	Perceived cost	Not supported	Supported by Luarn & Lin (2004)
H6	Intention to use	Perceived risk	Not supported	Supported by Luarn & Lin (2004)
H7	Intention to use	Perceived usefulness	Supported	Davis(1989), Luarn & Lin (2004): supported
H8	Intention to use	Perceived ease of use	Supported	Davis(1989), Luarn & Lin (2004)

A number of hypotheses for the use of mobile banking (SMS) were formulated based on a literature review. The results obtained after testing the hypotheses by using regression analysis are displayed in Table 5.1 along with results from previous studies. The results of this research are consistent with previous studies and the focus group discussion, with the exception of alternatives, perceived cost and perceived risk. Detailed explanations for each result are presented in the following section of the chapter.

5.3 Model variables

There are three separate analysis stages (Chapter 4). Stage one and stage two are both related to stage three because the two independent variables in stage three are defined in stage one and stage two (estimated perceived usefulness and estimated perceived ease of use).

Stage one includes four independent variables identified at the focus group discussion (speed, mobility access, advertising and functions), and alternatives. The results of the multiple linear regression analysis in Chapter 4 shows that only speed and advertising are found to have a significant positive effect on perceived usefulness, which in turn has a positive influence on intention to use mobile banking.

Speed and advertising have an indirect influence on intention to use mobile banking through their effect on perceived usefulness. This result supports the summary from the focus group discussion "*the more advertising of mobile banking(SMS) are posted in the public, the more knowledge and information is provided to the consumers", "using mobile banking can perform the simple task easily and quickly*".(Appendix O). The variable speed implies that users seek a simple, easier, faster performance process and environment for banking transactions. They prefer to use mobile banking (SMS), because it could provide a speedier service. Users are more likely to complete a simple task using more complex technology than more complex tasks, regardless of their level of education. When new technologies emerge, people may not feel like utilizing them because they only have limited time to learn how to use them.

There is a gap between new technology production and adoption. It always takes a long time for users to become familiar with new technologies.

In addition, the variable advertising provides information and recommendations to facilitate users' understanding of new technology in the market such as what it will bring to the user, and how easy and fast users can master it. Users may accept and use this new technology because the related information and knowledge guides them to acquire increased benefits and convenience by adopting this new technology. Therefore advertising can encourage people to use mobile banking (SMS).These two factors are related to each other: users can get more information about the speed of using mobile banking from advertising; users can also post their feedback about the speed after they have used mobile banking.

The other two variables, mobility access and functions are not part of the multiple regressions equation for perceived usefulness. This contradicts the results from the focus group discussion.*" more functions added in the mobile banking system could allow the users to perform more tasks during the banking transaction". "we can access mobile banking system anytime/anywhere through mobile device"* (Appendix O). It seems that people are not especially concerned with the number of functions provided by a mobile banking system. One possible reason is that simple functions may be enough for users to meet their banking needs. At this stage, mobile banking users do not have any new demands and requests which require the support of new functions in the mobile banking system. As a result increasing mobile banking functions is currently not an important step in developing the system in order to satisfy users' demands. On the other hand, many alternative banking options are available for users to perform their banking tasks i.e. internet banking, phone banking and personal banking. Some functions offered by these alternative banking options may complement the mobile banking system.

Mobility access is an important characteristic of the mobile banking service. Mobility access helps overcome time and space limitations of banking. It is obvious that users agree with the importance of mobility access to mobile banking. However, it is not necessary for users to access mobile banking at any

time, anywhere. As mentioned by some participants from focus group," *we know this is quite convenient, saving time, and saving distance to do banking and control it by ourselves. However we do not always do banking every time and everywhere. We normally do our banking once per week or per month as demanded. Even some of us don't do banking regularly, because we have some other people or assistants to do it for us. If we are in the urgent situation like due day payment, we could use it, but its use is no more than that purpose*."(Appendix O). Mobility access is one of great benefits to users adopting mobile banking as their banking options. However, it seems that mobility access is also currently an unnecessary luxury of using mobile banking in New Zealand.

The variable "alternatives" is another independent variable excluded in the regression model of perceived usefulness. There are a lot of banking options for users to choose from. "Alternatives" is a possible factor affecting perceived usefulness and user behaviour in mobile banking. In contrast, the results indicate that there is no positive relationship between alternatives and perceived usefulness so that "alternatives" may not be a factor influencing usage or adoption of mobile banking in New Zealand. People are aware of the alternatives offered to mobile banking as the relatively high average showed in the survey, but there are also other alternative choices for this particular sample (all participants live, work and study in the biggest New Zealand city), and mobile banking is just one of the many. However, "alternatives" is still a potential factor to be considered and explored in future work.

The results in Stage 2 show that compatibility and self efficacy have a significant positive effect on perceived ease of use, which in turn has a positive influence on intention to use mobile banking. Some supporting studies find that computer self efficacy would influence perceived ease of use (Agarwal et al., 2000; Hong et al., 2001; Igbaria&Iivari, 1995; Venkatesh, 2000). As shown by Goldsmith and Bridges (2000), life compatibility might affect the consumer's opinion of other e-commerce purchases. In addition, compatibility and self-efficacy are also significant factors which indirectly influence the intention to use mobile banking through perceived ease of use. The finding is supported by prior

study on mobile banking (Luarn & Lin 2004) and the discussion in the focus group.

"S*ome New Zealander used to do everything with mobile phone or SMS; they could be one group of mobile banking users, because SMS or playing with mobile phone is a part of their life and easy for them to master the mobile banking system quickly", "Using Mobile banking provides a chance and opportunity to the users who like to control and manage the financial transaction by themselves*" (Appendix O). Compatibility is found to be a factor of intention to use mobile banking; this suggests that if a mobile banking service is consistent with the user's demands and lifestyle, and is easy to use, it is a better channel compared with traditional banking services. It is quite important for users that new technology is consistent with their lifestyle rather than it breaking or disrupting their routines. Mobile banking is one such new technology.

Another significant factor affecting the use of mobile banking, self efficacy, was found in the regression analysis. This suggests that enhanced users' self efficacy in mobile banking may cause users to adopt and use mobile banking. *"I do not need anyone to teach me how to use mobile banking, because I could learn it by myself", "I would use mobile banking even if the different mobile technologies deployed.*" (Appendix O).To enhance self-efficacy, banks may organize training courses in mobile applications to help users to become familiar with mobile technologies. Individuals with higher self-efficacy are more likely to use mobile banking (SMS) because they are confident with this mobile technology.

Results in Stage 3 indicate that estimated perceived usefulness is found to be the most significant factor influencing the intention to use mobile banking (SMS). The importance of perceived usefulness has been confirmed in explaining the use of a new technology application in prior research. If mobile banking is to be accepted by users, then they should perceive it as a useful and quicker way of doing banking transactions compared with the traditional branch banking system. This is supported by previous studies on mobile banking (Luarn & Lin, 2004).

In addition, the results in Stage 3 also indicate that estimated perceived ease of use significantly influences the intention to use a mobile banking system, which confirms the importance of perceived ease of use to reflect user's intention and behaviour of using mobile banking. This is supported by prior studies (Chau & Lai, 2003; Luarn & Lin, 2004) which suggest that the easier mobile banking (SMS) is to use, the higher the number of users attempting or intending to use mobile banking.

However, the results show that perceived risk and perceived cost do not significantly influence the intention to use mobile banking, which contradicts prior studies (Luarn & Lin, 2004; Mathieson et al., 2001; Wang et al., 2003; Chen & Rea, 2004; Huang et al., 2003; Tan & Sutherland, 2004). In regard to risk, one possible reason may be that sample participants do not think that there are risks related to mobile banking services since there are only a few security issues published in the public domain. Another explanation may be that there are few mobile banking users in the sample since the introduction of mobile banking services, and therefore this research population is not aware of any negative experiences.

As far as the cost result is concerned, one possible reason may be that sample participants are not concerned about the cost of using mobile banking because they seldom use it. The other possible reason is that New Zealanders do not intend to use the corresponding technology because they consider higher cost associated with mobile banking. Another possible reason may be that the public is not aware of the details concerning cost, so participants may not be sure whether the cost is higher or not. For users, it might be one possible reason that affects their adoption of mobile banking service since they accept its cost or risk because they already have some experience of mobile banking but think that these factors have only a minor effect on any banking transaction.

Thus the findings about use, risk and cost contrast previous studies and the summary from focus group discussion. On the other hand, as more users start to use mobile banking and are provided with enough information about it, cost and risk issues may arise. So risk and cost as adoption factors may still be in need of further research.

To summarise, the study identifies and investigates the factors which influence customers' decision to use a specific form of mobile banking, and specifically focuses on the evaluation of SMS-based mobile banking in the context of New Zealand. The model attempts to identify the features of the service, the features of the environment and those user characteristics that underline usefulness and ease of use, and which may provide an insight of what influences user perceptions in the case of SMS-based mobile banking in New Zealand. It was found that two context specific variables (service speed and service awareness through advertising) may be important determinants of the success of SMS banking in New Zealand; it was also shown that, in line with prior results about other geopolitical locations, New Zealanders are more likely to adopt SMS banking if they were comfortable and confident in their ability to use the service. The hybrid approach used, combining qualitative data collection and a subsequent quantitative survey, provided a means of investigating how user perceptions about usefulness and ease of use were formed.

5.4 Research limitations

There are some limitations associated with the current study. The main focus of the research model is about four factors from the focus group discussion, namely, speed, mobility access, advertising and functions, as well as exploring their relationship with perceived usefulness. The reason is that the objective of the research is to find out the factors influencing mobile banking adoption in the New Zealand context. Thus the results are discussed from a New Zealand perspective. However, the model also draws on the literature, and the analysis provides a comparison of the results from the current study with those from prior studies done in other countries.

Another limitation is the type of participants responding to the research. The survey was only completed by students who were studying at university. The results may only reflect this sample. It cannot be representative of the whole New Zealand population's behaviour. However, the student researcher had limited time and resources, and was not be able to explore the general New Zealand population. Still the participants were rather diverse and included females, males, international students, national students, mobile banking users and non users. The participants were randomly selected. This helps avoid bias

towards the research outcome and increases the credibility of the feedback. Therefore the findings may be considered representative for a “young, urban, and educated” population segment.

As discussed by Straub, Limayem and Karahanna (1995), it is important to conceptualize and operationalize the construct of the research. Hence, multiple items are involved and used to collect information about one construct. Those items may not include other possible alternatives and may not directly point to each construct. Some of them may be duplicated and repeated in order to collect and record the data; some may not clearly explain the concept of each construct; some of the words used for items may be confusing to the participants.

In comparison with prior studies, each stage of the research model demonstrates a lower explanation power: 25% for stage one, 14% for stage two and 31% for stage three (see Chapter 4 and Appendix H). The unexplained 69% of the overall research model indicates that some important factors influencing users’ intention may have been ignored in the research. Thus searching for additional new variables may improve the accuracy relating to the expected use of mobile banking in further studies.

Perceptions of users may change over time when users have gained more experience (Mathieson et al., 2001; Venkatesh & Davis, 1996). So it may be useful to redo and re-evaluate this research and the study after a certain period of time as the results may be expected to be affected by the time.

5.5 Implications

The results of this research may be used to provide recommendations to banks and mobile service companies providing mobile banking (SMS).

Improving the speed of the SMS banking transaction may bring value to the service and customers may choose to use SMS banking rather than one of the other available options. In addition, mobile service providers also need to increase the bandwidth support of mobile banking in order to enable a better performance. Therefore, the improvement and development by both banks and

service providers will be important to provide high quality service and value to mobile banking users.

Advertising of mobile banking should be wider of higher frequency. Advertising may cause more people to be interested in using mobile banking, be aware of its availability and to consider the advantages and disadvantages of mobile banking. Banks should therefore distribute more information to demonstrate the features of mobile banking services, their benefits and how easy it is to use. In addition, banks should continue to innovate and invest in mobile banking services to add functions in order to allow users to have more alternatives and get value from the mobile banking service. Moreover, multiple services could be added into the mobile banking system by banks. As discussed by Chau and Lai (2003), customers prefer to perform multiple services instead of a simple task/transaction. Therefore, banks should build links between bank services and other related financial services in order to facilitate ease and speed. This could motivate customers to adopt and use mobile banking as their banking option. As 50% of current non-users may attempt to use mobile banking services in the future (see chapter 4), enhancing advertising and informing may increase the number of non-users who start to use and adopt this new technology for their daily banking transactions.

In order to enhance customers' self-efficacy in mobile banking, banks should arrange and organize sessions and presentations to demonstrate how to use mobile banking services, as well as what services are provided in order to show the benefits of using mobile banking systems. This may help customers to gain a positive perception of the ease of use of mobile banking (SMS). As mentioned by Hudson (2008), New Zealanders send at estimated 600 million texts a month (NZ Vodafone survey). Since New Zealanders widely use SMS as a communication medium, New Zealand banks and service providers should arrange the demonstration of mobile banking through SMS to enhance customers' self-efficacy. This is an easy and efficient way to help SMS users adopt and use mobile banking.

The results suggest that compatibility may be a significant factor in the use or adoption of mobile banking. Banks should therefore build and design functions

and mobile banking services in a way that is consistent and fits with customers' past experience (Chau & Lai, 2003) and life style (Vellido et al., 2000; Vijayasarathy, 2004; Ratchford et al., 2001). Banks can send customers surveys and receive feedback in order to develop services and functions which would satisfy customers' further demands.

All of the implications above follow from increasing the ease of use and usefulness of mobile banking. All factors are related to these two main constructs.

In order to increase the adoption rate, banks should focus on mobile banking non-users with mobile experience. This would help banks to cover the majority of non-user customers (90.2% in this research) who have experience using mobile phones. Sufficient resources should be allocated to train and educate staff so that staff would be able to explain mobile banking in more details and encourage non-users to use mobile banking services. Furthermore, the service providers should ensure that systems perform banking transactions over mobile devices much faster. With both banks' and service providers' assistance and maintenance, it is anticipated that in the future mobile banking would be adopted and used by non-users with mobile phone experience.

5.6 Future work

The limitations and implications discussed point at some areas for further study and research.

Regarding the use and adoption of mobile banking (SMS) in New Zealand, further research may contribute to a better understanding of the phenomenon. This research has explored the intentions of individuals who are studying at Auckland University of Technology in the Auckland city campus, so future studies could extend to other universities and even build upon this research to different parts of New Zealand as well as different types of participants such as corporate customers. In a comparison between student customers and corporate customers, the differences and similarities could be identified in terms of factors influencing the use or adoption of mobile banking.

