

Factors Influencing the Adoption and Usage of Internet Banking: A New Zealand Perspective

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ATTESTATION OF AUTHORSHIP

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the qualification of any other degree or diploma of a university or other institution of higher learning, except where due acknowledgement is made in the acknowledgements.”

Yours sincerely,

(Braja Podder)

ETHICS APPROVAL

The research conducted as a part of this thesis has been approved by the Auckland University of Technology Ethics Committee, Reference Number: 04/235

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ABSTRACT

Although the offering of financial products and services over the Internet by banks and financial institutions continues to spread, reports on Internet banking show that the adoption and usage of such services by consumers are low. Further, relatively little empirical research has been carried out to examine factors influencing users' adoption or use of Internet banking services, particularly in New Zealand. Hence, there is a need to identify relevant factors that influence New Zealand's bank customers' intentions to use Internet banking. This research used two commonly applied and empirically supported models of information technology adoption to achieve this objective. In this study, Davis's (1989) technology acceptance model (TAM) is extended by two external variables, namely *risk* and *self-efficacy*. The second model used is a reduced version of Moore and Benbasat's (1991) perceived characteristics of innovation (PCI) model, without the *image* and *voluntariness* constructs. A questionnaire was used to conducting a postal survey of 1000 individuals in Auckland, New Zealand. Out of 163 responses received 157(15.7%) were usable and with this data both research models were tested.

The results reveal that *perceived usefulness*, *perceived ease of use*, *self-efficacy*, *relative advantage*, *compatibility*, and *result demonstrability* have a significant association with *intention* to use Internet banking, while *risk*, *visibility* and *trialability* are not significant. Both the modified TAM and PCI models used in the study have a similar explanatory power of slightly over 20% of the variance in *intention*. In the TAM model, *perceived usefulness* and *self-efficacy* are significant variables, while *compatibility* is the only variable significant for the PCI model. Further, results indicate that users' perceptions of various aspects of Internet banking are more positive than non-users' perceptions, except for *risk*.

The results of this study indicate that both TAM and PCI have low capabilities in explaining the variances in users' intention to adopt or use Internet banking services. Therefore, further studies are recommended to examine the performance of these models in Internet banking studies and also to improve the prediction power of these models by incorporating additional constructs. Although *risk* is found to be insignificant in this study, considering results of prior studies, further studies are required to examine its influence on intention.

For banks point of view, banks should consider launching campaigns to demonstrate the usefulness and benefits. Once users perceive that advantages outweigh disadvantages, they are more likely to adopt or use Internet banking. Additionally, banks must make continuous effort to understand consumers' requirement and design and deliver their products and services in such a way that it is consistent with customers' requirements, beliefs and the way customers are accustomed to work. Banks website should facilitate customers with a 'one stop comprehensive financial' service. Banks can arrange hands-on training for prospective users to enhance their *self-efficacy* or may pay additional interest on online-deposit accounts (can be access through Internet only). Besides promoting services, banks need to invest in staff education and training and be equipped with advanced computer technology.

CHAPTER 1 INTRODUCTION

1.1 Background to the study

The rapid growth and popularity of the Internet has created great opportunities as well as threats to companies in various business sectors, to endorse and deliver their products and services using Internet as a distribution channel (Chau & Lai, 2003). Researchers have emphasised the importance of the Internet for financial services more than other industries (Mukherjee & Nath, 2003; Tan & Teo, 2000). Besides opportunities of this channel, banks and financial institutions across the world face new challenges to the ways they operate, deliver services and compete with each other in the financial sector. Driven by these challenges banks and financial institutions have implemented delivering their services using this channel (Chan & Lu, 2004; Cronin, 1997). Internet banking refers to the use of the Internet as a delivery channel for banking services, which includes all traditional services such as balance enquiry, printing statement, fund transfer to other accounts bill payment and so on, and new banking services such as electronic bill presentment and payment (Frust, Lang, & Nolle, 2000) without visiting to bank branch (Mukherjee & Nath, 2003; Sathye, 1999).

The objectives of Internet banking include cost containment through reduction in operating cost, performance improvement by making the service available at all times of the day, wider coverage by enabling the access to service from any location, revenue growth through better quality and additional non-financial services, and customer convenience through personalised service (Bradley & Stewart, 2002; Chau & Lai, 2003; Frust et al., 2000; Suganthi & Balachandran, 2001). From the customer's perspective, Internet banking facilitates a convenient and effective approach to manage personal finances, as it is accessible 24 hours a day and 365 days in a year without visiting the bank and from any locations (Rotchanakitumunai & Speece, 2003).

Although there is a significant growth of Internet users in almost every country, the number of financial transactions carried out over Internet remains to be low. It is observed that potential users either do not adopt Internet banking or do not use it continually after adoption. Mearian (2001) indicated that most of the banks' websites are getting accessed by huge number of customers in USA but only a minority of customers have made online financial transactions. Gartner expressed that out of 61% online users, only 20% of consumers carries out online banking in USA (J. Brown, 2001). Several studies have

reported not only low adoption rate but also disparity in adoption rates among European countries. ACNielsen (2002b) found that use of Internet banking is increasing in Asian countries but it is still slower than estimation. Due to these slow adoption rates, the transformation of banking services from 'bricks and mortar' to 'clicks and mortar' is yet to eventuate to the extent it was predicted (Bradley & Stewart, 2002). Customers in some countries have ranked Internet banking as less important than other channels such as ATM or telephone banking (Aladwani, 2001; Rotchanakitumunai & Speece, 2003; Suganthi & Balachandran, 2001).

In order to be successful, banks and financial organisations are keen to understand to what extent customers are adopting or using Internet banking services. Courtier and Gilpatric (1999) recommended that banks and financial companies must survey customers' requirements on a regular basis in order to understand factors that can affect their intention to adopt or use Internet banking. Researchers (I. Brown, Hoppe, Muger, & Newman, 2004) suggested banks (mainly international banks) for considering influence of national factors while introducing their services. For example, socio-economic conditions that affects income and levels of affluence, and the consumers' ability to use Internet banking need to be considered. Further banks must be equipped with necessary technological infrastructure and resources to demonstrate the potential benefits of this new channel. But due to the limited number of studies that have been conducted in understanding users' adoption or usage intention, availability of information in this context is found limited for many countries, including New Zealand.

In New Zealand Internet banking was started in mid 1996 by the ASB bank. First Internet-only bank (without a branch) was launched in 1997. The number of online customers was low in every New Zealand bank in 1999, but was doubling every six months. Around 200,000 customers used Internet banking in New Zealand in 2000, which increased to 480,000 in 2001 (Chung & Paynter, 2002). A recent report claimed that about 100,000 customers bank online daily. The relative success of Internet banking to date can be gauged by identifying the number of active users and anticipated future adopters (Gerrard & Cunningham, 2003). All major banks have introduced their Internet banking services and are constantly investing and expanding their products and services in New Zealand. According to Chung and Paynter (2002), Internet banking services offered by most of the New Zealand banks are similar and are not customer focused. Therefore, although numbers of bank customers are growing, the use of services remains at the lowest amongst all

banking facilities. Privacy and security are found to be the most important issues that inhibit customers from using Internet banking in New Zealand (Chung & Paynter, 2002). As mentioned earlier, due to limited research on Internet banking in New Zealand, information on factors that have influenced users' behaviour to adopt or use Internet banking is limited. The current study will address this shortcoming. The findings of this study will help the banking industry in developing strategic plans to promote products and services over the Internet in future (Chau & Lai, 2003; Wang, Wang, Lin, & Tang, 2003).

1.2 Studying Internet banking adoption

There is a growing body of academic research that has focused on examining the factors that have influenced user behavioural intention to adopt or use innovations in information technology (Compeau, Higgins, & Huff, 1999; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Moore & Benbasat, 1991; Rogers, 1983; Taylor & Todd, 1995a; Venkatesh & Davis, 1996; Wang et al., 2003). Among the different models that have been proposed, the technology acceptance model (TAM) suggested by Davis (1989) is the most widely accepted model because of its specific focus on information system (IS) use, its basis in social psychology theory, its parsimony and empirical support from various studies. According to TAM, adoption behaviour is determined by the *intention to use* which is turn determined by the *perceived usefulness* and *perceived ease of use* traits of the system.

Although researchers have found support for TAM but there are studies that have claimed that TAM's fundamental constructs are unable to fully explain the variances in *intention*. Davis (1989) expressed that future research of TAM needs to address how other variables affect *perceived usefulness* and *perceived ease of use*. Recent research on Internet banking and online shopping has revealed that *risk* (Doolin, Dillon, Thompson, & Corner, 2005), *self-efficacy* (Chan & Lu, 2004; Wang et al., 2003), *credibility* (Chan & Lu, 2004; Luarn & Lin, 2004), and *task familiarity* (Chau & Lai, 2003) have a significant influence on intention to adopt or use Internet banking or buying products online.

In studying the adoption or usage of Internet banking, we argue that the original TAM's constructs are not sufficient because technology settings and transaction environment are different from conventional information system studies such as adopting software packages or tools (Moon & Kim, 2001), thus necessitating a search for additional variables that better explain adoption or use of Internet banking. Moreover researchers (Plouffe, Hulland, & Vandenbosch, 2001) commented that TAM's parsimony can be trade-off by

adding richer set of constructs that enhances the prediction ability of the model. Therefore, this research proposes to extend TAM in the context of Internet banking with a view to provide a more in-depth analysis of intention to adopt or use of services. For this study, we propose two additional variables, *risk* and *self-efficacy* to enhance understanding of users' behavioural intention. *Risk* is found to be a widely recognised obstacle to Internet banking adoption in prior studies. This may be because of lack of security and privacy over the Internet and thereby any commercial transaction over Internet is viewed as a risky undertaking. On the other hand, *self-efficacy*, an internal control factor, is found to influence the adoption or rejection decisions of information system users.

Another model that has been used in studies of information system adoption is Rogers' (1983) diffusion of innovation (DOI) theory. Rogers (1983) proposed five characteristics of an innovation that affect adoption behaviour: *relative advantage*, *compatibility*, *complexity*, *trialability* and *observability*. Although both TAM and DOI focus on usage as the primary outcome of adoption process, DOI has gone beyond in explaining various types of usage such as initial usage and continual usage (Rogers, 1983). Although TAM has been the most widely studied model in users' technology acceptance field, researchers (Plouffe, Hulland, & Vandenbosch, 2001) are of the opinion that DOI's constructs explain a higher proportion of the variance than TAM when it is being used as antecedents to adoption intention. Further, Moore and Benbasat (1991) have extended DOI for studying information technology usage by adopters and potential adopters. Their extended model, perceived characteristics of innovating (PCI), comprises eight user perceptions that can help in explaining information technology usage (Agarwal & Prasad, 1997). These are: *relative advantage*, *compatibility*, *ease of use*, *image*, *voluntariness*, *trialability*, *result demonstrability* and *visibility*.

Motivated by the conceptual similarity of TAM and PCI on technology acceptance behaviour, and the set of constructs used in TAM which is a subset of some of the constructs of PCI, this study proposes to apply the PCI model along with TAM to identify factors that influence Internet banking adoption and usage in New Zealand.

In this study variable *image* is not considered because the researcher belief that one's status does not get elevated any more in the social system by seeing him or her using Internet banking. Further, the construct *image* is considered as a part of *relative advantage* (Agarwal & Prasad, 1997). The construct *voluntariness* is also dropped because the researcher is of the

opinion that there will not be any external pressure on the individual to adopt or use Internet banking system. Moreover, support for the role of external pressure on to intention is inconclusive (Agarwal & Prasad, 1997).

1.3 Research objectives

This study aims to enhance the understanding and knowledge of factors that affect adoption and usage of Internet banking services in New Zealand. The primary objectives of this study are to:

- ?? Identify factors influencing the adoption and usage of Internet banking services in New Zealand
- ?? Examine whether TAM or PCI can explain more variance in intention to adopt or use Internet banking
- ?? Investigate whether differences exist in perceptions of Internet banking between users and non-users of those services.

1.4 Significance of the research

This study has a number of theoretical contributions. It is the first study to empirically examine the influences of TAM constructs together with *risk* and *self-efficacy* on behavioural intention to adopt or use Internet banking services in New Zealand. It is one of the few studies on Internet banking context that have used most of the PCI constructs, and the first in New Zealand. Further, this study aims to indicate which model has the better explanation capabilities. Aside from theoretical values, practitioners, information system developers and researchers require a better understanding of why people refuse to use new technologies, in order to predict how people respond to new innovations. They need to motivate user acceptance of information technology based innovations by changing the technological characteristics and processes by which it is implemented.

1.5 Organisation of this thesis

This thesis is organised into six chapters. Chapter 1 provides an introduction to Internet banking services and sets out the objective and significance of this research. Chapter 2 outlines the adoption trends of Internet banking in several countries across the world. Chapter 3 review prior literature on information technology adoption, and formulates the hypotheses used in this study. Chapter 4 presents the research method, including data

collection and analysis. Chapter 5 and 6 present the research findings and discuss the implications of this study.

CHAPTER 2 AN OVERVIEW OF INTERNET BANKING: GLOBAL AND LOCAL PERSPECTIVES

2.0 Introduction

In order to exemplify the importance of current study, this chapter provides a background highlighting the benefits of Internet banking, consumers' adoption trends across various countries in the world and those in New Zealand. The first section focus on types of Internet banking services, its acceptance trends as against predictions from different market research organisations and factors that motivated adoptions, followed by a comparative review of adoption trend in New Zealand and other countries, which forms the significance of this study.

2.1 Internet banking

Internet banking refers to the delivery of banking services over the Internet. Such services are advantageous as no transfer of physical goods are involved, any transaction can be processed electronically that includes balance enquiry, transferring funds to other accounts, bill payments and so on. Banks have adopted various means in providing banking services over the Internet and those are: creation of an Internet-only bank, called as virtual bank where bank does not have physical existence and provide services through the Internet, ATMs and other remote delivery channels (Carlson, Furst, Lang, & Nolle, 2001); offer services through its website as a complementary distribution channel besides its traditional delivery channels; creation of an Internet bank as a subsidiary of bricks and mortar bank targeting complementary user segments (Centeno, 2003).

The objective of Internet banking services is to provide financial services to consumers 24 hours a day and 365 days a year from locations where Internet access is available. Apart from *any time* and *anywhere*, consumers can have better control on their banking transactions. On the other side, banks expect to reduce operating costs, enhance customer reach, enable business diversification such as providing non-financial services, increase volume of business, provide better services, form alliances with other industries and retain market share by implementing Internet banking services (Carlson et al., 2001; Centeno, 2003). Booz Allen and Hamilton (B. Singh & Malhotra, 2004) conducted a survey in 42 countries comprising of 386 retail and corporate banking institutions to assess the strategic impact of Internet banking on the financial service industry and found that there is a large perception gap between North American and European banks compared to Japanese

banks. Japanese banks expect to retain traditional channel while Internet banking is expected to become the most important retail channel within 10 years in North America or in Europe.

According to Carlson et al (2002) \$6 million would be required to set-up an Internet bank compared to \$25 to \$30 million for a brick-and-mortar bank in USA. In addition to this, low customers' servicing cost (shown in figure 2.1) has encouraged organisations to invest in Internet banking, even though the channel is yet to produce profitable results. Figure 2.1 indicates that the cost of providing services is approximately \$1.07 per transaction from a physical bank, \$0.47 per transaction from phone banking, \$0.27 per transaction from ATM banking and \$0.1 per transaction from Internet banking (Carlson et al., 2001; Centeno, 2003; Perumal & Shanmugam, 2004).

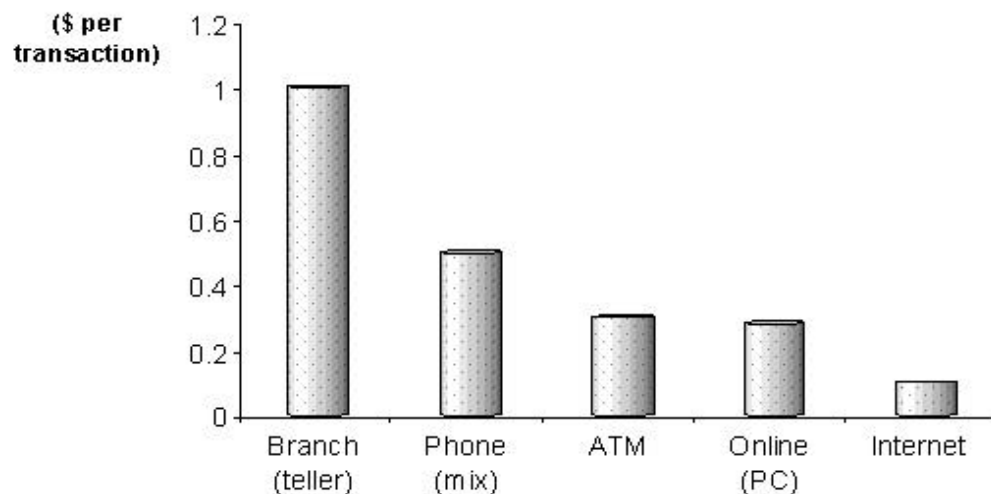


Figure 2.1: Processing cost (US\$) per transaction

(Source: Perumal & Shanmugam, 2004)

Centeneo (2003) argued that Internet banking has the capability of increasing customers' satisfaction, enhancing bank's profitability through cost efficiency and could be useful for cross-border bank expansion but in reality, the cost of introducing new technologies, managing associated risk and acquiring new customers are the major barriers in achieving profitability in short or even medium term. Besides this, Internet banking has brought huge competition between banks and products and services for users in countries where Internet banking is most developed, for instance, Sweden. Due to this competition or consumer demand, banks are forced to introduce and maintain several services including non-profitable services. Researchers (Frust et al., 2000) have expressed that the statistical

relationship between offering services and profitability might be different with smaller banks (having assets less than US\$100 million) than bigger banks (assets over US\$100).

2.2 Global Internet banking trend

Several research organisations have predicted the future growth of Internet banking users in different countries based on available adoption trends, and banks' strategies and initiative toward implementing it. It is evident from extant literature review that the average consumer has accepted the Internet with phenomenal intensity, but adoption of Internet banking services has been found much slower than predictions made (Centeno, 2003). A similar trend is reported in study conducted in New Zealand (Chung & Paynter, 2002).

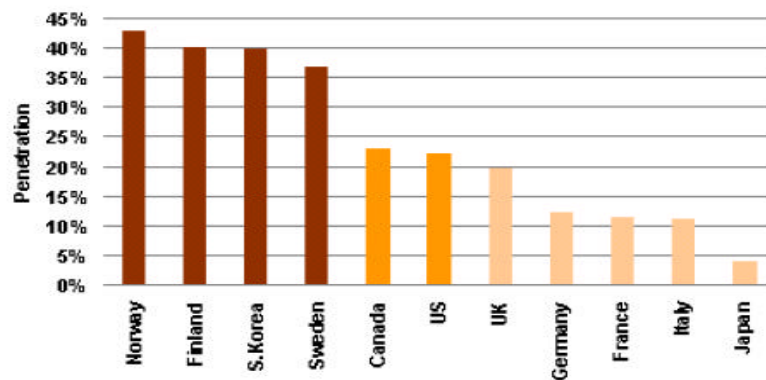


Figure 2.2: Rate of diffusion (by % total banking customers)

(Source: Grealish, 2002)

Barwise (1997) estimated that 60% of retail banking transactions would be online by 2007 while Burnham (1997) indicated that 20% of retails and 30% of corporate customers will use some form of Internet banking by 2002. Grealish (2002) report showed online banking penetration by percentage of total banking customers across countries in the world till 2002 (shown in figure 2.2). Figure 2.2 shows European countries are in the lead, with Norway over 40%, Finland and South Korea around 40% followed by Sweden over 35%, far behind is USA having around 20% and Japan less than 5%.

Further, a report from International Data Corporation (IDC) (Perumal & Shanmugam, 2004) estimated that the number of Internet banking users in Western European would reach the total number of Internet banking users of USA, Japan and Asia-Pacific counties by 2004 and diffusion rate in Japan's users would almost same as of USA (shown in figure 2.3). Figure 2.3 shows that the rate of growth would be very slow for the countries categorised under rest of the world. However, estimations on the growth rate as indicated

by various market research organisations also vary significantly. For example, Forrester research estimated 16% growth in users while Datamonitor estimated 36% increase (Centeno, 2003).

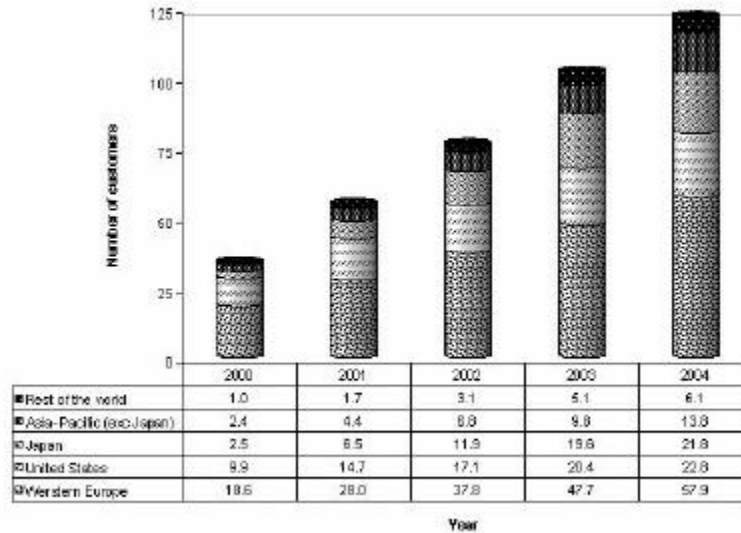


Figure 2.3: Estimates Internet banking services users

(Source: Perumal & Shanmugam, 2004)

Another study found a significant disparity between use of the Internet and adoption rate of Internet banking (shown in figure 2.4). Through a statistical analysis, Bughin (2001) concluded that when a country achieves Internet penetration rate of 30%, (which he referred to as a measure of customer's readiness to transact on-line) use of Internet banking services will start increasing disproportionately. For example, Sweden and Norway have Internet and Internet banking penetration rates over 50% and 25% respectively. On the contrary, Spain, France and Portugal have Internet usage less than 20% and Internet banking diffusion rate less than 5%. Other researchers also have supported such relation (Christiansen, 2001; Corrocher, 2001). However, the relation does not hold valid for USA, Korea and Switzerland where Internet banking diffusion rates are low, despite high Internet penetration rates. Even for New Zealand low Internet banking usage was reported low (Chung & Paynter, 2002) despite Internet penetration rate was well above 45% (<http://www2.stats.govt.nz>). The differences might be due to the lack of banks' initiative towards converting their offline customers to online (Bughin, 2001) and are not related with countries' economic development (Centeno, 2003) status.

In summary, slower diffusion rate is experienced in various countries in the world compared to estimations made by the market research organisations. This has caused

several virtual banks running into trouble. European countries are found much ahead from rest of the world in Internet banking adoption. Although use of the Internet is high in several countries, such as USA, Canada, adoption of Internet banking is lacking. In the next few sections levels of Internet banking adoptions in several countries across the world are reviewed.

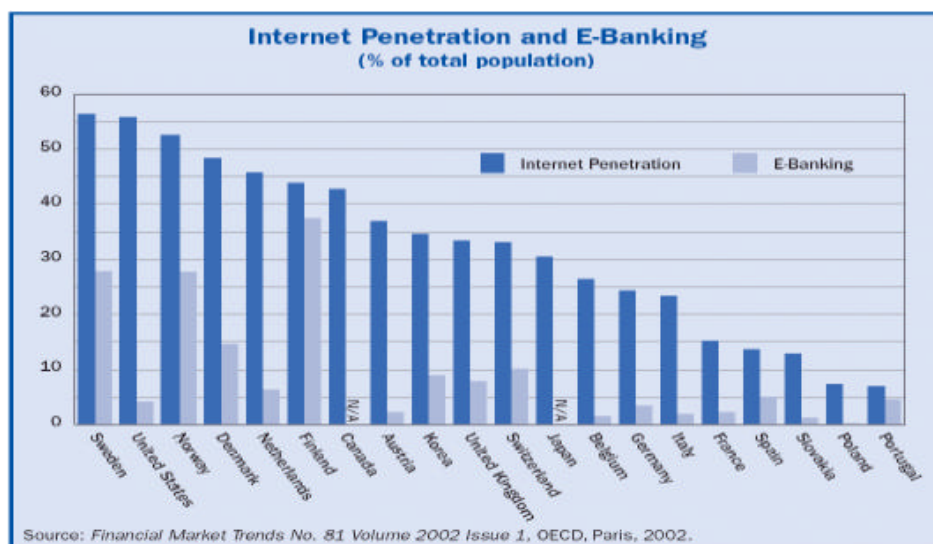


Figure 2.4: Diffusion of Internet and Internet banking services (% total population)

(Source: Grealish, 2002)

2.2.1 Internet banking trend in U.S.A and Canada

Figure 2.5 shows actual online banking in USA as against estimated by different market research analysts. The data shows that although actual number of online banking users is growing, it is still much lower than what was predicted.

Fox (2002) found “convenience” is the main attraction for 79% of consumers to use Internet banking services of which 82% of respondents aged between 30-49 years. About 71% of consumers use Internet banking for time saving, 30% for cost savings and 52% to have better control of their finance. TowerGroup (CRMToday, 2003a) found that Internet banking users make 30% less calls to banks’ help line and have higher overall account and loan balances. Further, study indicated that 56% of consumers chose bank for the quality and reliability of bill payment service, ahead of physical branch location (45%) or the number of ATMs (52%) a bank has (Finextra, 2005b).

CRMToday highlighted TowerGroup’s prediction on IT spending by large banks in USA, which amounts to 24.1 billion in 2004 as compare to 22 billion in 2002. CRMToday

(2003a) indicated that online banking customers are increasing but without the major consumers' adoption, it would not become as profitable as it promises. From bank's perspective, customers are 21% profitable after 2.5 years of use of Internet banking services (TechnologyforFinance, 2004). In order to boost customers' usage many banks have introduced free bill payment services (Tedeschi, 2005) in addition to installing web-enabled ATMs which facilitate customers with cheque and cash deposits without having to visit bank branches. These ATMs are equipped with scanners, accepts envelop-free deposits and capable of providing almost all the services that are available over banks' web sites (Tedeschi, 2005).

While analysing reasons for low diffusion rate, Carlson (2001) argued that it might be due to consumers' "wait and see" attitude as they neither clear about the benefits nor they convinced of the usefulness of Internet banking services (e-Marketer, 2004). Forrester (e-Marketer, 2004) expressed security and privacy are the main barriers to Internet banking diffusion apart from preference of branches, ATMs and phone banking. Cyota's (Finextra, 2005a) survey highlighted users' concern about security issue and indicates about 70% of Internet banking users express that they are less likely to respond to an e-mail from their bank and more than 50% would discontinue the service in future. Keynote (Finextra, 2005b) highlighted cross-selling issue where banks performed poorly and customers were finding difficulties in accessing information from banks' websites on Internet banking products and services.

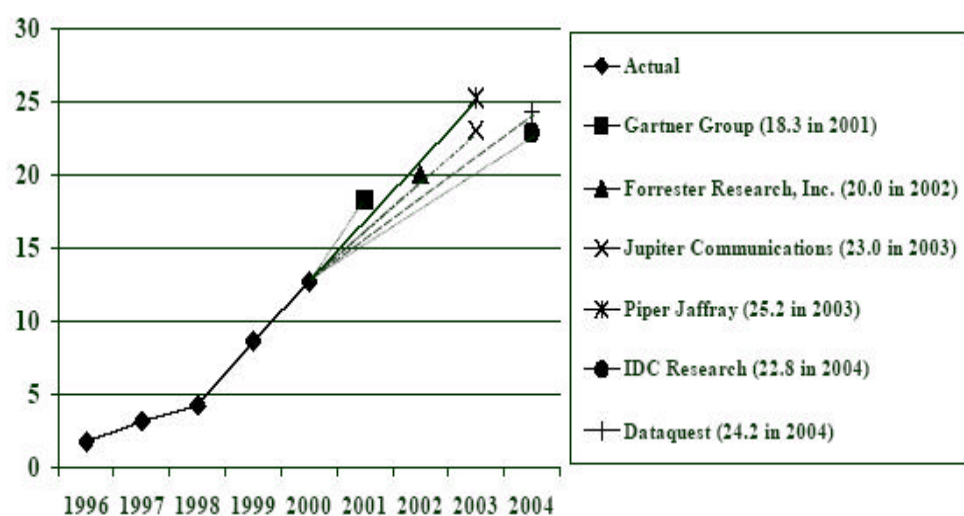


Figure 2.5: Projected and actual Internet banking users

(Source: Carlson et. al 2001)

On the other hand, although banks are introducing new services and making continuous effort in improving existing services on a short-term basis; they are yet to determine *when and how deep to plunge* into Internet banking services. This is due to huge competition, not only from traditional rival banks but also from banks from new and distant locations and from non-financial institutions. TowerGroup's (CRMToday, 2003b) review of 10 top Internet banking sites in USA revealed that security is the top barrier to adoption of Internet banking services and banks have made poor attempt, so far, in communicating key points about Internet security to their customers or their responsibilities in the event of unauthorised access not clearly stated. Most of banks' website have mentioned what security technology they follow such as *128-bit Secure Socket Layer (SSL) encryption* – this technical information does little to communicate consumers about the level of protection measure that banks' have adopted. The report recommended banks to intimate customers about the following:

- ?? Security measures in place and how those systems works in non-technical language
- ?? Procedure customers to follow to protect their data
- ?? Inform Bank's indemnification policy

In contrast to what was discussed until now, a recent study by Pew research organisation (e-Marketer, 2004), portrayed a different picture of Internet banking adoption or usage in USA. According to their report, 53 million people that constitute 44% of the Internet users carried out online banking in USA in 2004, which is an increase of 47% from 2002. If these figures are considered valid, then Internet banking user's growth has surpassed most of the previous predictions. The usage gains are significant in 28-39 and 50-58 year age groups with high school or college degrees and in broadband user category. Among the users 50% are men and 40% are women compared to 31% and 29% in 2002. The study also indicated that 39% of consumers who have been using Internet for four or more years have ported to Internet banking services, while 20% of those with 2-3 years and 6% of those with one year of experience. About 92% use Internet banking services for checking account balances and transactions, 51% for checking and printing statements and 43% for bill payment services and 21% for downloading transactions to use with other software applications (e-Marketer, 2004). Further researches or reports on current status would help to ascertain how diffusion has grown over the years in USA.

According to a Canadian market research company (Finextra, 2005c), use of Internet banking services is increasing but once it reaches to a sizeable segment of consumers it might slow down or even get stopped as they presumed that Internet banking service is not for everyone. The major barrier to Internet banking service diffusion is due to availability of other channels, which adequately meet customers' need. The study reported the use of ATMs in 2004 is 75%, which is same as that of 2003 while telephone banking has reduced to 20% in 2004 from 26% in 2001. About 59% of consumers visit branches for banking, which remain unchanged since 2003. Further, among 6% of non-user has shown interest to use Internet banking services within next six months. Review on adoption and usage of Internet banking services in Canada remains limited due to very little studies that have found by the current researcher.

In short, Internet banking diffusion appears to be slower than expected except Pew's (e-Marketer, 2004) findings. Individuals are aware of Internet banking products and its benefits but are not adopting due to risks involved in carrying out financial transactions. Banks are facing huge competition from their rivals as well as from new entrants in Internet banking services. Large banks are dominating the market with more variety of products and services while small and medium sized banks waiting for market to grow. Canadians prefer to visit bank branches or using ATMs than using Internet banking services, whereas majority of US customers select bank based on their quality and reliability of Internet banking services.

2.2.2 Internet banking trend in Europe

According to the European Central Bank in 2002 (Centeno, 2003), although all major banks offer Internet banking services, the level of services and its quality differ according to the country and the banks. The adoption rate is found to be averaging less than 6% of total bank customers or only 17% of Internet users (Bughin, 2001). Since majority of consumers continue to rely on either branch access or telephone banking as they found these channel provide more information and better services than bank's website. Even countries where Internet penetration rate is over 50%, such as Finland and Sweden, online consumers found to transact with physical branch or call centres. Around 60% of Internet customers do not have issue in buying books, CDs or low valued item through online but are reluctant to make online banking transactions (Bughin, 2001).

Further, disparities in Internet banking adoption also existed among several countries in Europe. For example in Estonia, 18-25% of population are using Internet banking services whereas Italian bank had almost no on-line customers by early 2000, banks in Malta launched Internet banking services in December 2002 (Centeno, 2003). Even adoption disparities are evident among banks within the same country. For example, in France, leading banks have diffusion rate over 11% while minor bank such as the Credit Commercial de France have converted only 2% of its customers to online for the same period (Bughin, 2001). *Bankinter*, a medium bank in Spain, has ranked by *Euromoney* as one of the best Internet bank in Europe in year 2000 (Ward & Peppard, 2003) despite country's low Internet penetration rate and inferior telecommunication system. Through a cluster analysis (shown in figure 2.6), Bughin (2001) found that the Scandinavian banks are the best performing banks (7%) due to strong "push" and "pull" effects while poorly performing cluster (of 7%) Irish and French banks have lower level of "push" and "pull" factors.