Since this study is concerned with mobile banking adoption in a New Zealand context, other factors may be added to the one emerging from the focus group. This study finds that perceived cost and perceived risk are not significant for the use of mobile banking service in New Zealand, however, prior studies strongly support perceived cost (Luarn & Lin, 2004) and perceived risk (Bhatnagar et al., 2000) as important factors influencing user behaviour. A further study should retest and investigate these two issues.

The methods applied at different stages in this research were a focus group and a survey. Several open-ended questions and some closed-ended questions were asked in the focus group sessions. More closed-ended questions could be added to the focus group discussion in future studies. In addition, interviews could be conducted in order to acquire more feedback which could be used to design and develop the survey questionnaires. It may be helpful to modify the survey questionnaires and provide more conceptualizations and specifications. Moreover, some open-ended questions may also be added to a future survey.

The research model could also be extended in future work by adding more concepts and variables. Extended TAM (Luarn & Lin, 2004) and TAM (Davis, 1989) models have been adopted in this research. The results of this research show that 31% of the variances in the intention to use of mobile banking are explained with perceived ease of use and perceived usefulness. Further studies could be carried out to develop and validate the models by adding external constructs to fit mobile banking with the specific context.

The statistical analysis could be extended to consider some of the more complex relationships emerging from the model rather than to be limited to a staged approach.

5.7 Conclusion

As a new technology application, mobile banking is used as a banking and financial service. Consequently exploring the factors influencing the use or adoption of mobile banking is quite important for banks and service providers who may need to improve and validate their services in order to satisfy more customers and make more profit. This research adopts TAM and Extended

TAM in a New Zealand context to investigate the research questions and achieve the objectives. This model has been tested and validated against data collected from 254 subjects using a focus group, and a paper based survey. There are two parts to the results comparisons. Firstly, some results are found to be consistent with previous studies except risk and cost which were found to be important in the adoption of mobile banking in Taiwan. Secondly, some results are found to be in line with the discussion from the focus group in a New Zealand context, with the exception of alternatives. Conversely, these could be explored and investigated in future studies. Furthermore, speed, advertising, compatibility, self-efficacy, ease of use, usefulness and intention are consistently forming a suitable model, explaining the variance in the intention to use mobile banking in New Zealand despite the fact that the model has a lower predicting capability than prior studies in other countries. In order to attract an increasing number of people to mobile banking (SMS) services, banks and service providers should improve the quality of this service by improving the speed of service, offer more information and advertising, enhance users' ability, experience and knowledge about mobile banking services, educate their staff, as well as provide more funding for conducting research about users' behaviour at different periods of time.

The results of the study contribute to the body of knowledge in the area by demonstrating that context specific factors such as service quality and service awareness are influencing user perceptions about the usefulness of SMS mobile banking which in turn affect intention to use and adoption. The study also demonstrates, on the example of SMS - based mobile banking, how a hybrid approach involving qualitative data collection and a subsequent quantitative survey can help investigate how user perceptions about usefulness and ease of use are formed. Despite the limitations discussed above, it is hoped that the practical recommendations to the banking industry will be found useful, and that the research approach can be applied to the study of other mobile services, in a range of contexts and environments.

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Appendix A: Survey original data

Note:'0' represents "not applied"

PU_1	PU_2	PEOU_1	PEOU_2	PEOU_3	PEOU_4	SP_1	SP_2	SP_3	MA_1	MA_2	AT_1
2	2	2	2	4	2	2	4	4	4	2	2
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3	2	5	1	2	3	5	5	2	5	4	3
4	4	5	4	5	5	4	5	5	5	4	5
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2	3	4	3	3	3	2	4	2	4	5	4
1	1	5	1	3	1	1	1	1	2	2	1
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4	4	5	2	3	5	2	5	5	5	4	5
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AT_2	FN_1	FN_2	AL_1	AL_2	SE_1	SE_2	SE_3	SE_4	SE_5	SE_6	PC_1
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5	5	0	4	4	3	2	3	4	3	0	1
3	3	3	3	2	3	5	3	4	0	0	1
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4	4	3	3	3	2	2	5	4	0	0	2
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4	2	4	4	1	2	1	5	3	1	0	2
1	5	5	5	5	1	1	5	1	0	0	2
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4	4	4	4	4	2	2	2	1	0	0	1
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3	0	3	3	3	3	2	3	1	0	0	2
1	1	2	2	3	1	1	5	3	0	0	1
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3	2	5	5	2	3	2	4	4	0	0	2
3	4	3	4	2	3	4	2	4	0	0	2
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4	3	4	4	3	4	2	4	4	0	0	3
1	1	3	2	1	2	5	3	5	0	0	1
4	3	5	5	2	5	4	4	4	0	0	2
0	3	5	2	5	5	4	4	4	0	0	3
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3	3	4	2	4	4	4	3	3	0	0	2
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3	1	2	4	1	2	3	3	5	3	3	3
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4	4	4	4	4	3	3	4	3	0	0	1
3	3	4	4	2	3	1	3	2	0	0	2
4	4	5	4	3	2	3	4	1	0	0	2

Background information data:

Gender	Mobile use	Txt use	banking use	MB use*	Student status
1	3	1	4	0	1
2	4	4	2	0	1
2	4	4	4	1	1
1	4	4	4	0	1
2	4	2	1	0	1
1	1	1	1	0	1
1	4	4	2	1	1
1	4	4	4	0	1
2	3	4	3	0	4
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1	2	4	2	1	1
2	2	1	1	1	2
1	2	3	1	0	2
1	3	4	4	0	1
2	3	4	3	0	1
1	4	4	4	1	1
1	4	4	2	1	1
1	3	4	4	0	1
1	3	2	3	0	1
1	3	1	3	1	2
2	4	4	4	0	1
1	4	4	2	0	3
2	3	4	1	1	1
1	3	4	1	0	1
2	4	4	2	1	2
2	4	4	4	0	1
2	4	4	2	1	1
2	1	4	2	0	3
1	3	4	2	0	1
2	3	4	4	0	2
1	4	2	1	0	2
1	4	1	4	0	2
2	4	3	2	0	1
1	4	2	4	0	2
1	4	0	3	0	2
1	3	4	0	0	2
1	4	4	1	0	1
2	1	2	3	1	1
2	4	4	3	0	2

*Note:'0' represents "Not use":'1' represents "use" in this table.

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1	4	4	2	0	3
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1	4	4	2	0	1
1	4	4	1	0	4
1	4	4	4	0	3
1	3	4	0	0	2
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2	4	4	2	0	1
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1	4	1	1	1	3
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1	2	3	2	1	3
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2	4	3	2	1	2

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2	4	4	4	0	4
2	4	4	3	0	3
2	4	4	2	0	4
2	4	4	2	0	4
2	4	4	2	0	4

Appendix B: Data after averaging items

PU	PEOU	SP	MA	AT	FN	AL	COMP	SE	PC	PR	INT
2.00	2.50	3.00	2.50	2.50	5.00	5.00	2.00	2.67	2.33	4.00	3.33
2.00	3.25	4.00	3.00	3.00	3.50	3.50	1.67	2.67	3.33	3.67	2.33
2.50	4.25	4.50	4.00	3.50	1.00	1.00	1.67	2.33	3.67	2.67	4.00
4.00	3.25	4.50	4.00	3.00	3.50	3.50	3.00	3.83	3.67	3.67	4.67
2.50	2.50	5.00	3.50	4.00	4.00	4.00	2.00	2.83	3.33	3.67	4.33
2.00	3.00	3.50	3.00	2.00	5.00	5.00	1.00	3.17	1.33	2.00	2.67
2.50	3.25	4.50	3.50	4.00	4.00	4.00	2.33	4.33	3.00	3.67	2.67
1.00	3.50	2.00	2.00	1.50	1.00	1.00	2.33	1.67	2.67	4.33	1.00
2.00	2.00	4.00	3.00	1.50	4.00	4.00	1.33	3.67	1.67	4.33	2.67
2.50	3.25	4.00	3.50	3.50	4.00	4.00	3.33	3.33	2.67	2.33	3.67
3.50	2.50	1.50	4.50	5.00	4.00	4.00	2.33	3.00	1.67	3.33	3.00
5.00	2.50	1.00	3.50	3.50	4.00	4.00	4.33	2.83	4.33	3.67	3.33
3.50	4.00	2.00	4.50	3.50	4.50	4.50	4.33	3.50	1.67	3.67	3.67
4.50	3.50	3.00	4.00	5.00	3.50	3.50	3.33	3.00	2.00	4.00	4.00
2.50	1.75	4.00	3.50	4.00	4.00	4.00	3.67	3.17	2.67	2.67	2.33
2.50	3.25	4.00	3.00	4.00	4.50	4.50	2.33	2.83	3.33	3.67	3.67
1.50	1.75	1.00	3.50	3.00	1.00	1.00	3.00	1.67	3.33	5.00	1.00
1.50	2.75	3.50	3.50	3.00	5.00	5.00	2.00	3.33	4.33	2.33	2.67
3.50	3.00	5.00	3.00	3.00	4.00	4.00	1.67	2.67	3.67	5.00	3.67
3.00	3.50	4.50	3.50	2.50	4.00	4.00	2.33	3.33	4.33	4.67	3.67
4.00	4.25	4.50	4.50	4.00	3.00	3.00	2.67	2.83	1.67	2.67	4.00
1.00	2.00	4.50	3.50	3.00	4.00	4.00	3.00	2.83	4.33	2.33	3.67
3.00	4.00	4.00	4.00	4.00	3.50	3.50	3.33	2.67	2.67	2.67	4.67
5.00	4.00	4.00	4.00	3.00	3.00	3.00	3.33	2.50	4.67	2.33	4.33
2.50	2.75	3.50	1.00	4.00	4.00	4.00	3.67	2.17	2.33	5.00	2.33
3.50	4.00	5.00	4.50	4.00	5.00	5.00	3.33	2.67	3.00	4.67	4.33
2.00	1.00	2.50	3.50	3.00	4.50	4.50	2.67	2.17	1.33	3.33	3.00
3.50	3.25	4.00	3.00	3.50	4.00	4.00	3.33	3.33	3.33	3.00	4.00
5.00	3.75	5.00	4.00	4.00	5.00	5.00	3.67	3.83	5.00	4.33	4.67
3.50	3.75	5.00	3.50	2.50	4.00	4.00	3.67	2.50	5.00	4.33	4.00
1.50	2.75	3.00	3.00	2.50	4.00	4.00	2.00	2.50	3.00	3.67	3.00
2.50	3.25	5.00	3.50	3.00	3.00	3.00	3.00	3.00	2.00	2.33	4.33
3.00	2.50	4.00	1.00	3.00	1.00	1.00	2.33	2.50	3.00	5.00	3.67
3.00	3.50	4.00	2.50	4.00	4.50	4.50	3.00	2.17	3.00	2.67	3.33
2.00	2.75	5.00	1.50	3.00	5.00	5.00	1.67	2.50	3.67	4.00	2.67
3.50	3.75	4.00	4.50	3.50	3.50	3.50	3.33	3.50	1.33	3.00	3.67
3.50	3.50	4.00	3.00	2.00	3.50	3.50	3.00	3.00	3.67	4.33	4.67
5.00	4.00	5.00	4.00	3.00	4.50	4.50	3.00	4.67	2.33	4.00	4.67
3.00	3.75	5.00	4.00	3.50	4.50	4.50	3.33	3.67	3.33	4.00	4.00
3.50	3.25	3.00	3.00	3.00	3.00	3.00	3.00	3.83	4.67	4.00	3.33
2.50	2.50	4.00	2.00	3.00	2.00	2.00	3.00	2.67	2.67	4.33	3.33
1.00	2.75	3.50	2.00	2.50	5.00	5.00	1.33	2.00	4.00	2.67	2.00
2.50	2.50	2.50	2.50	3.50	4.50	4.50	2.67	2.33	4.00	3.67	2.67
2.50	3.00	3.00	3.00	2.50	2.50	2.50	2.67	3.00	2.67	3.00	2.33
3.50	3.75	5.00	3.50	4.00	3.50	3.50	3.67	3.50	2.00	3.33	4.33
3.50	3.50	4.50	5.00	3.50	5.00	5.00	3.33	2.50	4.33	4.33	4.67
5.00	4.25	4.00	3.50	3.00	5.00	5.00	3.67	3.17	3.00	2.67	4.00
1.50	2.25	4.00	3.00	3.00	3.50	3.50	2.00	2.67	3.00	4.00	3.67
3.00	4.00	3.50	2.50	4.00	2.50	2.50	3.67	2.83	1.67	3.00	3.67
2.50	3.25	2.50	2.50	3.00	5.00	5.00	2.33	2.83	1.00	1.67	2.33
3.00	4.00	5.00	4.00	3.00	4.50	4.50	3.67	4.50	3.67	3.33	4.33
2.00	2.75	3.50	3.00	3.50	4.50	4.50	3.00	3.50	2.33	4.67	3.67
2.50	2.75	2.50	2.50	2.50	2.50	2.50	2.67	2.83	3.00	3.00	3.67
3.00	3.00	2.50	3.00	3.50	3.50	3.50	3.00	2.83	3.67	3.33	2.33

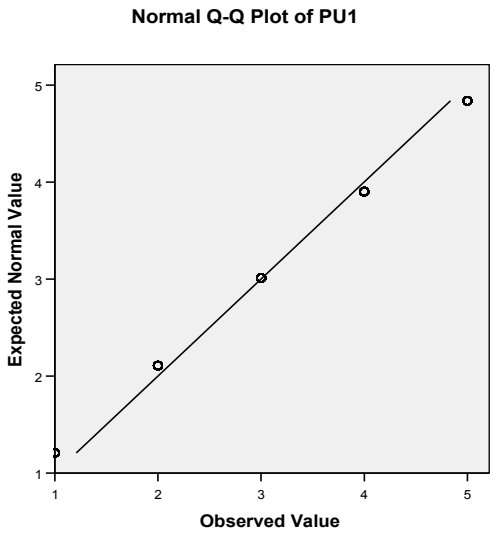
2.00	2.75	4.00	4.00	4.00	4.50	4.50	1.67	2.83	3.33	3.33	2.33
3.00	2.75	3.00	1.50	2.50	2.50	2.50	3.33	2.67	3.00	4.33	4.00
3.50	3.75	5.00	3.50	2.50	4.50	4.50	2.33	4.17	4.33	4.67	3.00
3.00	2.50	4.00	3.50	2.00	4.00	4.00	2.00	3.17	5.00	4.00	3.67
1.50	3.25	4.00	1.00	2.00	3.50	3.50	2.67	1.50	2.67	4.00	3.67
3.00	3.50	4.00	3.50	2.50	4.00	4.00	2.00	2.83	4.00	2.33	4.00
1.50	4.00	4.00	2.00	2.00	4.00	4.00	1.00	1.67	5.00	3.00	2.67
5.00	3.50	4.50	3.50	3.50	4.50	4.50	3.67	4.83	2.00	2.67	5.00
4.50	3.50	5.00	3.00	3.00	5.00	5.00	3.00	4.17	2.00	3.33	4.67
5.00	3.25	5.00	3.50	3.00	4.50	4.50	3.00	4.17	2.00	3.33	4.67
3.00	2.75	4.00	3.00	3.50	2.50	2.50	2.67	2.50	2.33	3.00	3.33
5.00	4.25	5.00	4.50	4.00	1.50	1.50	3.67	3.00	2.00	4.00	3.67
5.00	4.25	2.00	3.00	2.00	3.50	3.50	3.33	3.17	3.00	2.33	2.00
3.50	2.75	4.00	3.00	4.00	4.00	4.00	2.33	2.83	3.00	3.33	2.67
2.50	3.25	4.00	3.50	2.50	4.00	4.00	3.00	2.00	3.33	3.33	3.33
3.00	3.50	1.50	3.50	2.50	2.50	2.50	2.67	3.50	3.33	3.67	3.00
1.50	3.75	5.00	2.50	3.00	2.50	2.50	1.33	0.67	4.00	3.00	4.00
3.50	3.25	5.00	4.00	4.50	4.50	4.50	2.67	4.00	2.67	4.33	4.00
4.00	4.50	5.00	3.00	4.00	5.00	5.00	2.67	3.00	3.00	4.00	4.67
5.00	4.25	5.00	4.00	3.00	5.00	5.00	3.67	4.33	5.00	3.67	5.00
2.00	2.00	2.50	2.00	2.00	1.00	1.00	1.00	1.00	2.33	3.00	1.67
3.50	3.75	4.00	4.50	3.00	3.50	3.50	3.33	4.33	3.67	3.00	4.00
3.50	4.00	3.50	4.00	3.50	3.00	3.00	3.33	4.17	4.00	4.00	4.00
3.00	3.50	4.00	4.00	3.50	4.00	4.00	3.33	3.83	3.67	3.33	4.00
2.50	4.00	4.50	3.00	3.00	5.00	5.00	3.00	3.83	4.67	4.33	4.33
2.50	2.75	3.50	4.00	3.50	3.00	3.00	2.33	3.17	4.00	5.00	3.33
2.50	4.25	5.00	5.00	5.50	5.00	5.00	3.67	3.33	2.00	2.33	4.33
2.00	4.00	4.00	3.00	3.50	1.50	1.50	1.33	2.17	2.67	2.33	3.33
3.50	2.75	4.50	5.00	2.50	3.50	3.50	2.00	3.00	3.33	4.33	4.33
2.50	2.50	4.00	2.00	2.50	4.00	4.00	2.00	2.67	3.00	3.00	2.33
4.00	3.25	2.50	2.50	3.00	4.50	4.50	3.67	2.83	2.33	2.67	2.67
2.50	2.50	4.00	2.00	3.50	5.00	5.00	1.00	3.00	3.33	4.00	2.67
3.50	3.75	4.00	3.50	4.50	3.50	3.50	3.33	2.50	3.00	3.67	4.67
1.50	3.50	3.00	4.00	5.00	1.50	1.50	2.33	2.67	5.00	4.33	4.67
1.50	1.25	3.00	1.50	4.00	3.50	3.50	1.33	2.17	4.33	4.33	2.33
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
2.50	2.75	4.00	4.00	4.00	3.50	3.50	2.00	2.17	3.33	3.67	4.00
1.50	3.50	2.00	2.50	3.50	5.00	5.00	1.67	2.17	2.33	3.67	3.33
4.00	3.75	4.00	4.50	2.00	2.50	2.50	2.33	2.67	2.67	3.00	3.67
2.50	2.75	3.50	4.00	3.50	3.00	3.00	2.67	3.17	4.00	5.00	3.33
3.00	3.00	4.00	4.00	2.50	3.50	3.50	2.00	2.67	3.33	3.67	3.33
4.00	2.75	4.00	3.00	2.50	3.50	3.50	3.00	2.83	2.67	2.00	3.67
2.00	1.75	4.00	3.00	4.00	3.50	3.50	2.00	2.17	1.33	2.33	2.00
4.50	3.50	4.50	4.00	3.50	2.50	2.50	3.33	2.67	2.67	3.00	4.00
2.00	2.75	4.50	2.50	4.00	3.00	3.00	3.33	2.67	3.67	4.33	4.00
2.50	3.50	5.00	3.00	3.00	3.50	3.50	3.00	3.17	3.33	3.00	4.33
4.00	2.75	4.50	3.50	3.50	3.50	3.50	2.67	3.17	4.00	4.33	3.00
2.00	2.00	4.50	3.00	3.50	4.00	4.00	3.00	2.67	5.00	4.67	2.67
4.50	2.25	1.50	3.50	3.50	2.50	2.50	2.67	2.50	1.33	3.00	3.33
3.50	2.75	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.33	3.00	3.00
5.00	4.25	4.00	4.00	4.50	1.00	1.00	2.67	4.67	2.33	2.33	4.00
3.50	4.25	4.50	5.00	2.50	1.50	1.50	3.67	3.33	3.33	3.33	4.67
4.00	3.50	4.00	4.50	2.50	3.00	3.00	2.67	2.33	3.00	3.33	4.00
4.50	3.00	4.00	2.00	3.00	3.50	3.50	2.67	3.00	3.00	3.67	3.00
2.00	2.75	3.00	2.00	3.50	4.50	4.50	1.67	1.83	3.00	3.33	4.00

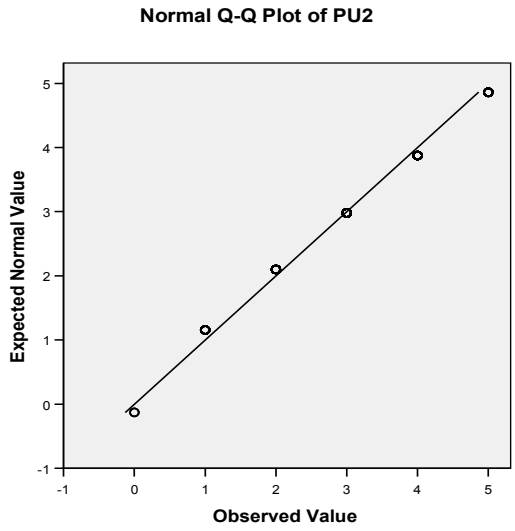
2.00	2.00	4.00	3.00	3.00	4.00	4.00	3.00	3.17	4.00	4.67	3.33
2.00	3.75	4.00	2.50	2.00	4.00	4.00	1.67	2.67	2.67	3.67	2.67
2.50	2.75	4.50	4.00	3.50	3.00	3.00	2.67	3.00	2.67	2.33	4.33
2.50	3.75	4.00	4.00	3.50	3.50	3.50	3.00	2.83	2.00	3.00	4.33
2.00	4.00	4.00	2.50	3.00	4.00	4.00	1.67	3.00	3.00	2.33	4.00
1.50	2.50	4.00	4.00	3.50	4.50	4.50	2.33	3.00	3.67	1.00	1.67
3.00	3.00	4.00	3.00	3.50	2.50	2.50	3.00	3.17	4.67	4.33	4.00
4.00	3.25	5.00	4.00	3.50	4.00	4.00	3.00	2.67	3.00	3.67	3.67
3.00	3.00	3.00	4.00	3.00	4.00	4.00	2.33	3.00	4.00	3.67	3.67
1.50	2.50	3.50	3.00	3.50	1.00	1.00	1.00	2.00	1.67	4.33	3.67
1.50	2.25	3.00	2.50	3.00	4.50	4.50	1.67	2.83	4.33	3.67	3.00
2.50	3.00	3.50	2.50	3.00	3.50	3.50	3.00	4.17	4.33	4.67	4.67
2.00	3.50	3.00	3.50	3.50	4.00	4.00	2.33	2.33	3.33	3.67	3.33
2.50	2.50	3.00	3.00	2.50	5.00	5.00	2.67	3.33	3.00	4.00	3.67
3.00	3.00	5.00	4.00	3.50	5.00	5.00	2.67	3.33	2.67	2.67	3.67
2.50	2.50	2.50	2.00	3.00	3.00	3.00	3.33	4.00	3.00	3.00	3.67
3.00	2.50	5.00	3.50	3.50	5.00	5.00	4.00	3.17	2.67	3.00	3.67
1.00	3.00	3.00	3.00	2.00	4.00	4.00	1.00	2.33	3.67	3.00	3.00
2.50	3.25	3.00	3.00	3.00	3.50	3.50	3.00	3.33	3.67	3.33	3.33
5.00	4.00	5.00	3.50	3.50	3.50	3.50	4.67	3.83	2.33	4.33	4.67
3.50	3.00	3.50	2.50	3.00	2.50	2.50	3.33	2.83	3.33	3.00	3.33
3.50	2.75	3.00	3.00	2.50	4.00	4.00	3.00	4.67	3.67	4.00	4.00
2.50	4.00	3.50	3.00	3.50	5.00	5.00	2.00	4.33	5.00	5.00	3.67
2.00	2.25	2.00	3.50	2.50	3.50	3.50	3.33	2.83	3.67	3.33	3.00
1.00	3.00	2.00	3.00	5.00	5.00	5.00	1.33	1.67	5.00	4.67	1.33
2.50	3.50	5.00	2.50	3.00	4.50	4.50	3.00	2.33	3.00	3.67	3.67
1.50	2.75	4.00	3.00	3.00	3.50	3.50	2.67	3.17	2.00	3.67	4.00
5.00	3.75	5.00	4.00	2.50	3.00	3.00	3.00	3.33	1.00	3.33	4.33
4.00	3.25	3.50	3.00	3.50	1.50	1.50	2.00	3.50	4.00	3.33	3.67
1.00	3.25	3.00	3.00	3.00	3.00	3.00	3.00	2.50	2.00	2.67	2.67
1.00	1.75	3.50	2.50	2.50	1.50	1.50	1.67	1.67	2.00	3.00	3.00
3.00	3.25	3.50	3.50	3.50	4.00	4.00	3.33	3.33	3.67	4.33	3.33
3.50	3.25	5.00	4.00	3.50	3.50	3.50	3.00	3.67	3.33	3.33	4.67
3.50	3.25	3.50	3.50	3.50	3.00	3.00	3.33	3.00	2.67	3.00	3.33
2.50	1.25	2.00	3.50	3.00	2.50	2.50	1.00	2.83	2.33	2.00	1.67
3.00	3.00	4.50	5.00	3.00	3.00	3.00	2.33	2.00	3.00	4.33	3.00
5.00	4.25	5.00	3.50	4.00	2.00	2.00	3.67	4.17	3.67	4.33	5.00
3.50	3.00	4.00	3.50	4.00	2.00	2.00	3.67	3.83	4.33	4.00	4.33
4.00	2.75	5.00	2.50	3.00	1.50	1.50	2.67	3.00	3.67	3.67	2.00
3.50	3.50	3.00	2.50	2.50	3.50	3.50	2.33	3.00	3.33	4.33	3.00
3.50	2.50	3.00	3.50	3.50	3.00	3.00	2.67	3.50	4.33	2.67	2.67
3.50	2.25	4.00	0.50	4.00	1.50	1.50	1.67	2.33	4.00	2.00	4.00
4.00	3.25	4.00	4.00	3.00	3.50	3.50	2.67	3.00	2.67	3.00	4.00
3.00	3.00	4.50	4.00	4.50	3.50	3.50	3.67	2.67	2.00	4.67	3.33
2.00	2.50	3.50	3.00	3.00	5.00	5.00	2.00	2.17	3.33	3.00	2.67
3.50	3.00	4.00	3.50	3.50	4.00	4.00	3.33	3.17	4.67	4.33	3.33
4.50	4.25	4.00	4.00	4.50	5.00	5.00	3.67	3.33	1.67	2.67	4.67
2.00	1.75	1.50	1.50	3.00	5.00	5.00	2.33	2.17	2.00	4.67	2.00
3.50	3.50	5.00	3.50	3.00	5.00	5.00	2.00	3.33	3.00	5.00	4.00
3.50	3.00	4.50	4.50	3.00	3.50	3.50	3.00	2.83	2.67	4.00	4.00
4.00	4.50	3.50	3.00	3.00	3.00	3.00	3.00	3.67	3.00	2.67	4.00
4.50	4.00	4.50	3.50	3.00	3.50	3.50	3.33	3.83	3.00	3.67	4.00
4.00	3.00	5.00	3.50	2.50	4.50	4.50	2.67	4.83	4.00	3.00	4.33
4.00	3.25	5.00	1.50	3.00	3.50	3.50	3.33	3.83	2.67	1.67	4.33
2.50	3.00	2.50	2.50	2.50	2.00	2.00	3.33	2.17	3.00	4.00	2.00