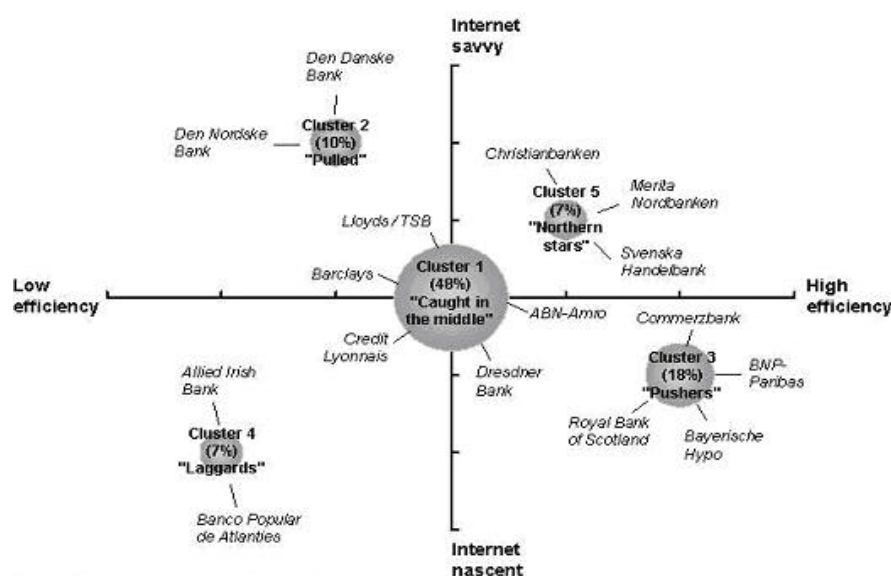


Figure 2.6: Clustering of on-line banking in Europe

(Source: Bughin, 2001)

While analysing reasons behind disproportion adoption rates and means to improving adoption and usage, Kulkun (2002) found home-Internet access have increased Internet banking service acceptance but exception was found for Estonia where home-Internet access is only 10% but Internet banking diffusion rate is 18-25%. Further, researches have indicated a strong correlation between Internet diffusion and cost of service access, confidence in the security of the system, privacy of the service and trust on banks (e-

Marketer, 2002; Gourova & Burgelman, 2002) but mixed results are reported in prior studies. Among other factors that have influenced on the acceptance of Internet banking services, access to ATM, use of cashless payment instruments and value of cash in circulation to gross domestic products (GDP) are reported in earlier studies (Centeno, 2003). But results are inconclusive due to number of exceptions are reported in prior studies.

Bughin (2001) identified cost effectiveness, customer convenience and online readiness as the significant factors that motivate customer to bank online. Grealish (2002) recommended two practices to be followed by the banks to boost their customers to:

- ?? Make bill payment as cornerstone of the service rather than an add-on service
- ?? Allocate sufficient resources on staff education and training, so that the staff can explain and encourage non-users of Internet banking services

Deutsche Bank Research (Centeno, 2003) predicted Internet banking diffusion rate could rise from 1% to 10% in newly developed market and could reach 20% by 2005 whereas it could rise from 8.5% to 50% in industrial countries. In Nordic countries for example, adoption of Internet banking services could reach 80% by 2005, while in UK and USA, Internet banking diffusion could be around 50%. The study estimated that western European countries are expected to consolidate their lead in terms of numbers of Internet banking customers, which would go past 60 million.

Study on the usage of Internet banking services for 5000 small and medium size businesses, Ramsay (2004) revealed that there has been only a 3% of increase in Internet banking usage since 2002 compare to 13% increase between 2000 and 2002. Datamonitor (Centeno, 2003) estimated that spending on Internet banking services in Europe would go past \$2.3 billion in 2005 from the figure of \$1.7 billion in 2002 and the number of users is estimated to reach 75 million in 2005. A workshop on “the future of on-line banking” in 2002, researcher argued that pure Internet banking would be unlikely to succeed in Europe since high level of technology investment and high customer acquisition cost would hinder economic viability of most projects. Rather Internet banking could succeed by integrating with traditional channels.

In summary, adoption rate found to be averaging less than 6% of total bank customers. Consumers continue to depend on branches and call centres to get more information or make banking transaction rather than using banks' websites. Consumers are ready to use online banking services for low valued items but are found reluctant for high valued transactions. Disparities in adoption of Internet banking service exist among countries in Europe. Scandinavian banks are ahead of others in terms of Internet banking penetration due to high Internet penetration and banks' initiatives. Several European banks have experienced reduction in Internet banking users in 2002. Researchers recommended banks to make the bill payment as keystone of their services and educate banks' staff on products and benefits of Internet banking services in order to attract more customers.

2.2.3 Internet banking trend in Africa

In South Africa, Internet banking is relatively new and also making slow progress (A. Singh, M, 2002); only four banks were providing Internet banking services in 2002. Around 31% of customers banked online of which 59% are male and 41% are female. Over 50% of users aged between 25 and 34 years while 30% are aged between 35 and 44 years. The frequency Internet banking ranges from 12% daily, 29% weekly and 59% monthly. About 92% depend mainly on ATMs, 39% transfer funds within accounts, 14% transfer funds to other banks, 27% check balance or print statements.

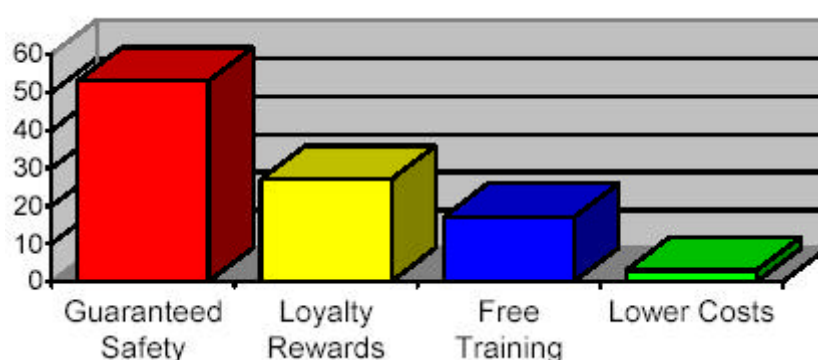


Figure 2.7: Internet banking criteria required by customers in South Africa

(Source: Singh A M, 2002)

Among non-Internet banking users, 69% were not using Internet banking services due to transactions unsafe, unaware of Internet banking products and benefits (33%), time consuming (10%) and more costly (10%). On the other hand, discontinued Internet banking users are willing to comeback, if current service met the criteria as shown in figure

2.7. Although large number of people (33%) found to be ignorant of Internet banking services and its benefits, still free training has received low importance (17%).

In short, Internet banking is relatively new in the country with low diffusion rate. Current situation could not be analysed further due lack of information and limited studies that carried out on diffusion of Internet banking service.

2.2.4 Internet banking trend in Australia

The Market Intelligence Strategy Centre (MISC) reported over 7.2 million customers accessed 27 millions accounts in 2003 which is a 31% increase (AustralianBusinessIntelligence, 2003) compared to 16.2% in 2002 (Douglas, 2003). A significant increase in the number of transactions transferring funds to external accounts are found, which consumers found more cost effective option than transferring fund through the traditional banking process. The report also indicated that users are able to transact more amounts using fewer sessions, which indicated users become more efficient in using Internet banking services. The multiple-access accounts were activated 15% more in 2004 compared to 12% in 2003. Further, among users women in particular are becoming increasingly attracted to Internet banking services and 50+ years age group is the fastest growing category. Recent reports highlighted a 6% growth of active users in 2004 compared to 5% in previous year (Lebihan, 2004; MISC, 2004). Another survey indicated that new registration has fallen from 19.4% in 2002 to 2.8% in last quarter of 2003, which might be an indication of existing consumers are immune to the security issue and behaves normally but new users may have been deterred.

Banks are considering active-user's growth and increase in the number of online transactions are the factors that determine the performance of online banking channel rather than the number of new registrations. Banks are facing increased competition from their rivals that lure consumers with a range of services including loans, savings, managed funds, etc rather than only transactional banking facilities. Unlike USA, where larger banks provide more variety services than smaller banks in Australia, some small and medium sized banks offer more user-friendly services than larger banks and performed well in the area of personal Internet banking, and website reliability and transactional capabilities. Banks are taking initiative to educate customers over on-line risk. ACNielsen (2004) highlighted higher interest rate in online savings account have motivated 89% of users in using online banking and also forces major banks in offering similar products. For

example, St. George bank's "dragondirect directsaver", Citibank's "Online Cash Manager", Suncorp's "Everyday options" and HSBC's "online savings account" are few of them.

In summary, Internet banking diffusion rate is significant since 2000. Banks experienced 800,000 new online users in 2004 and are focusing on active-user's growth and to increase the number of online transactions rather than the number of new customers. Transferring to other bank's account has grown 24% in 2004 due to lower transfer fees. Small and medium sized Australian banks are found to offer more user-friendly services than larger banks and are successful in providing personal banking services. High interest rate in online savings account has motivated most customers in using online banking and also forces major banks in introducing similar products.

2.2.5 Internet banking trend in Middle East

Al-Bassera's (Guru, Shanmugam, Alam, & Perera, 2003) study showed that only 19% of banks have full transactional capability in their current services. About 41.4% of banks websites have rated less than 10 on a maximum rating of 27 (Guru et al., 2003). But banks are soon catching up with the conventional system. A recent study by the Institute of Banking in Kuwait expressed that Islamic banks can no longer ignore the importance of Internet banking as 20% of their customers are willing to move to another financial institution if their current bank fails to offer financial services over the Internet. According to the Economist Intelligence Unit's (Guru et al., 2003) report, 14% of the region's Internet users are now registered to Internet banking services. The most significant is three Arab countries having high Internet banking adoption and they are Bahrain with 17%, the United Arab Emirates with 21% and Kuwait with 29% (Roth, 2001).

Similar to European countries a significant disparity in adoption rate is noticed in Gulf countries. For instance, Kuwait, which had 2.2 million people, has nearly as many online banking customers as Saudi Arabia, with a population of 20.5 million. Figure 2.8 shows that no banks in Turkey, Iran, Palestine and Yemen have online transactional capabilities (Awamleh, Evans, & Mahate, 2003). Further, level of services provides by banks in Egypt, Lebanon and Cyprus is not known.

Jasimuddin (2001) expressed that use of Internet banking is a marginal activity in Saudi Arabia. About 73% of banks' have their own websites, out of which 25% of sites are offering full services over the Internet and rest use for brand awareness and promotions.

As of September 2003, only two banks are providing Internet banking services in Oman and Jordan (Awamleh et al., 2003). However, other banks in Oman and Jordan maintained an informational website with basic interactive capability. Awamleh *et al* (2003) argued that banking industries in Jordan and USA exhibit weakness in building customer relationship. Accenture's study (Guru et al., 2003) on banks' strategies expressed that almost 33% of Gulf countries banks have no intention of introducing Internet banking services in the next 18 months either because of non core area of business, high technology or marketing costs, lack of customers and/ or banks are not interested in it.

Region	Full	Hybrid	Info	Total
GCC States				
Kuwait	5	1	3	9
Qatar	3	1	5	9
Bahrain	6	0	17	23
Saudi	9	2	2	13
UAE	15	2	12	29
Oman	2	5	4	11
Sub Total	40	11	43	94
Remaining Middle East				
Jordan	2	0	21	23
Egypt	3	1	39	43
Lebanon	4	15	29	48
Cyprus	3	4	21	28
Turkey	0	2	23	25
Iran	0	0	6	6
Palestine	0	0	1	1
Yemen	0	0	5	5
Sub Total	12	22	145	179
Grand Total	52	33	188	273
Full: Financial transaction capabilities Hybrid: within own bank transactions only Info: No financial transaction capabilities				

Figure 2.8: Analysis of Internet banking services for Middle East banks

(Source: Guru et al, 2003)

Although arguments in favour of adopting Internet banking services such as time saving, convenience and increased efficiency are highlighted in prior studies but those factors seem to be less convincing considering the slower pace of life where a visit to the bank branch may be viewed as an opportunity to socialise. Further, absence of adequate infrastructure may be another obstacle to online banking particularly with regards to connectivity.

In summary, Internet Banking is a relatively recent phenomenon, especially in Arab countries except UAE, Kuwait and Bahrain where Internet banking adoption reported high. Only a few banks have online transactional capabilities. Although one-third banks have no intentions of introducing Internet banking, customer demands might force them

to change their views. Disparity in adoption rate is noticed within gulf countries as experienced in Europe. Limited number of studies and lack of information from other sources have restricted analysis for this region.

2.2.6 Internet banking trend in Asia

According to ACNielsen (2001) online banking consumers has grown by 63% across South Korea, Hong Kong, Singapore, China and Taiwan. The total Internet banking population for this region has increased by 4 million in one year time. About 38% of Internet users are now using Internet banking services compared to 29% a year ago. South Korea has the largest number of users followed by China and Taiwan and out of top 20 Internet banks, South Korea has 12, China 5 and one each in Singapore, Taiwan and Hong Kong. A recent report from IDC (CRMToday, 2004) highlighted growing usage of Internet banking services in nine countries in Asia Pacific that includes Australia, China, Hong Kong, India, Korea, Malaysia, Singapore, Taiwan and Thailand. Internet banking population has crossed 1 million marks in most of these countries. A maximum growth of 300% is expected in India and China, where the number of Internet banking users estimated to reach in the tens of millions within couple of years. Furthermore, the report indicated as more affluent and educated people move to Internet banking services, banks will be challenged in near future to remain focused to service online customers rather than servicing a majority of its least profitable customers that use most expensive offline banking channel.

In Malaysia, although the accessibility to computers and the Internet is found to be higher within non-Internet banking users, Suganthi *et al* (2001) found that the level of awareness on Internet banking services is lacking within non-user. They recommended banks to create awareness on banking products and services. Guru *et al.* (2003) found almost all domestic banks are offering full Internet banking services in 2003 while it was only four banks in 2000 (Suganthi & Balachandran, 2001). Vijayan and Shanmugam (2003) revealed that two of the top five Malaysian banks had a four star rating out of a maximum five star rating. The remaining three top banks had a three star rating based on a 40-item evaluation instrument indicating that banks must focus on improving their service quality. The diffusion Internet banking services is affected by trust, security and preference to human interface (Suganthi & Balachandran, 2001).

Thailand banks expressed that there is a high potential growth for retail Internet banking that includes features such as balance enquiry, bill payment, fund transfer, business information and payment for goods purchased.

Steyen et al (2003) reported over half a million users have visited an online banking site in Hong Kong from their home computers, represents a growth of 42% in 2003. Although Internet banking is gaining popularity, home Internet users are found reducing in numbers. It might be due to the fact that the Internet users have reached a critical mass. The average time spend in top ranking bank site is 30 minutes per month per visitor of which 39% is female, which has increased by 4%.

Several studies (B. Singh & Malhotra, 2004) on diffusion of Internet banking services in India predicted a highly sophisticated and competitive Internet banking market would emerge by 2005. But to reach a critical mass, level of services offered by Indian banks currently requires much improvement to reach international standard. In addition to this sufficient infrastructure must be in place (Rao & Prathima, 2003). As of March 2004, 51.6% of commercial banks and 48% of public sector banks provide Internet banking services. Among public sector banks only 15% offer fully transactional Internet banking service while foreign and private sector banks offer a broad range of service over the Internet. Internet banking in private and public sectors are less profitable than non-internet banks (B. Singh & Malhotra, 2004).

The first Internet bank in Japan, the Japan Net bank (JNB) started in 2000 without a physical branch, offers savings account, term deposit account, mortgages, fund transfers and insurance. It serves customers in all 50 states and 20 foreign countries. In 2001, Sony, the electronic giant started Sony bank as a second online bank in Japan. Another bank named as E*TradeBank has become the world's largest Internet-only bank with 435, 000 customers and total deposit exceeding 7.7 billion. Till 2002, there were only four online banks in Japan (Pyun et al., 2002). Since Net bank operates only over the Internet, their operating cost is much lower than the cost in traditional banks with physical existence. It offers 20% and 40% interest on ordinary and time deposits accounts, which are twice the rates that are offered by conventional banks. Further, for transferring fund to other banks, JNB charges only 26% of fees of traditional banks for amounts up to 30,000 yen (Trends in Japan, 2001). The customer base consists of 85% male and 15% female. The age of online banking users shows that 25% are in their forties, 37% are in their thirties and

28% are in their twenties (Trends in Japan, 2001). All four Japanese online banks face uphill battles for profitability like USA banks. Researchers (Pyun et al., 2002) estimated that it will take at least a period of two to three years to secure profitability as more and more younger generation feel comfortable with Internet banking services and become active Internet banking users.

In summary, Internet banking is growing rapidly in this region. Highest growth is expected in India and China where expected users would reach tens of millions by 2005. Due to huge competitions, banks in many Asian countries are challenged to remain focused on service online customers rather than servicing offline-banking channel. Japan's only-Internet bank found to offer consumer better terms than conventional banks because of their low operating cost.

2.2.7 Internet banking trend in New Zealand

New Zealand consumers are accustomed to use a safe and secure 'electronic information and money transfer systems' (Chung & Paynter, 2002). They are found to be reluctant in online purchase compare to USA or European customers (McStay, 2003). The use of the Internet in New Zealand has been increased at the reduction of charges by the Internet Service Providers (ISPs) which in turn motivates several financial institutions and Banks in introducing their Internet banking products into the New Zealand market, such as Australia and New Zealand Bank (ANZ), Bank of New Zealand (BNZ), ASB Bank, National Bank of New Zealand (NBZ), WestpacTrust Bank and TSB Bank. Although Internet penetration and usage has reached to a significant level, still use of Internet banking services is the lowest amongst all banking facilities in New Zealand (Chung & Paynter, 2002).

ACNielsen (2001) indicated that attitude towards online banking have decreased from 32% in 1998 to 11% in the 2001 due to unpleasant experience of Internet users (McStay, 2003) but the survey conducted between October and December 2001 by the same organisation found that the attitude toward online banking have changed significantly and the online banking population has reached to 480,000, which is a growth of 54%. Almost 50% of Internet users now bank online once a week or more and over 100,000 users bank online on a daily basis. The popularity of online banking has overtaken online shopping. Even 64% of non-Internet banking service users are willing to bank online in near future. Figure 2.9 shows that almost 60% of consumers use Internet banking services to view account

balances and recent transactions, transfer funds between accounts and paying bills but while applying for credit cards or home loans, they prefer to visit bank branches (AcNielsen, 2002a).

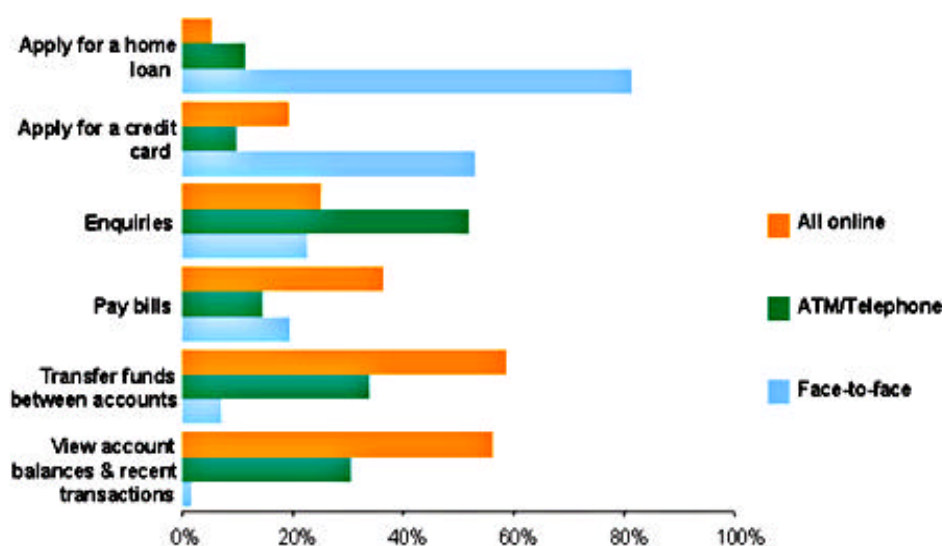


Figure 2.9: Service-wise channel preferences of Internet banking in New Zealand

(Source: ACNielsen, 2002)

According to Consumer magazine's annual banking survey, customers expect banks to offer personal one-to-one service. Further, they are found satisfied with smaller banks services. While evaluating banks' performance, PSIS bank, Bank Direct and TSB bank are the found to be the top three spots for overall performance. Kiwibank, ASB and National Bank in the fourth spot, BNZ is the next followed by Westpac and ANZ. HSBC is last in the list, in which customers demand more branches and services such as credit card (Herald, 2005).

Although banks are denying on the issue of hacking Internet banking systems (Eames, 2005), but media have reported Internet banking scam and security violations in couple of occasions. A Sunday newspaper, the Star-Times, reported a computer hacker has accessed private accounts to demonstrate the level of Internet banking security adopted on the part of New Zealand banks. In another occasion, One News, the television channel, reported "New Zealanders are having money stolen from their internet banking accounts all the time and banks need to upgrade their security" (OneNews, 2005). The New Zealand Herald on March 2005, reported that hundreds of customers of major banks were blocked from accessing banks' website (Beston, 2005).

McStay's (2003) report on security policies adopted by five major banks in New Zealand highlights that ASB offers highest secure environment, followed by Westpac, National bank and ANZ and the lowest is the BNZ. The author (McStay, 2003) concluded that banks in New Zealand are yet to reach the levels of security implemented by international banks.

In short, Internet banking in New Zealand started late as compared to USA and Europe despite higher Internet diffusion. Internet banking is gaining popularity in recent years but limited to certain types of services. People generally prefer personalised services and found satisfied with smaller banks. The researcher of this study found there are very few studies conducted to examine users' adoption or usage behaviour of Internet banking services and therefore the knowledge on factors that have influenced their intention is limited. This has motivated researcher to carry out this study in this field.

2.3 Chapter summary

It is evident from the extant literature that Internet banking offers many opportunities for the growth and development for financial institutions that includes additional transaction revenue by providing link to other services such as insurance and stock brokerage, reduced customer service cost by converting more transactions to electronic form, acquiring new customers by providing quality services and continually inventing new products and services, and retaining customers by customising services. Its usage, till date, mainly remains with certain types of transactions. At the same time Internet banking has brought increased competitions from within the sectors and from new entrants coming from financial service market.

The picture presented by several researchers on the future of Internet banking, has yet to be materialised in reality due to either low adoption rate or low active users presence. Researchers recommended banks to understand customers' requirements and their financial priorities in order to boost adoption and usage. Further, banks and financial institutions must design Internet banking as an alternate service distribution channel rather than the only distribution channels.

Even though Internet banking has not been living up to the hype that surrounded it, adoption and usage is reported increasing in most of the countries. Due to limited studies,

current trend of adoption or usage of Internet banking services is not known for New Zealand. Therefore following questions arise:

- ?? Why are users not adopting or using Internet banking services despite its assured benefits?
- ?? Do banks provide service of international standard?
- ?? Do banks communicate key points on security and privacy measure they have implemented to protect users' interest
- ?? Are banks indemnified their responsibilities in the event of unauthorised access to their customers' account?
- ?? Do banks make efforts to understand customers' requirements on a regular basis or to create awareness of their products and services (as seen in Malaysia)?
- ?? Do banks accept lesser fees for external fund transfers (as seen in Australia) or do they pay higher interest rate for online-only deposit accounts (as seen in Australia and Japan).
- ?? Are banks planning to install web-enabled ATMs (as seen in USA)?

Other countries	Adoption or usage trend and other issues	Factors affected
USA	<p>2002: 79% of customers use due to convenience of which 82% aged 30-49 years. 71% are using for time saving, 30% for cost savings and 52% for better control</p> <p>2004: 47% growth since 2002. More usage is in 28-39 and 50-58 age groups, comprises of 50% men and 40% women. Around 40% users having experience over 4 years and 20% having of 2-3 years of experience. 92% use for checking account balances</p> <p>2005: 56% of users select banks for Internet banking due to quality and reliability of bill payment service. More than 50% would discontinue the service in future. 85% of users are concerned about Security and privacy of Internet banking.</p> <p>2004: Not much information available. People prefer visiting banks branches (59%). Use of ATMs is 75% of total banking transactions.</p>	<p>User: Security and privacy, time saving, better control, quality and reliability of service</p> <p>Banks: Security, high competition and low customer size</p>
Canada		
Europe	<p>2001: 17% of Internet users have adopted. Users are reluctant to buy high valued item over the Internet. Convenience, cost-effectiveness and availability motivate customers to bank online</p> <p>2002: Positive relation between the Internet access and diffusion of Internet banking services except Estonia.</p> <p>2003: Disparity in adoption across counties in Europe. Correlation between adoption and cost of service, privacy of service and trust on bank. Access to ATMs, use of cashless payment and cash in circulation to GDP are reasons for not using Internet banking. Growth could reach to 80% for Scandinavian countries due to their advancement in banking sector</p>	<p>User: Internet access, cost of service, trust, convenience, availability and prior banking knowledge</p> <p>Banks: High technology investment and customer acquisition cost. Low profitability due to small customer size.</p>

Table.2.1: Country-wise adoption trends and factors influenced adoption or usage

Table 2.1: Country-wise adoption trends and factors influenced adoption or usage (cont.)

Other countries	Adoption or usage trend and other issues	Factors affected
Africa	2002: One study is found. 31% of bank customer bank online of which 59% male and 41% female aged between 25 and 34 years (50%) and about 30% aged between 35 and 44 years age. Security, time taking and cost are found inhabiting customer to adopt or use	User: security, time consuming and cost Banks: Not known
Australia	2003: 31% increases in usage. New registration has fallen over 16% due to security issue 2004: Significant growth in new users. Multiple-access accounts are more used. Users of age 50+ years are adopting more. Active users have grown 6%. High interest rate in online account attracted 89% of users.	User: Security and cost Banks: No data available
Middle East	2003: Only few banks provide services. Disparity in adoption among countries. Visiting banking is viewed as an opportunity to socialise in their slow pace of lifestyle.	Users: social risk in Internet banking and compatibility Banks: 33% banks have no intention to provide due to lack of customers, high technology cost and non-core area of business
Asia	2001: 63% growth found five countries comprising of 4 million of users. South Korea is leading in number of uses. Additional interest rate has attracted customer to online banking in Japan of which 85% male and 15% female. 2003: 42% growth is experienced in Hong Kong of which 39% female 2004: Many countries have Internet banking users over 1 million. A 300% growth is expected in India and China. Indian banks need to improve quality of service	Users: cost, availability, quality of service Banks: Huge competition
New Zealand	Only one study is found. 2001: Attitude to adopt has decreased 22% since 1998 due to security and privacy issue 2002: 50% prefer online banking for checking balances or fund transfers. 2003: 54% growth reported which is about 50% of Internet users. About 64% of nonusers intend to adopt in near future.	Users: Security and privacy Banks: Not known

With an objective of providing information on the above, this study made an attempt to identify factors that have influenced customers' intention to adopt or use Internet banking services in of New Zealand customers. Table 2.1 presents a summary of adoption and usage trends of Internet banking across countries in the world along with New Zealand, which might assist to identify factors influencing adoption or usage of services.

In the next chapter, literature on theories and frameworks from social psychology are reviewed to identify the suitable framework(s) for this study and also to identify possible factors that have influenced Internet banking adoptions in other countries. These factors are further examined with data collected from New Zealand and results are discussed in later chapters.

CHAPTER 3 THEORETICAL BACKGROUND OF INTERNET BANKING ADOPTION OR USAGE BEHAVIOUR

3.0 Introduction

Within the Internet banking adoption context, researchers have indicated various determinants or drivers that have had a positive effect on adoption decisions. For example usefulness, compatibility, self-efficacy, relative advantage, visibility and trialability are among few. On the contrary, lack of user-friendly technology, high initial set-up costs, high security and privacy risk, lack of suitable skills, slow rate of adoption and low usage have been the major factors that have limited banks from widespread implementations of financial services over the Internet. In chapter 2, we have reviewed actual adoption and usage against trends projected by market research organisation across countries in the world.

In addition to the above, we have identified that there is limited information available either on projected trends or on actual adoption or usage rates for New Zealand's Internet banking services and this might be due to limited number of studies carried in this field. To the best of our knowledge there is only one published study (Chung & Paynter, 2002) that was carried out in 2002. It was an exploratory study that evaluated the *functionalities* of Internet banking services using information from banks' websites while the *effectiveness* of services was judged by collecting information from computer literate university students. Thus there was almost no study conducted to understand what users and non-users perceive about Internet banking services and what are the factors that have influenced users' intention. This study focuses on individual perspective and proposes to identify factors that influence adoption and use of Internet banking services in New Zealand. It does so by drawing upon a number of theories that have achieved popularity in the study of technology adoption behaviour. This chapter presents a review of literature in these areas.

Four widely used models or theories are reviewed and discussed in relation to Internet banking. These are: a) the *theory of reasoned action* (TRA) proposed by Fishbein and Ajzen (1975) to explain and predict the determinants of intended behaviour of individuals; b) the *theory of planned behaviour* (TPB) developed by Ajzen (1991) by adding a *perceived behavioural control* construct to TRA; c) *diffusion of innovation* (DOI) proposed by Rogers (1983) which identifies factors that are important in the decision to adopt an innovation and d) the

technology acceptance model (TAM) proposed by Davis (1989) to address why users adopt or decline information technology. In the following sections, these theories are reviewed from prior studies and an attempt is made to identify the most suitable framework(s) for this study.

3.1 Theory of reasoned action

The *theory of reasoned action* (TRA) is a widely studied model from social psychology that is concerned with the determinants of intended behaviour (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). According to TRA, an individual's *behavioural intention* to perform a specific behaviour is determined by his / her *attitude* towards performing the behaviour and *subjective norms*. *Attitude* is defined as individual's negative or positive feelings about performing a specific behaviour and can be determined by one's beliefs that performing the behaviour will lead to various consequences multiplied by the subjective evaluation of those consequences (Davis et al., 1989). *Subjective norms* refer to "*the person's perception that most people who are important to him think he should or should not perform the behaviour in question*" (Fishbein & Ajzen, 1975). In other words, the effect of *subjective norms* on intention is that an individual may choose to perform a behaviour, if he / she believes that one or more important individuals or group think he or she should, even though it may not be favourable to him / her (Venkatesh & Davis, 2000). Figure 3.1 displays the TRA model, wherein *behavioural intention* is a measure of one's intention to perform a specific behaviour and is the only antecedent of *actual behaviour*.

The ability of *attitude* and *subjective norms* to predict *behavioural intention* will differ within the domain of study. *Attitude* will be a dominant predictor of *behavioural intention* over *subjective norms* when personal-based influence is stronger in behaviour domain. On the other hand, *subjective norms* are a dominant predictor of *behavioural intention* for behaviour in which normative implications are strong. For example, *attitude* is a dominant predictor of *behavioural intention* when purchasing something for personal use while *subjective norms* would be a dominant predictor when purchasing something for others. Furthermore, *subjective norms* can be more important in the early stages of innovation implementation when users have limited knowledge or experience that forms the *attitude* (Taylor & Todd, 1995a). Since TRA is a general theory it does not specify the beliefs that are operative for particular behaviour. Ajzen and Fishbein (1980) suggested that researchers using TRA must first identify the beliefs that are salient in the behaviour under investigation.

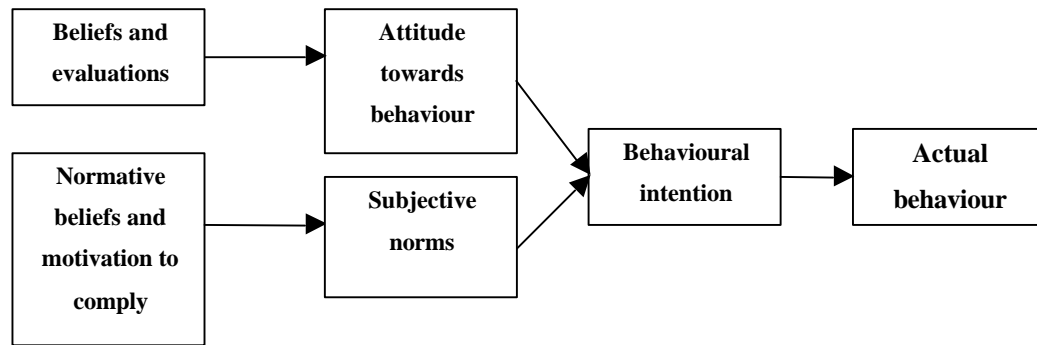


Figure 3.1: Theory of reasoned action model (TRA)

(Source: Davis et al., 1989)

TRA has been successfully applied to predict behaviour and intention in a variety of subject areas. At the same time, a number of studies have been carried out to understand its limitations, test hypotheses and analyse extensions, and refinements. In a meta-analysis of research on TRA, Sheppard, Hartwick and Warshaw (1988) concluded that the predictive power of TRA is significant across a variety of domains. Despite the strong predictability of TRA across studies, it becomes problematic as researchers reported mixed results on the effects of *subjective norms* on *behavioural intention*. For example, researchers (Davis et al., 1989; Mathieson, 1991) found no significant effect of *subjective norms* on *behavioural intention*, while Taylor and Todd (1995a) found the opposite. With a view to identify possible reason(s) for such difference in outcomes, Hartwick and Barki (1994) separated their sample into mandatory and voluntary settings and have identified that *subjective norms* has significant influence on *behavioural intention* in mandatory settings but not in voluntary settings. To overcome the lack of variable in TRA that captures situation specific information, Ajzen (1991) developed the Theory of Planned Behaviour (TPB) by including an additional construct namely *perceived behavioural control*.

3.2 Theory of planned behaviour

The *theory of planned behaviour* (TPB) refers to an individual's perception of the presence or absence of requisite resources or opportunities necessary for performing a specific behaviour (Ajzen & Madden, 1986). Thus, in TPB, *behavioural intention* acts as a mediator of three distal constructs' effects on actual performance (figure 3.2). Further, these three distal constructs also mediate the effects of three conceptually distinct sets of beliefs. *Perceived behavioural control* mediates the effects of *control belief* and *perceived facilitation*. *Control belief* is defined as individual's self-confidence in his or her ability to perform a behaviour, similar

to self-efficacy (Bandura, 1977) and *perceived facilitation*, which is defined as individual's assessment of the importance of those resources to the achievement of outcomes (Ajzen & Madden, 1986). External factors that mediate through *attitude* and *subjective norms* are already discussed in section 3.1.

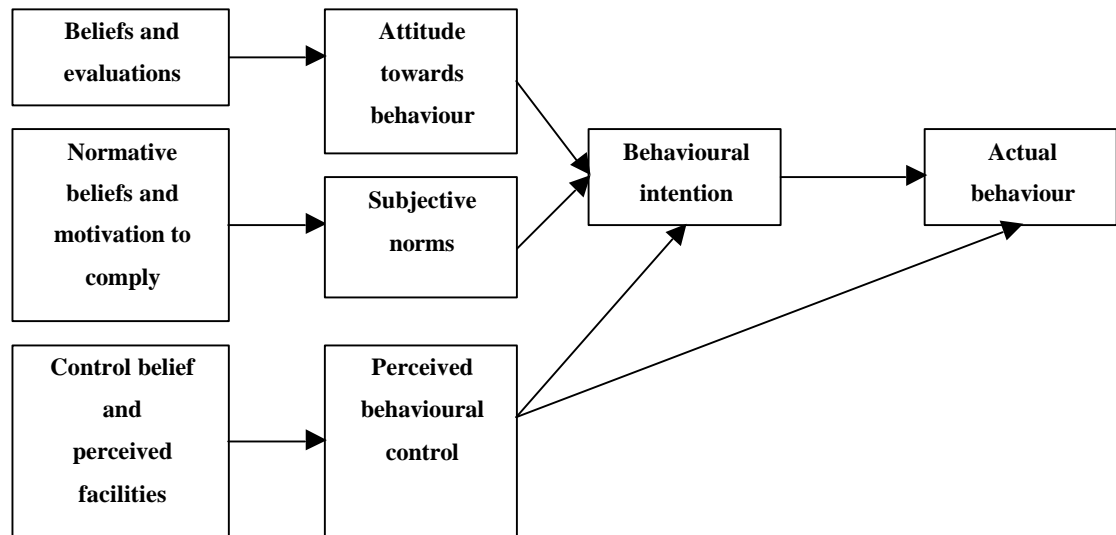


Figure 3.2: Theory of Planned Behaviour (TPB)

(Source: Ajzen, 1991)

In TPB, Azjen (1991) hypothesised that *perceived behavioural control* has both an indirect effect on behaviour through *behavioural intention* and a direct effect on *actual behaviour*. In figure 3.2, the direct path from *perceived behavioural control* to *actual behaviour* is hypothesised to represent the actual control one possesses over a particular behaviour. For example, when people believe that they have little control over performing the behaviour because of a lack of requisite resources such as skill, hardware or software knowledge, money, time, documentation, data and human assistance that are needed to use an information system (IS) (Mathieson, Peacock, & Chin, 2001), then their intentions to perform the behaviour may be low even if they have favourable *attitude* and /or *subjective norms* concerning performance of the behaviour (Ajzen, 1991). Similar to TRA, the dominant predictors of *behavioural intention* and *actual behaviour* might vary with the behavioural domain of study. TPB has been successful in variety of subject areas for predicting the performance of *actual behaviour* and *behavioural intention*.

The main difference between TRA and TPB is that the TPB has added an exogenous variable, *perceived behavioural control* that has both direct and indirect effect on actual behaviour through intention. Several researchers claimed that TPB has a better prediction power of behaviour than TRA (Cheung, Chan, & Wong, 1999; Madden, Ellen, & Ajzen, 1992). We have considered TPB for further comparison with other models because its similarity with TRA except it has an additional variable and it is found more widely used than TRA to study technology acceptance and Internet banking adoptions.

3.3 Diffusion of innovation

An innovation is a new concept, object, information technology or system presented to the targeted audience for adoption. Rogers (1983) developed a *diffusion of innovation* (DOI) model to explain how the diffusion of innovations takes place in social systems. According to DOI theory, individuals collect and synthesise information about an innovation and compiling this information forms their perceptions about an innovation. Based on these perceptions, an individual may decide to accept or reject an innovation (Agarwal & Prasad, 1997; Moore & Benbasat, 1991).

Rogers's (1983) postulated that innovation is more likely to be adopted i) if the *relative advantage* (the degree to which an innovation is perceived to be better than idea it supersedes) of a technology is evident by its introduction, ii) if it is *compatible* (the degree to which an innovation is consistent with the existing values) with the individual's life style or organisation, iii) if it is not too *complex* (the degree to which an innovation is hard to understand and use), iv) if it can be *trialled* (the degree to which an innovation can be experimented with) before accepting, and v) if it can be *observed* (the degree to which the result of an innovation is visible) prior to adoption (Pease & Rowe, 2004).

However, there is always a high degree of uncertainty in making a decision to adopt an innovation. According to Rogers (1983) information about innovation flows through different channels, such as mass-media or interpersonal channels into the social system where adopters are located. The potential adopters form perceptions about characteristics of innovations, which influence adoption decision (Agarwal & Prasad, 1998). Knol and Stroeken (2001) suggested that diffusion is about minimising uncertainty among the members of social system through communication. Wejnert (2002) claimed that the process of adoption is not uniform and may differ depending upon the nature of innovations, the adopters and the environmental context where innovation is placed.

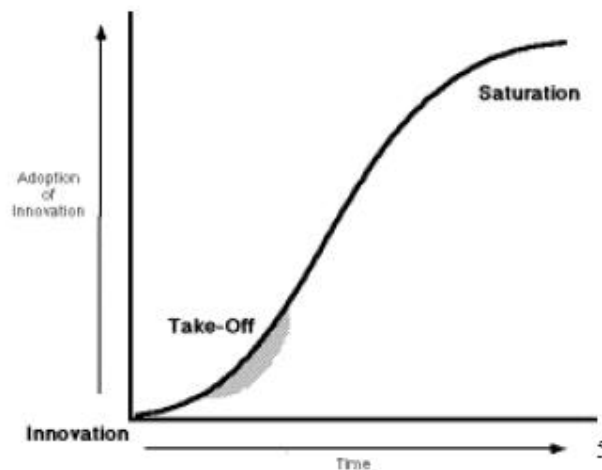


Figure 3.3: Adoption of innovation curve

(Source: Rogers, 1983)

The rate of diffusion is measured by the rate of adoption over a period of time. Researchers observed only a few early adopters, who are active information seekers of new ideas, have less reliance on others evaluations, have access to resources necessary to adopt changes, have good formal education, are able to cope with risk and uncertainty, and are willing to adopt an innovation at an early stage. It has also been observed that when early adopters begin to communicate to their peers about the innovation, the rate of adoption increases rapidly, then slows down in a subsequent phase, as only late adopters remain to accept. The adoption of innovation can be represented by a S-curve graph (figure 3.3).

DOI has been widely used to understand consumers' adoption of various innovations (Howcroft, Hamilton, & Hewer, 2002; Lee & Lee, 2000; Moore & Benbasat, 1991; Tan & Teo, 2000).

Moore and Benbasat (1991) extended and refined Rogers (1983) model to develop an instrument that can be used across a variety of information system / technology innovation domains and at the same time robust enough to tap a variety of perceptions of innovations. They retained *relative advantage*, *compatibility* and *trialability* as original, and renamed *complexity* as *ease of use* to be consistent with Davis's (1989) TAM. Rogers's (1983) construct *observability* was argued to be more generic purpose than specific to information systems studies. Therefore, Moore and Benbasat (1991) replaced it with two new constructs: *visibility* (the degree to which an innovation is visible) and *result demonstrability* (the degree to which the result of an innovation is readily apparent to adopters). Further, they added two

new constructs: *image* (the degree to which an individual believes that by adopting a technology will enhance his or her prestige in the community) and *voluntariness* (the degree to which an innovation adoption is perceived to be under adopter's control).

The extended model passed through rigorous initial testing and claimed to be a reliable candidate for predicting various information system adoptions. However, the model has received only little empirical attention with all constructs (Agarwal & Prasad, 1998; Plouffe et al., 2001). For example, Agarwal and Prasad (1997) found *relative advantage*, *visibility*, *compatibility*, *trialability* and *result demonstrability*, Tan and Teo (2000) found *relative advantage*, *complexity*, *compatibility* and *trialability*, Chin and Gopal (1995) found *compatibility*, Karahanna et al (1999) claimed *voluntariness*, Taylor and Todd (1995a) found *relative advantage* and *ease of use* and *compatibility*, and Chan and Lu (2004) found *image* and *result demonstrability*, as significant predictors of intention to adopt an innovation. Further, from a meta-analysis of adoption of innovation studies, *relative advantage*, *complexity* and *compatibility* were identified as consistently related to innovation adoption (Tornatzky & Klein, 1982).

Another study (Lehmann & Markman, 2001) investigated the psychological processes involved in consumer's adoption decision and reported that prior product knowledge had a negative influence on adoption. Explaining the above, the authors (Lehmann & Markman, 2001) argued that experts are likely to have more product-related goals than novices do and, therefore, if a product does not have relevant characteristics, experts will not accept it while novices would not mind to adopt. For example, consumers, who have little camera knowledge but high computer knowledge are found to buy digital cameras whereas those with high camera and low computer knowledge are less likely to buy a digital camera.

Technology-based consumer innovations such as Internet banking services or e-commerce represent an innovation where both intangible service and an innovative medium of service delivery employing high technology are present. In the Internet banking context, although Tan and Teo (2000) found that *relative advantage*, *compatibility* and *trialability* influence intention, *complexity* is found insignificant, which contradicted prior findings (Taylor & Todd, 1995a). While explaining possible reasons(s) for such deviation, researchers (Tan & Teo, 2000) stated that since Internet banking is in early stage of implementation at Singapore, where not many users have tried to use it, the perceived complexity of using such services was not significant. In another empirical study in Turkey, *relative advantage* is

found to be one of the important factors affecting users' adoption decisions (Polatoglu & Ekin, 2001).

3.4 Technology acceptance model

The *technology acceptance model* (TAM) developed by Davis (1989) was adapted from TRA (Fishbein & Ajzen, 1975). The objective of TAM is to provide an explanation of users' acceptance and usage behaviour across a variety of end-user computing technologies (Davis, 1989; Davis et al., 1989). Among other technology acceptance and diffusion models, TAM is arguably the approach most widely accepted and used by information system researchers. The main reason for the TAM's popularity is perhaps due to its parsimony, information system-specific nature and empirical support from several studies (Mathieson et al., 2001; Wang et al., 2003).

TAM postulated that user acceptance of a new technology is determined by their *behavioural intention* to use the system, which can be explained jointly by user's perception about the technology's usefulness and attitude towards the technology use (figure 3.4). *Attitude* is jointly influenced by two behavioural beliefs, *perceived usefulness* and *perceived ease of use*. *Perceived usefulness* is defined as the degree to which a person believes that using a particular system will enhance his or her performance, while the *perceived ease of use* is defined as the extent to which a person believes that using a particular system is free of effort. External variables, such as task, user characteristics, political influence, organisational factors, are expected to influence technology acceptance behaviour indirectly by affecting *perceived usefulness* and *perceived ease of use* (Szajna, 1996). Further, *perceived usefulness* is influenced by *perceived ease of use*.

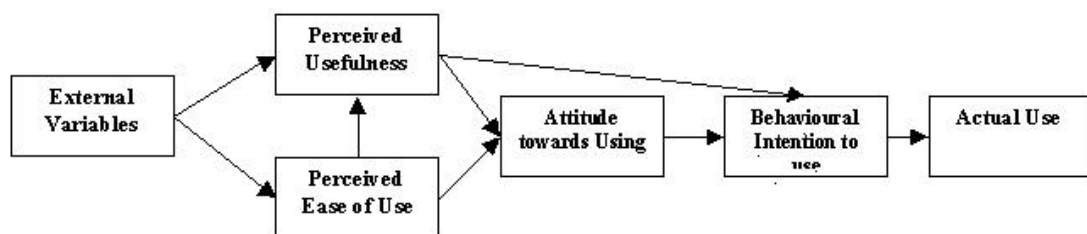


Figure 3.4: Technology acceptance model (TAM)

(Source: Davis, 1989)

A significant body of research supports the role of *perceived usefulness* as a strong factor that influences user intention and usage behaviour over time (Taylor & Todd, 1995b; Venkatesh

& Davis, 1996). Chau (2000) decomposed *perceived usefulness* into two parts – perceived near-term usefulness and perceived long-term usefulness and hypothesised that behavioural intention to use a particular technology is dependent on the above two variables as well as *perceived ease of use*. Studying the utilisation of two software packages by 285 subjects, Chau (2000) found that perceived near-term usefulness had the most significant relation with the intention to use a technology, followed by perceived long-term usefulness variable. In January 2000, the Institute for Scientific Information's *Social Sciences Citation Index*® listed 424 journal citations of the two journal articles that introduced TAM (Davis, 1989; Davis et al., 1989), which indicated that TAM has become a well established, robust and parsimonious model for predicting user adoption of information system. Across many empirical tests of TAM, *perceived usefulness* has been found to be the consistent determinant of usage intentions, with standard regression co-efficient typically around 0.6.

Study	Framework	Subject and findings
Szajna (1996)	TAM	Email system: Findings indicated that TAM is a valuable for predicting <i>intention</i> to use electronic mail system.
Laurin and Lin (2004)	Extended TAM	Mobile banking: Support was found for an extended version of TAM. <i>Perceived credibility</i> found to have stronger influence on <i>behavioural intention</i> than <i>perceived usefulness</i> and <i>perceived ease of use</i> . <i>Self-efficacy</i> and <i>cost</i> affect behavioural intention significantly.
Wang et al. (2003)	Extended TAM	Internet Banking: The results strongly supported modified TAM in predicting the <i>intention</i> of users to adopt Internet banking services. Perceived self-efficacy has significant effect on <i>intention</i> through <i>perceived usefulness</i> , <i>perceived ease of use</i> and <i>perceived credibility</i>
Chan and Lu (2004)	TAM2 and Social cognitive theory	Internet Banking: Findings indicated that <i>subjective norms</i> and <i>self-efficacy</i> play significant role in influencing the <i>behavioural intentions</i> to adopt internet banking services. Effects of <i>perceived usefulness</i> and <i>perceived ease of use</i> on <i>intention</i> found similar to other studies.
Chau and Lai (2003)	Extended TAM	Internet Banking: <i>Personalisation</i> , <i>alliance services</i> , <i>task familiarity</i> and <i>accessibility</i> were found to have significant influence to <i>attitude</i> through <i>perceived ease of use</i> and <i>perceived usefulness</i>
Riemenschneider et al (2003)	TAM & TPB	Website: Results indicated that combination of TAM and TPB models is a framework in predicting website adoption. <i>Social contact</i> facilitated by Internet found to be influencing factor for website adoption
Shih (2004)	Extended TAM	e-shopping: Both <i>perceived usefulness</i> and <i>perceived ease of use</i> significantly influence <i>attitude</i> towards e-shopping. User <i>satisfaction</i> and <i>perception of information system and service</i> affect user acceptance.
Lederer et al (2000)	TAM	WWW: Findings supported TAM. <i>Ease of understanding</i> and <i>ease of finding</i> were antecedent to <i>perceived ease of use</i> and information quality predicted <i>perceived usefulness</i>
Gefen & Straub (1997)	Extended TAM	e-mail: Results indicated that men and women differ in their perceptions about email. Recommended gender to included in information technology diffusion model
Klopping and McKinney (2004)	TAM and Task technology fit (TTF)	e-commerce: The study found strong support for applying modified TAM in e-commerce. <i>Perceived usefulness</i> is found to be more dominant predictor than <i>perceived ease of use</i>
Chau (2000)	Extended TAM	Internet: The study found strong support for applying modified TAM in Internet use. <i>Perceived near-term usefulness</i> found to be more dominant to influence <i>intention</i> than <i>perceived long-term usefulness</i>
Teo et al.(1999)	Extended TAM	Internet: <i>Perceived enjoyment</i> is found to have significant influence on actual use apart from TAM's fundamental variables i.e. <i>perceived usefulness</i> and <i>perceived ease of use</i>

Table 3.1: Summary of prior studies used TAM

In contrast, the role of *perceived ease of use* in TAM has been reported differently in prior studies. Gefen and Straub (2000) argued that the role of *perceived ease of use* is more complex than reported in prior research. They expressed that *perceived ease of use* deals with the motivation that is based on the assessment of *ease of use* and *ease of learning* of the interfaces and the process involved in using it, which they refer as *intrinsic* aspect of information technology. Since most studies captured *extrinsic* aspect of information technology, *perceived ease of use* is therefore often found not to affect information technology adoption. Chau (2000) suggested that learning to use a technology is much easier now than in the past and thereby influence of *perceived ease of use* on adoption is not significant in many studies.

The results from various studies indicated that TAM does not consistently explain more than 40% of system use except those where subjects of studies are students, which is comparatively a simpler environment (Legris, Ingham, & Colletette, 2003) and students tend to support the view of researchers (Agarwal & Prasad, 1997; Chau & Lai, 2003; Gefen & Straub, 1997; Kloppe & McKinney, 2004; Luarn & Lin, 2004; Wang et al., 2003). In order to enhance TAM's predictability, researchers extended TAM with different factors but mixed results are reported. Studies used TAM in Internet related studies are summarised in table 3.1. These studies are recent and are using following criteria:

- ?? TAM or an extended TAM is used in an empirical study
- ?? Study focuses on the adoption / continual use of online services for example email, e-shopping, Internet banking, mobile banking and related examples.
- ?? Research results are available and complete.

Of the twelve studies summarised in table 3.1, ten studies suggested for additional variables to explain variances in intention, apart from TAM's fundamental variables. Several studies (Luarn & Lin, 2004; Wang et al., 2003) found *perceived credibility* has stronger influence on intention than *perceived usefulness* and *perceived ease of use* in Internet banking and mobile banking context. Among other variables that are reported influenced intention in prior studies, *self-efficacy* (Chan & Lu, 2004; Wang et al., 2003), *perceived cost* (Luarn & Lin, 2004), *social contact* (Riemenschneider, Harrison, & Mykytyn, 2003) and *gender* (Lederer, Mauphin, Sena, & Zhuang, 2000) *perceived enjoyment* (Teo, Lim, & Lai, 1999) are few of them.

We have, so far, reviewed four frameworks that are commonly used in social psychology studies in identifying factors that influence user's behavioural intention in adopting or rejecting a new technology or innovation. In the next few sections, these frameworks are compared to identify the most suitable framework(s) for this study.

3.5 Comparison of theories / models

In this section, TPB, DOI and TAM are compared with a view to establish justifications in favour of theory / model that are theoretically as well as empirically tested and found to have better prediction power in understanding users' intentions towards adoptions and continual usage of Internet banking services. As mentioned in section 3.2 TRA is not considered for further comparison with other theories or models.

3.5.1 Comparison of TPB and TAM

TPB is general theory of human behaviour while TAM is developed to predict information system/technology usage. TAM assumes that *perceived usefulness* and *perceived ease of use* are always the determinants to predict the users' behavioural intentions of information system use, whereas TPB assumes those users' beliefs are situation specific and cannot be generalised across situations. In particular, it requires the development of instruments for almost every study (Mathieson et al., 2001). This provides TPB with an additional advantage of capturing situation specific variables, which is not present in TAM since *perceived usefulness* and *perceived ease of use* are the two primary determinants of user's decision. In the case of TPB, a pilot study is required to identify relevant outcomes, control variables in every context it is used, whereas TAM's constructs are measured in the same way in every study. The main reason for the TAM's popularity is perhaps due to its parsimony but Venkatesh (2000) suggested that parsimony is both a strength and a limitation of TAM. TAM provides predictive information but does not provide sufficient information that helps designers with the information required to create acceptances for a new system (Mathieson, 1991). Furthermore, TAM does not explicitly include any social variables. Davis et al. (1989) argued that social norms are not independent of outcomes and omitted them from the original TAM. However, they did acknowledge the need for additional research to "*investigate the conditions and mechanisms governing the impact of social influences on usage behaviour*" (Davis et al, 1989, p.999).

Several studies have extended TAM by adding *subjective norms* in order to examine the effect of *subjective norms* on intentions but have produced mixed results so far. Mathieson (1991)

found *subjective norms* has no significant effect on intention while Taylor and Todd (1995a) has reported significant. Further, Hartwick and Barki (1994) found its effects under mandatory settings and does not influence in voluntary settings, which is supported by Venkatesh and Davis (2000). This lead researchers (Taylor & Todd, 1995a) to conclude that social effects might be complex and might affect decisions only in some situations. For example, people get motivated by thinking that their friends or co-workers will perceive them as technology sophisticated and start using technology. This motivation is more likely to be captured by TPB than by TAM. In the Internet banking context, *subjective norms* have been found to have no or little influence on intention (Liao, Shao, Wang, & Chen, 1999; Tan & Teo, 2000). Tan and Teo (2000) suggested that this might be due to the fact that a potential adopter can get relevant information that is readily available from banks, reducing the dependency of potential adopters on others.

Another major difference between TAM and TPB is in addressing behavioural control. TAM has only one such variable i.e. *perceived ease of use*, which according to Davis (1989) refers to user's capabilities and the skills required to use the system. This is similar to the *internal control factors* defined by Ajzen (1985). *External control factors* include time, opportunity, resources and the co-operations of others (Ajzen, 1985) can be argued that *perceived ease of use* has addressed those but it is not explicit. Moreover, in a situation where *internal control factors* vary from those in another situation, TAM's constructs would not be able to address those situation specific *internal control factors*. For example, studies have confirmed that self-efficacy, which refers to an individual's belief in his or her capability to perform a specific task (Bandura, 1977), plays a significant role in understanding users' intentions toward adoption and usage of information system. *Perceived ease of use* does not have items that capture information on self-efficacy. On the other hand, TPB captures variables for each situation and is more likely to tap such factors.

In summary, TAM is information system-specific while TPB is not. TPB requires unique operationalisation in each situation in which it is used (Mathieson et al., 2001), suggesting development of customised instruments for behavioural beliefs, normative beliefs and control beliefs, while TAM is a general model and is robust across time, setting, populations and technologies (Davis et al., 1989; Venkatesh, 2000) and its instrument is psychometrically sound. TAM is more parsimonious than TPB, and is easier to apply in practice, giving TAM an empirical advantage over TPB (Mathieson, 1991). Finally, TAM is

superior to TPB in explaining *behavioural intention* to adopt or use information systems (Luarn & Lin, 2004).

Some consideration was also given to a decomposed TPB, which integrates TPB with TAM to make it more information system specific and was found to have better prediction capabilities than TAM. But considering the increase in model complexity as against the small increase in predictive power as reported in earlier studies (Chau & Hu, 2001; Taylor & Todd, 1995a), decomposed TPB is not considered for this study.

The other approach is to extend TAM to include necessary constructs from TPB so that the extended model retains underlying simplicity of TAM while improving its ability to predict *behavioural intention* and explain information system usage. Riemenschneider et al (2003) argued that hybrid model (combination of TAM and TPB) offers a richer explanation of the determinants of adoption decision. In attempts to extend TAM with constructs from TPB, *subjective norms* is dropped since its effect on *behavioural intention* is inconclusive in prior studies, it was excluded by Davis (1989) due to theoretical and measurement problem (Venkatesh & Morris, 2000), and *subjective norms* will not have effects on *behavioural intention* if Internet banking services adoption is considered to be voluntary (Venkatesh & Davis, 2000). Further, individuals are unlikely to have any influence on potential adopters of Internet banking, since relevant information is readily available from the banks. Also, it is presumed that there is lack of experienced and knowledgeable users around who could influence potential adopters since body of knowledge on Internet banking in New Zealand is limited due limited research in this field. Among the other constructs of TPB, attitude also dropped due to reasons discussed in section 3.7.

This leaves attempts to extend TAM with *perceived behavioural control*. In most of the studies that attempted this, it decreases the parsimony of their models. For example, Mathieson et al.(2001), with an objective to identify how technology and resources influence information system usage, added a construct *perceived resources* to TAM. *Perceived resources* is defined by them as the extent to which a user beliefs that he or she has the both personal and organisational resources needed to use an information system. Mathieson et al.(2001) considered *perceived resources* as a subset of *perceived behavioural control* and operationalised it so as to be compatible with TAM. Researchers (Mathieson et al., 2001) found that resources such as data, documentation and assistance of others do not influence users' acceptance. Moreover, if an individual has the necessary resources such as hardware, software, and time

and so on, *perceived usefulness* and *perceived ease of use* should adequately explain information system usage, indicating the extended model is less parsimonious than the TAM. As the technological infrastructure supporting Internet banking becomes cheaper, it will become easily and readily available (Goh, 1995). As a result, the resources barrier for Internet banking adoption will be minimised and thereby '*perceived resources*' is not considered in this study.

3.5.2 Comparison of TAM and DOI

Both TAM and DOI are concerned with individuals' perceptions about innovation characteristics, which influence the acceptance behaviour. TAM, TRA, TPB and DOI have different conceptualisations of perceptions. For example, TAM includes two perceptions, TRA and TPB recommend beliefs need to be elicited from target users and could be different for each innovation (Agarwal & Prasad, 1997), while DOI posits five perceived characteristics of an innovation affect adoption behaviour (Rogers, 1983). Although both TAM and DOI focus on usage as the primary outcome of adoption process, DOI has gone beyond in explaining various types of usage such as initial usage and continual usage (Rogers, 1983). As mentioned earlier, TAM has been the most widely studied model in users' technology acceptance field and both the constructs; *perceived usefulness* and *perceived ease of use* are empirically tested and found consistent. In comparison, most of the studies on DOI have found only few constructs are consistently related to adoption behaviour (Agarwal & Prasad, 1998; Taylor & Todd, 1995a).

Plouffe et al. (2001) claimed that DOI's constructs explain a higher proportion of the variance than TAM when they are used as antecedents to adoption intention. Although, TAM is more parsimonious than DOI, it places relatively lower strains on respondents and researchers. But reliance on TAM can at times misleading (Plouffe et al., 2001). For example, one could conclude from prior studies that *perceived usefulness* plays a key role in explaining intention while others might emphasis the importance of *perceived ease of use*. In DOI, although *relative advantage* has a significant importance, its other constructs are found to be equally important. Researchers (Plouffe et al., 2001) commented that TAM's parsimony can be traded-off by adding richer set of constructs that enhances the prediction ability of the model.

Motivated by the conceptual similarity of TAM and DOI on technology acceptance behaviour and that the set of constructs used in TAM is in many ways similar to some of

the constructs of DOI, this study proposes to apply both TAM and DOI models to identify factors that influence Internet banking adoption and usage in New Zealand.

3.6 Research models and hypotheses

In the following sections prior studies using TAM and DOI in the adoption of information system/technology and Internet banking services contexts are used to develop two research models. The first model takes the original TAM and attempts to include additional factors that have been empirically tested and found to influence on intention in order to enhance the prediction capabilities of TAM. The second research model is based on the extended DOI approach proposed by Moore and Benbasat (1991), and adapted to the Internet banking context.

3.6.1 Research model 1

Most of the initial studies using TAM have been conducted on the adoption and usage of relatively simple information system/technology, such as word processing, personal computers and spreadsheet software. In these studies, TAM was generally found to be valid in predicting user acceptance of the various systems. However, in more complex domains, as mention before, TAM's original constructs do not fully explain behavioural intentions toward adoption and use of information system, necessitating a search for additional factors that can enhance prediction power of the model. As Davis (1989) suggested, future technology acceptance research must look for other variables that influence *perceived usefulness* and *perceived ease of use* and user acceptance.

In addition to studies mention in table 3.1, several studies (Agarwal & Prasad, 1997; Karahanna & Straub, 1999; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000) have attempted to extend TAM with different variables and had observed that addition of such variables increases the prediction of system usage. But results are inconclusive in terms of increase in model's capability in explaining the variances in intention since studies found both significant (Luarn & Lin, 2004; Mathieson, 1991) and marginal increase (Chau & Hu, 2001; Mathieson et al., 2001) in prediction power.

Considering the importance of the construct *perceived behavioural control* of TPB in explaining Internet banking usage as expressed in prior studies, the current study proposes to extend TAM by adding an internal control factor, *perceived self efficacy* (Luarn & Lin, 2004). Further, *perceived risk* is added to the model since it is a widely recognised obstacle to the adoption of

Internet-related applications in prior studies. The security and privacy issues are found to be significant concern for users while conducting commercial transactions over the Internet (discussed in chapter2).

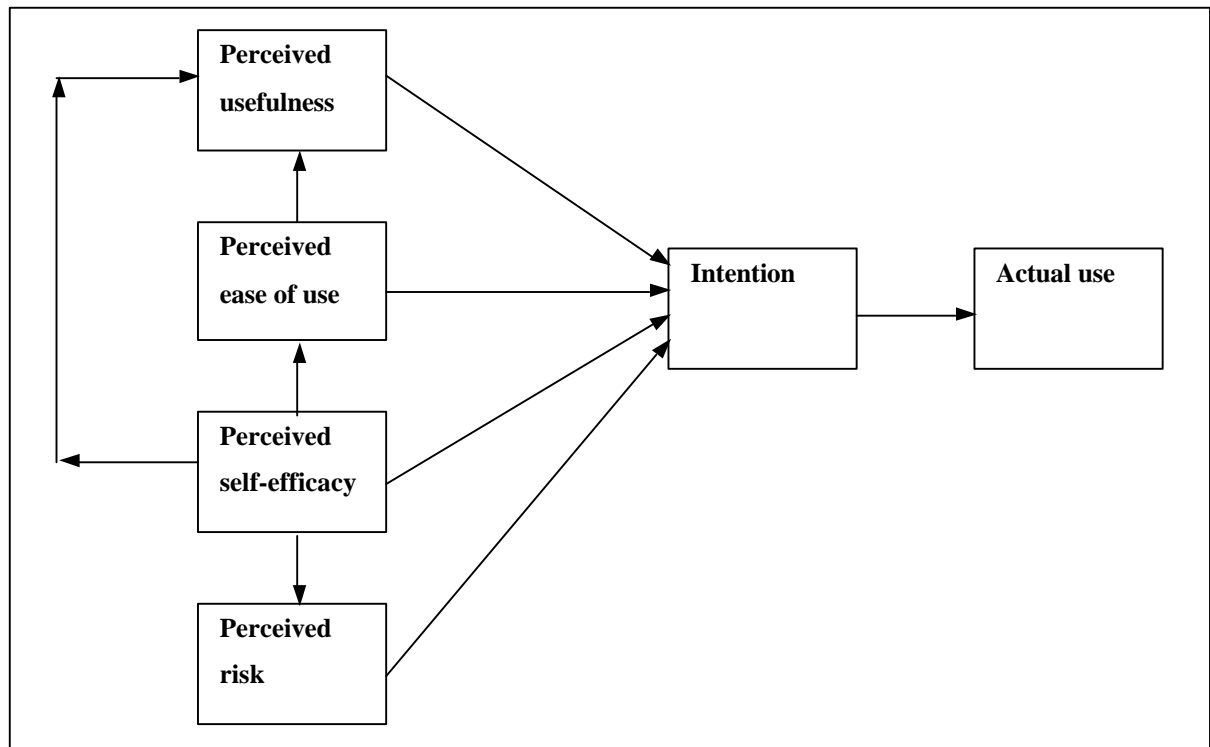


Figure 3.5: Research model 1 (extended TAM)

Recent studies that have used TAM as a theoretical framework have suggested to exclude *attitude* construct from the model since it does not arbitrate fully the effect of *perceived usefulness* and *perceived ease of use* on *behavioural intention* as originally anticipated (Koufaris, 2002; Venkatesh, 1999). Originally, Davis (1989) found a weak link between *perceived usefulness* and *attitude*, but a strong link between *perceived usefulness* and *behavioural intention*, therefore dropped *attitude* from the final model. The revised model of TAM has two versions: pre and post implementation. Davis et al (1989) expressed that in both the phases of implementations, individuals would depend more on *perceived usefulness* and *perceived ease of use* to form intentions which predicts acceptance behaviour. The modified TAM has been tested in several users' technology adoption / continual usage investigations (Luarn & Lin, 2004; Venkatesh, 1999; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh, Morris, Davis, & Davis, 2003), and has consistently done well in predicting users' intentions. On the other hand, *attitude* has found to mediate the effect of *perceived usefulness* and *perceived ease of use* (Davis et al., 1989; Mathieson, 1991; Taylor & Todd, 1995a, 1995b). In a meta-analysis of prior studies on TAM, Legris et al. (2003) observed that only 3 out of

22 studies have included attitude. For these reasons, *attitude* has not been considered in this study. Research model 1 is shown in figure 3.5.