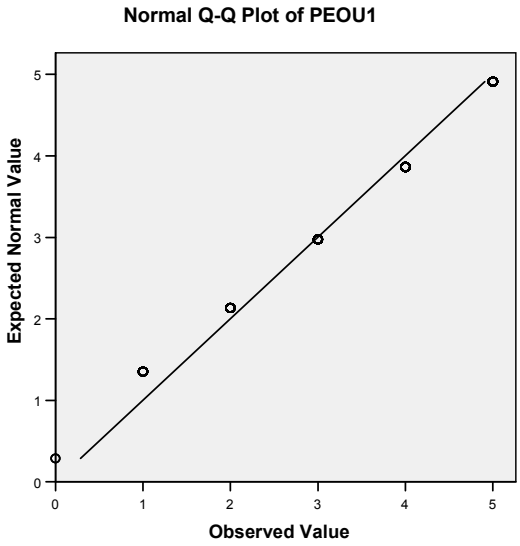
3.50	3.00	4.50	3.50	3.00	5.00	5.00	4.00	4.50	5.00	5.00	5.00
4.00	4.50	5.00	3.50	2.50	3.50	3.50	3.00	3.17	4.33	4.00	4.00
4.50	3.75	5.00	3.00	2.00	3.50	3.50	2.67	2.83	4.33	2.67	4.67
3.00	4.00	5.00	3.00	3.00	2.00	2.00	3.67	3.33	2.67	2.67	4.67
2.00	2.00	1.50	4.00	3.00	3.00	3.00	2.33	2.50	3.00	3.00	2.67
1.00	1.25	4.00	3.00	3.00	4.00	4.00	3.00	3.17	4.00	5.00	3.00
3.00	3.25	4.00	3.00	3.00	4.50	4.50	2.33	3.33	3.33	4.67	4.00
2.50	3.00	3.50	3.00	3.00	4.00	4.00	1.67	3.17	4.00	3.00	3.33
2.50	3.00	3.50	2.00	2.50	3.50	3.50	3.00	2.67	2.33	3.33	2.67
3.00	3.25	2.00	3.00	1.50	2.00	2.00	2.67	2.33	2.33	2.33	3.33
3.00	3.25	3.00	3.00	4.00	2.50	2.50	3.00	3.00	3.67	3.00	3.33
1.50	3.25	2.50	1.50	3.00	2.50	2.50	3.00	3.00	4.67	2.00	3.33
4.00	3.75	4.50	3.50	5.50	4.50	4.50	2.67	3.50	4.00	4.33	5.00
3.50	3.50	4.00	4.00	3.00	3.50	3.50	3.33	3.50	2.00	2.67	3.67
3.00	4.50	5.00	5.00	3.50	5.00	5.00	3.33	3.50	3.00	3.67	5.00
1.00	3.00	2.50	4.00	3.00	1.50	1.50	2.33	1.50	3.00	2.00	3.33
2.00	2.50	4.00	3.00	2.00	5.00	5.00	1.33	2.50	2.67	3.00	2.67
2.50	2.25	4.00	1.50	2.50	3.00	3.00	1.00	1.33	3.67	5.00	3.33
3.50	3.00	1.00	3.50	4.00	1.00	1.00	1.33	3.33	3.33	3.67	4.00
3.50	3.25	3.50	3.50	2.00	4.00	4.00	3.00	4.00	3.67	4.00	3.67
2.50	3.50	2.50	3.50	3.50	3.00	3.00	2.33	2.67	2.67	3.67	2.67
3.50	3.50	3.50	4.50	2.50	3.50	3.50	3.00	3.00	5.00	4.00	4.33
1.00	1.50	2.00	3.00	2.50	5.00	5.00	2.00	2.50	4.33	5.00	1.67
3.50	3.25	4.50	3.50	4.00	4.50	4.50	3.00	4.00	3.33	3.33	4.67
2.00	3.00	2.50	5.00	4.50	2.00	2.00	3.67	2.50	3.00	2.33	2.67
2.00	3.25	2.50	3.00	3.50	3.50	3.50	2.33	2.17	3.33	3.00	3.00
1.50	2.25	3.50	4.00	4.00	3.00	3.00	2.67	2.17	2.67	4.00	3.67
3.50	4.00	4.00	4.00	4.00	3.50	3.50	1.67	2.17	4.33	5.00	2.67
3.00	2.50	2.50	3.00	4.00	4.00	4.00	2.67	2.00	2.67	3.00	4.00
2.00	2.50	5.00	4.00	3.00	5.00	5.00	1.00	1.33	1.00	2.33	4.33
2.00	3.00	4.00	3.50	2.50	1.00	1.00	3.00	3.33	3.00	2.33	3.67
3.00	3.00	3.50	3.50	3.00	4.00	4.00	2.33	3.00	3.00	4.00	3.00
2.00	2.00	3.50	1.50	2.00	1.50	1.50	3.67	2.33	3.33	3.00	3.00
4.00	3.75	3.50	2.50	3.00	5.00	5.00	2.33	2.83	4.00	3.33	4.33
2.00	3.50	4.00	3.50	3.00	3.50	3.50	2.00	2.83	3.00	2.00	2.67
3.50	2.00	4.00	3.50	2.50	4.00	4.00	3.00	3.33	3.67	3.67	4.00
4.00	3.75	4.50	3.50	3.50	3.50	3.50	3.00	3.33	3.00	4.00	4.33
3.50	4.00	4.00	2.50	3.50	3.50	3.50	2.00	0.83	2.33	3.67	4.67
4.00	3.75	4.00	3.00	3.00	4.00	4.00	3.00	3.00	4.33	2.67	3.67
2.50	3.25	2.00	2.50	3.50	3.00	3.00	3.00	2.83	3.00	2.33	2.00
4.00	4.75	5.00	4.00	5.00	3.00	3.00	4.00	3.00	3.33	2.33	3.67
2.50	3.00	2.50	2.00	3.00	5.00	5.00	2.33	2.83	5.00	4.33	2.00
2.00	2.50	4.50	3.00	2.00	3.50	3.50	2.00	2.83	3.00	3.67	3.67
4.00	4.25	4.00	4.50	3.50	3.00	3.00	2.00	3.50	4.67	3.67	2.33
2.00	3.25	2.00	3.00	3.00	2.00	2.00	2.33	1.67	3.00	4.33	1.00
3.00	2.75	4.50	3.50	3.00	4.00	4.00	3.33	3.00	3.33	3.00	3.33
2.50	2.75	4.50	3.50	3.00	5.00	5.00	3.33	3.17	4.67	4.00	3.67
3.00	3.00	4.00	3.00	3.00	4.00	4.00	3.33	3.17	3.33	3.67	3.33
4.00	2.50	4.50	2.50	2.50	4.00	4.00	2.67	4.17	3.67	3.67	4.00
5.00	3.50	4.50	5.00	4.00	5.00	5.00	3.33	3.33	0.67	2.00	4.00
3.00	4.00	4.00	2.50	4.00	4.50	4.50	3.67	4.17	3.00	4.00	3.33
5.00	4.50	2.50	3.00	4.00	4.50	4.50	3.67	4.33	2.67	4.00	5.00
2.50	2.50	3.00	3.00	3.00	3.00	3.00	3.00	2.83	3.00	3.00	2.67
3.00	3.25	3.00	2.50	3.50	3.50	3.50	1.33	3.17	3.00	3.00	3.00
4.00	4.00	3.50	4.00	4.00	3.00	3.00	3.33	3.17	2.67	2.67	3.33

4.50	4.25	2.50	2.00	3.50	3.00	3.00	3.33	3.83	5.00	4.67	3.00
1.50	2.75	2.50	3.50	2.00	4.00	4.00	1.00	1.83	4.67	4.00	3.00
3.50	3.50	4.50	5.00	2.50	3.00	3.00	2.33	3.00	4.33	2.67	4.00
3.00	3.25	4.00	3.50	2.50	3.00	3.00	2.67	2.50	3.33	4.00	3.67
5.00	4.00	5.00	4.00	2.50	5.00	5.00	4.00	5.00	1.67	4.00	4.33
2.00	2.50	3.00	3.50	3.00	3.00	3.00	3.00	2.50	2.67	2.67	2.67
2.50	2.50	3.50	2.50	3.00	4.50	4.50	3.67	3.67	2.67	3.33	3.00
3.00	3.50	2.50	3.00	2.50	3.00	3.00	3.33	3.33	3.33	3.00	3.33
3.00	3.50	3.50	3.00	2.50	2.50	2.50	3.00	3.33	4.00	4.00	3.00
3.00	3.25	3.00	4.00	2.50	4.00	4.00	3.33	3.83	3.33	4.00	3.67
3.50	4.00	4.50	3.50	3.50	3.50	3.50	3.00	4.00	3.00	3.67	4.33
4.50	4.25	4.00	4.00	3.00	2.50	2.50	2.33	4.33	3.00	3.67	5.00
3.00	3.50	4.50	3.50	3.50	3.50	3.50	3.00	3.67	4.00	4.67	3.67
4.00	4.25	3.50	4.00	2.50	4.00	4.00	3.33	2.83	3.67	2.33	4.33
4.00	3.50	5.00	3.00	3.00	4.00	4.00	2.33	3.00	3.00	3.00	4.00
1.00	1.25	3.00	3.00	3.50	5.00	5.00	3.00	4.00	4.00	3.33	1.33
4.50	2.25	1.50	2.50	3.00	3.50	3.50	2.00	2.83	2.67	3.00	1.67
4.50	4.25	5.00	4.00	3.00	5.00	5.00	3.00	3.00	3.33	4.33	4.00
4.00	3.50	5.00	4.00	3.50	5.00	5.00	3.67	4.83	2.33	3.67	5.00
3.50	4.00	4.50	3.50	3.50	4.50	4.50	3.33	4.33	4.00	4.00	3.67
4.00	3.25	4.00	3.50	3.50	4.00	4.00	2.33	3.00	3.00	4.67	4.00
5.00	4.25	5.00	3.50	3.00	5.00	5.00	4.00	4.67	3.67	3.00	3.67
4.50	3.25	1.00	3.00	3.00	2.00	2.00	3.00	3.50	4.67	4.33	2.67
4.00	3.00	4.00	2.50	3.50	3.50	3.50	3.33	3.50	4.00	3.67	3.67
3.50	3.50	3.50	3.00	3.00	2.00	2.00	3.00	2.83	3.33	3.00	3.00
2.50	3.50	5.00	3.50	3.00	5.00	5.00	2.67	4.00	1.00	2.33	5.00
5.00	3.25	4.00	3.00	3.00	3.00	3.00	2.67	3.67	1.67	2.33	4.00
2.50	3.00	4.50	2.50	2.50	3.00	3.00	1.33	3.33	2.67	4.00	4.00
2.00	3.25	4.00	2.50	3.00	5.00	5.00	1.67	3.00	2.33	3.33	4.00
3.50	3.50	4.50	2.50	3.00	3.00	3.00	2.67	2.50	4.33	3.67	3.33
2.50	3.00	0.50	2.50	3.50	1.00	1.00	1.67	2.67	1.67	0.00	0.67
3.00	3.50	3.50	3.00	2.50	3.50	3.50	2.67	2.67	3.67	3.00	3.00
3.00	3.00	3.50	4.00	3.00	3.00	3.00	2.67	3.17	4.00	4.00	3.00
2.50	2.00	4.00	2.50	2.50	3.50	3.50	2.33	2.83	3.00	3.33	3.00
2.50	3.25	3.50	2.00	3.00	4.00	4.00	2.33	3.00	3.67	4.00	4.00