3.6.1.1 Perceived ease of use

A significant number of studies suggested that *perceived ease of use* influences intention both directly or indirectly via its impact on *perceived usefulness* (Agarwal & Prasad, 1997; Davis et al., 1989; Venkatesh, 1999; Venkatesh & Davis, 2000). The direct path indicates that *perceived ease of use* motivates user acceptances when the system is easy to learn and use. The indirect effect is explained as stemming from a situation, where other things being equal, the less effort needed to use a system, the more system's usefulness will be perceived by users. In other words, the system that is easier to use will facilitate more system use and task accomplishment than systems that are hard to use (Venkatesh & Morris, 2000).

Prior studies have shown that while the direct effects of *perceived ease of use* remain important over the time, the indirect effect of *perceived ease of use* becomes stronger (Venkatesh & Morris, 2000). In the Internet banking context it is presumed that the system must be easy to learn and use for potential adopters otherwise they might refrain from adopting or using of Internet banking. The indirect effect of *perceived ease of use* through *perceived usefulness* will be more significant for existing users of Internet banking services as experience with the target system increases. Thus the following hypotheses are proposed:

H1a: *Perceived ease of use will have a positive effect on the behavioural intention to use Internet banking.*

H1b: *Perceived ease of use will have a positive effect on the perceived usefulness of Internet banking.*

3.6.1.2 Perceived usefulness

A significant number of studies have shown that *perceived usefulness* is an important antecedent to *behavioural intention* to adopt and use technology (Davis et al., 1989; Venkatesh, 1999, 2000; Venkatesh & Davis, 2000). In these studies, researchers provided support for Davis et al.'s (1989) argument that in a real work environment, behavioral intentions are based primarily on performance-related elements, rather than on the individual's attitude towards the behavior.

In the Internet banking context, it is presumed that the level of usefulness that Internet banking offers over and above regular banking methods could affect intentions towards adoption and usage. For example, individuals who find it difficult to visit to the bank

would perceive the possibility of performing transactions at any time of the day from any location useful. Therefore the following hypothesis is tested:

H2: *Perceived usefulness will have a positive effect on the behavioural intention to use Internet banking.*

3.6.1.3 Perceived self-efficacy

Control is a construct that has been shown to have an effect on intention and usage in a variety of domains. It relates to one's behaviour through the availability of knowledge, opportunities and resources required to perform the specific behaviour. The role of control was not explicitly incorporated in the TAM. Rather, it was assumed that there are no barriers in technology acceptance and thereby the effect of control on intention over and above of *perceived usefulness* and *perceived ease of use* is not known (Venkatesh, 2000). In information system research control is viewed as a one-dimensional structure that includes *self-efficacy*, technology facilitating conditions and resource facilitating conditions (Venkatesh, 2000). Azjen (1985) defined controls as internal and external constraining factors. Internal control relates to self-efficacy while external control relates to environment. Despite the controversy of conceptualisation of control, empirical results confirm that both internal and external control play an important role in shaping intention and behaviour across a variety of domains (Venkatesh, 2000).

Further, the social cognitive theory of self-efficacy (Bandura, 1977) has been used in understanding human behaviour and performance in a wide range of activities. Bandura (1977) defined *self-efficacy* as one's belief or judgement on what he or she can do with the skill he or she possess within a particular domain. *Self-efficacy* beliefs or judgement differ on three interrelated dimensions: generalisability, magnitude and strength. Generalisability shows that the degree to which one's belief is limited to a specific domain of the activity or not (Chan & Lu, 2004). Within a computing context these skills might be what users can do with such skills, such as using software to analyse data (Compeau & Higgins, 1995). Thus individuals with high generalisability are expected to be able to confidently use different computer systems and software packages. The magnitude refers to the level of capability expected. Thus, individuals with high (*self-efficacy*) magnitude perceive themselves competent to accomplish more difficult tasks with minimum support and assistance as those with lower magnitude of *self-efficacy*. The strength of *self-efficacy* refers to the confidence an individual has on his/her ability to perform tasks as mentioned earlier. Researchers (Wang et al., 2003) suggested that individuals with high computer *self-efficacy* are expected to be able to use computer systems more regularly because they feel "comfortable" about computers, than those with low strength of *self-efficacy*. Venkatesh and Davis (1996)

suggested that many systems fail due to usability issues where a key element of the problem could be users with 'low self-efficacy'. In other words, users with high *self-efficacy* not only perceive themselves as able to accomplish difficult tasks but also display confidence about their ability to successfully perform tasks.

Chan and Lu (2004) suggested that *self-efficacy* is formed through a gradual and dynamic weighing, integration and evaluation of complex cognitive, linguistic, social experiences. Compeau and Higgins (1995) found *self-efficacy* as a mediator between environmental variables, outcome expectations and usage, which in turn enhances outcome expectations (Eastin & LaRose, 2000). Several studies have found evidence of the relationship between *self-efficacy* and the adoption of technology. Venkatesh and Davis (1996) have identified that computer *self-efficacy* plays a role as an antecedent of *perceived ease of use*. The authors explained when users do not have experience on information system, their confidence in computer related abilities and knowledge can be expected to serve as the basis for his or her judgement about how easy or difficult a new system will be to use. This is empirically supported by other researchers (Agarwal, Sambamurthy, & Stair, 2000; Chan & Lu, 2004; Chau & Lai, 2003; Hong, Thong, Wong, & Tam, 2001; Hsu & Chiu, 2004; Igarria & Iivari, 1995; Venkatesh, 2000; Venkatesh & Davis, 1996).

Further, Mathieson et al. (2001) found *perceived resources*, which can be viewed as a subset of construct *perceived behavioural control*, influences behavioural intention. Since *perceived behavioural control* is most compatible with *self-efficacy* (Ajzen & Madden, 1986), therefore, *self-efficacy* can be considered a factor that influences *behavioural intention*. Prior studies (Compeau & Higgins, 1995; Compeau et al., 1999; Igarria & Iivari, 1995) expressed that *self-efficacy* has positive effect on decisions involving computer adoption and usage and also on *perceived usefulness* (Lopez & Manson, 1997). Igarria and Iivari (1995) claimed that computer *self-efficacy* affects one's computer anxiety, which in turn influences *perceived ease of use* and *perceived usefulness*. Another empirical study (Eastin, 2002) proposed that task-specific *self-efficacy* to be considered as a new variable in the adoption process which is supported by other researchers stating that task-specific *self-efficacy* has significant effect on online search performance (L. Thompson, Foster, Meriac, & Cope, 2002) and software usage (Agarwal et al., 2000).

In the Internet banking context, *self-efficacy* is treated as one's confidence in having the knowledge and skill in using the computer and the Internet to carryout banking

transactions over the Internet. Luarn and Lin (2004) found that *self-efficacy* has a significant positive influence on behavioural intention to use mobile banking. Chan and Lu (2004) and Wang et al. (2003) found *self-efficacy* indirectly influences intention through *perceived usefulness*, *perceived ease of use* and *perceived credibility* in the Internet banking context. *Perceived credibility* is used as a variable to capture users' security and privacy risk in the acceptance of Internet banking (Wang et al., 2003). In order to enhance customers' *self-efficacy* researchers recommended banks' managers arrange familiarity sessions for mobile banking (Luarn & Lin, 2004) and Internet banking (Chan & Lu, 2004; Wang et al., 2003), which might enhance adoptions of services.

Based on above literature review it is found that *self-efficacy* influences behavioural intention of Internet banking adoption and usage directly or indirectly through *perceived ease of use* or *perceived usefulness* or *perceived risk*. Therefore, *self-efficacy* is tested as follows:

H3a: *Perceived self-efficacy will have a positive effect on behavioural intention to use Internet banking.*

H3b: *Perceived self-efficacy will have a positive effect on the perceived ease of use of Internet banking.*

H3c: *Perceived self-efficacy will have a positive effect on the perceived usefulness of Internet banking.*

H3d: *Perceived self-efficacy will have a negative effect on the perceived risk of Internet banking.*

3.6.1.4 Perceived risk

The role of *perceived risk* has been investigated widely in the business arena in understanding consumers' intended and actual purchase behaviour. *Perceived risk* has been conceptualised in the extant literature in various ways. Moreover, risk level associated with certain dimensions might get elevated under a specific context. Although studies showed *perceived risk* as an important factor that influences online shopping (Doolin, Dillon, Thompson, & Corner, 2005; Jarvenpaa & Todd, 1997; Stewart, 1999), still limited work has been carried to identify risk dimensions in this context (Cases, 2002).

Wong and Chang (2005) argued that *perceived risk* usually arises from the uncertainty that customers face when they cannot foresee the consequences of their purchase decisions. In an e-shopping context, this uncertainty regarding the value of services, the technological unpredictability of the Internet that reduces consumer perceptions of control over their transactions, and the impersonal nature of online transactions, drive consumers' beliefs about the risk associated with the purchase process (Pavlou, 2001). Consumers' purchasing behaviours or speed of adoption gets influenced by risks that they perceive as against their

own tolerance of risk (Bhatnagar, Misra, & Rao, 2000; Chan & Lu, 2004; Lim, 2003). It should be stressed that users are influenced only by their perception of risk, whether or not such risk actually exists. In a study on online shopping, authors (Bhatnagar et al., 2000) found that consumers patronising the Internet are those who perceive the risk associated with shopping on the Internet as low or find that the relative advantages of buying over the Internet channel are high. Four sources of risk in the e-shopping context, comprising eight dimensions, are summarised in table 3.2.

Measuring the dimensions of risk, Wong and Chang (2005) found that confidentiality and security associated with Internet transactions are the major risks, while social risk incurred appears to be the lowest. In another study, performance risk is found to be the prime determinant of adoption of e-services (Featherman, 2002). According to Bhatnagar et al. (2000), consumers are more concerned about losing credit card details and/or not receiving the right product rather than the monetary amount involved in the transactions. However, several studies have reported consumers' apprehension of financial risk associated with purchasing items over the Internet.

Source of risk	Risk dimension	Description
Product	Performance risk	Dissatisfaction of the consumer in relation to expectations concerning product quality
Remote transaction	Time risk	Time spent for purchasing includes a bad purchase
	Financial risk	Loss of money in bad purchase or purchase of a item can end up being higher than expected
	Delivery risk	Fear of not receiving the product on time or long waiting period
Internet	Social risk	Use of the Internet for purchase item may cause disagreement with other family members or friends
	Privacy risk	Personal information might be used for other purposes
	Payment risk	Fear of giving credit card number to others
Website	Source risk	Fear of credibility and reliability of website and web-service provider

Table 3.2: Risk source and dimension in electronic shopping context

(Source: adapted from Cases, 2002)

In Internet banking services, *perceived risk* may be associated with the financial product itself as well as with the electronic delivery channel. Importance must be given to this attribute while examining consumers' adoption behaviour (Harrison, 2000). Authors (Polatoglu & Ekin, 2001; Sathye, 1999; Tan & Teo, 2000) found that *perceived risk* is one of the major factors affecting user adoption of Internet banking. Chan and Lu (2004) added that risk perception hinders adoption for potential customers more than for existing customers of Internet banking services. Wong and Chan (2005) claimed that more experienced Internet users are likely to involve themselves in Internet banking services than those less-experienced, as adoption is affected by the *perceived risks* and familiarity with the Internet

technology. For example, in Thailand, non-Internet banking customers have greater levels of worry about the risk involved in carrying out financial transactions over Internet and prefer to receive services from the bank directly (Rotchanakitumunai & Speece, 2003). In an empirical study on the adoption of Internet banking in Finland, Mattila, Karjaluoto and Pento (2003) found that customers over 65 years of age are more concerned about risk involvement of Internet banking services and, therefore, are the late adopters of Internet banking services. Kim and Prabhakar (2000) suggested that the balance between willing to take risk and *perceived risk* influences the adoption of Internet banking. If the level of willingness to take risk exceeds the level of *perceived risk*, consumers generally adopt Internet banking services.

From the literature review it is evident that many consumers believe carrying out financial transactions over the Internet is a risky undertaking. Their concerns are about the reliability of the Internet and related infrastructure, as well as the spatial and temporal separation among users and bank personnel. Consequently, the lower the perception of risks involved in using Internet banking the more likely an individual would be prepared to use it. Thus the following hypothesis is formulated:

H4: *Perceived risk will have a negative effect on the behavioural intention to use Internet banking.*

3.6.1.5 Actual use

In prior studies intention to use is found to be a predictor of *actual use*. Therefore, *actual use* has been used as a dependent variable in several studies (Agarwal & Prasad, 1997; Davis, 1989). In Internet banking context it is presumed that an individual with positive intention to adopt or use will use Internet banking services more frequently. In other words, positive intention will increase the number of times the services is being used within a period of time. Thus the following hypotheses are tested:

H5a: *Perceived behavioural intention will have a positive effect on the frequency of Internet banking use*

H5b: *Perceived behavioural intention will have a positive effect on the number of times of Internet banking use*

3.6.2 Research model 2

Research model 2 uses extended DOI model proposed by Moore and Benbasat (1991). As noted earlier, this model replaced Rogers' (1983) *complexity* factor with *ease of use*, and

observability with the two constructs *visibility* and *result demonstrability*. However, the new constructs, *image* and *voluntariness*, added by Moore and Benbasat (1991) are not used for this study since *Image* is considered to be of low relevance to Internet banking, which is typically conducted in private by an individual. Similarly, as this study is focusing on the adoption or use of Internet banking by individuals in non-organisational contexts, *voluntariness* as proposed by Moore and Benbasat (1991) is not considered to be relevant. Research model 2 is shown in figure 3.6.

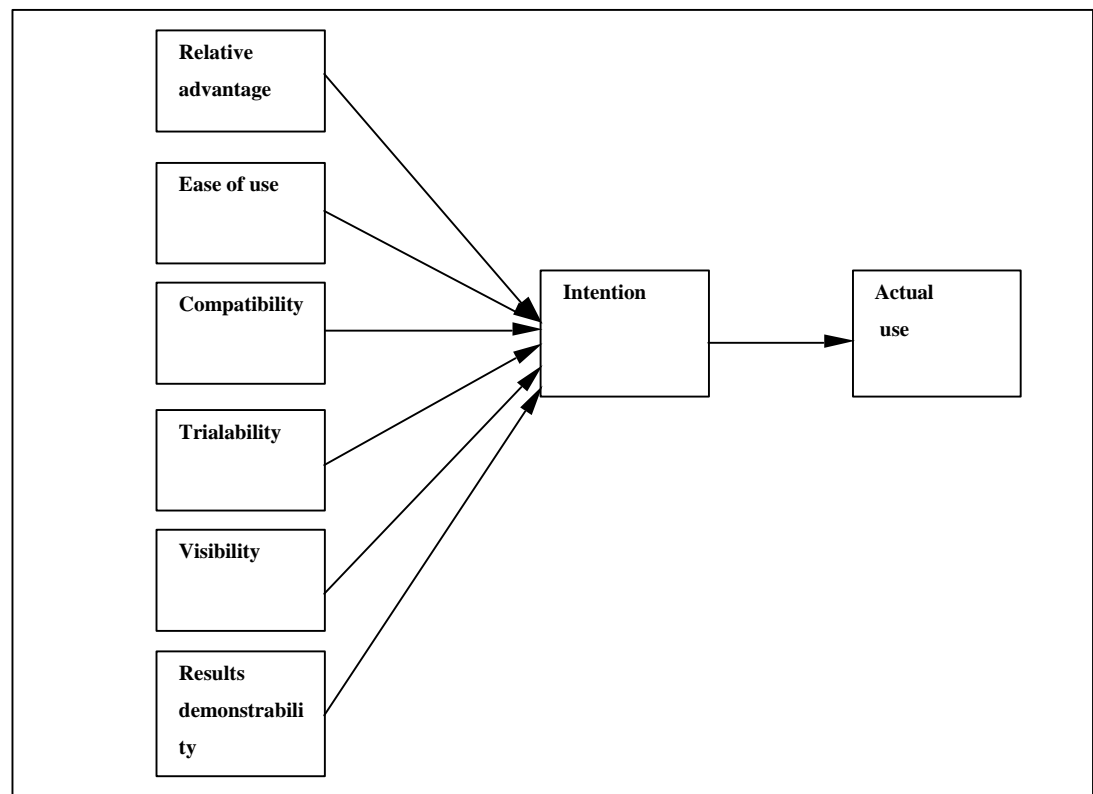


Figure 3.6: Research model 2 (modified PCI)

3.6.2.1 Relative advantage

Relative advantage is often referred to in terms of convenience, savings of time and effort, and decrease of discomfort in adopting or using an innovation. It is domain and environment specific (Rogers, 1983). With respect to Internet banking, consumers may perceive a *relative advantage* over branch banking in accessing accounts from any location and at any time of the day, and in facilitating greater control and flexibility in managing their accounts. Several empirical studies (Kolodinsky & Hogarth, 2001; Polatoglu & Ekin, 2001; Tan & Teo, 2000) on Internet banking have reported *relative advantage* as one of the key determinants that influences consumers' adoption decisions. However, Agarwal and Prasad (1997) found a lack of significance of *relative advantage* in predicting the usage of

WWW. They suggested that adopters get curious about the innovation due to its high visibility, putting the innovation into initial use, irrespective of any benefits it might offer.

In the light of advantages that Internet banking services offer and a review of extant literature, it is presumed that an individual, who perceives Internet banking as advantageous over branch banking, would be likely to adopt the service. Therefore the following hypothesis is tested:

H6: *Perceived relative advantage will have a positive effect on the behavioural intention to use Internet banking*

3.6.2.2 Compatibility

According to researchers (Agarwal & Prasad, 1998; Tornatzky & Klein, 1982) an innovation is more likely to be adopted when individuals find it compatible with their past experience, beliefs and the way they are accustomed to work. In the Internet banking context, *compatibility* can be viewed as how well does the service fit with the way consumers manage their finances and how does it suits their lifestyle or current situations. Studies (Agarwal & Prasad, 1997; Kolodinsky & Hogarth, 2001; Tan & Teo, 2000) on e-commerce and Internet banking have reported positive influence of *compatibility* on intention to adopt.

It is expected that people perceive Internet banking services more compatible to their lifestyle, they will more likely to adopt (Tan & Teo, 2000). Thus the following hypothesis is tested:

H7: *Perceived compatibility will have a positive effect on the behavioural intention to use Internet banking*

3.6.2.3 Ease of use

In studies based on DOI, *complexity* or *ease of use* is found to be an important factor affecting users' intentions. Again, an exception was the study by (Agarwal & Prasad, 1997), where ease of use was not found to be significant due to high visibility of Internet technology. Ease of use is hypothesised in the same way as in Research model 1 (see Hypothesis 1a).

3.6.2.4 Trialability

According to Rogers (1983), consumers might adopt an innovation if they are given the opportunity to trial the innovation because it provides a means for potential adopters to reduce the uncertainty of outcomes they feel toward an unfamiliar technology. Tan and

Teo (2000) and Agarwal and Prasad (1997) suggested that by trying out a technology, users feel more comfortable with the innovation and are more likely to adopt it.

In Internet banking, *trialability* can be viewed as the ability to access accounts and carry out banking transactions before setting up one's own system, preferably at bank premises where bank personnel will be available to demonstrate how it works, what it can do and also to provide assistance, if required. This will minimise potential adopters' fears about Internet banking services and motivate them to adopt it. Thus the following hypothesis is tested:

H8: *Perceived trialability will have a positive effect on the behavioural intention to adopt Internet banking.*

3.6.2.5 Observability

Rogers (1983) argued that more easily individuals could observe the positive effects of an innovation, the greater its chance to accept. The original construct was complex and has been redefined into two constructs by Moore and Benbasat (1991). Those are *visibility* and *result demonstrability*.

In the Internet banking context, *visibility* can be viewed as the coverage of Internet banking in public media such as newspapers, television or the Internet. Through such exposure, consumers could gain knowledge about Internet banking services and its benefits. If this knowledge and benefits can be shared with peers, adoption may be facilitated. Thus it is presumed that the *visibility* and *result demonstrability* of Internet banking services will influence potential adopters positively. The following hypotheses are tested:

H9: *Perceived visibility will have a positive effect on the behavioural intention to adopt Internet banking.*

H10: *Perceived result demonstrability will have a positive effect on the behavioural intention to adopt Internet banking.*

3.6.2.6 Actual use

Studies based on PCI presumed that intention have positive effect on *actual use*. In internet banking context intention is assumed to have positive influence on *actual use* and therefore hypotheses H5a and H5b are formulated (see section 3.7.1.5) for testing in this study.

3.7 Chapter summary

In this chapter, factors that influence behavioural intention towards adopting and using of Internet banking are discussed. Despite divergences in hypothesised relationships, a common theme underlying the various streams of research in technology adoption is the inclusion of perceptions of an information technology as key independent variables. Four widely used theories or models that have been used in technology adoption and diffusion studies are reviewed. Among these models, TAM is selected for this study because of its wide acceptance in information system/technology acceptance studies. In the Internet banking context, two additional factors that might influence adoption intention have been identified from prior studies and included to extend TAM as one of two research models. The second research model is PCI, which an extension diffusion of innovation (DOI) model and is considered for this study due to its similarity with TAM in the conceptualisation of perceptions. Hypotheses from the two models will be empirically tested. A comparison will be made between the two models to identify which model has the better ability to predict Internet banking adoption or usage. The next chapter will discuss the research method used to accomplish this.

CHAPTER 4 RESEARCH METHOD

4.0 Introduction

This chapter discusses the research method used to accomplish the objectives of this study. It describes the research objective, research approach and research design adopted, followed by sections on the data collection method, sample selection and data analysis approach undertaken in this study. Motivations and justifications have been given for all adopted methods of this study. Figure 4.1 depicts the steps followed in this study.

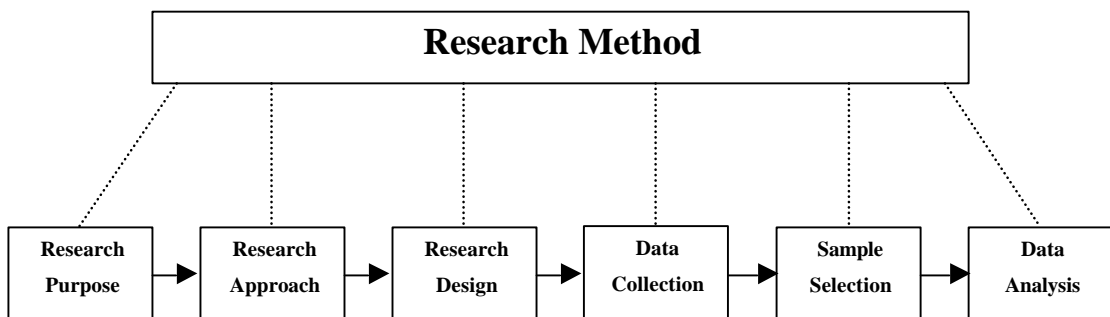


Figure 4.1: Schematic presentation of research method

4.1 Research purpose

The purpose of this study is to determine which factors influence customers' behavioural intentions to adopt or use Internet banking services in New Zealand. In chapter 2, literature on Internet banking adoption and usage trend across different countries including in New Zealand was reviewed. Literature on technology adoption theories and frameworks was reviewed in chapter 3 and two research frameworks were identified that included factors that might have an influence on the adoption and usage of Internet banking services in New Zealand. Hypotheses were formulated to investigate the impact of these factors using data collected from sample of New Zealand population. Finally, a comparison will be made highlighting the prediction capabilities of these frameworks.

As mentioned in earlier chapters, limited studies have been carried out on the adoption and usage of Internet banking services in New Zealand and, therefore, both the adoption and usage trend remains unclear. This study attempts to provide a better understanding of the current trend of Internet banking adoption and usage in New Zealand. This, therefore, is an exploratory study, which is appropriate when the problem is difficult to demarcate, there exists no or limited knowledge on the subject area and no clear apprehension about what model should be used for gaining a better understanding of dimensions of the problem.

The objective of this study is neither to develop a theory, which is a descriptive approach, nor to identify factors from various perspectives, which is an explanatory approach (Hussey & Hussey, 1997).

4.2 Research approach

There are two main approaches to performing research in social science, a positivistic paradigm and a phenomenological paradigm. The purpose of research in both of these approaches is to create a better understanding of the actions of individuals, groups and institutions, and to analyse the influence on each other. Some researchers have referred to the positivistic paradigm as ‘quantitative’ and the phenomenological paradigm as ‘qualitative’ (Hussey & Hussey, 1997).

Table 4.1 summarises the features of two paradigms. It is evident from the table 4.1 that this study is located within the positivistic paradigm rather than the phenomenological paradigm, as the study intends to gain an overview of the present situation pertaining to adoption, and continual usage of Internet banking services in New Zealand. In this study, hypotheses were formulated by applying logical reasoning to the findings of prior studies. These hypotheses will be tested with data collected from a survey using instruments applied in prior studies. An attempt is made to select samples that represent the characteristics of New Zealand population.

Positivistic paradigm	Phenomenological paradigm
Uses large sample size	Uses small sample size
Researcher does not get involved into problem domain	Researcher gets involved
The location is artificial	The location is natural
Data is specific and more precise	Data is subjective
Concerned with testing hypothesis	Concerned with developing theories
Generalises from sample to population	Generalises from one setting to another

Table 4.1: Features of two research paradigms

(Source: Hussey & Hussey, 1997)

Since the determinants that motivate Internet banking adoption and usage will be identified by establishing relationships between the variables and linking them to a theory (rather than developing theory), the researcher remains unaffected by the problem domain (Hussey & Hussey, 1997) as shown in figure 4.2. Further, the researcher observes the problem domain, Internet banking services, as a spectator observes the world and remains neutral through out the study. Therefore, this is a positivistic approach. In the phenomenological

paradigm, the researcher would include himself with the problem and thus participate in the subjective world.

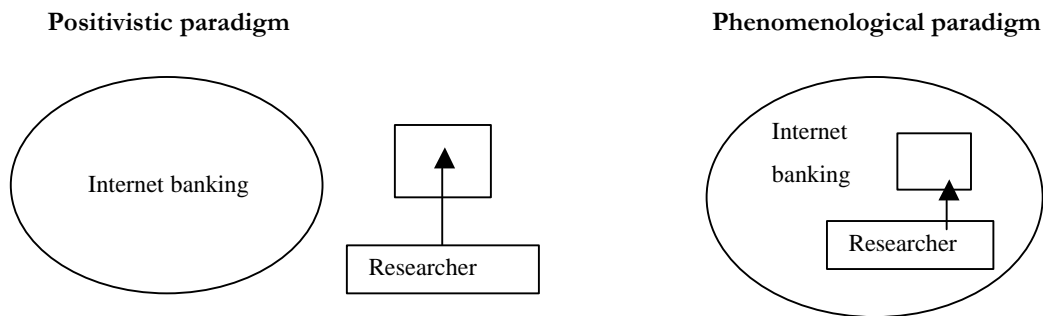


Figure 4.2: Role of researcher in two paradigms

4.3 Research design

There are number of approaches for a researcher to undertake data collection and it depends upon the question(s), depth, width and the time span of a research. Using a positivistic methodology, a researcher may choose between an experiment, a longitudinal study, a cross-sectional study, a survey or a case study(Hussey & Hussey, 1997). Again choice of method depends upon research questions and objectives.

Out of these available methods, experimental studies are carried out in a systematic either in a laboratory or in a natural setting way, where researchers tend to keep some variables under their control. Experimental studies are difficult to perform in business research (Hussey & Hussey, 1997). In longitudinal studies fixed samples are repeatedly investigated and measured over a period of time with a view to find out the relative stability of the problem under study. This is often runs for many years and therefore is not appropriate for this study due to time limitation of this research. In a cross-sectional study, a single investigation of a sample of elements selected from the studied population is conducted in order to have a “snapshot of an ongoing situation” (Hussey & Hussey, 1997). Cross-sectional studies are inexpensive, have low time and resource requirements, and are ethically safe. However they were found not suitable because although they establish association between variables they do not indicate the clear cause of relationship between them and also are susceptibility to bias (Hussey & Hussey, 1997).

A survey can be a powerful and effective tool for collecting data on human attitudes, behaviour and characteristics. A survey is made when a sample of elements is selected to be representative of the investigated population. Sometimes it is the only available option for acquiring information to examine research questions. However, a survey may not be the

best approach for every study, as it requires a familiarity with the basic principles and methods of statistical analysis for large survey data sets (Doyle, 2003).

Study	Application	Methodology	Sample Size
Gefen and Straub (1997)	E-mail	Email Survey	392
Mathieson, Peacock and Chin (2001)	Software application	Postal survey	1172
Agarwal and Karahanna (2000)	WWW	Field survey	Not known
Shih (2004)	e-Shopping	Postal survey	320
Chan et al (2004)	Internet Banking	Mail survey	634
Mattila et al (2003)	Internet banking	Mail survey	3000
Cooke and Kroeze (2004)	Impact of Internet	Case study	1
Chau and Lai (2003)	Internet banking	Postal survey	422
Polatoglu and Ekin (2001)	Internet Banking	Email survey	987
Klopping and Mckinney (2004)	e-Commerce	Web survey	263
Henfridssen and Holmstrom (2002)	Computer game	Case study	1

Table 4.2: Internet adoption research works: surveys and case studies

A case study is an extensive examination of one or a small amount of units. It involves gathering information on the unit of analysis over a long period of time and is often used when boundaries between the phenomenon and the context are not clearly understood due to lack of theories or a deficient body of knowledge (Hussey & Hussey, 1997). Often case studies are carried out in connection with evaluations or when the research objective is to explain, comprehend or describe an organisation or system. Case studies may be applied in both positivistic and phenomenological paradigms, and are common in information system research. Table 4.2 displays prior studies of the adoption of Internet banking or mobile banking services that used survey or case study approaches.

Considering the benefits of survey method and its common use in business studies (shown in table 4.2), survey method was considered suitable for this study.

4.4 Data collection

There are several methods that can be used to collect data for survey research. These are: mail survey, telephone survey, personal interview survey, email survey and web-based survey. Each method has its advantages and disadvantages. The choice will depend upon the type and size of sample being studied, the purpose of study, time limit, available budget and resources.

4.4.1 Data collection method

Some consideration was given to running the survey over the Internet since web and e-mail surveys are quite common (Kaplowitz, Hadlock, & Ralph, 2004; Yun & Trumbo, 2000).

Analysis of prior studies that conducted surveys on the Internet have shown web and e-mail surveys can offer shorter administration time and lower survey costs (Porter, 2004; Shaeahan & McMillian, 1999; Yun & Trumbo, 2000). While several experiments have yielded higher response rates in web-based surveys compared to postal surveys (Cobanoglu, Warde, & Moreo, 2001; Kaplowitz et al., 2004; Schaefer & Dillman, 1998), other studies have shown mixed or contradictory results. For example, Cobanoglu *et al* (2001) reported 18% higher response rates for web-based surveys while Schaefer and Dillman (1998) reported only 0.5% higher. Further, Shannon and Bradshaw (2002) reported 15% lower response rates whereas Weible and Wallace (1998) reported 1% lower. Porter (2004) suggested that reduced response rate might be due to the survey design and characteristics of the sample.

Kaplowitz, Hadlock and Levine (2004) suggested that a web survey can achieve a higher response rate when the population has easy access to the Internet and is comfortable with using the Internet (Porter, 2004). Besides this, lower response rates in a web-based survey was reported because the survey instrument was delivered to non-regularly-used email accounts or due to “fancy” appearance of survey websites (Dillman, Tortora, Conradt, & Bowker, 1998). Drawing any conclusion about response rates from web-based or e-mail surveys is thus difficult. table 4.3 shows an overview of advantages and disadvantages of various methods of data collection in survey research (Cobanoglu et al., 2001; Czaja & Blair, 1995; Diem, 2002).

From table 4.3, it is evident that while postal survey costs and time requirements are higher than web-based or email surveys, the potential coverage for postal surveys is higher because every individual has some kind of postal address. Since 37.40% of New Zealanders have access to the Internet (<http://www2.stats.govt.nz>), it can be assumed that everyone might not have access to Internet or does not have email address. Further, non-deliverable survey instrument in postal survey are lower than that of web-based or email survey as people change their email addresses and Internet service providers (ISP) more frequently compared to postal addresses (Cobanoglu et al., 2001). Even if the postal addresses get changed, people can use the facility of mail forwarding, while in case of email there is usually no way to redirect email that were send to old email address. Postal surveys are easier to construct than web surveys, where a separate skill set is required for programming and designing the survey site.

	Postal	Telephone	Personal Interview	Web-based
Coverage	High: Everyone has some kind of address	Low: Not everyone has a telephone	Low: Sample size must be low	Low: Everyone may not have access to Internet
Response rate	Low: Low response in general	Medium: Generally people participate	High: Generally every respondent will participate	High: Generally high with exceptions
Speed	Low: Takes time, requires follow-up	High: Quick response possible	High: Quick response possible	High: Quick response possible
Wrong address	Low: Change of address can be tackled using mail forwarding facility	Low: Change of telephone number can be handled except unpublished numbers	Nil: Direct contact with participant	High: Change of email addressed can not be tracked
Labour	High: Copying, labelling, folding and stuffing into envelopes and preparing return envelopes takes considerable labour	Medium: Staff required for dialling	Low: Except preparing questionnaire and interviewing, no other labour is needed	Low: Except setting up website, labour is minimal
Expertise to construct	Low: Easy to construct	Low: Easy to construct	High: Requires social skills and quick thinking	High: Setting up web server, designing page and validating questionnaire
Cost	High: Postage, photo copying, stationery and labour costs are involved	Low: If dialling is local and volunteers are available	High: Requires an inordinate time and cost	No cost or minimal cost since postage and stationery cost are eliminated
Others	Can be buried in junk mail Requires literacy Difficult accurate mailing list	Language barrier could affect the process Caller ID and answer machines limit access Only few and simple questions can be asked Respondent might be uncooperative	Trained interviewer needed Researcher can make more valid interpretations More than one interview might be necessary to check the validity of the data if third party is engaged	Can be deleted without opening / reading email Reminder needed

Table 4.3: Advantages and disadvantages of various methods of data collection
(Cobanoglu et al., 2001; Czaja & Blair, 1995; Diem, 2002)

Research has shown that inclusion of pre-paid cash and non-cash benefits can increase response rates, while inclusion of post-paid incentives have no impact on response rate (Porter, 2004). Cash or non cash incentives can be included with postal surveys while it is not possible to include prepaid incentives with web-based surveys (Cobanoglu et al., 2001).

Schaefer and Dillman (1998) cited several studies that have not found any significant difference in response rates that used a mixed-mode survey strategy; i.e. web-based and postal surveys. The major problem with using mixed-mode surveys for the same population is defined as the measurement differences between modes (Dillman, 2000).

Other challenges in the use of web and email based surveys are recipients may delete messages from unknown recipients without even reading them, considering them as junk

mail (Dillman, 2000). Yun and Trumbo (2000) have highlighted ethical concerns and technical problems generally involved in web-based or email surveys.

Telephone surveys are popular because information can be obtained quickly and can be inexpensive, if dialling is local and staff/volunteers are available (Newman & McNeil, 1998). This method is appropriate when there are a few simple questions to be asked and when superficial information is sought from respondent instead of in-depth responses. Since the current study aims to collect information on several factors and on consumers' intentions towards Internet banking services, it was decided that a telephone survey would not be suitable.

In the case of interview surveys, there are advantages such as i) the interviewer can obtain insights into why the respondent answered the way he or she did; ii) sensitive data may be able to be collected; iii) complex questions can be asked; and iv) interview sessions may be recorded. The disadvantages of interview surveys include a) a high time and cost requirement; b) requirement of training on interviewing techniques; and c) low coverage (Newman & McNeil, 1998). Consequently, the researcher decided not to use this option for this study.

In a directly administered survey, information is collected by distributing a survey questionnaire to students in a classroom or at a meeting of a group of the population to which results are to be generalised. The procedures for developing such survey are similar to those for a postal survey. However, considering the researcher's possible influence on the subjects, a directly administered survey was not considered for this study.

The above review suggests that while every mode of survey has its own advantages and disadvantages, a postal survey was found appropriate mode of data collection for this study.

4.4.2 Designing survey instrument

In a survey, individuals are asked to volunteer their time to complete a questionnaire for which they will receive no instant response, benefit, or gratification. If the questionnaire design makes the task difficult due to confusing questions, poor directions, or lengthy questions, people tend to choose not to donate their time "to the cause" (Dillman, 2000). Though items of this study were adopted from prior research, still attention was given to

content validity, readability and formatting of the items in order to minimise the chance of misleading and inaccurate recording responses. Further, emphasis was given to the original items and the items that were used in most studies.

From the extant literature on Internet banking, e-commerce and information systems research, it was noticed that most studies used a single set of questionnaire to collect information from both users and non-users of a system or application. Other studies designed questionnaire to in such a way that items within each construct could capture information for both users and non-users. For example, question such as “*Internet banking would be (is) easy to use*”. In both the approaches, it is difficult to be sure how respondents have interpreted the question. To overcome this issue, current researcher decided to develop two sets of the survey instrument: one set with questions suitable for users and the other set comprising of questions suitable for non-users. Different coloured paper was used to distinguish the two versions of the survey instrument: yellow for users and blue non-users. Both sets of questionnaires were delivered to every household surveyed. Instructions were given on the front page of each questionnaire form, as well as in a covering letter, which explained which questionnaire should be used by whom. Respondents were requested to complete only one of the two questionnaire forms (covering letter can be found in Appendix A).

4.4.2.1 Measurement of the constructs

This section discusses the procedure followed in constructing the items used in the survey instrument. Wherever possible, items used for the constructs were adapted from prior research in order to ensure the content validity of the scale used (Luarn & Lin, 2004). The instruments used for TAM and PCI surveys are psychometrically sound and have been applied in several studies. The scales for *perceived usefulness*, *perceived ease of use* and *behavioural intention* were measured using items adapted from the original TAM instrument (Davis, 1989) and subsequent applications of TAM to Internet banking and other technology acceptance studies (Agarwal & Prasad, 1997; Davis et al., 1989; Lederer et al., 2000; Luarn & Lin, 2004; Tan & Teo, 2000; Venkatesh & Davis, 2000; Wang et al., 2003). Items for the *perceived self-efficacy* construct were adapted from an original instrument developed by Compeau and Higgins (1995) and from other studies that have used self-efficacy as a construct (Luarn & Lin, 2004; Tan & Teo, 2000; Venkatesh, 2000; Venkatesh et al., 2003; Wang et al., 2003). Measures of *perceived risk* were adapted from studies on Internet banking

(Tan & Teo, 2000), e-services(Pavlou & Featherman, 2002), and e-shopping and e-commerce(Cases, 2002; Jarvenpaa & Todd, 1997; Lim, 2003).

Construct	Items	Adapted from
Perceived Usefulness	1. Internet banking enables me to accomplish my banking tasks more quickly 2. Internet banking makes it easier for me to do my banking 3. I find Internet banking useful	(Davis, 1989),(Davis et al., 1989),(Venkatesh & Davis, 2000),(Lederer et al., 2000), (Luarn & Lin, 2004), (Wang et al., 2003)
Perceived Ease of Use	1. Learning to use Internet banking was easy for me 2. It was easy to become skilful at using Internet banking 3. I find Internet banking easy to use 4. Using Internet banking can often be frustrating 5. Internet banking can be complicated to use	(Davis, 1989),(Davis et al., 1989),(Venkatesh & Davis, 2000), (Moore & Benbasat, 2001) (Tan & Teo, 2000), (Luarn & Lin, 2004)
Self Efficacy	1. I can use Internet banking even if there was no one around to show me how to do it 2. I can use Internet banking with only the online help function for assistance 3. I could use Internet banking even if the system was changed	(Compeau & Higgins, 1995), (Venkatesh et al., 2003), (Tan & Teo, 2000), (Luarn & Lin, 2004), (Wang et al., 2003)
Risk	1. Using Internet banking increases my cost of banking 2. Internet banking lacks the benefits of personal interaction with bank personnel 3. Internet banking is unreliable 4. Using Internet banking may expose me to fraud or monetary loss 5. Using Internet banking may jeopardise my privacy 6. Internet banking is insecure 7. Using Internet banking would increase the time it takes to do my banking	(Tan & Teo, 2000), (A. Pavlou, Paul & S. Featherman, M, 2002), (S. Jarvenpaa, L & P. Todd, A, 1997)
Relative advantage	1. Internet banking is more convenient than other banking options 2. Internet banking is more accessible than other banking options 3. Internet banking is less time-consuming than other banking options 4. Internet banking gives me greater control over my finances than other banking option	(Moore & Benbasat, 2001), (Agarwal & Prasad, 1997), (Plouffe et al., 2001), (Tan & Teo, 2000)
Compatibility	1. Internet banking is compatible with my lifestyle 2. Using Internet banking fits well with the way I like to manage my finances 3. Using Internet banking suits my current situation	(Moore & Benbasat, 2001), (Agarwal & Prasad, 1997), (Taylor & Todd, 1995a), (Tan & Teo, 2000)
Observability	1. The advantages and disadvantages of using Internet banking are obvious 2. I would have difficulty explaining why using Internet banking may or may not be beneficial 3. Internet banking is very visible in the public media 4. I have seen what others do using Internet banking	(Moore & Benbasat, 2001), (Agarwal & Prasad, 1997), (Venkatesh & Davis, 2000), (Plouffe et al., 2001), (Karahanna & Straub, 1999)
Trialability	1. 1.Internet banking is available for me to use on a trial basis 2. .I am able to see how Internet banking works and what it can do 3. I know where I can get more information on Internet banking	(Moore & Benbasat, 2001), (Agarwal & Prasad, 1997), (Plouffe et al., 2001), (Tan & Teo, 2000), (Karahanna & Straub, 1999)
Intention to Use	1. I intend to use Internet banking in the future	(Davis, 1989), (Venkatesh & Davis, 2000),(Lederer et al., 2000), (Luarn & Lin, 2004), (Wang et al., 2003), (Plouffe et al., 2001),(Tan & Teo, 2000) (Mathieson, 1991)
Usage	1. In the last 30 days, approximately how often have you used Internet banking? 2. In the last 30 days, approximately how many times have you used Internet banking?	(Davis, 1989), (Davis et al., 1989), (Lederer et al., 2000), (Venkatesh & Davis, 2000), (Agarwal & Prasad, 1997),

Table: 4.4: List of items by construct

Table 4.4: List of items by construct (cont.)

Construct	Items	Adapted from
Gender	1. What is your gender	(Luarn & Lin, 2004; Tan & Teo, 2000)
Age	1. What is your age	
Computer Use	1. For how long have you used a computer	
Internet	1. For how long have you used the Internet	
Internet Banking	1. For how long have you used Internet banking	
Internet access	1. Do you currently have access to the Internet	

With respect to PCI, some studies have reported similarities between *relative advantage* and *perceived usefulness*, arguing that both constructs are broadly based and indicate an increase in productivity, effectiveness and performance (Moore & Benbasat, 1991). However, researchers have used these constructs differently. Tornatzky and Klein (1982) expressed concern at combining *relative advantage* and *perceived usefulness*. They suggest that this is a measurement issue, which could lead to a plethora of scales and terms since all would subsumed under the idea of *relative advantage*, and meaning that *perceived usefulness* will be treated in relative terms. In order to retain the intuitive appeal of both the terms and considering their recognition across a variety of disciplines, it was decided to treat the constructs separately in this study. Items for *relative advantage* construct were adapted from Moore and Benbasat (2001) study, Tan and Teo (2000), Agarwal and Prasad (1997;1998), Karahanna and Straub (1999) and Plouffe et al (2001). As mentioned earlier, however, *complexity* is considered to be the equivalent of *perceived ease of use* (Moore and Benbasat, 1991), and the same scale was used in both TAM and PCI models.

Items for the constructs *compatibility*, *trialability*, *visibility* and *result demonstrability* were adapted from studies of Moore and Benbasat (2001), Tan and Teo (2000), Agarwal and Prasad (1997;1998), Plouffe et al (2001) and Karahanna and Straub (1999). Roger's (1983) original notion of *observability* has been defined as the degree to which the results of an innovation are visible and communicable. Moore and Benbasat (2001) and several other researchers have used two constructs: *visibility* and *result demonstrability* in place of *observability* to focus on each dimension separately, and this approach was also adopted in this study. Items for actual use construct were adapted from Davis (1989), Moore and Benbasat (1991) and Lederer et al.'s (2000) studies. Items for demographic variables such as gender, age, computer, Internet and Internet banking experiences were adopted from previous studies (Luarn & Lin, 2004; Tan & Teo, 2000)

Table 4.4 indicates the list of items used for developing each construct in the Internet banking-user questionnaire. The same items were used for the non-Internet banking-user questionnaire except that wordings were changed wherever required. For example, the first question in table 4.4 was modified for non-users as “*Internet banking would enable me to accomplish my banking tasks more quickly*”. A seven-point Likert scale with anchors ranging from *strongly disagrees* to *strongly agree* was used to ensure statistical variability among survey responses for all items measured.

4.4.2.2 Ordering questions in the questionnaire

The order in which questions are asked can affect the response as well as the overall data collection activity. The occurrence of adjusting answers to succeeding questions based on the answer of the previous questions - have been reported by many studies (Babbie, 1990; Dillman, 2000). Dillman (2000) indicated five distinct situations where answering one question may influence responses to later questions.

- ?? *The norm of evenhandedness*: Occurs when there are similarities in questions and they are placed next to each other. Some researchers (Bishop, Hippler, Schwarz, & Strack, 1988) argued that evenhandedness is likely to occur more in telephone surveys than in postal surveys as in the latter respondents can view all the questions before answering and can adjust answers accordingly. But empirical studies from field surveys provide evidence that effects in postal and telephone surveys are similar (Ayida & McCledon, 1990; Sangster, Lorenz, & Saltiel, 1995).
- ?? *The anchoring effect*: The anchoring effect is a form of suggestibility where response to the first opinion question serves as an anchor for the second answer. In other words, a respondent answers a question taking into account his / her preference and the answer to the previous question (Dillman, 2000).
- ?? *The addition effect*: In a survey, Schuman and Presser (1981) identified that percentage responding to the general question varied when a specific question is asked before a general question. The authors explain that respondents continued to think about specific question and adjust their answer while answering the second question.
- ?? *The subtraction effect*: The opposite of the addition effect is reported in another study (Mason, Carlson, & Tourangeau, 1994) where the authors noticed that respondents tended to “*subtract*” out reasons used to justify their answer to the preceding question.

?? *The summary item effect:* Willits and Saltiel (1995) illustrated that responses to the summary question tend to score low if it is asked before a list of questions relating to the domains that are summarised.

From the extant literature review, it is noticed that there has been a debate on the advisability of different approaches to place multiple items of constructs on a questionnaire. Some researchers have suggested that items for all constructs should be randomly placed so that no two items of a construct are adjacent (Babbie, 1990; Goodhue, 1998), while others (Babbie, 1990; Davis & Venkatesh, 1996) have argued that intermixing of questions creates difficulty for respondents as they are required to switch their attention continually from one topic to another. The measures from intermixed questions are more correlated with related variables than grouping the questions (Goodhue & Loiacono, 2002). However, Goodhue and Loiacono (2002) noticed that although intermixing improves the path coefficients, it is not significant and concluded that intermixing of questions is suitable for newly developed items and constructs. Since constructs of TAM and PCI are strong and well tested, it may not be the best context for testing the impact of questions order on measurement quality. Dillman (2000) suggested making half of the questions in one order and half in another. Babbie (1990) suggested constructing more than one version of the questionnaire containing different possible ordering of questions and then pre-testing the questionnaire using the different forms to determine different possible ordering effects.

However, it is important to recognise that a questionnaire cannot be considered as a compilation of completely independent questions that have no effects on one another even though similar questions are placed separately. This is because respondents might evaluate each question on the basis of its individual content and the larger content as well and adjust answers accordingly (Dillman, 2000). Considering the pros and cons of arranging questions in a questionnaire, the current study decided to place all items measuring a construct adjacent to each other, which was found consistent with several prior studies (Agarwal & Prasad, 1997; Chan & Lu, 2004; Tan & Teo, 2000).

4.4.2.3 Choosing the first question

According to Dillman (2000) choosing the first question in a questionnaire is more important than any other items, since it influences the destiny of the questionnaire – either to the mail box or to the garbage bin. The potential respondent casually glances through the first few questions before he or she starts answering. Success in understanding and

answering the first question motivates respondents to continue. Babbie (1990) suggested beginning the questionnaire with the most interesting questions. Alternatively, one can use a question that respondents would be keen to express an answer to and is likely to apply to everyone (Dillman, 2000). The question must be easy to comprehend and answer. It should not be a long question or an open-ended question. There are many well-designed surveys that start with age or education because it applies to everyone and easy to understand. However, such surveys have received poor responses due to the lack of connectedness between the objectives of surveys and the understanding of respondents (Babbie, 1990; Dillman, 2000). Therefore, researchers (Babbie, 1990; Dillman, 2000) proposed not to start a questionnaire with demographic questions. Placing demographic questions at the end of a questionnaire may or may not (Dillman, 2000) affect the response rate. In the current survey, demographic questions were placed at the end, considering that in a postal survey, respondents read the entire questionnaire and once they find it interesting they start answering it.

4.4.2.4 Raising response rates

Demands for survey research are increasing but reports indicated that survey response rates have been falling, both in USA and Europe (Porter, 2004). While addressing the cause for this decline, researcher (Porter, 2004) stated that respondents may either lack a survey response propensity or may be suffering from survey response fatigue. Since non-response is usually not random, conclusions drawn from such underrepresented data may be erroneous. It is, therefore, essential for researchers conducting a survey to understand how respondents will perceive and react to the survey. In order to have a better understanding of survey non-response, researchers have developed a theoretical framework from reasoned action and psychological perspectives.

From literature on the reasoned action approach, it is observed that researchers have considered different methods of survey administration and survey design to improve the rate of response. For example, by reducing survey length, providing cash incentives, reducing the cost of survey participation or using multiple contacts with members of the sample (Dillman, 2000; Porter, 2004). Literature on the psychological approach has tended to focus on several heuristic factors to increase survey response rates, including helping tendencies, compliance with legitimate authority and the norms of reciprocity. Keeping in mind the two different approaches, the following factors were considered in an attempt to increase the survey response rate of this study.

A. Survey length

Results of experimental studies on postal surveys indicated that surveys where length of questionnaire was short yielded better response rate than surveys with long questionnaire. One study using USA Census Bureau forms of varying lengths found that the response rate increases by 4% when a shorter version of the questionnaire is used (Porter, 2004). While a survey in Norway found that response rate dropped by 9% when the length of questionnaire increased from two pages to eight pages (Groves, Singer, Corning, & Bowers, 1999). Baumgartner (Porter, 2004) estimated that a 5% reduction in response rates for every additional 10 pages of questionnaire. Another study (Yammarino, Skinner, & Childers, 1991) estimated a 8% drop in response rate for surveys greater than four pages length. Conversely studies have found small differences in response rate for longer and shorter surveys (Porter, 2004). This indicates that survey length alone might not be enough to predict response rates rather there might be other factors that influence response rate.

In order to increase survey response rate in the current study, consideration was given to the length of the questionnaire at development and pre-testing phase. After pre-testing, the length of the questionnaire was 39 questions for the Internet banking-user form and 36 questions for non-Internet banking-user form. Each questionnaire form fitted within 3 pages of A4 sized paper.

B. Request for help

Porter (2004) claimed that survey response rate increases when surveys request respondents for assistance. For example by including the phrase “it would really help us out”, a study reported an 18% increase in survey response rate (Porter, 2004). Consequently, in this study the statement: “*We would appreciate your help in this research*”, was included in the covering letter of the survey.

C. Statement of confidentiality

Porter (2004) suggested that providing a statement of confidentiality fosters a sense of trust which in turn influences survey response rate. However, in a meta-analysis of thirty studies, researchers (Singer, Von, & Miller, 1995) revealed that the inclusion of a strong statement of confidentiality resulted in lower response rates. They suggested that a strong confidentiality statement influenced respondents to believe that the surveys contained sensitive or embarrassing questions, which in turn discouraged subjects from participation. Dillman et al. (1996) suggested that neither a standard statement nor a strong statement of

confidentiality has a significant effect on the response rates. However, for this study, it was decided to include a standard confidentiality statement in both the covering letter as well as in the questionnaire, in the hope that it would increase the survey response.

D. Salience

Salience of an issue to the sampled population has been found to have a strong positive correlation with response rate for postal, e-mail and web-based surveys. Groves, Singer, and Corning (2000) experienced an increase of 14.9 % by conducting a survey on a community related topic. Bean and Roszkowski (1995) argued that salience has more influence on response rate than survey length. They noted that *"if a person attaches little interest or importance to the particular content of a survey, then it will not matter if the survey form is short; the person still is unlikely to respond"* (p. 25). Internet banking is an important issue from both banks' and consumers' perspectives. Respondent might perceive that replying to a questionnaire will help banks in improving its services, which indirectly benefits him and therefore he or she might attach interest to participate in the survey. With this view, a statement about the survey's objective and the possible benefits of responding was included in the covering letter of this survey.

E. Introductory letter

As stated before, a letter introducing the study, its objective and importance, the importance of participation, and the mechanics of returning the questionnaire, was delivered along with questionnaire. A statement of "help required" was included within the letter. Further, a statement of the auspices under which the study was conducted, followed by two names, email addresses and phone numbers were provided for those who might want more information about the study.

F. Cash incentives

Church (1993) concluded from a meta-analysis of 34 studies, that people respond more favourably to incentives that are included with the questionnaire rather than those that are promised for after completing the survey questionnaire. Porter (2004) reported two studies where response rate increased by 18% and 12% by including \$0.50 and \$1 respectively with the survey instruments, while Groves et al.(2000) experienced an increase of 23.7% by adding \$5. On the contrary, no significant change in response rate was observed even after combining a \$5 bill and a promise of additional \$50 for a completed survey (Hager, Wilson, Pollak, & Rooney, 2003). Researcher (Porter, 2004) expressed that incentives offered in

online surveys resulted in a drop in response rate compared to those where no incentives were offered. Furthermore, according to Kehoe and Pitkow (1996), incentives might introduce systematic bias. Since the effects of incentives on response rate are inconclusive, it was decided not to include any incentives in this survey.

4.4.3 Pre-testing

Prior to the primary survey it was considered essential to validate the survey instrument through pre-testing in order to identify if there were any ambiguous questions, problems in understanding the questions, threatening or embarrassing questions, or suggestions, if any, for revision of the questionnaire (Remenyi, Williams, Money, & Swartz, 1998). In other words, to ensure that measurement scales were adapted and developed appropriately to the context, pre-testing was considered essential. Six Internet banking users and six non-users were selected from fellow Masters' students and friends. Both questionnaire forms along with the covering letter were distributed to each participant. Each respondent was timed so that the time requirement for answering the questionnaire was known. Respondents were then interviewed to identify issues relating to questionnaire.

Construct	Item		Participants' comment	Action taken
	No	Description		
Perceived ease of use	2	It was easy to become skilful at using Internet banking	Four Participants found item 2 and 3 are confusing and other two found item 2 3 and 4 had similar meaning	Dropped: Item 2 was dropped
Self-efficacy	3	I could use Internet banking even if the system was changed	Two respondents were not clear 'what was meant by the word 'system'	Revised: Interpretation of the word 'system' for this study was included
Risk	3	Internet banking is unreliable	"Does unreliable mean trust?" commented by three participants	Revised: Related to expectation
Relative advantage	1 2 3 4	Internet banking is more convenient than other banking options Internet banking is more accessible than other banking options Internet banking is less time-consuming than other banking options Internet banking gives me greater control over my finances than other banking option	Clarify what is meant by 'other banking' – commented by all participants	Revised: Word 'other banking' was replaced with 'visiting bank' and 'phone banking'
Compatibility	3	Using Internet banking would suit my current situation	Similarity found with item 1 of the same construct by all participants	Dropped Due to similarity
Demographic	7	Are there currently significant barriers to you using the Internet	"Be more explicit" – commented by a participant	Dropped: Not relevant

Table 4.5: Summary of changes after pre-testing questionnaire for user

The pre-testing of questionnaire elicited valuable comments from respondents on the questions. After reviewing these comments, current researcher dropped three items from

user and five from non-user questionnaire and also modified some questions. These changes are shown in table 4.5 and table 4.6. Final questionnaire form for user and non-user are included in Appendix B.

Construct	Item		Participants' comment	Action taken
	No	Description		
Perceived ease of use	2	It would be easy to become skilful at using Internet banking	All six participants found item 2,3,4 are similar meaning	Dropped: Item 2 was dropped
Self-efficacy	3	I would be able to use Internet banking even if I had never used a system like it before	There were no comments from participants	Revised: Since modification carried for user question form
Risk	3	Internet banking is unreliable	"Does unreliable mean security issue?" commented from one participant	Revised: Made changes similar to user question form
Relative advantage	1 2 3 4	Internet banking is more convenient than other banking options Internet banking is more accessible than other banking options Internet banking is less time-consuming than other banking options Internet banking gives me greater control over my finances than other banking option	"Clarify what is meant by other banking?" – comments from three participants.	Revised Similar to user questionnaire
Compatibility	3	Using Internet banking would suit my current situation	Similarity found with item 1 of the same construct by three participants	Dropped: Item 3 due to similarity
Usage	1 2	In the last 30 days, approximately how often have you used Internet banking? In the last 30 days, approximately how many times have you used Internet banking?	All participants commented as non-relevant – since they had never used Internet banking	Dropped: Item 1 and 2 were dropped as they were not applicable for non-users
Demographics	2	It would be easy to become skilful at using Internet banking	'Be more explicit' – commented by a participant	Dropped: Item 7 dropped due to non-relevant

Table 4.6: Summary of changes after pre-testing for non-user

4.4.4 Ethical approval

Since this study intended to collect data from individuals prior approval was required from the Auckland University of Technology's Ethics Committee. Application along with both sets of questionnaire was forwarded for Ethical Approval and the approval for conducting survey was received subsequently.

4.5 Sample selection

Selecting a sample is a fundamental element of positivistic study. Good sample selection involves considering that every member of the population has a chance of being selected. The sample should also be unbiased and large enough to satisfy the need of the research (Hussey & Hussey, 1997). It is possible to survey the entire population in few studies but it is impractical and unnecessary in majority studies. If chosen appropriately, a small sample of a population can yield highly accurate predictions. For example professional polling

organisations in the USA often use fewer than 2000 individuals as their survey sample to predict how more than 100 million people will vote in national elections (Doyle, 2003).

Most of the prior studies on Internet or mobile banking, university students were chosen as subjects since they were easy to access and chances of receiving higher response rate. Findings from those studies are confined to a particular segment of population and therefore cannot be generalised. This study targeted New Zealand households with a view to include all segments of the population who currently use or intend to use Internet banking in near future and non-users. Subjects to be surveyed were determined by natural sampling method (Babbie, 1990; Hussey & Hussey, 1997) since the researcher had little influence on the composition of the sample.

Profile	AWC	RCP	BBC	ASC	ROC	ECC	ACW	TKC	HEC	LNC	ACC
Number of households	1158	1236	1914	1509	1767	1077	1395	1644	1329	1671	130530
Number of males	1929	2136	2559	2178	2331	1515	1731	2229	1821	2427	177999
Number of females	2022	2025	2895	2325	2724	1755	1527	2514	2037	2541	189735
Age 15-64 years	65.6	69.1	61.6	63.7	67.4	68.4	90.4	68.6	66.3	66.2	70.0
Age 65 years and above	8.3	7.8	18.9	13.8	13.2	9.5	5.3	9.2	17.3	13.7	10.3
Ethnic group: European	35.0	43.1	72.1	55.2	74.5	58.8	56.5	54.0	74.5	51.0	65.7
Maori	12.3	15.1	4.1	9.3	4.1	1.9	7.0	8.8	4.7	6.7	8.4
Asian	24.1	19.5	24.0	28.2	21.8	40.3	36.7	24.5	19.6	38.5	18.7
Post school qualification	25.8	25.1	33.0	29.7	45.8	47.1	44.3	36.0	41.5	30.6	41.2
Internet connection	30.3	35.4	44.6	39.2	56.4	63.6	46.3	40.6	51.8	44.7	47.2
Telephone connection	92.1	95.5	98.7	97.7	99.0	98.5	93.8	96.0	98.6	98.5	96.5
Income	13900	17300	17300	16100	25100	19900	23000	18700	21700	16100	22300

AWC = Avondale west community, RCP = Rosebank community, BBC = Blockhouse bay community, ASC = Avondale south community, ROC = Royal oak community, ECC = Epsom central community, ACW = Auckland central west, TKC = Three kings community, HEC = Hillsborough east community, LNC = Lynfield north community, ACC = Auckland city community

Table 4.7: Summary of populations in Auckland west and central region
(Source: Statics New Zealand website <http://www2.stats.govt.nz>)

It was decided to collect data from households in the Auckland region so that the researcher could deliver survey questionnaires directly to residents' letterbox instead of

mailing. Names and addresses of residents were not required and chances of returned mails due to wrong addresses were thus eliminated. Population statistics for ten different locations in west and central Auckland, together with the profile of the Auckland region as given in *Statistics New Zealand's* website (<http://www2.stats.govt.nz>) were evaluated in selecting the sample frame. Table 4.7 indicates profile of population for those locations. While selecting survey area(s) emphasis was given on Internet access, education levels and household income since these factors were found to produce gap between online and offline population (Courtier & Gilpatrick, 1999; Hall et al., 1999). Therefore area(s) were selected where values for these factors were at par with the values of Auckland city area. Further importance was placed on area(s) with larger number of households as opposed to commercial organisations so that information can be collected from individuals. Furthermore, ethnic dwelling distributions were also considered

It is evident from table 4.7 that four areas, BBC, ROC, TKC and LNC, had more than 1500 households and the percentage of ethnic dwelling of BBC and ROC areas were much close to ethnic dwelling of ACC area than other areas including TKC and LNC. For instance European populations in BBC, ROC and ACC were 72.1%, 74.5% and 65.7% whereas as TKC and LNC had 54% and 51%. Furthermore, percentage of Internet connection and average yearly income of BBC and ROC were higher than TKC and LNC. Therefore BBC and ROC were selected for this study. A list of roads and streets in BBC and ROC that were covered in this survey can be found in Appendix C.

From the literature, it is understood that deciding a sample size is a complex process. It depends on the kind of statistical analysis the study proposes, the anticipated response rate and the expected variability within the samples and the results (Hussey & Hussey, 1997). Newton and Rudestam (1999) suggested that survey cost and time are also to be considered. On one hand, if sample size is taken small to suit the budget, many statistical tests do not work well with a smaller data size. On the other hand, results might be tenable for a large sample size but due to high cost and longer time requirement, such surveys may not be feasible to carry out. There are number of guidelines or rules of thumb that have been developed to assist researchers in selecting sample size. For example, Newton and Rudestam (1999) suggested a 4 to 1 ratio of responses to items. Others suggest a 10 to 1 ratio. For this study, if we consider 4 to 1 ratio, which means for 40 items questionnaire responses should be 160. Further, there would be some incomplete and incorrectly fill out questionnaire and if those are estimated to be 10% of the responses received (Newton &

Rudestam, 1999), then the required number of responses would be nearly 180. Now the typical response rate from a postal survey is between 15% and 25% and is decreasing over the time. If we consider that the current survey would generate about a 20% response rate, a sample size of 900 people would be required for this survey. In another calculation, authors (Newton & Rudestam, 1999) conducted a power analysis, assuming a multiple regression analysis with R^2 value (effect size) of .10 and recommended sample size as below

$$SampleSize = \frac{Total_response_required}{response_rate \times 0.9}$$

If we follow the similar approach, we require 1000 subjects to be surveyed in order to get 180 responses, with 20% response rate and R^2 value of .10. In another calculation Dillman (2000) estimated the sample size would be 1067 with $\pm 3\%$ sampling error, 50/50 expected variation in answers to the question of interest. Considering different formulas for sample size calculation, survey cost, time requirement and available resources, it was decided to survey 1000 subjects for this study.