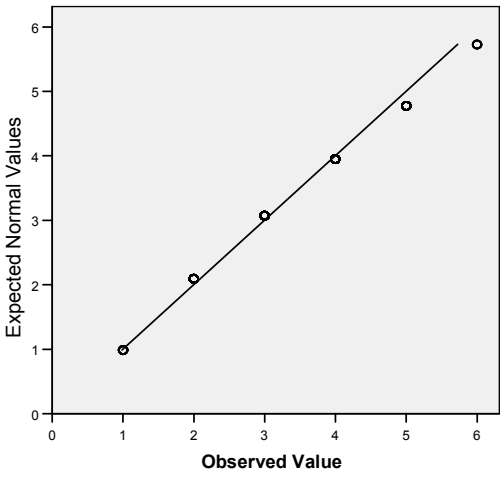
Appendix C: Normality of data



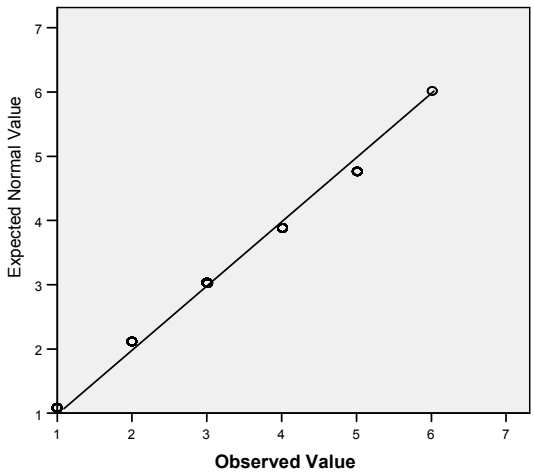




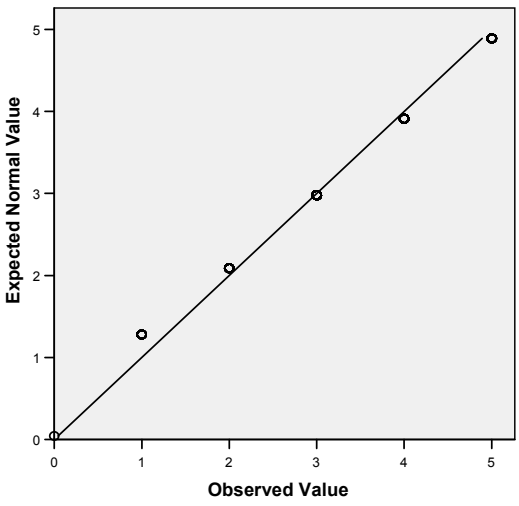
Normal Q-Q Plot of PEOU2



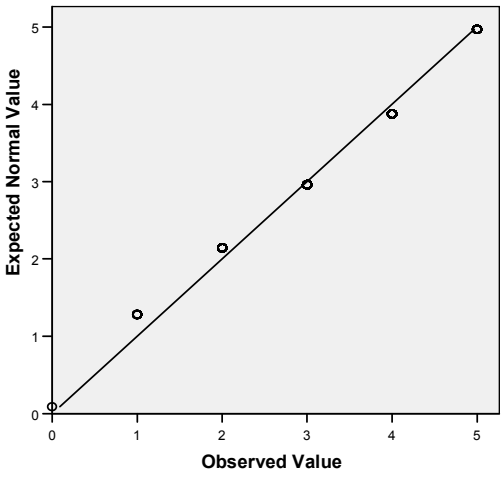
Normal Q-Q Plot of PEOU3



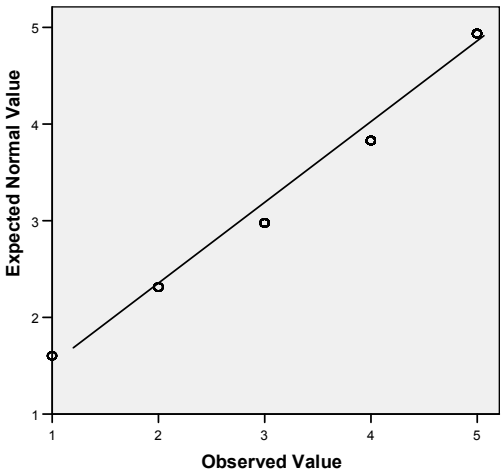
Normal Q-Q Plot of PEOU4



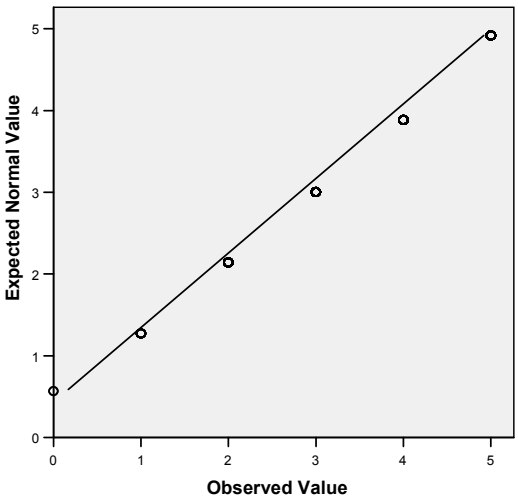
Normal Q-Q Plot of SP1



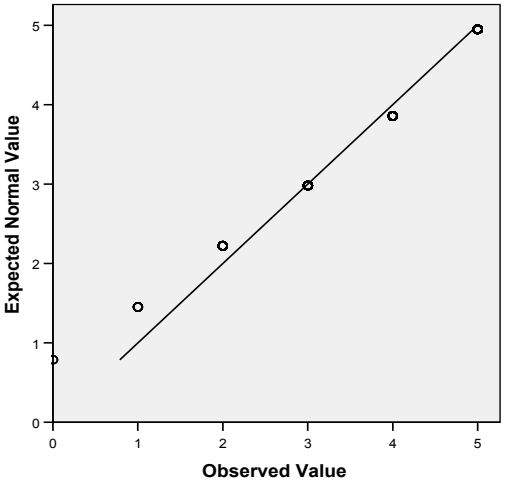
Normal Q-Q Plot of SP2



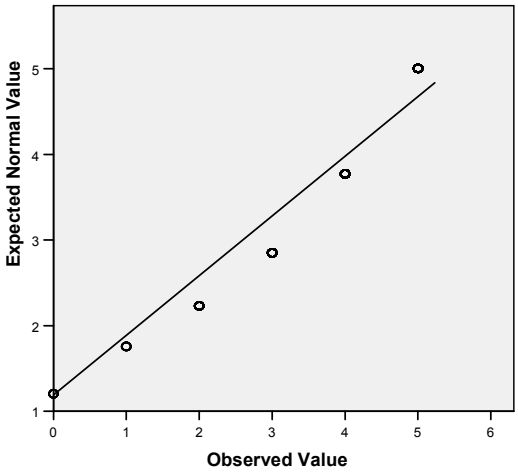
Normal Q-Q Plot of SP3



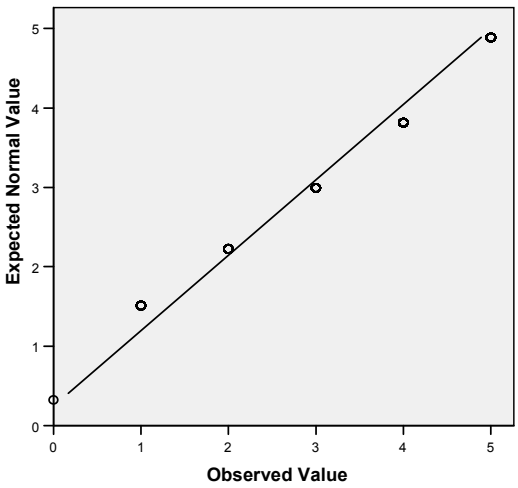
Normal Q-Q Plot of MA1



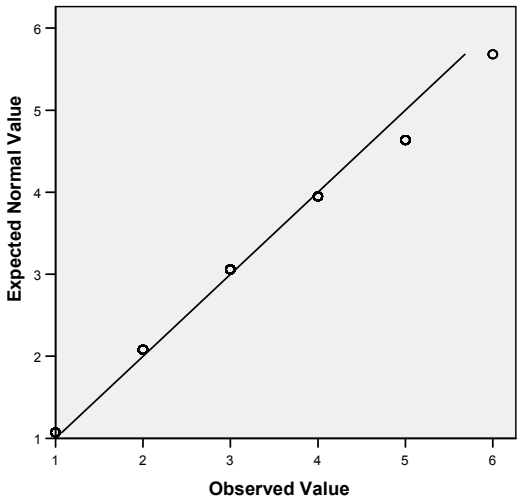
Normal Q-Q Plot of MA2



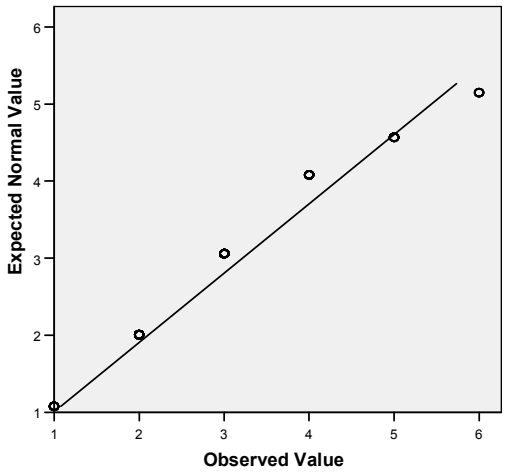
Normal Q-Q Plot of AT1



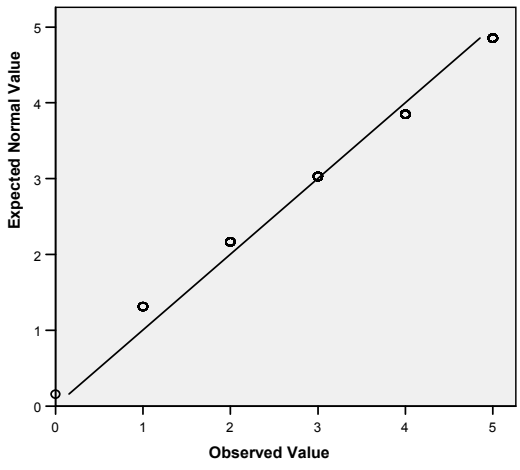
Normal Q-Q Plot of AT2



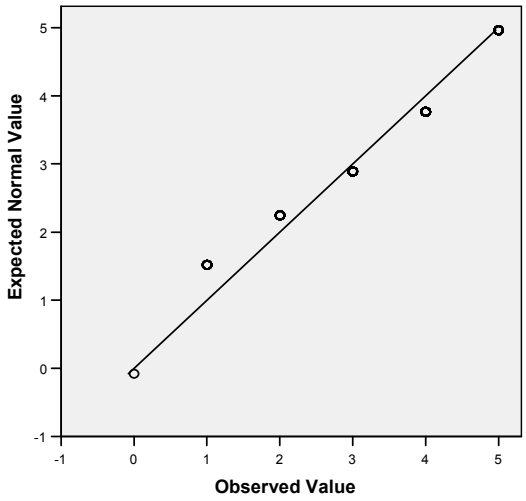
Normal Q-Q Plot of FN1



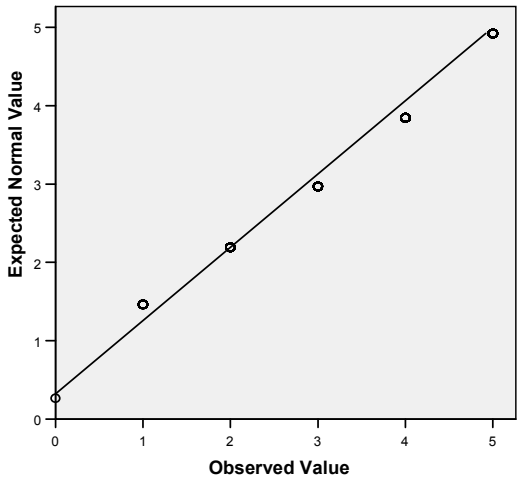
Normal Q-Q Plot of FN2



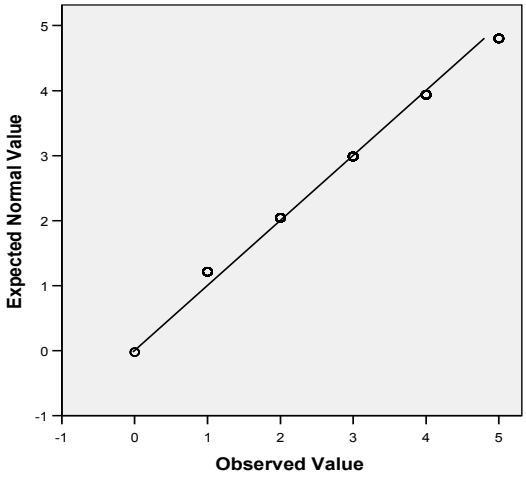
Normal Q-Q Plot of AL1



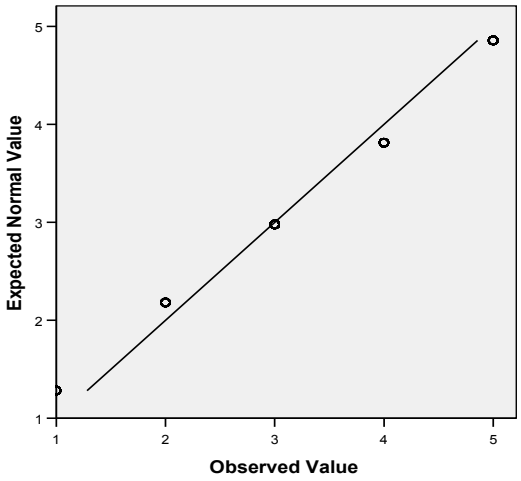
Normal Q-Q Plot of AL2



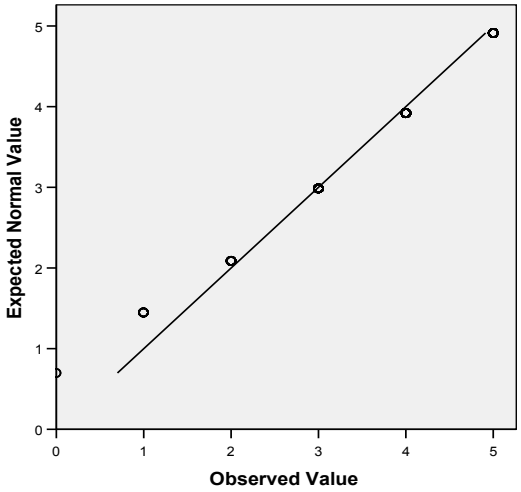
Normal Q-Q Plot of SE1



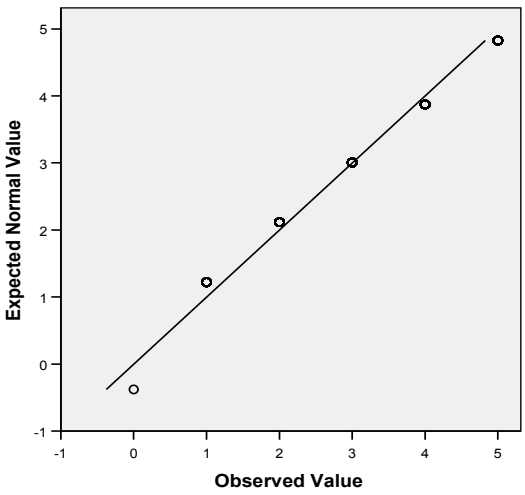
Normal Q-Q Plot of SE2



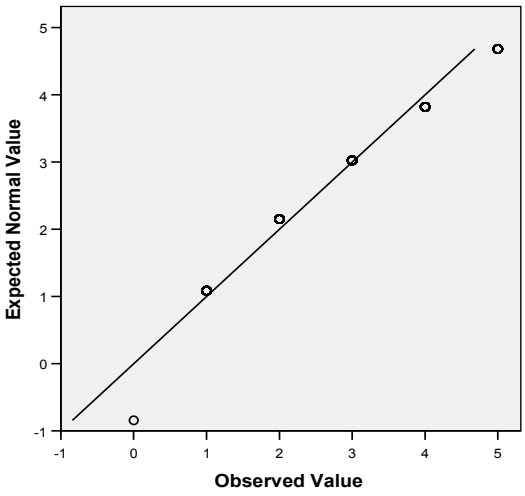
Normal Q-Q Plot of SE3



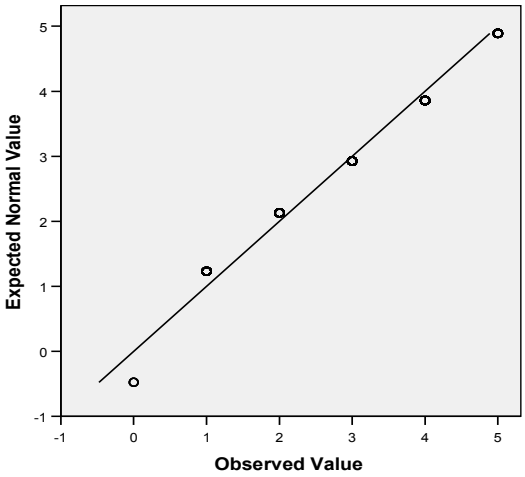
Normal Q-Q Plot of SE4



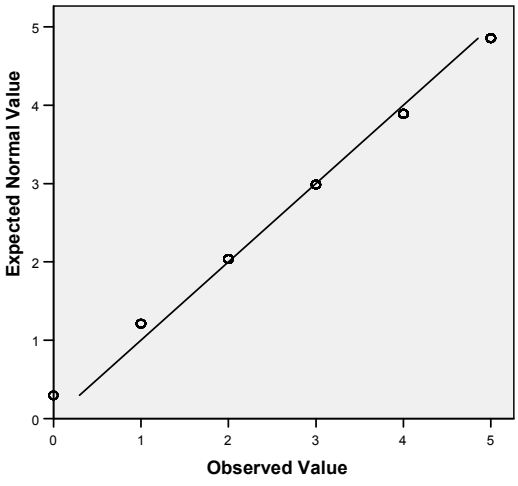
Normal Q-Q Plot of SE5



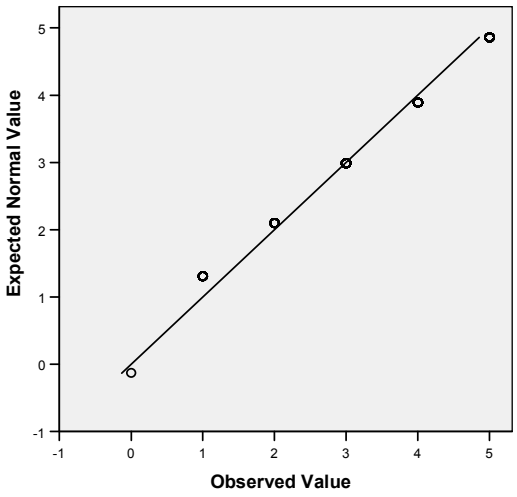
Normal Q-Q Plot of SE6



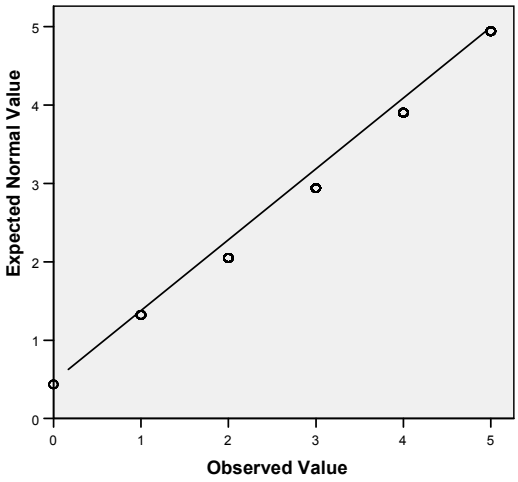
Normal Q-Q Plot of PC1



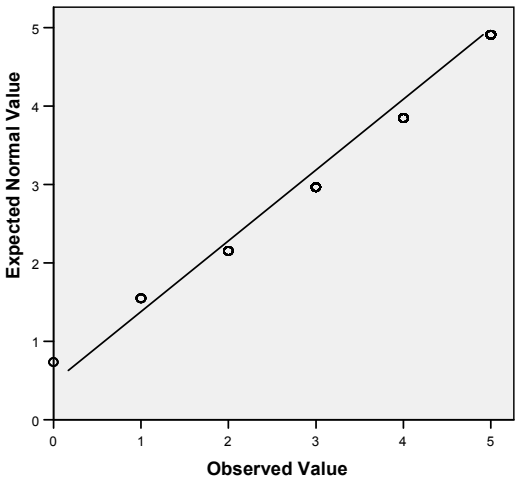
Normal Q-Q Plot of PC2



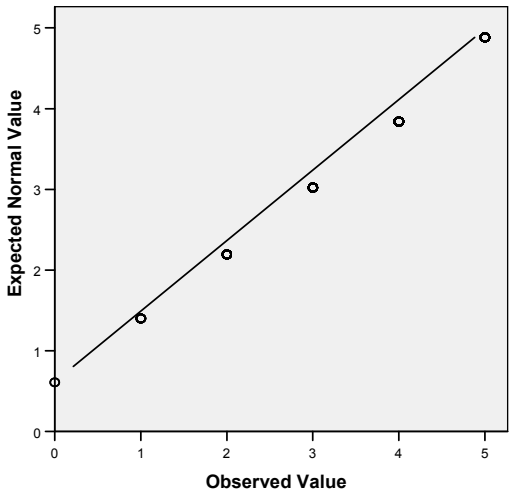
Normal Q-Q Plot of PC3



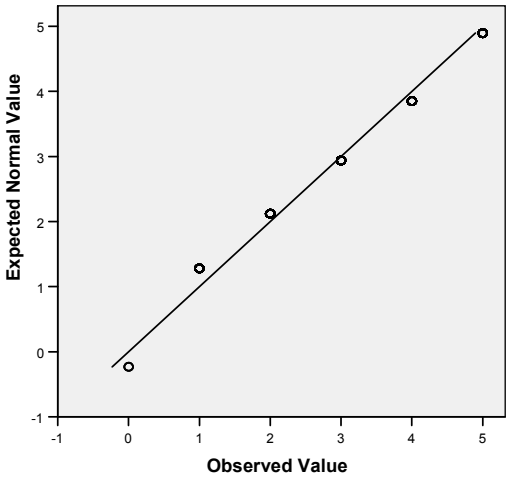
Normal Q-Q Plot of PR1



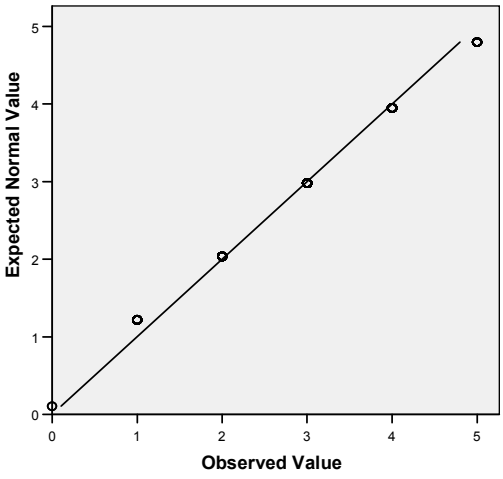
Normal Q-Q Plot of PR2

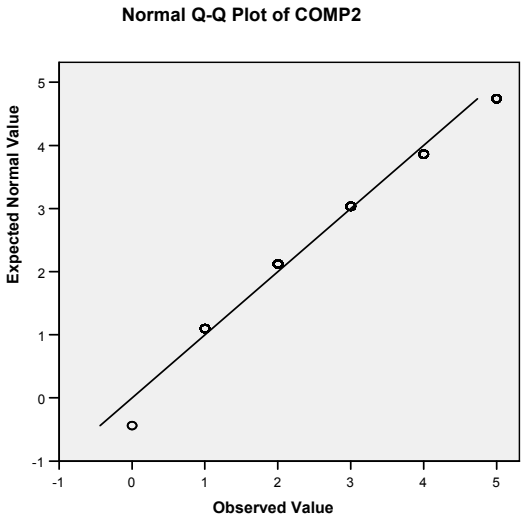


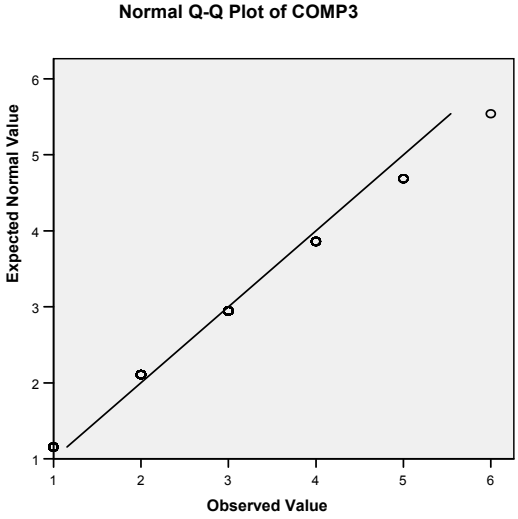
Normal Q-Q Plot of PR3



Normal Q-Q Plot of COMP1




Normal Q-Q Plot of COMP2
Expected Normal Value
Observed Value
5
4
3
2
1
0
-1
-1
0
1
2
3
4
5


Normal Q-Q Plot of COMP3
Expected Normal Value
Observed Value
6
5
4
3
2
1
1
2
3
4
5
6

Appendix D: focus group questions and discussion items

Focus Group Questions and Discussion Items

Part 1- to be completed by each participant in the focus group:

Please select an answer placing a tick (√) in the blank box in Questions 1 to 4.

1) How often do you use text messaging by cell phone during the day?

Once	Twice	Three times	Over Three times

2) How often do you check your bank balance per week

Once	Twice	Three times	Over Three times

3) Which bank services are you using now? (Tick all that apply)

Internet Banking	Mobile Banking(Txt Message)	Personal Banking	Phone Banking(Calling service)	None of these

4) In your own view, how good are you at starting to use new technology:

Rarely good	Good	Very Good

5) Please rank the potential benefits for you to use an electronic banking service, where 1 is “most beneficial”, and 7 is “least beneficial”

Less Cost	High security	High Service	Ease to use	High speed	Big server coverage	Convenience	Not applicable

Ranking

1	2	3	4	5	6	7

Part 2- Focus group discussion items

1. What do you know about mobile banking services offered by New Zealand banks? What do you think about these services?

2. Do you use a similar electronic bank service? How do they compare with mobile banking, which services do you prefer, why?

3. Comparing with the services you currently use, what do you think of the potential benefits or drawbacks of mobile banking?

4. Why mobile banking based on SMS is not very popular? Are there any suggestions and recommendations about the improvement or development of mobile banking?

Talking Points: Cost, Type of service, Tradition Habits, Experience in new technology, Trust and Security.

Appendix E: Questionnaire items

Variable	Sub-variable	Item
Customer service	Speed	SP1 Using mobile banking (based on SMS) enables me to perform banking transaction quickly
		SP2 Mobile banking is faster than visiting a bank or using phone banking
		SP3 Mobile banking is a less time consuming than other banking options
	Mobility access	MA1 Mobile banking is more accessible than other banking (e.g.: visiting a bank or using phone banking)
		MA2 Mobile banking allows me to do my banking anywhere /anytime
	Advertising	AT1 I would use mobile banking if I could get enough information about it.
		AT2 I was not encouraged to use mobile banking once visiting the bank or surfing on bank website.
	Functions	FN1 The current mobile banking functions only allow simple banking tasks (e.g.: balance checking)
		FN2 I would use mobile banking if there are such more functions or services added (e.g., overseas payment)
Alternatives		AL1 I will use mobile banking if there are not other banking options (e.g., phone banking and internet banking)
		AL2 I will use mobile banking if the other banking service could not provide the same useful service or function as mobile banking.
Self Efficacy	Ability	SE1 I use mobile banking because it has a built –in help facility for assistance
		SE2 I do not need anyone to teach me how to use mobile banking because I can learn it by myself
	Experience	SE3 I will use mobile banking if the mobile technologies are deployed.
		SE4 I use mobile banking because I am good at txt message
	Knowledge	SE5 I use mobile banking because I have seen someone else using it
		SE6 I use mobile banking because someone has shown me how to do it
Perceived Cost		PC1 It costs a lot to use mobile banking
		PC2 There are financial barriers (e.g., having to pay for handset and communication time) to my using mobile banking.
		PC3 Using mobile banking increases my banking costs
Perceived Risk		PR1 Mobile banking is one of new useful technology application, but I am still aware of its security during the transactions
		PR2 Mobile banking is unreliable because I

		afraid that my personal or transaction detail would be leaked during message passing PR3 If I lose the mobile phone as a mobile banking user, in the meantime, I will lose my money as well.
Perceived usefulness		PU1 I find Mobile banking useful for my banking needs. PU2 Mobile banking is more convenient than other banking options (e.g. Internet banking, phone banking, going to a bank branch
Perceived ease of use		PEOU1 Learning to use mobile banking is easy for me. PEOU2 Mobile banking is complicated to use message text to do the banking PEOU3 Using mobile banking is often frustrating because I need remember the access code to do further banking transaction each time. PEOU4 Using mobile banking makes it easier for me to conduct my own banking transactions
Compatibility		COMP1 Using mobile banking fits well with the way I like to control and manage my banking transactions. COMP2 I use mobile banking because I am used to doing everything with my cell phone COMP3 I satisfy the current banking service (e.g.: phone banking, and internet banking) at this stage because these are already a part of my daily life.
Intention to use		INT1 I intend to use mobile banking in the future

Appendix F: Mobile banking survey

Mobile Banking Survey

Mobile banking is an application of mobile computing which provides customers with the support to do banking anywhere/anytime using a mobile handheld device and a mobile service such as text messaging (SMS).

Dear Prospective Participant, completion this questionnaire indicates that you have understood the information provided about this research project and that you have been given the opportunity to ask any questions and/or clarify certain points.

Completing this questionnaire indicates that you consent to participate. Participation is purely voluntary.

Please complete the questionnaire below

Please indicate the extent to which you agree or disagree with each of the following statements. Circle a number from 1 to 5 that best represents your level of agreement with the statement. Here 1 represents “strongly disagree” and 5 represents “strongly agree”. “Mobile banking” in the survey means “SMS (TXT message) based mobile banking.

1. Mobile banking is more convenient than other banking options (e.g. Internet banking, phone banking, and going to a bank branch).

Strongly disagree strongly agree

1 2 3 4 5

2. I find Mobile banking useful for my banking needs.

Strongly disagree strongly agree

1 2 3 4 5

3. Learning to use mobile banking is easy for me.

Strongly disagree strongly agree

1 2 3 4 5

4. Mobile banking is complicated to use message text to do the banking.
.

Strongly disagree strongly agree

1 2 3 4 5

5. Using mobile banking is often frustrating because I need remember the access code to do further banking transaction each time.

Strongly disagree strongly agree

1 2 3 4 5

6. Using mobile banking makes it easier for me to conduct my own banking transactions.

Strongly disagree strongly agree

1 2 3 4 5

7. Using mobile banking (based on SMS) enables me to perform banking transaction quickly.

Strongly disagree strongly agree
1 2 3 4 5

8. Mobile banking is faster than visiting a bank or using phone banking.

Strongly disagree strongly agree

1 2 3 4 5

9. Mobile banking is a less time consuming than other banking options.

Strongly disagree strongly agree

1 2 3 4 5

10. Mobile banking is more accessible than visiting a bank or using phone banking.

Strongly disagree strongly agree

1 2 3 4 5

11. Mobile banking allows me to do my banking anywhere /anytime.

Strongly disagree strongly agree

1 2 3 4 5

12. I would use mobile banking if I could get more information about it.

Strongly disagree strongly agree

1 2 3 4 5

13. I was not encouraged to use mobile banking once visiting the bank or surfing on bank webpage.

Strongly disagree strongly agree

1 2 3 4 5

14. The current mobile banking functions allow only simple banking tasks (e.g.: balance checking)

Strongly disagree strongly agree

1 2 3 4 5

15. I would use mobile banking if there are such more functions or services provided (e.g., overseas payment)

Strongly disagree strongly agree

1 2 3 4 5

16. I will use mobile banking if there are not other banking options (e.g., phone banking and internet banking)

Strongly disagree strongly agree

1 2 3 4 5

17. I will use mobile banking if the other banking service could not provide the same useful service or function as mobile banking.

Strongly disagree strongly agree

1 2 3 4 5

18. I use mobile banking because it has a built –in help facility for assistance.

Strongly disagree strongly agree

1 2 3 4 5

19. I do not need anyone to teach me how to use mobile banking because I can learn it by myself.

Strongly disagree strongly agree

1 2 3 4 5

20. I will use mobile banking if the different mobile technologies are deployed.

Strongly disagree strongly agree

1 2 3 4 5

21. I use mobile banking because I am good at txt message

Strongly disagree strongly agree

1 2 3 4 5

22. I use mobile banking because I have seen someone else using it.

Strongly disagree strongly agree

1 2 3 4 5

23. I use mobile banking because someone has shown me how to do it.

Strongly disagree strongly agree

1 2 3 4 5

24. It costs a lot to use mobile banking.

Strongly disagree strongly agree

1 2 3 4 5

25. There are financial barriers (e.g., having to pay for handset and communication time) to my using mobile banking.

Strongly disagree strongly agree

1 2 3 4 5

26. Using mobile banking increases my banking costs.

Strongly disagree strongly agree

1 2 3 4 5

27. Mobile banking is one of new useful technology application, but I am still aware of its security during the transactions.

Strongly disagree strongly agree

1 2 3 4 5

28. Mobile banking is unreliable because I afraid that my personal or transaction detail would be leaked during message passing.

Strongly disagree strongly agree

1 2 3 4 5

29. If I lose the mobile phone as a mobile banking user, in the meantime I will lose my money as well.

Strongly disagree strongly agree

1 2 3 4 5

30. Using mobile banking fits well with the way I like to control and manage my banking transactions.

Strongly disagree strongly agree

1 2 3 4 5

31. I use mobile banking because I am used to do everything with my cell phone.

Strongly disagree strongly agree

1 2 3 4 5

32. I satisfy the current banking service (e.g.: phone banking, and internet banking) at this stage because these are already a part of my daily life.