4.5.1 Survey error

Salant and Dillman (1994), and Dillman (2000) expressed that researchers conducting surveys should take necessary steps to minimize four potential sources of error: sampling error, non-coverage error, non-response error, and measurement error.

Sampling error is the degree to which the selected sample does not represent the general population and is caused by exclusion of certain members of the population from the sample. Several studies have suggested increasing sample size to decrease sampling error when simple random sampling is used. For example, when the sample size is increased from 400 to 1000, the sampling error decreases from 5% to 3%, which is an acceptable trade-off between precision of estimate and costs (Cui, 2003; Dillman, 2000). Therefore in this study, the sample size was set to 1000 to minimise the sampling error.

According to Dillman (2000) and Cui (2003) some members of the sample simply do not respond to the survey questions, irrespective of the process followed during a sample selection. A low response rate does not necessarily lead to non-response error. In section 4.4.2.4, techniques to raise the survey response rate were discussed at length. In summary, the following measures were taken to reduce the non-response error:

- ?? Survey instrument was kept short and simple
- ?? Survey sponsor was made known
- ?? Confidentiality and anonymity were assured
- ?? Questionnaire started with non-threatening questions
- ?? An offer was made to provide a summary of results, if requested
- ?? A pre-paid envelope was enclosed for returning the completed questionnaire.

Measurement error results when the respondent fails to follow instructions on how to complete the survey form, does not respond to specific questions, or supplies inadequate answers that cannot be compiled in any useful way with responses from others (Dillman, 2000). Measurement error is defined as the difference between the answer given by the respondent and the true value that applies to that answer. There are several causes of measurement error that have been discussed in the literature. Out of these causes, error due to non-response bias, a badly designed questionnaire, respondent bias and processing error are found to be most common. We have already discussed measures taken to improve the response rate and the strategy adapted for designing the survey questionnaire. The remaining causes and how they are addressed in the current survey are now discussed.

Respondent bias is due to a refusal or inability to answer questions, or the provision of incomplete or inaccurate information. In the current survey, attention was paid to the wording of questions during questionnaire development and after the pre-testing phase. Further, importance was placed on protecting respondents' privacy, integrity and interest while designing the instruments.

Emphasis was placed on editing techniques and quality assurance practices at data grooming (preliminary checking before entering), data capture, editing and at estimation stages in order to ensure that there was no data loss, no duplication and no inaccurate weights in the estimation procedure. Several processes such as checks for duplicate responses, logic edits and range edits (valid range were entered) were carried out to minimise the error. However, such techniques can only minimise measurement error (Newton & Rudestam, 1999) and therefore every effort was made to reduce the magnitude of measurement error by focusing mainly on the questionnaire design and evaluation process as recommended by Esposito (2002)

4.5.2 Survey distribution

It was planned to distribute one thousand survey documents equally between the two areas selected for sampling; i.e. 500 each to ROC and BBC. Since the numbers of households in these two areas were 1767 and 1914, it was decided to deliver survey documents to households randomly. A list of roads and streets along with number of houses in each of them was constructed using information from www.wises.co.nz and the *quickmap* software. It was found that the number of houses in the two areas was more than that given in Statistics New Zealand's website. The difference was due to new houses built since 2001, when statistical data was last collected. A few roads and streets in each area were kept aside from the initial survey distribution, for a second survey distribution if the initial response rate turned out to be low. In order to cover more households of each area using available resources, it was also planned to delivery survey documents to alternate houses within a road or street where number of houses was up to 20, and one in every 3 houses where number of houses was over 20. Survey documents distribution was started in first week of March 2005 and was completed in seven days. Details of survey distribution can be found in Appendix D.

4.5.3 Response Rate

Of the thousand survey documents distributed, 163 responses were received by the first week of April 2005. Of these responses, 109 were from Internet banking users and 54 were from non-users. Six responses – 1 from a user and 5 from non-users – were either incomplete or blank and therefore were not considered for further data analysis.

Despite decreasing response rates in postal surveys, this survey achieved an acceptable response rate of 16.3% (15.7% usable responses). This compares favourably with recent studies. For example, Lin and Pervan (2003) received 6.8% in the first mail-out, Laitinen (2002) received 10.8% and Wu (2003) received 10.5%. Considering the response rate achieved, it was decided not to opt for a second round of survey distribution, which would have cost additional time and resources.

4.6 Data analysis

Survey data was entered into a statistical package, SPSS (Statistical package for social sciences) for analysis and graphical presentation of the results (a list of original data can be found in Appendix E). Using SPSS, frequencies and percentage distributions of respondents' demographic information were developed in tables to check that these responses were representative of the larger population of New Zealand and also to assess

non-response bias. Items that were negatively stated were reverse coded. These items were item 3 and 4 of *perceived ease of use*, item 3 of *risk* and item 2 of *result demonstrability* i.e. question number 6,7,13 and 25. The psychometric properties of the research instrument were assessed for its reliability and construct validity as well. The Cronbach alpha coefficient for each research variable was computed to test for reliability, while factor analysis was used for convergent and discriminant validity of the variables. Hypotheses were tested using linear regression analysis in the next chapter. Multi-linear regression analysis was used to test models' prediction capabilities. Further, t-test and Mann-Whitney tests were used to examine the differences in perception of Internet banking between users and non-users groups. Details of data analysis are discussed in details in next chapter.

4.7 Summary

This chapter has described and discussed the research method, survey mode, survey instrument, sample selection and survey process followed in order to investigate the research objectives of this study. Measurements for theoretical constructs have been adapted from the relevant literature. In the next chapter, the survey results and data analysis are described.

CHAPTER 5 RESEARCH FINDINGS

5.0 Introduction

In previous chapters, we described the theoretical background, significance and approach undertaken for practical investigation of this research. Information collected through the survey was intended to satisfy the research objectives. This chapter analyses the responses of the survey and presents the results.

5.1 Data analysis

The demographic profiles of respondents are summarised and comparisons are made with users and non-users of Internet banking in other countries. The validity and reliability tests of the research variables were carried out before statistical techniques were employed to analyse data. Both parametric and nonparametric tests, wherever applicable, were carried out to investigate the following research objectives:

1. Are the hypothesised relationships between variables in each of the models supported?
2. Which model, TAM or PCI, can explain more variance in intention to adopt or use Internet banking?
3. How do users and non-users differ in their perceptions of Internet banking?

5.1.1 Sample characteristics

It was noticed from the responses that few participants chose not to answer one or two items in the questionnaire. However, answers to the remaining items were found reasonable and therefore an initial value of '99' was assigned to the missing items at the time of data entry. Deleting responses from the analysis due to one or two absent data points would not be prudent, as the other key responses provided by participants would also be omitted. To enhance the use of questionnaire data, series mean was used to substitute for missing items (Piguet & Peraya, 2000). Table 5.1 shows the summary of respondents' demographics. The data shows that number of female respondents is higher than male respondents, with females accounting for 62.4 % and males 37.6% of responses. One possible explanation for more female respondents could be that female population was higher than male in New Zealand as well as in both the survey areas as shown in the table 5.2 (<http://www2.stats.govt.nz>).

Variables		All respondents		Internet banking user		Non-internet banking-user	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Response Type	User	108	68.8	108	100	49	100
	Non-user	49	31.2				
Gender	Female	98	62.4	70	64.8	28	57.1
	Male	59	37.6	38	35.2	21	42.9
Age	15-24 years	12	7.6	9	8.3	3	6.1
	25-39 years	52	33.1	48	44.4	4	8.2
	40-54 years	49	31.2	36	33.3	13	26.5
	55-69 years	27	17.2	13	12.0	14	28.6
	>69 years	17	10.8	2	1.9	15	30.6
Computer Use	Never	5	3.2	0	0	5	10.2
	< 1 year	4	2.5	2	1.9	2	4.1
	1 – 2 years	3	1.9	1	0.9	2	4.1
	3 – 5 years	19	12.1	12	11.1	7	14.3
	6 – 10 years	38	24.2	25	23.1	13	26.5
	> 10 years	88	56.1	68	63.0	20	40.8
Internet use	Never	8	5.1	0	0	8	16.3
	< 1 year	5	3.2	2	1.9	3	6.1
	1 – 2 years	6	3.8	5	4.6	1	2.0
	3 – 5 years	57	36.3	38	35.2	19	38.8
	6 – 10 years	58	36.9	46	42.6	12	24.5
	> 10 years	23	14.6	17	15.7	6	12.2
Internet banking use	Non-user	49	31.2	0	0	0	0
	< 6 months	6	3.8	6	5.6	0	0
	6 – 11 months	5	3.2	5	4.6	0	0
	1 – 2 years	27	17.2	27	25.0	0	0
	3 – 5 years	54	34.4	54	50.0	0	0
	> 5 years	15	9.6	15	13.9	0	0
	No response	1	0.6	1	0.9	0	0

Table 5.1: Summary of demographic profile

About 95% of respondents (149 out of 157 respondents) were Internet users. This is a significant increase over estimates of 47% in 2001 (<http://www2.stats.govt.nz>). Among these users, 73% have used the Internet for 3 to 10 years, while 14.6% have used it for over 10 years. This suggests that New Zealanders are generally experienced Internet users.

A predominance of females among Internet banking users is evident from data; female were 65% and males were 35%. Studies in several other countries have observed male domination in Internet banking (reported in chapter 2). Internet banking users are relatively younger than the overall sample, with 44.4% aged between 25 and 39 years, Male and 33.3% aged between 40 and 54 years. Half of Internet banking users has used these services for between 3 to 5 years, 35% have used Internet banking for less than 2 years and about 15% have used Internet banking services for longer than 5 years.

	New Zealand	BBC (survey area 1)	ROC (survey area 2)
Female	1,914,273	2,895	2,724
Male	1,823,007	2,559	2,331
Total	3,737,277	5,457	5,055

Table 5.2: Male and female population
BBC: Blockhouse bay community; ROC: Royal oak community

	All participants (N = 157)	User (N = 108)	Non user (N = 49)
Mean	5.25	6.43	2.65
Median	6.00	7.00	2.00

Table 5.3: Intention to use Internet banking services in future

Intention to use	Respondents	Male	Female	Users	Male	Female	Non-users	Male	Female
1	21 (13%)	8	13	1 (1%)	0	0	21 (43%)	8	13
2	9 (6%)	4	5	1 (1%)	0	1	8 (16%)	4	4
3	5 (3%)	1	4	4 (4%)	0	1	4 (8%)	1	3
4	13 (8%)	3	10	8 (7%)	0	4	9 (18%)	3	6
5	11 (7%)	5	6	2 (2%)	5	5	1 (2%)	0	1
6	23 (15%)	10	13	21 (19%)	8	13	2 (4%)	2	0
7	75 (47%)	28	47	71 (66%)	25	46	4 (8%)	3	1
Total	157(100%)	59	98	108(100%)	38	70	49(100%)	21	28

1 = strongly disagree 7 = strongly agree

Table 5.4: Intention to use Internet banking services

Frequency of use		up to 10 times	11–20 times	21–30 times	31–40 times	> 40 times	Total
Not at all	1	1	0	0	0	0	2
	2	7	0	0	0	0	7
	3	5	0	0	0	0	5
	4	11	0	0	0	0	11
	5	26	3	0	0	0	29
	6	9	5	4	0	0	18
Frequently	7	13	11	9	2	2	37
Total		72 (66.7%)	19 (17.6%)	13 (12.0%)	2 (1.9%)	2 (1.9%)	108(100%)
Male		22(20.4%)	11(10.2%)	3(2.9%)	0	2(1.9%)	38(35.1%)
Female		50(47.5%)	8(7.4%)	10(9.2%)	2(1.9%)	0	70(64.9%)

Table 5.5: Frequency and actual use of Internet banking in last 30 days

Intention to use Internet banking in future was measured with a 7-point Likert scale and shown in table 5.3 and table 5.4. The data show that existing users intended to use services in future (mean is 6.43 on a 7 point scale), while non-users were unlikely to adopt or use Internet banking (mean is 2.65 out of 7 in table 5.3). However, the overall scale mean is 5.25 out of 7, suggesting a high intention in adoption or using services in future. Further, about 47% of the respondents *strongly agreed* that they would use Internet banking in future, of which 94% were users and 6% non-users. On the other hand, about 43% of non-users *strongly disagreed* that they would use this channel in future, compared to less than 1% of users (table 5.4). From this, it can be assumed that existing users are likely to continue

using banking services over the Internet, while non-users are unlikely to adopt Internet banking.

Actual use of Internet banking was measured with a 7-point Likert scale to record agreement with overall frequency of use in prior 30 days, and an absolute estimate of use in the same period and is shown in table 5.5. The data shows that about 67% of users used Internet banking services up to 10 times in the prior 30 days. About 18% used Internet banking from 11 to 20 times in that period, nearly 12% between 21 and 30 times, and less than 4% were used Internet banking over 30 times in 30 days. Nearly 71% of females and 39% of males were using Internet banking services 10 times a month. Although the number of female users was more in Internet banking, males were found used services for maximum number of times (only males were found used *over 40 times a month*). The data in tables 5.6 and 5.7 indicate both that female and male users had similar Internet and Internet banking experience.

	Internet banking experience					
	< 6 months	6-12 months	1-2 years	3-5 years	> 5 years	Total
Male	0	0	9(8.3%)	21(19.4%)	8(7.4%)	38(35.1%)
Female	6	6(5.5%)	18(16.7%)	33(30.6%)	7(6.4%)	70(64.9%)

Table 5.6: Internet banking experience

	Internet use					
	< 1 year	1-2 years	3-5 years	6-10 years	> 10 years	Total
Male	0	1(0.9%)	14(12.9)	15(13.9%)	8(7.4%)	38(35.1%)
Female	2(1.8%)	4(3.7%)	24(22.2%)	31(28.7%)	9(8.3%)	70(64.9%)

Table 5.7: Internet use experience

In the next section, the constructs used in survey instrument are tested for various validity and reliability properties.

5.1.2 Construct validation

The validity and reliability of variables were tested to ensure that they produced reliable and consistent results. Construct reliability measures the stability of scale based on internal consistency of items measuring the construct. Construct validity measures “the degree to which the scale being used represents the concept about which generalisation is to be made” (Davis, 1989).

Item description	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Cronbach Alpha
Usefulness_1	0.851	-0.106	0.268	0.110	0.051	0.972
Usefulness_2	0.861	-0.078	0.259	0.152	0.009	
Usefulness_3	0.870	-0.133	0.231	0.138	0.000	
Ease of use_1	0.735	-0.093	0.320	0.274	0.018	
Ease of use_2	0.731	-0.097	0.387	0.301	0.006	0.872
Ease of use_3	0.340	-0.139	0.676	-0.103	-0.043	
Ease of use_4	0.356	-0.144	0.742	0.064	-0.015	
Self efficacy_1	0.567	-0.165	0.323	0.400	-0.072	
Self efficacy_2	0.249	0.064	0.262	0.525	-0.019	0.760
Self efficacy_3	0.641	-0.136	0.269	0.387	-0.056	
Risk_1*	-0.442	0.383	-0.132	0.071	0.120	
Risk_2*	-0.290	0.488	-0.387	0.014	0.059	
Risk_3	-0.695	0.064	-0.304	-0.139	0.121	0.792
Risk_4	-0.038	0.905	-0.103	-0.049	-0.053	
Risk_5	-0.061	0.910	-0.098	-0.078	-0.017	
Risk_6	-0.248	0.810	0.074	-0.054	0.015	
Risk_7	-0.519	0.186	-0.126	-0.185	0.245	0.935
Relative Advantage_1	0.893	-0.147	0.152	0.091	-0.011	
Relative Advantage_2	0.882	-0.143	0.046	0.123	0.044	
Relative Advantage_3	0.872	-0.085	0.109	0.028	0.017	
Relative Advantage_4	0.792	-0.149	0.130	0.186	0.056	0.959
Compatibility_1	0.886	-0.065	0.200	0.119	0.014	
Compatibility_2	0.879	-0.076	0.264	0.106	0.057	
Result_Demo_1	0.342	0.051	0.524	0.225	0.133	
Result_Demo_2*	0.199	-0.073	0.334	0.374	-0.099	<i>0.316</i>
Visibility_1	0.072	0.145	0.070	0.065	0.790	<i>0.466</i>
Visibility_2	-0.106	-0.153	-0.088	0.165	0.749	
Trialability_1	-0.061	0.090	-0.189	0.669	0.074	
Trialability_2	0.312	-0.176	0.110	0.620	0.281	
Trialability_3	0.327	-0.209	0.027	0.590	0.213	0.606

* alpha values below cut-off value; figures in **Bold** are above cut-off value; figures in **Italics** are below cut-off value

Table 5.8: Factor analysis and Cronbach alpha coefficient

Construct reliability was assessed by calculating Cronbach alpha coefficient, for variables since it is widely used research. Reliability of the constructs was tested by examining their alpha value at ≥ 0.6 , as suggested by Nunnally (1967). With respect to construct validity, factor analysis was used to test the convergent and discriminant validity of items. The convergent validity was evaluated by examining whether items of a variable converged together on a single construct (Premkumar & Ramamurthy, 1995), and whether the factor loading for every item was ≥ 0.50 , as suggested by Nunnally (1967) and Hair *et al* (1998). The discriminant validity was evaluated by examining the cross loading of items on different factors.

Results of factor analysis and Cronbach alpha coefficient are shown in table 5.8. The results show that all three items of *perceived usefulness* were loaded on to factor 1 with individual

value > 0.85 , which confirmed the validity of the scale. Further Cronbatch alpha of the scale was 0.97, which provided support for scale's reliability. With regards to *perceived ease of use* variable, two out of four items were loaded with factor of usefulness, suggesting that usefulness of Internet banking services was perceived due to *ease of use* of services. While rest two items i.e. item 3 and 4 which were targeting to capture user's "frustration" and "complexity", opposite of *ease of use* trait of Internet banking, were perceived differently and therefore loaded on to factor 3. Technically these items should be treated separately from item 1 and 2 but considering the reliability of the scale (Cronbatch alpha > 0.87) items were retained with same construct.

Furthermore, item 1 and 3 of *self-efficacy* was loaded on factor 1 while item 2 was loaded on factor 4 with Cronbatch alpha value over 0.76. Item 2 was intended to capture individual's confidence in using services with only online help or instructions but respondents might have viewed differently. Although the scale showed reliable, validity could not be established.

Table 5.8 shows that the reliability of *risk* scale was above the recommended value but the validity could not be established due to items were either below the cut-off value or loaded on more than one factors. Factor analysis shows that item 1 and 2 were below the cut-off value suggesting that respondents found economic risk (item 1) and social risk (item 2) were less significant to Internet banking context. Further item 3 and 7 were loaded on factor 1 (where items of *perceived usefulness* were loaded) indicating that respondents might have considered these items as usefulness traits of Internet banking services (Tornatzky & Klein, 1982) rather than risk associated in it.

Items of *relative advantage* were loaded on factor 1, where items of *perceived usefulness* were also loaded, suggesting similarity between these constructs (Moore & Benbasat, 1991). The reliability of scale was also established (Cronbatch alpha value > 0.93). Further on, the reliability and validity of *compatibility* scale was also established Cronbatch alpha value of the scale was > 0.95 and all items were loaded on factor 1, indicating that relative advantage and compatibility did not emerge as separate factors eventhough the items different were users for measuring these scales. This supported Moore and Benbasat's (1991) view that these constructs are correlated at the 0.99 level and difficult to segregate. Factor analysis shows that all items of *trialability* construct were loaded on factor 3 with Cronbach alpha just over cut-off value of 0.60 which established scale's validity and reliability.

The above factor loadings indicate that items of some scales tended to correlate more with other items of different traits rather than item used to measure the same trait. Furthermore, figures in table 5.8 shows that Cronbach alpha of *result demonstrability* and *visibility* were less than the cut-off value of 0.6. Although items used for this research were empirically tested and their reliability and validity were established in prior studies, deviations in both reliability and validity was experienced in this research. The possible reason could be that respondents not viewed them identically in the Internet banking context. As Moore and Benbasat (1991) expressed that ‘researchers must understand the difference between conceptual and empirical dimensionality ... high correlation is not a sufficient condition to claim that a concept is unidimensional rather than bidimensional’.

At this stage, before proceeding for data analysis using statistical techniques that are based on the assumption that variables are normally distributed, it was decided check the normality of the data and, if appropriate, to transform the data using one of the available normalisation techniques. Normalisation provides a means of modifying data to correct violations of normality. In other words, it reduces the possibilities of greatest variance dominate the results(Hair et al., 1998). Most normalisation methods effectively reduce the amount of variance by treating the outliers. Depending upon the skewness observed and the types of data, various data transformations can be applied such as mean correction, linear regression, nonlinear models, Bayesian methods (Finkelstein, Gollub, & Cherry, 2002) and Box-Cox transformation(Hair, Anderson, Tatham, & Black, 1998). Each normalisation method has its own assumptions, calculations and the adjusted values are often different. Some are more complicated and take into account more factors that could incur bias, while others are simpler to use and thus have higher popularity. For this research, the Box-Cox transformation (Hair et al., 1998) was used because it is simple and effective.

The Box-Cox transformation transforms variables allowing a flexible functional form for estimation and is useful when there are many variables, a small sample size and samples does not have any zero observations. It is defined as:

$$T(y) = (Y^{\lambda} - 1)/\lambda \quad (\text{for } \lambda \neq 0)$$

$$T(y) = \log(y) \quad (\text{for } \lambda = 0)$$

Where y is the response variable and λ is the transformational parameter.

Using the above formula data was transformed and factor analysis and reliability of scales for the normalised data were calculated (shown in Appendix F). But there were not appreciable differences in the results produced by the transformed and untransformed data. Therefore, it was decided to use the original data for further analysis.

Reliability analysis					
Items of perceived ease of use	Mean	Std. Dev	Cases		
Item 1	5.6624	1.5712	157		
Item 2	5.6242	1.6385	157		
Item 3	4.9038	1.8494	157		
Item 4	5.1795	1.6583	157		
Correlation Matrix					
	Item1	Item2	Item3	Item4	
Item 1	1.0000				
Item 2	.8543	1.0000			
Item 3	.3682	.4132	1.0000		
Item 4	.5135	.5775	.5953	1.0000	
Item-total Statistics					
	Scale Mean if item deleted	Scale Variance if item deleted	Corrected item-total correlation	Squared multiple Correlation	Alpha if item deleted
Item 1	15.7075	18.1483	0.6883	0.7304	0.7681
Item 2	15.7458	17.1052	0.7408	0.7567	0.7424
Item 3	16.4661	18.1154	0.5269	0.3617	0.8456
Item 4	16.1905	17.6162	0.6799	0.4876	0.7700

Table 5.9: Correlations of item to item and variation of *perceived ease of use*

At this point, in order to enhance the psychometric properties of the constructs, items that were either not loaded on any factors or loaded on multiple factors and the constructs with low Cronbach alpha coefficient values were reviewed. Review of constructs is discussed below.

Items 3 and 4 of the *perceived ease of use* variable were adopted from the Tan and Teo's (2000) study, and were present in the original construct developed by Davis (1989) and Moore and Benbasat (1991). These items were: "*Using Internet banking can be often be frustrating*" and "*Internet banking can be complicated to use*" and they were loaded on factor 3, while item 1 and 2 were loaded on factor 1. Items 3 and 4 were negatively stated (and were reverse coded, mentioned in chapter 4) and reflected the complexity of Internet banking services. A possible reason for loading on two factors could be that users and non-users perceived complexity differently because complexity of using an innovation starts to play a role only after one starts using an innovation (Moore & Benbasat, 1991). However, *item-wise*

mean, correlation matrix, corrected item-total correlation and effects on Cronbach alpha were not affected significantly significant, if these items were considered to be deleted (as shown in table 5.9). Therefore, items 3 and 4 were not considered differently from items 1 and 2 and we decided to retain all the items of *perceived ease of use* for further analysis.

Reliability analysis							
Correlation Matrix							
Items of RISK	RS1	RS2	RS3	RS4	RS5	RS6	RS7
RS1	1.0000						
RS2	.2633	1.0000					
RS3	.3050	.3425	1.0000				
RS4	.2598	.4237	.1508	1.0000			
RS5	.3330	.4039	.1540	.8491	1.0000		
RS6	.3829	.3794	.2234	.6607	.6795	1.0000	
RS7	.2566	.3186	.4292	.1847	.2058	.2440	1.0000
RS1...RS7 = item 1 to item 7 of risk variable							
Item-total Statistics							
	Scale Mean if item deleted	Scale Variance if item deleted	Corrected item-total correlation	Squared multiple Correlation	Alpha if item deleted		
RS1	23.0182	57.1158	.4300	.2240	.7815		
RS2	21.5239	51.4830	.5221	.2875	.7667		
RS3	23.1473	58.9725	.3869	.2627	.7883		
RS4	21.1187	52.7173	.6328	.7429	.7435		
RS5	21.3225	52.2825	.6601	.7523	.7385		
RS6	21.9277	53.2169	.6442	.5254	.7425		
RS7	23.3543	58.4526	.3923	.2335	.7878		

Table 5.10: Correlations of item-to-item and variation of risk

Item 2 of *self-efficacy* was loaded on factor 4 whereas items 1 and 3 were loaded on factor 1. This might be due to the wording of item 2, which was “*I can use Internet banking with only the online help function or instructions for assistance*”. Although the item was intended to capture the *self-efficacy* attribute, but the word ‘*only*’ in the question might have misled respondents to answer differently from other items. Although it is technically desirable to treat item 2 separately, the correlation factor between items gave us confidence to retain all the items.

Items 1 and 2 of *risk* were not loaded over 0.5 values on any factors and items 3 and 7 were loaded on factor 1 while items 4, 5 and 6 were loaded on factor 2 (shown in table 5.8). This suggests that respondents might have viewed *economic risk* (item 1), *social risk* (item 2), *performance risk* (item 3) and *time risk* (item 7) conceptually different from *internal risk* (items 4, 5 and 6) associated with Internet banking services. With regard to item 1 and 2, respondents’ opinion were almost evenly distributed on 1-7 scale, resulting items were not loaded on to any factors. On the other hand, respondents might have treated items 3 and 7 as the desirable features of Internet banking. A similar item was used in *relative advantage* variables (item number 3). Further, *item-to-item* relationship and *corrected item-total correlation* of

these items were very low (shown in table 5.10). Therefore, it was decided to drop item 1 and 2 due to lack of loading. Although loading for item 7 was above cut-off value, it was dropped due existence of a similar item in *relative advantage* scale. Furthermore, reliability of item 3, 4, 5 and 6 (shown in table 5.11) indicates that Cronbach alpha of *risk* construct would increase significantly if item 3 was deleted. In other words, item 3 seemed to be pulling the reliability of the scale and therefore it was decided to drop item 3 from risk construct.

Item-total Statistics \approx item 3,4,5,6					
	Scale Mean if item deleted	Scale Variance if item deleted	Corrected item-total correlation	Squared multiple Correlation	Alpha if item deleted
Q13_RS3	13.3374	22.6088	0.1938	0.0499	0.8906
Q14_RS4	11.3088	15.3536	0.7365	0.7339	0.6202
Q15_RS5	11.5126	15.3167	0.7503	0.7459	0.6128
Q16_RS6	12.1179	16.4197	0.6803	0.4999	0.6558

Table 5.11: Correlations of item to item and variation of risk

Although we aimed to measure several dimensions of *risk* such as performance, social, economical and so on, but due to lack of loading or loading on several factors, 4 out of 7 items were dropped to achieve scales reliability and validity. Thus the *risk* construct was left with items 4, 5 and 6, representing *internal risk* associated with Internet banking system. However *internal risk* i.e. security and privacy were found to be the most important factors that had negatively influenced Internet banking adoption and usage in various countries in the world, reported in chapter 2.

Construct	Number of items in survey	Items used in analysis
Perceived usefulness	3	3
Perceived ease of use	4	4
Self-efficacy	3	3
Risk	7	3
Relative Advantage	4	4
Compatibility	2	2
Result Demonstrability	2	1
Visibility	2	2
Trialability	3	3
Intention	1	1
Usage	2*	2*
Demographic	6**	6**
Total (users)	39	34
Total (non-users)	34	29

* number of items was 0 for non-user, ** number of items was 5 for non-user

Table 5.12: Construct-wise items in survey and used in data analysis

Item 2 of *result demonstrability* was not loaded on any factors and the alpha value of the scale was below the acceptable limit of 0.5. In order to include a measure of *result demonstrability*, item 1 retained and item 2 was dropped from the scale. The Cronbach alpha coefficient of *visibility* was just below the cut-off point of 0.50. However, considering its high loading values for both items (item 1 was 0.790 and item 2 was 0.749), it was decided to retain these items for further analysis. But importance will not be given to it while generalising research findings. A list of scale-wise number of original items used in the survey and the number of items used for statistical analysis is shown in table 5.12.

5.1.3 Averaging items

In the fields of psychology, marketing, political science and so on, it is common to compute average scores for items of a construct. According to Piguet *et al* (2000) averaging items enhances the flexibility of scale without affecting the statistical properties of the scores. Further averaging standardises the range of scale scores (Nunnally, 1978). But when a distribution of dataset is heavily skewed, the average or mean might be misleading due to presence of outliers (Argyrous, 1996). Since the data was not heavily skewed (results of Box-Cox transformation data was not significantly different from results with normal data), average score for items of each construct was used for further analysis (data after averaging item can be found in Appendix G).

5.1.4 Treating Likert scale data as interval data

The objective of Likert scale was to be able to accurately and reliably quantify verbal study instruments in sociological research. It is one-dimensional method of measurement. By using a combined score, some social scientists believe that the ordinal-scaled data based upon a Likert-scale can be converted into a form of interval data (Adams, 2004; Cooper & Schendler, 2001). For example, when a seven-point Likert scale for 30 items is totalled as a composite score, the possible range of data value will be from 30 to 210. According to Johnson (2005) although in most cases Likert scale data is ordinal but the extent they approach the intervalness depends on the correspondence of the ordinal labels to the empirical data. Turkey (1986) argued that not using “ordinal data for interval-based statistical techniques was a historically unfounded overreaction”. He expressed that if p-values or confidence intervals are to be sacred, then it must be precise. “In the practical world, when data values are transformed, the p values resulted from different expressions of data would change. Thus, ordinal-scaled data should not be banned from entering the realm of parametric tests” (Turkey, 1986).

On the contrary, according Mitchel (1996) data collected using Likert scale is ranked in order of importance to the researcher and are symbols not "scores". But use of these numbers, which identifies positions become quantity. Mathematically, the difference between 2 and 1 is equal to the difference between 3 and 2; but the difference between "I strongly agree" (coded as 7) and "I agree" (coded as 6) is not same. Thus, it violates epistemological and mathematical requirements to assume that these differences are equivalent.

Parametric tests are more flexible and can detect smaller differences or relationships when they exist, due to its precise and powerful measurement procedures. On the other hand, nonparametric tests are appropriate when a very small differences or relationships are less likely to be treated significant. Several studies were conducted to explore this issue, comparing the effectiveness of parametric versus nonparametric tests and had identified that statistical power to detect differences was no less for ordinal data than for interval level data. The investigators (Baker, Hardyck, & Petrinovich, 1966) concluded that parametric tests with ordinal data rarely distort the results. Baker *et al* (1966) and Borgatta and Bohrnstedt (1980) expressed that for typical data, whether scales are ordinal or interval does not matter.

Considering above, parametric techniques were used to analysis the survey data. But for comparison of results, nonparametric techniques were also employed wherever it was found appropriate.

5.1.5 Correlation matrices

In order to investigate possible association between variables, Pearson coefficient of correlation was calculated for all variables and shown in table 5.13. The Pearson coefficient, is a parametric technique and is so widely used that often the word 'correlation' by itself refers to it (Hussey & Hussey, 1997). Although this technique presumes interval data, its use for ordinal data is common – although this remains a matter of some debate (Bryman & Cramer, 1997).

A one-tailed test was performed on the data since there is some basis (previous studies) to predict the direction of the relationship existed between each pair of variables (except demographic variables) and shown in Table 5.13. The data in the table 5.13 shows that most of the users' perceptions were significantly correlated. All the correlations were in the

expected directions and provide support for the set of hypotheses constructed in chapter 3. The extant literature recommends examining multicollinearity effects in the predictor variables before proceeding to identify relations between independent and dependent variables particularly when data is collected through survey or field studies. This is because in survey and field studies researcher has much less control over the predictors and is thus vulnerable to this problem (Grapentine, 1986). On the contrary, in an experimental setting, researcher designs the predictor variables to be uncorrelated and can thereby avoid the multicollinearity problem.