Strongly disagree strongly agree

1 2 3 4 5

33. I intend to use mobile banking in the future.

Strongly disagree strongly agree

1 2 3 4 5

If you have not used mobile banking, please go to Question 36

Otherwise please continue to answer Question 34.

Please answer the following question by circling the number from 1 to 5 that best represent your level of use, where 1 mean" not at all", and 5 mean "frequently"

34. How often have you used the mobile banking based on SMS (TXT message) in the last month?

Not at all frequently

1 2 3 4 5

Please select the answer placing a tick (√) in the blank box with most appropriate option in following questions.

35. How many times have you used mobile banking based on SMS (TXT message) in the last month?

☐ None ☐ Once ☐ Twice ☐ Three ☐ Over three

---

36. What is your age (years old)?

☐ <20 ☐ 20-24 ☐ >25

37. What is your gender?

☐ Male ☐ Female

38. How long have you used a mobile phone?

☐ Never ☐ <1 year ☐ 1-2 year ☐ 3-5 years ☐ >6 years

39. How often do you TXT message using a mobile phone during the day?

☐ None ☐ Once ☐ Twice ☐ Three times ☐ > Three times

40. How often do you check your bank balance or do bank transaction per week?

☐ None ☐ Once ☐ Twice ☐ Three times ☐ > Three times

41. How long have you used mobile banking based on SMS (TXT message)?

☐ Never ☐ <1 year ☐ 1-2 year ☐ 3-5 years ☐ >6 years

42. In which year are you currently studying at AUT?

☐ 1st year ☐ 2nd year ☐ 3rd year ☐ 4th year ☐ 5th year

Would you like to receive a copy of the summary of this survey results?

☐ Yes if yes, Please send an email to the researcher, at the address shown below.

Please note that by sending a request, you will reveal yourself to the researcher as a participant in the survey. Your details will be treated as confidential and kept separately from the completed questionnaires. After sending the summary, all records including your personal detail will be destroyed.

shiyux07@aut.ac.nz

Thank you for your time and participation!

Appendix G: Simple linear regressions for all relationships between independent and dependent variables

Simple linear regression for Speed

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	SP(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.479(a)	.230	.227	.91192

a Predictors: (Constant), SP

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.567	1	62.567	75.237	.000(a)
	Residual	209.564	252	.832		
	Total	272.131	253			

a Predictors: (Constant), SP
b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.004	.239		4.194	.000
	SP	.577	.067	.479	8.674	.000

a Dependent Variable: PU

Simple linear regression for Mobility access

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	MA(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.286(a)	.082	.078	.99563

a Predictors: (Constant), MA

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.330	1	22.330	22.526	.000(a)
	Residual	249.801	252	.991		
	Total	272.131	253			

a Predictors: (Constant), MA
b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.897	.245		7.744	.000
	MA	.300	.063	.286	4.746	.000

a Dependent Variable: PU

Simple linear regression for advertising

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	AT(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.310(a)	.096	.092	.98806

a Predictors: (Constant), AT

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.115	1	26.115	26.750	.000(a)
	Residual	246.016	252	.976		
	Total	272.131	253			

a Predictors: (Constant), AT
b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.746	.254		6.865	.000
	AT	.393	.076	.310	5.172	.000

a Dependent Variable: PU

Simple linear regression for functions

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	FN(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.153(a)	.023	.019	1.02702

a Predictors: (Constant), FN

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.330	1	6.330	6.002	.015(a)
	Residual	265.801	252	1.055		
	Total	272.131	253			

a Predictors: (Constant), FN
b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.292	.305		7.527	.000
	FN	.230	.094	.153	2.450	.015

a Dependent Variable: PU

Simple linear regression for alternatives

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	AL(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.033(a)	.001	-.003	1.03862

a Predictors: (Constant), AL

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.292	1	.292	.271	.603(a)
	Residual	271.839	252	1.079		
	Total	272.131	253			

a Predictors: (Constant), AL
b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.907	.230		12.647	.000
	AL	.032	.062	.033	.520	.603

a Dependent Variable: PU

Simple linear regression for compatibility

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	COMP(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PEOU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.325(a)	.106	.102	.66748

a Predictors: (Constant), COMP

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.275	1	13.275	29.796	.000(a)
	Residual	112.275	252	.446		
	Total	125.550	253			

a Predictors: (Constant), COMP
b Dependent Variable: PEOU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.343	.157		14.882	.000
	COMP	.306	.056	.325	5.459	.000

a Dependent Variable: PEOU

Simple linear regression for self-efficacy

Variables Entered/Removed (b)

Model	Variables Entered	Variables Removed	Method
1	SE(a)	.	Enter

a All requested variables entered.
b Dependent Variable: PEOU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.318(a)	.101	.098	.66915

a Predictors: (Constant), SE

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.713	1	12.713	28.392	.000(a)
	Residual	112.837	252	.448		
	Total	125.550	253			

a Predictors: (Constant), SE
b Dependent Variable: PEOU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.261	.176		12.849	.000
	SE	.300	.056	.318	5.328	.000

a Dependent Variable: PEOU

Simple linear regression for perceived usefulness

Variables Entered/Removed (b)

Model	Variables Entered	Variables Removed	Method
1	PU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.404(a)	.163	.160	1.094

a Predictors: (Constant), PU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.873	1	58.873	49.168	.000(a)
	Residual	301.741	252	1.197		
	Total	360.614	253			

a Predictors: (Constant), PU
b Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.035	.212		9.607	.000
	PU	.465	.066	.404	7.012	.000

a Dependent Variable: INT

Simple linear regression for estimated perceived usefulness

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	EPU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.460(a)	.211	.208	1.062

a Predictors: (Constant), EPU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.155	1	76.155	67.465	.000(a)
	Residual	284.459	252	1.129		
	Total	360.614	253			

a Predictors: (Constant), EPU
b Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.273	.391		.699	.485
	EPU	1.048	.128	.460	8.214	.000

a Dependent Variable: INT

Simple linear regression for perceived ease of use

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	PEOU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.338(a)	.114	.110	1.126

a Predictors: (Constant), PEOU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.083	1	41.083	32.400	.000(a)
	Residual	319.531	252	1.268		
	Total	360.614	253			

a Predictors: (Constant), PEOU
b Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.627	.326		4.984	.000
	PEOU	.572	.100	.338	5.692	.000

a Dependent Variable: INT

Simple linear regression for estimated perceived ease of use

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	EPEOU(a)	.	Enter

a All requested variables entered.
b Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.495(a)	.245	.242	1.039

a Predictors: (Constant), EPEOU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.421	1	88.421	81.861	.000(a)
	Residual	272.193	252	1.080		
	Total	360.614	253			

a Predictors: (Constant), EPEOU
b Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.659	.787		-4.647	.000
	EPEOU	2.240	.248	.495	9.048	.000

a Dependent Variable: INT

Simple linear regression for perceived cost

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	PC(a)	.	Enter

a All requested variables entered.
b Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.013(a)	.000	-.004	1.196

a Predictors: (Constant), PC

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.060	1	.060	.042	.838(a)
	Residual	360.555	252	1.431		
	Total	360.614	253			

a Predictors: (Constant), PC
b Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.388	.269		12.611	.000
	PC	.016	.081	.013	.204	.838

a Dependent Variable: INT

Simple linear regression for perceived risk

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	PR(a)	.	Enter

a All requested variables entered.
b Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.008(a)	.000	-.004	1.196

a Predictors: (Constant), PR

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.025	1	.025	.017	.896(a)
	Residual	360.590	252	1.431		
	Total	360.614	253			

a Predictors: (Constant), PR
b Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.400	.321		10.584	.000
	PR	.012	.090	.008	.131	.896

a Dependent Variable: INT

Appendix H: Multiple linear regressions for three stages of the research model

Stage one

Variables Entered/Removed(a)

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

a Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.479(a)	.230	.227	.91192
2	.505(b)	.255	.249	.89886

a Predictors: (Constant), SP
b Predictors: (Constant), SP, AT

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.567	1	62.567	75.237	.000(a)
	Residual	209.564	252	.832		
	Total	272.131	253			
2	Regression	69.336	2	34.668	42.909	.000(b)
	Residual	202.795	251	.808		
	Total	272.131	253			

a Predictors: (Constant), SP
b Predictors: (Constant), SP, AT
c Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.004	.239		4.194	.000
	SP	.577	.067	.479	8.674	.000
2	(Constant)	.552	.283		1.948	.052
	SP	.509	.070	.423	7.314	.000
	AT	.213	.073	.167	2.894	.004

a Dependent Variable: PU

Excluded Variables(c)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	MA	.008(a)	.121	.904	.008	.657
	AT	.167(a)	2.894	.004	.180	.887
	FN	.076(a)	1.354	.177	.085	.973
	AL	-.044(a)	-.782	.435	-.049	.975
2	MA	-.004(b)	-.066	.948	-.004	.654
	FN	.044(b)	.777	.438	.049	.930
	AL	-.049(b)	-.881	.379	-.056	.974

a Predictors in the Model: (Constant), SP
b Predictors in the Model: (Constant), SP, AT
c Dependent Variable: PU

Stage two

Variables Entered/Removed(a)

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

a Dependent Variable: PEOU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.325(a)	.106	.102	.66748
2	.375(b)	.141	.134	.65556

a Predictors: (Constant), COMP
b Predictors: (Constant), COMP, SE

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.275	1	13.275	29.796	.000(a)
	Residual	112.275	252	.446		
	Total	125.550	253			
2	Regression	17.681	2	8.840	20.571	.000(b)
	Residual	107.869	251	.430		
	Total	125.550	253			

a Predictors: (Constant), COMP
b Predictors: (Constant), COMP, SE
c Dependent Variable: PEOU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.343	.157		14.882	.000
	COMP	.306	.056	.325	5.459	.000
2	(Constant)	1.990	.190		10.478	.000
	COMP	.212	.062	.225	3.400	.001
	SE	.200	.063	.212	3.202	.002

a Dependent Variable: PEOU

Excluded Variables(b)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	SE	.212(a)	3.202	.002	.198	.779

a Predictors in the Model: (Constant), COMP
b Dependent Variable: PEOU

Stage three

Variables Entered/Removed(a)

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

a Dependent Variable: INT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.495(a)	.245	.242	1.039
2	.556(b)	.309	.303	.997

a Predictors: (Constant), EPEOU
b Predictors: (Constant), EPEOU, EPU

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.421	1	88.421	81.861	.000(a)
	Residual	272.193	252	1.080		
	Total	360.614	253			
2	Regression	111.351	2	55.676	56.063	.000(b)
	Residual	249.263	251	.993		
	Total	360.614	253			

a Predictors: (Constant), EPEOU
b Predictors: (Constant), EPEOU, EPU
c Dependent Variable: INT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.659	.787		-4.647	.000
	EPEOU	2.240	.248	.495	9.048	.000
2	(Constant)	-3.654	.755		-4.840	.000
	EPEOU	1.613	.271	.357	5.953	.000
	EPU	.656	.137	.288	4.805	.000

a Dependent Variable: INT

Excluded Variables(c)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	EPU	.288(a)	4.805	.000	.290	.768
	PC	.001(a)	.017	.987	.001	.999
	PR	-.018(a)	-.323	.747	-.020	.997
2	PC	.014(b)	.266	.791	.017	.997
	PR	-.025(b)	-.468	.640	-.030	.997

a Predictors in the Model: (Constant), EPEOU
b Predictors in the Model: (Constant), EPEOU, EPU
c Dependent Variable: INT

Appendix I: Invitation letter for focus group

Invitation letter

My name is Shi (Jimmy) Yu. I am a Master of Computer and information Sciences student. I am conducting a research study in order to complete my Master's thesis. You are being invited to take part in the research.

The main purpose of this research is to find out the factors which influence the use of SMS-based mobile banking in New Zealand.

You will be a part of a focus group (10-12 people) to discuss the issue and the potential factors which may influence mobile banking adoption, with a focus on SMS banking. This will take about 30 minutes of your time. The proposed date is to be setup in the period between 9th August and 16th August, 2008.

All personal information which is collected about you during the course of the research will be kept strictly confidential. Any personal information identifying you will be removed from any document disseminated as a result of the project, so that it will not be possible for any participant to be identified and/or recognised.

Thank you for your time to read this Invitation Letter. If you like to participant this project or have any questions, please send an Email to

Student Researcher: Shi (Jimmy) Yu (shiyux07@aut.ac.nz)

If you accept my invitation, you will receive a detailed information sheet and details about the focus group. I am looking forward to your decision and your reply, and wish to thank you in advance for your time.

Kind regards

Shi (Jimmy) Yu

Student Researcher: Shi (Jimmy) Yu (shiyux07@aut.ac.nz)

Researcher Supervisor: Krassie petrova (Krassie.petrova@aut.ac.nz).

Appendix J: Participant information sheet for focus group

Participant Information Sheet

Date Information Sheet Produced:

09/June/2008

Project Title

Factors influencing the use of mobile Banking: the case of SMS-based Mobile Banking (Stage 1)

An Invitation

I am a Master student who is doing this particular research. You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear of if you would like more information. The comments and suggestions made by the participants in the focus group discussion will help me to design and develop the survey questionnaire for a larger study. Take time to decide whether or not you wish to take part. Your participation is entirely voluntary and you are able to withdraw at any time prior to the completion of data collection without any adverse consequences.Thank you for reading this.

What is the purpose of this research?

The main purpose of this research is to find out the factors which influence the use of mobile banking in New Zealand and more specifically, the factors limiting the use of the services available. Research results obtained in other regions and countries may not be entirely relevant to the New Zealand context due to a number of reason. The study will attempt to identify the New Zealand specific factors influencing.

How was I chosen for this invitation?

The Participants have been chosen from peers who are participants in an AUT Research Forum where they meet, discuss and support each other. Total Sample size is between 10-12 students in a small group. The invitation letter will be sent by the Email through AUT mailbox and handed out in the class by permission from lecturer. Adverts will be posted to AUT online student research community forum.

What will happen in this research?

This research will be based on the discussion and debate in a small focus group. The researcher will represent the detailed project to the whole group. It provides the main issue about the usage of SMS-based mobile banking .Firstly the participant need to sign the agreement to take part in this project. Secondly, the researcher will demonstrate and lead the whole session by asking some particular questions. Thirdly, the free talk and discussion will occur through the whole session. During the session, the note-taking and tape recorder will be used to record and collect the data. Finally, the researcher will summarise the whole session.

What are the benefits?

This outcomes and results of this research may be used to design and develop the further questionnaire to do survey in a big range of population. The basic idea and clue will be based

on this information which discussed and collected from you. It is quite important for the researcher to keep going on the whole project. Your idea and contribution about the topic will be quite significant for the project.

How will my privacy be protected?

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which is disseminated will have your name and address removed so that you cannot be recognised from it.

What are the costs of participating in this research?

Time of participating in this research is between 20-30 minutes.

What opportunity do I have to consider this invitation?

It is up to you to decide whether or not to take part.
If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without penalty or loss of benefits and giving a reason.
If you like to know more information about this research, please feel free to contact the researcher.
The report of outcome will be provided if you wish to have one.

How do I agree to participate in this research?

If you agree to participate in this research, please complete a Consent Form.

Will I receive feedback on the results of this research?

Yes, you will. You can contact the researcher to request the feedback after the research completion. The feedback is only a general summary.

What do I do if I have concerns about this research?

> Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Krassie Petrova, krassie.petrova@aut.ac.nz, 921 9999 ext 5045.
>
> Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEC, Madeline Banda, *madeline.banda@aut.ac.nz*, 921 9999 ext 8044.

Whom do I contact for further information about this research?

Researcher Contact Details:

Researcher: Jimmy Yu.
Contact Email Address: shiyux07@aut.ac.nz***.***

Project Supervisor Contact Details:

Supervisor: Krassie Petrova
Contact Email address: krassie.petrova@aut.ac.nz

Approved by the Auckland University of Technology Ethics Committee on 08/August/2008

AUTEC Reference Number: 08/54

Appendix K: Consent form for focus group

Consent Form

For use when focus groups are involved.

Project title:	***Factors influencing the use of mobile banking: the case of SMS-based mobile banking (Stage 1)***
Project Supervisor:	***Krassie Petrova***
Researcher:	***Shi (Jimmy) Yu***

- ○ I have read and understood the information provided about this research project in the Information Sheet dated 09/June/2008.
- ○ I have had an opportunity to ask questions and to have them answered.
- ○ I understand that the identity of my fellow participants and our discussions in the focus group are confidential to the group and I agree to keep this information confidential.
- ○ I understand that notes will be taken during the focus group and that it will also be audio-taped and transcribed.
- ○ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- ○ If I withdraw, I understand that while it may not be possible to destroy all records of the focus group discussion of which I was part, the relevant information about myself including tapes and transcripts, or parts thereof, will not be used.
- ○ I agree to take part in this research.
- ○ I wish to receive a copy of the report from the research (please tick one): Yes○ No○

Participant's signature:.....

Participant's name:.....

Participant's Contact Details (if a copy of the report is required):

……..

……..

……..

Date:

Approved by the Auckland University of Technology Ethics Committee on: 08 August 2008

AUTEC Reference number: 08/54

Appendix L: Invitation letter for survey

Invitation letter

My name is Shi (Jimmy) Yu. I am a Master of Computer and information Sciences student. I am conducting a research study in order to complete my Master's thesis. You are being invited to take part in the research.

The main purpose of this research is to find out the factors which influence the use of SMS-based mobile banking in New Zealand.

You will be asked to answer the questions in the survey. This will take about 30 minutes of your time. The survey questionnaire will be made available to you between 15th September, 2008 and 30th September, 2008.

All personal information which is collected about you during the course of the research will be kept strictly confidential. Any personal information identifying you will be removed from any document disseminated as a result of the project, so that it will not be possible for any participant to be identified and/or recognised.

Thank you for your time to read this Invitation Letter. If you like to participant this project or have any questions, please send an email to

Student Researcher: Shi (Jimmy) Yu (shiyux07@aut.ac.nz)

If you accept my invitation, you will receive a detailed information sheet and the survey questionnaire. I am looking forward to your decision and your reply, and wish to thank you in advance for your time.

Kind regards

Shi (Jimmy) Yu

Student Researcher: Shi (Jimmy) Yu (shiyux07@aut.ac.nz)

Researcher Supervisor: Krassie Petrova (Krassie.petrova@aut.ac.nz).

Appendix M: Participant information sheet for survey

Participant Information Sheet

Date Information Sheet Produced:

29/August/2008

Project Title

Factors influencing the use of mobile banking: The case of SMS based mobile banking

An Invitation

I am a Master of Computer and information Sciences student researching the factors that influence people when considering using SMS based mobile banking. You are being invited to take part in this research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information.

Previously – at stage one of this project, I asked participants about SMS banking in a focus group. Their comments and suggestions were used to help me design the questionnaire that I am asking you to complete now. Take some time to decide whether or not you wish to take part. Your participation is entirely voluntary and you will be able to withdraw at any time prior to the completion of data collection without any adverse consequences. Thank you for reading this.

What is the purpose of this research?

The main purpose of this research project is to identify the factors which influence the use of mobile banking in New Zealand and also the factors limiting the use of the already available services of this type. Prior research results about other regions and countries may not be entirely relevant to the New Zealand context due to a number of reasons. The study will attempt to identify the New Zealand specific factors influencing the use and adoption of SMS based mobile banking.

How was I chosen for this invitation?

Advertisements were posted onto all available AUT notice boards. You have read an advertisement and expressed interest in participating.

What will happen in this research?

Data will be collected using an anonymous questionnaire. The researcher will analyse the data collected in the survey and will use the analysis results in his Master's thesis.

What are the benefits?

First, the researcher will benefit from being able to complete and submit to examiners his thesis on the topic. Secondly, the findings of the research will be used to draw conclusions and recommendations about the development and adoption of SMS based mobile banking, which may be of benefit to all New Zealanders.

How will my privacy be protected?

No personal data will be collected as part of the survey. The questionnaire is anonymous. All published results will be in summary form.

What are the costs of participating in this research?

The time to complete the questionnaire is estimated to be about 30 minutes.

What opportunity do I have to consider this invitation?

It is up to you to decide whether or not to take part.
If you do decide to take part you will complete the questionnaire. If you decide to take part you are still free to withdraw before you submit the completed questionnaire without any penalty or loss, and without a need to give a reason.
If you would like to know more about the research, please feel free to contact the researcher.

How do I agree to participate in this research?

If you agree to participate in this research, please complete the questionnaire and return as instructed, by 30th September, 2008.

Will I receive feedback on the results of this research?

Yes, you may. Contact the researcher at his email address below, to request feedback after the research is completed. Please note that by contacting the researcher with this request, you will reveal yourself to the researcher as one of the survey participants. The results provided to you will be in summary form. Your details will be treated as confidential by the researcher.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Krassie Petrova, krassie.petrova@aut.ac.nz, 921 9999 ext 5045.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEC, Madeline Banda, *madeline.banda@aut.ac.nz*, 921 9999 ext 8044.

Whom do I contact for further information about this research?

Researcher Contact Details:
Researcher: Jimmy Yu.
Contact Email Address: shiyux07@aut.ac.nz***.***

Project Supervisor Contact Details:
Supervisor: Krassie Petrova
Contact Email address***:*** krassie.petrova@aut.ac.nz

Approved by the Auckland University of Technology Ethics Committee on 15/September/08

AUTEC Reference Number: 08/54

Appendix N: Advertisement for survey

Advertisements

My name is Shi (Jimmy) Yu. I am a Master of Computer and information Sciences student. I am conducting a research study in order to complete my Master's thesis. The main purpose of this research is to find out the factors which influence the use of SMS-based mobile banking in New Zealand.

You are being invited to take a part in a survey, related to the research. This will take about 10-20 minutes of your time. The survey will be available to participants between 15th September, 2008 and 30th September, 2008.

All personal information which may be collected about you during the course of the research will be kept strictly confidential, and removed from any document disseminated as a result of the project, so that it will not be possible for any participant to be identified and/or recognised.

Thank you for your time to read this advertisement. If you would like to receive a detailed information sheet and the survey questionnaire or have any questions, please send an email to

Student Researcher: Shi (Jimmy) Yu (shiyux07@aut.ac.nz)

Appendix O:
Transcript and Report for Focus groups Discussion in mobile banking (SMS)

Focus groups method is adopted in the first stage of this research in order to collect deep information and data about some issues regarding mobile banking (SMS) usage in New Zealand context. The outcome and result of focus groups interview will be helpful to revalidate and redesign the questionnaire in the second stage (Survey).

There are two small focus groups to discuss and debate in this stage. Each focus group has 5-6 participants involved. They are studying the Postgraduate or Master program of computer and information science. There are two female and eight male students in this stage. Six out of ten students are international students; four out of ten students are domestic students.

Four out of ten students (40%) use text messaging by using the cell phone once a day; one out of ten students (10%) use text messaging twice in one day; five out of ten students (50%) use text messaging over three times or more per day.

Three out of ten students (30%) check their bank account balance once per week; five out of ten students (50%) check their bank account balance three times per week; two out of ten students (20%) check their bank account balance over three times per week.

Four out of ten students (40%) currently use Internet banking and personal banking; one out of ten students (10%) currently use internet banking and phone banking; three out of ten students (30%) currently use only internet banking; two of ten students (20%) currently use personal banking.

Most of the participants were in favour of using new technology. When deciding to use electronic banking, most of them considered issues such as less cost, higher security and better service.

The points emerging from the discussion about questions 1 - 4 (part 2) are summarized below:

1) What do you know about Mobile banking service offered by NZ banks, what do you think about these services?

   There are not all students who know the Mobile banking service offered by New Zealand banks. Some student only knew simple function about mobile banking service such as balance check.

   ”I know about the balance checking in mobile banking service, but I do not know more than this”

   “You need apply for this mobile service online to active this”

   “I find the mobile banking service once I am doing the internet banking online, I do not think I need mobile banking service at this stage, I usually use the Bank card to pay my bill and make an expense”

2) Do you use a similar electronic bank service, how do they compare with mobile banking, and which service do you prefer, why?

   Most of participants have used the Internet banking, some of them use the phone banking, and some of them use the personal banking as usual. They satisfy current electronic banking service in this stage. To compare Mobile banking, they prefer to the current banking service. The reasons include the cost, and security.

   “I found internet banking is very convenient for me to do banking, if the usability is higher in mobile banking, I believe a lot of people will use it. But internet banking is more benefit for me at this moment.”

   “I normally use phone banking; phone banking is high security for me. Because I usually do not transfer any money, and just use it for balance checking and bill payment through the phone”

   “No, I normally use ATM machine and go to the bank to do my banking. I do not do much bank account checking, and only wait for the bank statement sent monthly to know how much money is in the bank account. I even do not want use internet banking because I think the passwords to

account will be hacked by someone else. If mobile banking has a low cost and high security, I might trust it and have an opportunity to use it"

"I have an experience to use mobile banking (SMS) to transfer the money from one bank to another bank. The bank sent me a message with the code, and then I use this code to prove my transaction on internet. This combines mobile banking and internet banking together"

"I think a user satisfies the current internet banking or other banking service at this stage, a user is still learning how to accept and use this new technology at the moment"

3) Comparing with the services you currently use, what do you think of the potential benefits or drawbacks of mobile banking (SMS)?

Comparing with current bank service they use, the most responds agree that mobile banking could be convenient, faster, and mobility access. But some of them also refer mobile banking might have low security and high cost issues; some of them concern about the small device for mobile banking.

"When we are in the village with no ATM machine, and no transport, we could use mobile banking as a main option to do banking"

"I think mobile banking should be good for elder or disable people to use, because they are not able to walk and drive in a long distance to find ATM machine or banks"

"I think we can access mobile banking service anywhere/anytime through mobile device, however, we need a work station to do banking for internet banking"

"Mobile banking is particularly suitable for New Zealander. A lot of New Zealanders have a faster speed to text Message even without watching the keypad."

"I think mobile banking will be better for people who could not access internet and catch the transport"

"I think mobile banking is not secure enough to keep passwords or codes safety"

"The usability of mobile banking is worse than internet banking, because the device in mobile banking is much smaller than internet banking so that it is hard to read the detail in the screen and control the keypad"

"Doing banking with mobile banking (SMS) costs more minutes than phone banking. I could use a phone to make a request to do any transaction immediately"

"If you lost the mobile phone, you would lose the money, because all codes to access your bank are stored in your mobile phone"

"Internet banking is more security than Mobile banking since it has security layers to protect the risk on internet"

"It is an easy, convenient and faster process for mobile banking to do a simple task such as balance checking. However, phone banking will need more processes to perform even this simple task"

"Mobile banking is easy to let other people to know your privacy, because Short Message Service (SMS) is a main media to be served. Other people will be easily read messages in your mobile device"

"Mobile banking has a higher cost to receive and send the request based on Text format"

4) Why mobile banking based on SMS is not very popular? Are there any suggestions and recommendations about the improvement or development of mobile banking?

Due to mobile banking's drawbacks such as high cost, lower security, and smaller device, people do not use the mobile banking so often. Also people would choose their best banking service on the different situation.

The participants provide a lot of good suggestions and recommendations to improve the mobile banking (SMS) service in New Zealand. To solve the security and cost issue is a main concern during the discussion

"The bank could provide once or twice free transaction in mobile banking (SMS) per week, if the transaction is more than twice, the bank could charge a user 20-50c extra"

"The code sent from the bank to allow the user to do the transaction would be expired after first transaction has been done. So the code could not be re-used in the second time"

"I think the more functions added in Mobile banking should allow users to perform more functionality of banking"

"I think designing a larger size of mobile device is also a chance to let people use mobile banking service"

"I think the bank and server provider should post more advertisement about mobile banking. I have not heard any information about mobile banking from the bank site."

"I think some of the bank staffs do not have some knowledge about mobile banking, they should get more training for that"

The points emerging from the discussion about questions 1-4 (part 2) are summarized below:

IX) Mobile banking would be more convenient and more accessible than other banking if there were limited transport, no internet access and/or in an isolated environment such as a village and a suburb.

X) Using the "code expired" function after a current transaction is done. The code sent from the bank is only used to do a transaction once after the current transaction is completed, the code cannot be used again.

XI) Reasonable cost for mobile banking (SMS): The bank would provide one or two free transaction a week using mobile banking (SMS), and charge extra 20-50 cents for more.

XII) Mobile banking (SMS) is arguably better and faster (better performance) in simple tasks compared to other banking services such as phone banking. For instance, phone banking needs a complex process regardless of whether the task is simple or complex. In contrast, using mobile banking is easier to perform simple task compared to phone banking.

XIII) Young New Zealanders would be able to use mobile banking easily

because they are good at typing messages in the mobile device with small keyboard.

XIV) No matter whether the people have knowledge about mobile banking or not, they seldom use mobile banking. People with no knowledge may not be using mobile banking because of their concerns about security. People with enough knowledge are even more aware of the security issues, as they know more about security, and they would like to have more security hole covered.

XV) Users would be able to access a mobile banking service anywhere/anytime because of the higher coverage of mobile devices compared to broadband.

XVI) Advertising of mobile banking (SMS) should be made more in the public, and that more knowledge and information could be distributed to the customers