	PU	EOU	SE	RSK	RA	COM	DEM	VIS	TRI	BI	Use_1	Use_2	Gender	Age	Comp	Inter
PU																
EOU	0.788															
SE	0.646	0.657														
RSK	-0.242	-0.272	-0.222													
RA	0.840	0.722	0.657	-0.272												
COM	0.843	0.751	0.682	-0.205	0.892											
DEM	0.466	0.522	0.446	-0.076	0.427	0.420										
VIS	-0.004	-0.028	0.057	-0.030	0.005	0.026	0.059									
TRI	0.370	0.348	0.453	-0.203	0.373	0.340	0.266	0.304								
BI	0.441	0.373	0.406	<i>-0.139</i>	0.451	0.485	0.218	0.001	<i>0.143</i>							
Use_1	0.478	0.452	0.393	<i>-0.176</i>	0.437	0.489	0.311	0.018	0.170	0.795						
Use_2	0.312	0.288	0.239	<i>-0.132</i>	0.296	0.347	0.242	-0.037	0.043	0.511	0.709					
Gender	-0.044	-0.060	-0.071	-0.008	-0.027	-0.040	-0.037	-0.071	-0.206	0.014	0.020	0.053				
Age	-0.314	-0.220	-0.278	0.125	-0.271	-0.284	<i>-0.161</i>	0.005	-0.215	-0.540	-0.423	-0.228	0.256			
Comp	0.234	0.221	0.245	-0.080	0.221	0.268	0.130	-0.040	0.087	0.437	0.316	0.191	-0.018	-0.314		
Inter	0.188	<i>0.173</i>	0.234	-0.099	0.210	0.274	<i>0.180</i>	0.014	0.060	0.387	0.320	0.206	0.044	-0.246	0.734	
IB	0.452	0.415	0.391	<i>-0.175</i>	0.410	0.463	0.274	0.024	0.157	0.797	0.904	0.581	0.010	-0.408	0.394	0.396

figures in **Bold** are where correlation is significant at the 0.01 level (1-tailed)

figures in **Italic** are where correlation is significant at the 0.05 level (1-tailed)

PU: *Usefulness*, EOU: *Ease of use*, SE: *Self efficacy*, RSK: *Risk*, RA: *Relative advantage*, COM: *Compatibility*, Dem: *Result Demonstrability*, VIS: *Visibility*, TRI: *Trialability*, BI: *Intention*, Comp: *Computer use*, Inter: *Internet use*, IB: *Internet banking use*.

Table 5.13: Pearson correlation coefficients

Multicollinearity is defined as the extent to which a variable can be explained by other variables in the analysis (Hair et al., 1998) or an explanatory variable demonstrates a near-linear dependence with another explanatory variable (Leeler & Pireaux, 1995). The effects of multicollinearity make it difficult to determine the contribution of each independent variable as the effects of independent variables are mixed or confounding (Hair et al., 1998). In other words, regression coefficients can be insignificant (Grapentine, 1986). There are several ways to detect and analyse multicollinearity effects. For this study,

squared correlation coefficient (R^2) was calculated. None of the calculated squared correlation coefficient values were > 0.80 , which suggests no multicollinearity problem within the research variables (Thong, 1999).

Table 5.13 shows the inter-correlationship matrix with Pearson's correlation coefficients. Significant values are shown using bold and italic fonts and are discussed briefly next.

The relationship between *perceived usefulness* and other variables was found significant except for *visibility* and *gender*. *Visibility* was found not correlated with other variables, indicating either Internet banking had limited visibility in public media and due to this respondents were not aware of usefulness of Internet banking or respondent viewed that *visibility* would not change their perceptions of benefits of Internet banking. Even Cronbach alpha was below the cut-off value. Similarly, *gender* did not correlate with most of the variables, meaning males and females perceived characteristics of Internet banking in a similar way. On the other hand, *age* was correlated with most of the variables but in opposite direction, meaning younger people found Internet banking more useful than the older people (Moore & Benbasat, 1991). *Risk* was found not correlated with most of the research variables suggesting that *risk* had minimum influence on Internet banking in New Zealand, which was not perceived from the literature review. The correlation of *Internet use* ($r = .396$, $p < .01$) with *Internet banking use* was found significant, meaning that the use of *Internet banking* will increase if the use of the Internet increases. This does not support Grealish's (2002) findings reported in chapter2 (section 2.2).

Although Pearson's correlation is probably one of the most highly employed statistical techniques, one outlier can significantly affect the result. Moreover, as mentioned above underlying assumption for using Pearson coefficient technique is that data must be interval. Since the major part of the data of this research was ordinal, an alternative to Pearson's correlation technique was searched in the literature. The extant literature review revealed that the two most commonly used nonparametric techniques are *Kendall's tau* and *Spearman's rho*. Several studies expressed that the *Spearman* and the *Kendall* correlation measures give an excellent compromise between local robustness and high efficiency in presence of outliers. The interpretation of the results of either method is identical to Pearson's correlation coefficient. Although underlying assumptions in these two measures are similar but they are not identical in magnitude, since their underlying logic and computational formulae are quite different. For this study, *Kendall's tau* is preferred over *Spearman's rho* since the former

has greater power than Spearman's (Ferrier & Watson, 1997) and deals better with tied ranks (Bryman & Cramer, 1997).

	PU	EOU	SE	RSK	RA	COM	DEM	VIS	TRI	BI	Use_1	Use_2	Gender	Age	Comp	Inter
PU																
EOU	0.644															
SE	0.438	0.435														
RSK	-0.263	-0.250	-0.148													
RA	0.687	0.547	0.431	-0.234												
COM	0.697	0.584	0.468	-0.203	0.755											
DEM	0.366	0.346	0.297	-0.074	0.319	0.324										
VIS	-0.042	-0.013	0.036	-0.021	0.006	0.010	0.026									
TRI	0.293	0.247	0.309	-0.174	0.291	0.284	0.199	0.207								
BI	0.444	0.331	0.337	-0.132	0.398	0.441	0.167	0.008	0.142							
Use_1	0.367	0.321	0.250	-0.161	0.324	0.373	0.236	0.000	0.109	0.621						
Use_2	0.337	0.284	0.213	-0.131	0.296	0.337	0.208	-0.010	0.086	0.553	0.812					
Gender	-0.028	-0.019	-0.081	0.004	-0.032	-0.010	-0.050	-0.076	-0.182	0.009	0.031	0.031				
Age	-0.227	-0.171	-0.205	0.101	-0.213	-0.202	-0.124	-0.021	-0.147	-0.362	-0.317	-0.246	0.232			
Comp	0.156	0.130	<i>0.125</i>	-0.101	0.137	0.164	0.036	-0.048	0.021	0.327	0.208	0.188	0.029	-0.169		
Inter	<i>0.116</i>	0.084	<i>0.108</i>	<i>-0.108</i>	<i>0.106</i>	0.133	0.098	0.004	0.021	0.257	0.204	0.172	0.082	-0.133	0.559	
IB	0.334	0.290	0.233	-0.158	0.275	0.329	0.189	0.000	0.081	0.613	0.707	0.646	0.045	-0.270	0.340	0.343

figures in **Bold** : Correlation is significant at the 0.01 level (1-tailed)

figures in **Italic**: Correlation is significant at the 0.05 level (1-tailed)

PU: *Usefulness*, EOU: *Ease of use*, SE: *Self efficacy*, RSK: *Risk*, RA: *Relative advantage*, COM: *Compatibility*, Dem: Result demonstrability, VIS: *Visibility*, TRI: *Trialability*, BI: *Interntion*, Comp: *Computer use*, Inter: *Internet use*, IB: *Internet banking use*.

Table 5.14: Kendall's tau correlation

The *Kendall's correlation coefficients* for all variables are presented in table 5.14. Results of the parametric and nonparametric analysis do not indicate significant differences in correlations between variables except correlations of *risk* with *compatibility*, *trialability* and *use_1* were found more significant in nonparametric test. The results of both techniques extend support to studies that argued in favour of using *Pearson's correlation coefficient* for ordinal data since outcomes from both techniques do not differ significantly.

5.2 Hypotheses testing

In order to test the hypotheses formulated in chapter 3, a series of simple linear regression analyses was conducted to calculate direct and indirect path coefficients (?). Simple linear regression is a useful statistical method for exploring the relationship between dependent and independent variables and can be described by the following equation:

$$y = a + bx$$

Where “x” and “y” are classed as independent and dependent variables and “b” is the slope of the line and “a” is the intercept i.e. where the line cuts the y-axis.

In social and natural science research, linear regression is widely used mainly for its simplicity and ability for producing output quickly. Hypotheses are considered supported when path coefficients (?) are significant at the 0.05 level. The path coefficients were calculated using simple linear regression technique for the following:

1. Independent variables, *perceived ease of use*, *perceived usefulness*, *self-efficacy*, and *risk* were separately regressed with the dependent variable, *intention* (Hypotheses H1a, H2, H3a, and H4).
2. Independent variable *perceived ease of use* was regressed against *perceived usefulness* (Hypothesis H1b).
3. Independent variable *self-efficacy* was regressed individually against *perceived ease of use*, *perceived usefulness*, and *risk* (hypotheses H3b, H3c, H3d).
4. Using *intention* as an independent variable, regression was run separately for dependent variables, *actual use_1* and *actual use_2* (hypotheses H5a, H5b).
5. Using *relative advantage*, *compatibility*, *trialability*, *visibility* and *result demonstrability* as independent variables, individual regression analyses were carried out with *intention* as the dependent variable (hypotheses H6, H7, H8, H9, H10).

Hypot hesis	Dependent variable	Independent variable	?	t-value	p-value
H1a	Intention	Perceived ease of use	0.373	5.005	0.000
H1b	Perceived usefulness	Perceived ease of use	0.788	15.910	0.000
H2	Intention	Perceived usefulness	0.441	6.124	0.000
H3a	Intention	Perceived self-efficacy	0.406	5.530	0.000
H3b	Perceived ease of use	Perceived self-efficacy	0.657	10.850	0.000
H3c	Perceived usefulness	Perceived self-efficacy	0.356	3.919	0.000
H3d	Perceived risk	Perceived self-efficacy	-0.222	-2.828	0.005
H4	Intention	Perceived risk	-0.139	-1.753	0.082
H5a	Use_1	Intention	0.795	16.324	0.000
H5b	Use_2	Intention	0.511	7.393	0.000
H6	Intention	Relative advantage	0.451	6.285	0.000
H7	Intention	Compatibility	0.485	6.905	0.000
H8	Intention	Trialability	0.143	1.803	0.073
H9	Intention	Visibility	0.001	.012	0.991
H10	Intention	Result demonstrability	0.218	2.785	0.006

Table 5.15: Regression analysis

The results of linear regression analysis are presented in table 5.15 and discussed in the following sections. Figure 5.1 and 5.2 present the relationship of independent variables with dependent variables in the TAM and PCI models.

5.2.1 Perceived ease of use and intention

Hypothesis H1a, that *Perceived ease of use will have a positive effect on the behavioural intention to use Internet banking*, was supported ($\beta = 0.373$, $t = 5.005$ and $p < .001$). This result is consistent with the findings of prior studies that used either TAM or PCI model (Mathieson et al., 2001; Moore & Benbasat, 1991; Wang et al., 2003). This suggests that if bank customers perceive an Internet banking system is easy to use, they might adopt that system or use it in preference to other Internet banking systems perceived as hard to use.

5.2.2 Perceived ease of use and perceived usefulness

Hypothesis H1b, that *Perceived ease of use will have a positive effect on the perceived usefulness of Internet banking* was supported ($\beta = .788$, $t = 15.910$ and $p < .001$). It is consistent with findings of prior studies (Chan & Lu, 2004; Wang et al., 2003). The path coefficient (β) values for *perceived ease of use* to *perceived usefulness* was higher than β values for *perceived ease of use* to *intention*, which indicates that although the direct effects of *perceived ease of use* on to users intention remain important over the time but indirect through *perceived usefulness* will be more weighted by the existing users as their experience with Internet banking system increases (Chau & Lai, 2003; Luarn & Lin, 2004). Both the hypotheses H1a and H1b, thus support Davis'(1989) argument that “ *perceived ease of use may actually be a casual antecedent to perceived usefulness, as opposed to a parallel, direct determinant of system usage*”.

5.2.3 Perceived usefulness and intention

Hypothesis H2, that *Perceived usefulness will have a positive effect on the behavioural intention to use Internet banking* was supported ($\beta = .441$, $t = 6.124$ and $p < .001$). The result is expected and consistent with prior studies that used TAM in Internet or mobile banking context (Chan & Lu, 2004; Luarn & Lin, 2004). This suggests that if banks customers perceive Internet banking to be a useful, quicker and easier way of carrying out financial transactions than traditional branch banking, they will adopt or use the services.

5.2.4 Self-efficacy and intention

As expected, hypothesis H3a, that *perceived self-efficacy will have a positive effect on behavioural intention to use Internet banking* was supported ($\beta = .406$, $t = 5.530$ and $p < .001$). This indicates that banks customer, who are confident of their abilities to use Internet banking services are more likely to adopt such services. The result extends support to previous findings (Luarn & Lin, 2004; Tan & Teo, 2000).

5.2.5 Self-efficacy and perceived ease of use

Table 5.15 demonstrates support for hypothesis H3b that, *Perceived self-efficacy will have a positive effect on the perceived ease of use of Internet banking* ($\beta = .657$, $t = 10.850$ and $p < .001$). The result is consistent with finding of prior researches (Agarwal et al., 2000; Chan & Lu, 2004; Hong et al., 2001; Igbaria & Iivari, 1995; Venkatesh, 2000; Venkatesh & Davis, 1996; Wang et al., 2003). This implies that individuals with higher *self-efficacy* will perceive Internet banking services easier to use than those with lower *self-efficacy*.

5.2.6 Self-efficacy and perceived usefulness

The support ($\beta = .356$, $t = 3.919$ and $p < .001$) for hypothesis H3c that, *Perceived self-efficacy will have a positive effect on the perceived usefulness of Internet banking* extended support to prior researches (Wang et al., 2003). This implies that individuals with higher *self-efficacy* will perceive more positive usefulness of Internet banking than others with lower *self-efficacy*.

5.2.7 Self-efficacy and risk

Hypothesis H3d that *Perceived self-efficacy will have a negative effect on the risk of Internet banking* was supported ($\beta = -0.222$, $t = -2.828$ and $p = .005$), suggesting individual has higher *self-efficacy* will perceive less risk than individual with lower *self-efficacy*. The result supports Wang et al (2003) findings.

5.2.8 Perceived risk and intention

There was a weak negative relationship between *perceived risk* and *intention* to use Internet banking. Consequently, hypothesis H4 that, *Perceived risk will have a negative effect on the behavioural intention to use Internet banking*, was not supported ($\beta = -0.139$, $t = -1.753$ and $p = .082$). This conflicts with the findings of prior studies (Bhatnagar, Misra, & Rao, 2000; Chan & Lu, 2004; Doolin, Dillon, Thompson, & Corner, 2005; Jarvenpaa & Todd, 1997; Lim, 2003; Pavlou, 2001). Further, in chapter 2, perceived security and security risk associated with Internet banking have been found major impediments to Internet banking adoptions in many countries across the world. One explanation for the deviation from could be that respondents did not perceive *risk* associated with Internet banking system. This might be one of the reasons behind the growing popularity of Internet banking over online shopping, mentioned in chapter 2.

5.2.9 Intention and usage_1

Usage_1 was measured as the frequency of use of Internet banking services. The hypothesis H5a that, *perceived behavioural intention will have a positive effect on the frequency of Internet banking use*, was supported ($\beta = 0.795$, $t = 16.324$ and $p < .001$) and thus extended support to previous studies (Agarwal & Prasad, 1997; Davis, 1989; Mathieson et al., 2001).

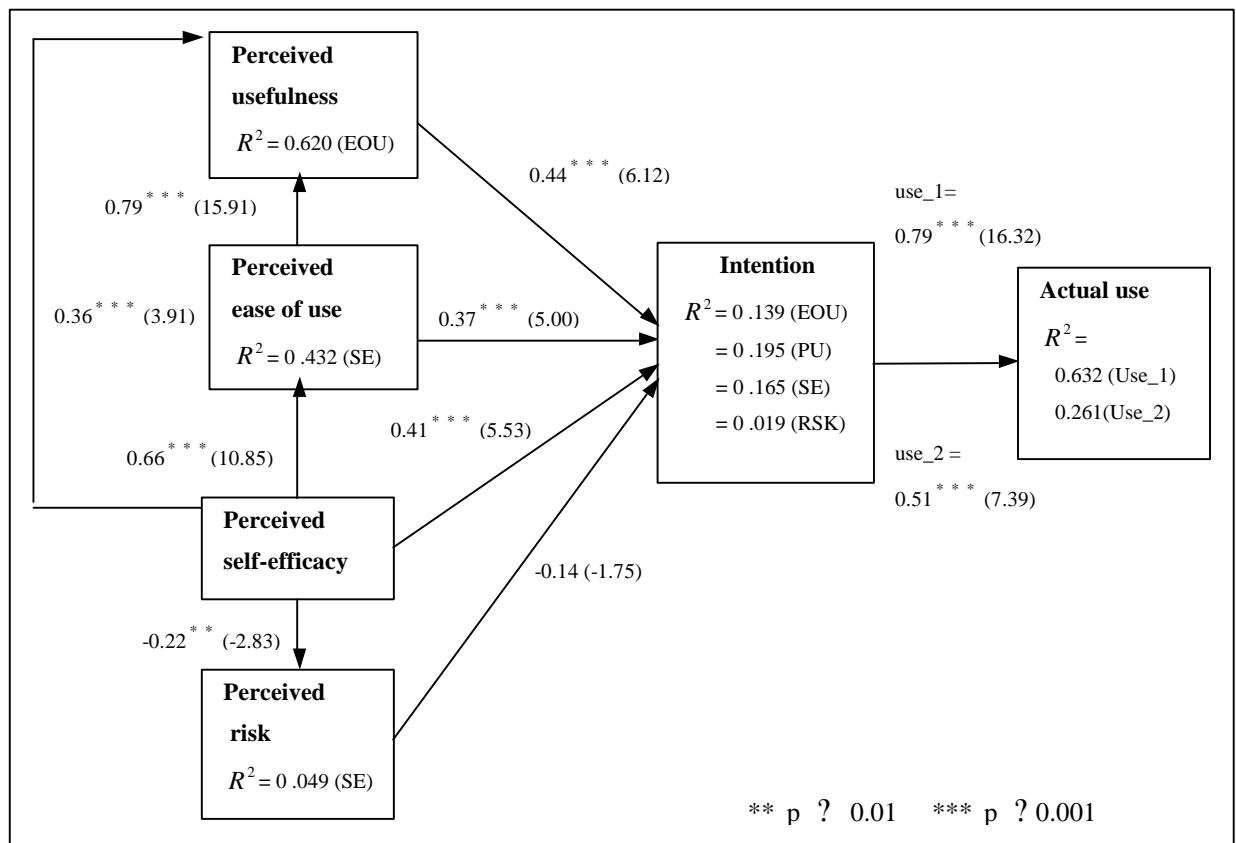


Figure 5.1: Regression analysis of model 1

Note. t-values for standardised path coefficient (β) are shown in parenthesis

5.2.10 Intention and usage_2

Usage_2 was measured as the number of times in a month user used Internet banking services. The hypothesis H5b that, *Perceived: behavioural intention will have a positive effect on the number of times of Internet banking use*, was supported ($\beta = 0.511$, $t = 7.393$ and $p < .001$) and the result is inline with findings of prior study (Davis, 1989).

5.2.11 Relative advantage and intention

The Hypothesis H6 that, *perceived relative advantage will have a positive effect on the behavioural intention to adopt Internet banking*, was supported ($\beta = 0.451$, $t = 6.285$ and $p < .001$), which

was expected since most of the studies that uses either Roger's (1983) DOI model or Moore and Benbasat's (1991) PCI model, have found *relative advantage* is one of the key factor that influence adoption or use of Internet banking services (Kolodinsky & Hogarth, 2001; Polatoglu & Ekin, 2001; Tan & Teo, 2000). This suggests that if bank customers perceive that Internet banking has a *relative advantage* over branch banking in accessing accounts from any location and at any time, and provides greater control and flexibility in managing their accounts, they may adopt it and use it.

5.2.12 Compatibility and intention

The support ($\beta = 0.485$, $t = 6.905$ and $P < .001$) for hypothesis H7 that *Perceived compatibility will have a positive effect on the behavioural intention to adopt Internet banking* is shown in table 5.15, which suggests Internet banking services in New Zealand fit well with the way individuals manage their finances as well as it suits to their lifestyle or current situations. This is consistent with prior findings (Agarwal & Prasad, 1997; Kolodinsky & Hogarth, 2001; Tan & Teo, 2000).

5.2.13 Trialability and intention

Table 5.15 shows lack of support for hypothesis H8 that *Perceived trialability will have a positive effect on the behavioural intention to adopt Internet banking* and does not support prior findings (Agarwal & Prasad, 1997; Moore & Benbasat, 1991) that supported Rogers' (Rogers, 1983) argument that users who feel more comfortable with the innovation are more likely to adopt provided they are able to try out a technology. Further, Tan and Teo (2000) have expressed that *trialability* influences intention to adopt or use Internet banking services in Singapore. One possible reason for the lack of support could be that New Zealand banks do not provide services on a trial basis and therefore respondents perceived *trialability* was not a factor that could influence their intentions. Another possible reason could be easy access to information on Internet banking that had made respondents less dependent on trying the option.

5.2.14 Visibility and intention

The results of linear regression show lack of support for hypothesis H9 that *Perceived visibility will have a positive effect on the behavioural intention to adopt Internet banking* (see table 5.15). This suggests that *visibility* in public media is not be instrumental in persuading New Zealand bank customers to adopt or use Internet banking, which is inconsistent with findings of empirical researches (Agarwal & Prasad, 1997; Moore & Benbasat, 1991).

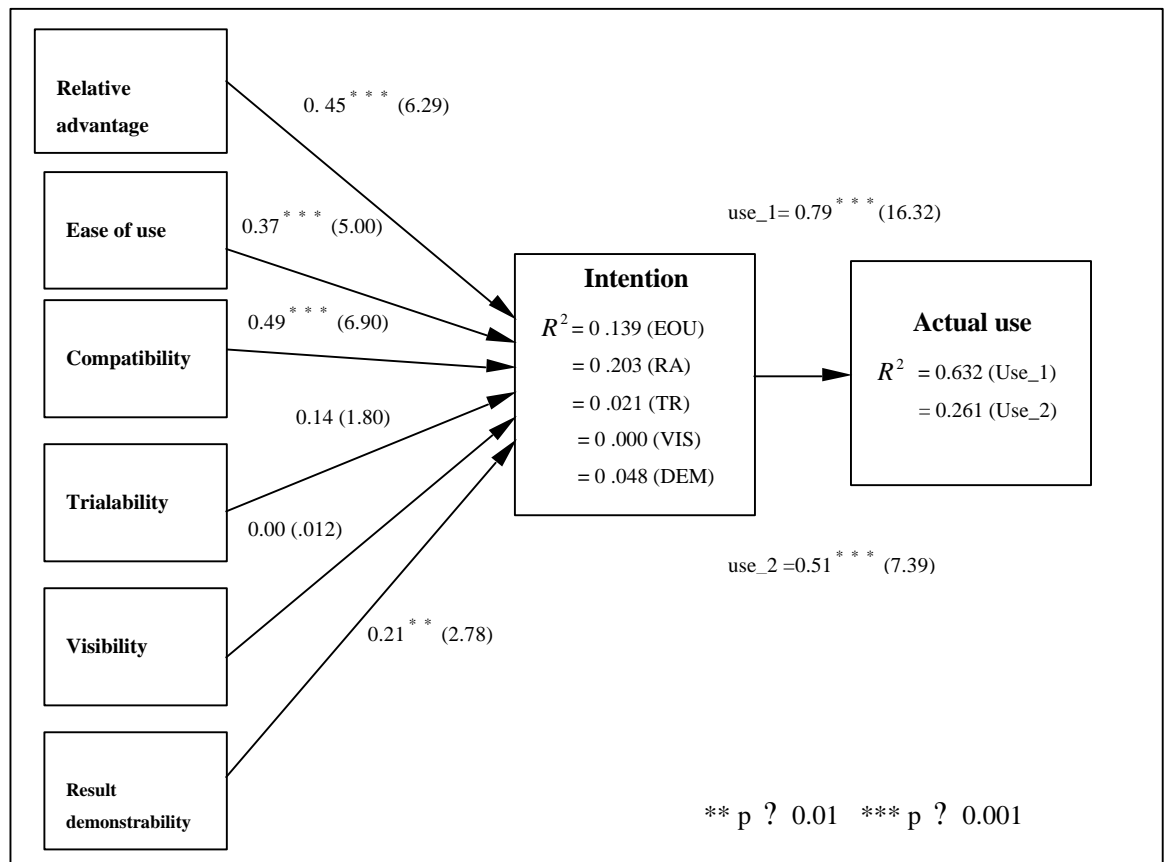


Figure 5.2: Regression analysis of model 2

Note. t-values for standardised path coefficient (?) are shown in parenthesis

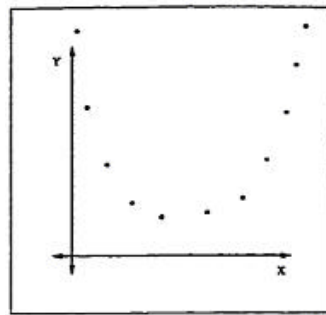
5.2.15 Result demonstrability and intention

Hypothesis H10 that *Perceived result demonstrability will have a positive effect on the behavioural intention to adopt Internet banking*, was supported ($\beta = .218$, $t = 2.785$ and $P < .05$). It extended support to prior studies (Agarwal & Prasad, 1997; Moore & Benbasat, 1991; Venkatesh & Davis, 2000), which suggest that the tangible benefits of Internet banking, as measured by *result demonstrability*, may influence individuals to adopt or use it.

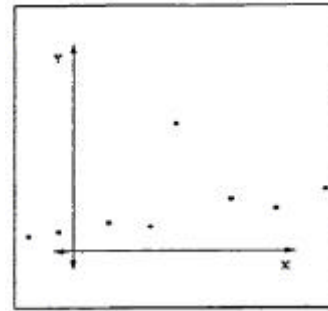
The nonparametric versions of linear regression are established in method comparison studies, of which the *Passing Bablok regression* (PBR) perhaps is the widely used method. But its application to date has been restricted to clinical research and is not supported by SPSS. Therefore, this study did not explore the nonparametric regression method (Stockel, Dewitte, & Thienpont, 1998).

5.3 Model analysis

Multiple linear regression were used to analyse the amount of variance (R^2) accounted for in the dependent variable from a set of independent variables. As mentioned before, this technique is useful and easy to use but has some disadvantages too. For example, figure 5.3 shows (non-normal distribution) for a type of data set no line can be accurately map the input sample to appropriate output classes. Further, this technique can be affected due to outliers. For example, figure 5.3 shows (data with outstanding outliers) a dataset with outstanding outliers. This outlier can skew the regression line away from the others points to a significant degree as this regression technique does not ignore outliers and treats all points as important ones, these outliers can skew the regression line away from its optimal position. However in this research the data set used apparently does not have outliers and therefore linear regression was used for examining variances in dependent variable.



Non-normal distribution



Data with outstanding outliers

Figure 5.3 Example of data distribution

5.3.1 Model 1: extended TAM

Model 1: Stepwise regression analysis									
Model		R^2	Adjusted R^2	Sum of squares	df	Mean squares	F	p	
1	Regression	0.195	0.190	148.698	1	148.698	37.508	0.000	
	Residual				614.490	155			3.964
	Total				763.187	156			
2	Regression	0.220	0.210	167.859	2	83.929	21.711	0.000	
	Residual				595.329	154			3.866
	Total				763.187	156			
Model 1: Independent variable: <i>Perceived usefulness</i>					Dependent variable: <i>Intention</i>				
Model 2: Independent variable: <i>Perceived usefulness, Self-efficacy</i>									

Table 5.16: Stepwise regression analysis of model 1

In order to identify most the important independent variables that explain the behaviour of dependent variable, stepwise regression analysis (Norusis, 1999) was carried out. The

stepwise multiple regression technique allows isolating those independent variables that contribute most to the explanation of the variance of a dependent variable. The results of stepwise regression analysis are presented in table 5.16, table 5.17 and table 5.18.

Coefficient			
Model	Standardised Beta	t	p
1 Perceived usefulness	0.441	6.124	0.000
2 Perceived usefulness	0.307	3.300	0.001
Self-efficacy	0.207	2.226	0.027

Table 5.17: Explanation power of variables associate with model 1

Excluded variables			
Model	Beta in	t	p
1 Perceived ease of use	0.067	0.569	0.570
Self-efficacy	0.207	2.226	0.027
Risk	-0.035	-0.467	0.641
2 Perceived ease of use	-0.016	-0.131	0.896
Risk	-0.021	-0.278	0.781
Model 1: Independent variable: <i>Perceived usefulness</i>			
Model 2: Independent variable: <i>Perceived usefulness, Self-efficacy</i> Dependent variable: <i>Intention</i>			

Table 5.18: Excluded variables of model 1

Although the sum of squares (148.698) is larger than residual sum of squares (614.490), still the value of F was found significant at 0.001 level ($p < 0.001$). The analysis suggests two models: one with *perceived usefulness* ($\beta = .441$, $t = 6.124$ and $p < .001$) as the only independent variable that explains 19.5% ($R^2 = 0.195$) of the variance in *intention*, while the second model comprises of *perceived usefulness* ($\beta = 0.307$, $t = 3.300$ and $p = 0.001$) and *self-efficacy* ($\beta = 0.207$, $t = 2.226$ and $p = .027$) as the independent variables, that increases explanation power to 22% ($R^2 = 0.220$) (shown in figure 5.4). This means *self-efficacy* in the second model explains only 2.5% ($0.220 - 0.195 = 0.025$) of the variance in *intention*. The effect of *perceived usefulness* ($\beta = 0.307$) on *intention* is higher than the effect of *self-efficacy* ($\beta = 0.207$) and both effects are statistically significant ($p < 0.005$) in model 2 (Chau & Lai, 2003; Luarn & Lin, 2004).

Model 1 variables that had not been entered in to the equation are shown in table 5.18. *Beta in* is the standardised regression coefficient that would result if the variables were entered into the equation in the next step. Figure 5.4 shows variables are related with *intention* (values of table 5.17 and table 5.18 for model 2 are used).

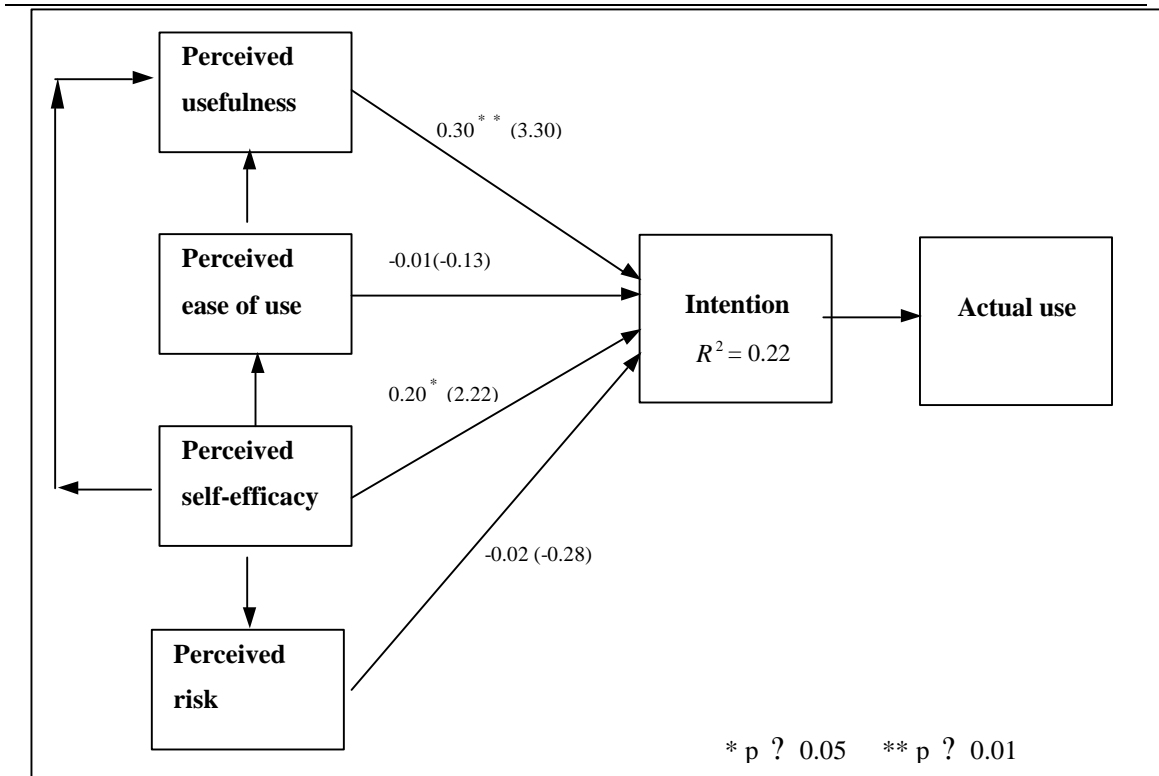


Figure 5.4: Model 1 regression analysis

Note. t-values for standardised path coefficient (?) are shown in parenthesis

5.3.2 Model 2: PCI

Model 1 : Stepwise Regression Analysis								
Model		R^2	Adjusted R^2	Sum of Squares	df	Mean squares	F	p
1	Regression	0.235	0.230	179.519	1	179.519	47.673	0.000
	Residual			583.668	155	3.766		
	Total			783.187	156			
Model 2: Independent variable: <i>Compatibility</i>				Dependent variable: <i>Intention</i>				

Table 5.19: Stepwise regression analysis of model 2

Coefficient			
Model	Standardised Beta	t	p
1 Compatibility	0.485	6.905	0.000

Table 5.20: Stepwise regression analysis of model 2

The results of stepwise regression analysis are presented in tables 5.19, 5.20 and 5.21. The results show that compatibility ($\beta = .485$, $t = 6.905$ and $p < .001$) is the only independent variable that explains 23.5% ($R^2 = 0.235$) the variances in *intention* (shown in figure 5.5). Table 5.21 shows other variables of model2 that had not been entered in to the equation. As explained, *Beta in* is the standardised regression coefficient that would result if the

variables were entered into the equation. Figure 5.5 shows how variables are related to *intention*.

Excluded variables				
Model		Beta in	t	p
1	Relative advantage	0.088	0.566	0.572
	Perceived ease of use	0.020	0.192	0.848
	Trialability	-0.024	-0.327	0.822
	Visibility	-0.011	-0.162	0.871
	Result demonstrability	0.017	0.225	0.744
Model 2: Independent variable: <i>Compatibility</i>		Dependent variable: <i>Intention</i>		

Table 5.21: Stepwise regression analysis of model 2

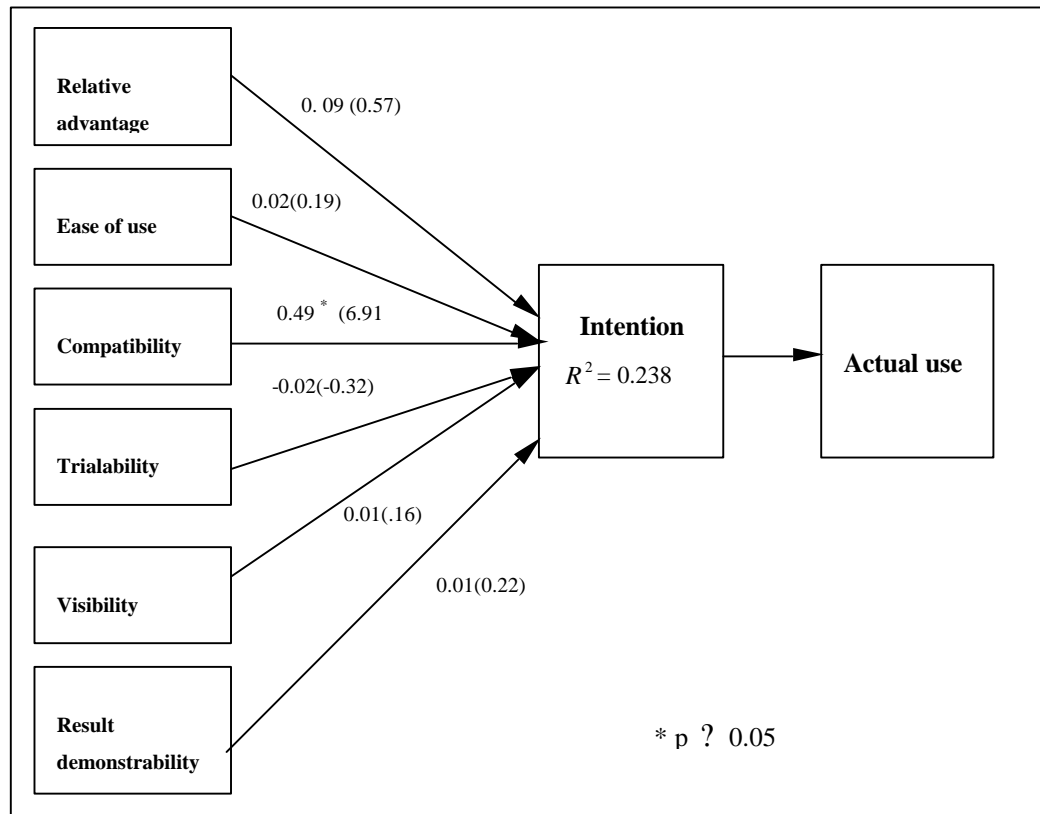


Figure 5.5: Model 2 regression analysis

Note. t-values for standardised path coefficient (?) are shown in parenthesis

5.3.3 Summary of model analysis

Multiple regression analysis shows that both models have almost same explanation capabilities. Extended TAM with two independent variables, *perceived usefulness* and *self-efficacy* are found to explain 22% variance in intention, while PCI model with one independent variable as *compatibility* can explain 23.8% variance in intention. The independent variable, *perceived ease of use*, was found not significant in either model. Further, *risk* in TAM and

relative advantage, *trialability*, *visibility* and *result demonstrability* in PCI model, are found not significant in explaining variances in intention to adopt or use Internet banking services.

5.4 Perceptions of Internet banking

In order to understand the differences in perceptions of Internet banking services between users and non-users, this research carried out *t-test* and the *Mann-Whitney U-test*. As mentioned earlier both parametric and nonparametric tests were carried in this research due to ordinal data.

5.4.1 t-test of independent sample

The *t-test* is a parametric technique which can be used for either independent or dependent samples (Hussey & Hussey, 1997). For carrying out *t-test* for independent samples, data should meet the underlying assumptions and those are: data must be at least ordinal; data in each data set are normally distributed; and the two populations have similar variance (Hussey & Hussey, 1997). The *t-test* has some disadvantages. It is sensitive to data interdependence in which case *t-test* has a tendency to indicate differences between groups but in reality there are none (Livingstone, 2004). However, considering its robustness, i.e. it provides a good estimates of significance even when there is fair amount of deviations from its underlying assumptions and popularity over other statistical techniques (Livingstone, 2004), *t-test* was used in this study to examine the differences in perceptions of Internet banking between user and non-user groups.

Table 5.22 shows the results of *t-test* of independent samples. As recommended by SPSS package, values associated with *equal variances assumed* are considered where F values were significant at $\alpha = 0.05$ levels in Levene's test. For others, values in *equal variances not assumed* were considered for evaluation. Thus values for *risk*, *trialability*, *visibility* and *result demonstrability*, in *assume equal variances* were considered. Apart from *visibility*, perceptions of Internet banking between users and non-users groups were significant. The *mean difference* indicates that users' perception of Internet banking was higher than non-users in all aspects except *risk*. Similar results were found in *Mann-Whitney U-test*, described in the next section.

		Levene's test for equality of variance		t-test for equality means						
		F	Sig.	t	df	Sig. (1-tailed)	Mean Difference	Std. Error Difference	95% confidence interval of the difference	
									Lower	Upper
PU	EVA	10.384	0.002	-6.955	155.000	0.000	-1.880	0.270	-2.414	-1.346
	EVN A			-6.202	72.292	0.000	-1.880	0.303	-2.484	-1.276
EOU	EVA	4.697	0.032	-5.834	155.000	0.000	-1.246	0.214	-1.668	-0.824
	EVN A			-5.218	72.742	0.000	-1.246	0.239	-1.722	-0.770
SE	EVA	21.602	0.000	-5.985	155.000	0.000	-1.509	0.252	-2.006	-1.011
	EVN A			-5.179	68.301	0.000	-1.509	0.291	-2.090	-0.927
RSK	EVA	1.707	0.193	2.560	155.000	0.011	0.687	0.268	0.157	1.217
	EVN A			2.370	78.002	0.020	0.687	0.290	0.110	1.264
RA	EVA	8.035	0.005	-6.199	155.000	0.000	-1.594	0.257	-2.102	-1.086
	EVN A			-5.576	73.553	0.000	-1.594	0.286	-2.164	-1.025
COM	EVA	8.641	0.004	-6.845	155.000	0.000	-2.015	0.294	-2.596	-1.433
	EVN A			-6.216	74.959	0.000	-2.015	0.324	-2.660	-1.369
DEM	EVA	0.002	0.964	-3.730	155.000	0.000	-0.918	0.246	-1.404	-0.432
	EVN A			-3.596	85.225	0.001	-0.918	0.255	-1.426	-0.411
VIS	EVA	1.654	0.200	-0.739	155.000	0.461	-0.162	0.220	-0.596	0.272
	EVN A			-0.773	103.687	0.441	-0.162	0.210	-0.579	0.254
TRI	EVA	0.810	0.369	-2.689	155.000	0.008	-0.579	0.215	-1.004	-0.154
	EVN A			-2.556	82.591	0.012	-0.579	0.226	-1.029	-0.128
User = 108 Non-user = 49		EVA: Equal variance assumed EVNA: Equal variance not assumed								

Table 5.22: Result of independent sample t-test

PU: *Usefulness*, EOU: *Ease of use*, SE: *Self efficacy*, RSK: *Risk*, RA: *Relative advantage*, COM: *Compatibility*, Dem: *Result demonstrability*, VIS: *Visibility*, TRI: *Trialability*

5.4.2 Mann-Whitney test

The Mann-Whitney U-test is the most commonly used alternative to t-test (Norusis, 1999). It is powerful, compares the number of times a score of one of the samples ranked higher than a score from the other sample (Bryman & Cramer, 1997) irrespective of the shapes of distribution of data (Norusis, 1999). The two-tailed probability was used to find out if any difference between users and non-users' perceptions and if the scores between two groups were statistically significant (Yuksel, 2003). The results of the Mann-Whitney U-test, as shown in table 5.23, indicate that out of 9 areas assessed, eight are showing significant differences between users and non-users' perceptions. On the *visibility* there is no significant difference between the mean scores of users and non-users. The possible explanation is the limited coverage of Internet banking in public media. The mean scores between users and non-users indicate that non-users are more negative on perceptions than users in all areas except perception of *risk*. One possible reason for high mean scores in *risk* is that non-users perceive higher risk involvement in carrying out banking transactions over the Internet than existing user (Rotchanakitumunai & Speece, 2003).

Variables	Non-users		User		Mann-Whitney U	Sig. (2-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks		
Perceived usefulness	47.32	2318.50	93.38	10084.50	1093.500	0.000
Perceived Ease of use	51.27	2512.00	91.58	9891.00	1287.000	0.000
Self-efficacy	52.81	2587.50	90.88	9815.50	1362.500	0.000
Risk	95.50	4679.50	71.51	7723.50	1837.500	0.002
Relative advantage	49.66	2433.50	92.31	9969.50	1208.500	0.000
Compatibility	48.96	2399.00	92.63	10004.00	1174.000	0.000
Trialability	64.13	3142.50	85.75	9260.50	1917.500	0.006
Visibility	75.33	3691.00	80.67	8712.00	2466.000	0.492
Result Demonstrability	60.62	2970.50	87.34	9432.50	1745.500	0.000
User = 108 Non-user = 49						

Table 5.23: Mann-Whitney U-test analysis

5.5 Chapter summary

This chapter presents the results of data analysis. Demographic profile together with respondents' perception of Internet banking was presented. Regression techniques were employed to test the research hypotheses and capabilities of models in explaining the variances in intention to adopt or use of Internet banking. The t-test and the Mann-Whitney test were carried out to examine the difference in perceptions between users and non-users of Internet banking.

The results of hypotheses testing provide support for all variables except *risk* in TAM and *visibility* and *result demonstrability* in PCI model. Results of model analysis indicate that extended TAM with *perceived usefulness* and *self-efficacy* as independent variables and PCI model with *compatibility* as independent variable, have almost similar explanation capabilities with PCI marginally higher than TAM. Over difference in perceptions, user and non-user had significant differences except *visibility*. Users' perception of Internet banking was higher than non-user on all dimensions except *risk*, where the non-user group had higher *risk* perceptions than existing users. All SPSS outputs can be found in Appendix H.

CHAPTER 6 DISCUSSION AND CONCLUSION

6.0 Introduction

This chapter begins with a discussion of the results found in chapter 5 and its comparison with prior research works that either support or contradict with findings of this research work. This is followed by conclusions that are drawn from this research work. Several implications for both research and practice emerged and are discussed in following sections. In the final part recommendations for future research are made.

6.1 Discussion

The objectives of this research are to identify the following:

1. Are the hypothesised relationships between variables in each of the models supported?
2. Which model, TAM or PCI, can explain more variance in intention to adopt or use Internet banking?
3. How do users and non-users differ in their perceptions of Internet banking?

Based of the research findings, mentioned in chapter 5, we will now discuss how results of this study support the objectives.

Using two commonly applied and supported models of information technology adoption, the Technology Acceptance Model (TAM) proposed by Davis (1989) and the Perceived Characteristics of Innovating (PCI) model proposed by Moore and Benbasat (1991), this research examines factors that influence the adoption or usage of Internet banking services in New Zealand. The PCI model is an extension of Rogers'(1983) Diffusion of Innovation (DOI) model, developed for studying information technology usage by adopters and potential adopters. The conceptual similarity between TAM and PCI have motivated current researcher to include PCI model along with TAM for this research.

This study has extended TAM, while retaining its parsimony and information system focus, with two external variables: *risk* and *self-efficacy*. These variables were theoretically justified to have influence on *behavioural intention* within the Internet banking context. On the other hand, for PCI model we had a priori reason to believe that all the innovation characteristics would be significant in affecting *intention* (Agarwal & Prasad, 1997). However, considering

the context of current study two constructs, *image* and *voluntariness*, were dropped from the PCI model (discussed in detail in chapter 3).

Hy pot hesi s	Dependant Variable	Independent Variable	This Study	Prior Studies
H1a	Intention	Perceived Ease of use	Supported	Tan et al (2000) in Singapore: Not supported Chau et al (2003) in Hong Kong: Perceived Ease of use is the single most determinant of acceptance Chan et al (2004) in Hong Kong : Not supported Gefen et al (2000) in USA: Supported Agarwal et al.(1997) in USA: Not supported
H1b	Usefulness	Perceived Ease of use	Supported	Chau et al (2003) in Hong Kong: Perceived Ease of use influence attitude through perceived usefulness. Chan et al (2004) in Honk Kong: Supported Gefen et al (2000) in USA: Supported
H2	Intention	Perceived usefulness	Supported	Chau et al (2003) in Hong Kong: Supported Chan et al (2004) in Hong Kong: Supported
H3a	Intention	Perceived Self-efficacy	Supported	Tan et al (2000) in Singapore: Supported Laurn et al (2004) in Hong Kong: Supported
H3b	Ease of use	Perceived Self-efficacy	Supported	Chan et al (2004) in Hong Kong: Supported for both user and potential adopters Laurn et al (2004) in Hong Kong: Supported
H3c	Usefulness	Perceived Self-efficacy	Supported	Laurn et al (2004) in Hong Kong: Supported
H3d	Risk	Perceived Self-efficacy	Supported	Wang et al. (2003) in Taiwan: Supported
H4	Intention	Risk	Not supported	Tan et al (2000) in Singapore: Supported Rotchanakitumunai (2003) in Thailand: Supported Doolin et al (2005) in New Zealand: Supported
H5a	Usage_1	Intention	Supported	Davis et al (1989) in USA: Supported
H5b	Usage_2	Intention	Supported	Davis et al (1989) in USA: Supported
H6	Intention	Relative Advantage	Supported	Tan et al (2000) in Singapore: Supported Kolodinsky et al. (2001) in USA: Supported
H7	Intention	Compatibility	Supported	Tan et al (2000) in Singapore: Supported Kolodinsky et al. (2001) in USA: Supported
H8	Intention	Trialability	Not supported	Tan et al (2000) in Singapore: Supported Kolodinsky et al. (2001) in USA: Supported Agarwal et al.(1997) in USA: Weak support
H9	Intention	Visibility	Not supported	Kolodinsky et al. (2001) in USA: Supported
H10	Intention	Result Demonstrability	Supported	Chan et al (2004) in Hong Kong: Supported for users but not for potential adopters

Table.6.1: Result of hypotheses testing with prior studies

A number of hypotheses concerning the adoption and use of Internet banking were formulated after an extensive literature review. Hypotheses were tested using regression

analyses and results are summarised in table 6.1 together with the results of prior studies. The results of the current study were found to be generally consistent with prior studies except for *risk*, *trialability* and *visibility*. The possible explanations for lack of support for these constructs are discussed later in this section. In addition, TAM and PCI were compared on their explanation powers on the variances in intention. Both models exhibited explanation of variances in intention slightly over 20%. Results of t-tests and Mann-Whitney-U tests showed that there are differences in perceptions of Internet banking between users and non-users of Internet banking services. A detailed discussion is presented below.

6.1.1 Model 1 variables

The results of linear regression analysis indicate that *perceived usefulness* was found to be the most significantly related factor affecting intention. This confirms the importance of *perceived usefulness* in explaining adoption or use of a new technology. If Internet banking is to be accepted by the users, they should perceive it to be useful, quicker and easier way of carrying out financial transactions than traditional branch banking system. This finding supports previous studies on Internet banking (Chan & Lu, 2004; Chau & Lai, 2003) (shown in table 6.1). The *perceived ease of use* was found to affect *intention* significantly, which confirms the importance of the role of *ease of use* variable that reflects users' concern of newness (Chau & Lai, 2003) of the Internet banking environment and confirms that difficulty of use can discourage *intention*. Although the effects of *ease of use* on *intention* concurs with the study of Chau et al.(2003), it contradicts the findings of other studies by (Chan & Lu, 2004; Tan & Teo, 2000). A plausible reason could be that the *perceived ease of use-intention* relationship is significant when Internet banking is new but diminishes over the time as experience makes use of Internet banking services easier.

In addition, *perceived ease of use* exhibited a significant indirect effect on *intention* through *perceived usefulness*. This suggests that the easier Internet banking is to use, the greater will be a user's feeling of determination and which in turn might motivate user to explore features and benefits of service and thereby increase perceived system usefulness (Chan & Lu, 2004). Further, the findings of this study confirm that the indirect effect of *perceived ease of use* on *intention* through *perceived usefulness* will be more weighted by existing users as their experience with Internet banking system increases. In other words, difficulty of use can discourage intention to adopt or use of a useful system but no amount of ease of use can compensate for a system that is not found useful by users (Davis, 1989). The implication is

that New Zealand banks must not overemphasise ease of use at the expense of overlooking the usefulness of Internet banking.

Self-efficacy was found to influence *intention* either directly or indirectly through its effects on *perceived ease of use* and *perceived usefulness*. This finding supports prior research on Internet banking (Chan & Lu, 2004; Luarn & Lin, 2004). To boost customer's confidence and enhance their *self-efficacy* in Internet banking, banks could organise demonstrations via video presentation or arrange hands-on training to show the user-friendliness of such services. Further, *self-efficacy* was found to have negative effect on *risk*, which confirms individual with higher *self-efficacy* will perceive less risk than individual with low *self-efficacy* and is consistent with prior findings (Wang et al., 2003). Therefore banks must focus in enhancing customers' self-efficacy, which would enhance adoption indirectly. However, *risk* is not significantly related to *intention*, contradicting expectations and the findings of prior studies (Bhatnagar, Misra, & Rao, 2000; Chan & Lu, 2004; Doolin, Dillon, Thompson, & Corner, 2005; Jarvenpaa & Todd, 1997; Lim, 2003; Pavlou, 2001). One possible explanation for such deviation in New Zealand could be that respondents did not perceive any *risk* associated with Internet banking services since very few security violations have been publicly reported so far (discussed in chapter 2). Another possible explanation could be that the measures of *risk* used for this research might not suitable for the Internet banking context, although they were adopted from prior studies conducted in other countries. According to Liao et al (1999) getting a reliable measure on *perceived risk* in the virtual banking environment is difficult. For example, some of the risk facets (*time risk*, *financial risk*) were found to be salient concerns in the adoption of e-services (Featherman, 2002), while those were dropped in this study due to lack of loading in factor analysis.

6.1.2 Model 2 variables

The attribute *compatibility* emerged as the most significant factor affecting intention of Internet banking, followed by *relative advantage*. This suggests that if Internet banking services are perceived as a better channel than traditional banking systems, as consistent with users' needs and lifestyle, and as easy to use, then adoption of Internet banking is more likely to take place. Support for *relative advantage* and *compatibility* concur with findings of prior studies (Tan & Teo, 2000; S. Thompson, H, Tan, & Buk, 1997). A possible reason for the lack of support for *relative advantage* in prior study (Agarwal & Prasad, 1997) could be that respondents started using a technology without evaluating its benefits as a result of high *visibility*, which created a willingness to put the innovation into initial use.

The lack of support for *trialability* suggests that respondents viewed it as an insignificant factor that could motivate their intentions to adopt Internet banking. The role of *trialability* in affecting *intention* is found mixed in prior studies, although it was found important for initial use. *Trialability* was found insignificant in adoption of e-commerce services in Thailand because of availability of too many options in the market place including access to free trial, which leads to an unimportance of *perceived trialability* of e-commerce. On the contrary, studies (Agarwal & Prasad, 1997; Moore & Benbasat, 1991; Tan & Teo, 2000) found *trialability* as a predictor of technology usage since it is perceived as a risk free exploration before adoption. However, the facility of trying out an innovation was available in the initial days when of e-commerce or Internet banking services were getting implemented. But the facility of ‘free trying out’ was diminished over the period of time and to the best of our knowledge no banks in New Zealand provide such service. This is possibly explaining why respondents perceived it as insignificant in motivating their intentions.

The lack of significance of *visibility* in predicting adoption of Internet banking services contradicts prior studies (Agarwal & Prasad, 1997; Moore & Benbasat, 1991) which viewed *visibility* of an innovation to be instrumental in motivating user adoption. One possible reason could be a lack of presence of Internet banking services in public media. In order to enhance the adoption or usage rate of Internet banking services, banks need to increase their presence in public media.

Result demonstrability was found to be a significant factor influencing customers’ *intentions* to adopt Internet banking. This suggests that *result demonstrability* has contributed to user perceptions of the tangible benefits of Internet banking. The *relative advantage* and *result demonstrability* appeared to work in tandem with each other. If *relative advantage* of Internet banking is perceived positive, *result demonstrability* might influence *intention* positively. Alternately *result demonstrability* might affect *intention* negatively if *relative advantage* is perceived negative (Agarwal & Prasad, 1997).

6.1.3 Model performance

The findings of this study show that model 1 (TAM) could explain 22% of variance in *intention* with two variables. Out of these variables *perceived usefulness* could explain 19.5% and *self-efficacy* only 2.5% of variance. The explanatory power is lower than that found in other studies. For instance, in Chau and Hu (2001), Chan and Lu (2004), Luarn and Lin (2004)

and Mathieson et. al. (2001) studies, it was 42%, 53%, 82% and 43.8% respectively. Further *perceived ease of use* and *risk* are found not associated with Internet banking intention in model 1. For model 2 (PCI), *compatibility* is the only variable with explanation capability of 23.8% of variance in *intention*. All other variables are found non-significant.

The low explanation capabilities raise the issue of whether the constructs or the models used in this study are suitable for the Internet banking context. Some researchers are of the opinion that TAM's fundamental constructs do not adequately reflect the comprehensive set of technological and financial influences on users' acceptance and intention to use Internet-related technologies (Luarn & Lin, 2004; Moon & Kim, 2001). Therefore, the incorporation of other constructs into TAM may provide a broader framework to understand user acceptance or rejection of Internet banking services in New Zealand.

There are few studies that have used PCI model in the Internet banking context and results are mixed (Liao et al., 1999; Tan & Teo, 2000). Most of these studies have used only a few variables as Tornatzky and Klein (1982) concluded that relative advantage, compatibility, and complexity are the most relevant constructs to adoption research. These three constructs may fall short of capturing information on factors that influence users' intentions to adopt and use Internet banking. It is recommended that a richer set of variables is considered in order to enhance the explanatory power of this model in the Internet banking context.

6.1.4 Internet banking perception

It is observed from the results that users and non-users perceive Internet banking differently. Users have higher perceptions in all dimensions of Internet banking use except *risk*. For most of these dimensions, it seems likely that this reflects that, as users of Internet banking, they have a higher degree of 'involvement' (Barki & Hartwick, 1989) than non-users with Internet banking services. For example, users of Internet banking presumably do so because they perceive it as *easy to use*, as *compatible* with the way they manage their finances, and that it is *useful* or provides them with a *relative advantage* in terms of carrying out financial transactions compared with the traditional branch banking system (Chau & Lai, 2003).

Similarly, the tangible recognition of the benefits of Internet banking as measured by *result demonstrability* was found to be higher for users. With regard to *trialability*, users might have

explored the ramification of Internet banking services for themselves before using them and thereby have higher perceptions of *trialability* than non-users. The difference in perceptions of *visibility* of Internet banking between users and non-users was low, probably reflecting that the limited presence of Internet banking in public media is not likely to have motivated either users or non-users to adopt or use Internet banking services.

Technology adopters tend to hold stronger *self-efficacy* beliefs than non-adopters (Venkatesh & Davis, 1996), which may explain why *self-efficacy* perceptions were found to be higher for users of Internet banking. In contrast, higher levels of involvement or use of a technology generally leads to a reduced perception of its risks and an increased willingness to adopt it (Wang et al., 2003). This might explain why users' perceptions of the *risk* associated with Internet banking were lower than those of non-users (Wong & Chang, 2005).

6.2 Limitations

The present study has several limitations that should be noted before discussing the implications of the results. Due to the limited number of studies on Internet banking in New Zealand, the information available on the subject inevitably came from other countries. This might not reflect actual situation of New Zealand due to the influence of national environment on the users, which found to be an important factor that influences intention (I. Brown et al., 2004).

Multiple items for each construct were used for collecting information, which might have not included all possible alternatives. Despite effort given to amend survey instrument at the time of development and after pre-testing, respondents perceived a few questions differently than it was intended. Thus additional work is certainly required to further validate these scales in Internet banking context. One of the fundamental assumptions of research in the area of user acceptance of information systems is determined by system usage, which is defined as the utilisation of information system (Venkatesh, 2000). There has been some concern about how this construct has been conceptualised and operationalised (Straub, Limayem, & Karahanna, 1995) and then predictability of TAM (Venkatesh, 2000). However, considering support from existing body of research that *intention* as a predictor of actual use, the issue of *usage* construct treated as less critical for this research (Venkatesh, 2000).

Although the results of this study suggest several factors affecting intention to adopt or use Internet banking services, caution needs to be taken while generalising current findings to users in different geographical location since it is probably the first study of this nature in New Zealand and consistency of the results could hardly be validated. Further, both the research model has explanation power below 25% ($R^2 = 0.22$ for TAM and $R^2 = 0.23$ for PCI), which are low compared to results from prior TAM or PCI studies. The unexplained over 75% indicates that there might be omission of some important factors that affect user intentions.

Parametric tests were used for ordinal data, which is common in psychological and business research. As an alternative, non-parametric tests were also carried out wherever applicable to examine the differences. As mentioned before, for testing research models only parametric technique was used since non-parametric technique is not supported by SPSS and its use found limited to clinical research.

Web/e-mail surveys are now quite common (Kaplowitz et al., 2004; Yun & Trumbo, 2000) and can offer shorter administration time and lower survey cost (Porter, 2004; Shaeahan & McMillian, 1999; Yun & Trumbo, 2000). They would potentially have yielded a higher response rate (Cobanoglu et al., 2001; Kaplowitz et al., 2004; Schaefer & Dillman, 1998) especially when considering that 95% of New Zealand population has access to the Internet (Porter, 2004). Nevertheless, a postal survey was used for this study because numerous studies have compared the responses on postal and web-based surveys and have shown mixed results. It is quite common in web/email surveys that recipients delete messages from unknown sources without even reading them, considering them as junk mail (Dillman, 2000). Drawing any conclusion about effects on response rate due to adoption of postal survey is thus difficult.

6.3 Research contributions

Despite the limitations mentioned in an earlier section, this study and its findings form a useful contribution to the body of knowledge regarding the adoption and usage behaviour of Internet banking in New Zealand. To be useful, research findings must be validated in a larger context and subsequently generalised or considered applicable in different settings. Understandably, users from a different culture may demonstrate differences in technology assessment and therefore their adoption decision factors might vary in a culture characterised by differences in levels of individualism (Chau & Lai, 2003). As mentioned

there were very few studies on Internet banking and probably this is the first study of users' adoption in New Zealand. In this connection, this research represents an effort towards validating previous results in a different context by investigating the intention to adopt or use of Internet banking services by users in New Zealand.

Although the survey instrument used in this study was adapted from prior research on Internet banking and technology acceptance studies, rewording of items within variables was required to suit Internet banking study. Further, the survey instrument was modified suitably to incorporate the changes suggested by the faculty members and colleagues at the time of pre-testing the questionnaire. Therefore, this survey instrument could be useful for similar studies with possible changes as discussed in earlier section.

The response rate of this study appears to be better than postal surveys in recent studies, which might be due to direct delivery of the survey instruments to householders' letterbox rather than using postal addresses. This reduces the chances of mail returns due to wrong addresses. Future studies can adopt such an approach to enhance response rate.

Utilisation of TAM with two additional external variables, *self-efficacy* and *risk* and PCI model with almost all variables is possibly the first approach for determining factors that influences user intention to adopt or use of Internet banking services and is therefore considered to be a contribution of this study. Further, it might be the first approach to investigate the role of determinants direct on to *behavioural intention* in Internet banking context.

The New Zealand context provides a useful extension of research on Internet banking services and comparison with previous studies conducted in other countries. The results of this study contradict several studies that have used risk as a variable. Further studies are needed to examine this difference.

6.4 Practical implications

The findings of this study hold important practical implications for banks and financial organisations that are offering Internet banking. In particular, compared with *perceived ease of use*, *perceived usefulness* might be important in technology acceptance. Banks should consider launching campaigns to demonstrate the features of Internet banking services, its benefits and how easy to use. When more people are aware of the availability, they are more likely

to discuss the advantages and disadvantages of Internet banking. Once users perceive that advantages outweigh disadvantages, they are more likely to adopt or use the services. The types of products and services offered should be those that are frequently used and requiring minimum visit to bank branches. Further, banks should continuously innovate in adding value to their service. For instance, personalisation was found to be a significant influence on *perceived usefulness* and (Chau & Lai, 2003) recommended banks to allow customers not only access their current and historic transactions but also other related applications of their interest.

In addition to above, banks should introduce sending more personalised information in order to build one-to-one relationship marketing and might include financial planning services. Chau and Lai (2003) observed that customer prefer multiple services or “*one-stop comprehensive financial service*” instead of single or simple tasks/transactions. Therefore banks need to build link with other services or enter into business agreement with major vendors in the market to provide all banking and other financial-related services to their customers. This might motivate customers to visit more frequently to consolidate the usefulness of Internet banking services. Conversely, potential customers either will not adopt services or will select a competitor bank for Internet banking services.

With regard to *perceived ease of use*, banks should design sophisticated websites to provide Internet banking services and these Websites must be easy to use so that users get motivated to explore the services and its features. This will lead to increase perceived system usefulness (Teo et al., 1999) and consequently a favourable users intention on Internet banking will be created, which will eventually motivate them to spend more time on banking services (Chau & Lai, 2003). Further, access to the banking websites must be quick and 24 hours a day. If a user finds difficulty in getting access or gets frustrated due to slower connection speed, his or her perception on the *ease of use* will be negative and thereby reduces the chances of his re-visit or reuse that website. Therefore, banks must emphasise on improving the quality and performance of their website in terms of availability at all times with response time.

In order to boost customer's confidence and enhance their *self-efficacy* in Internet banking, banks could organise demonstrations via video presentation or arrange hands-on training to show the user-friendliness of such services. Such an initiative would help customers in developing positive perceptions of *ease of use* and *usefulness* of Internet banking services.

Further individuals with higher *self-efficacy* will perceive less risk than individuals with low *self-efficacy* (Chan & Lu, 2004; Wang et al., 2003). Chan and Lu (2004) have identified that use of automatic teller machine (ATM) as the most popular channel in Hong Kong and therefore they recommended banks for arranging demonstration of Internet banking through web-enabled ATM (Tedeschi, 2005). New Zealand banks may also adopt similar approach to enhance *self-efficacy* of their customers.

The results of the second model suggest that *compatibility* might be more significant in adoption or usage of Internet banking than its *relative advantage*. Therefore, banks should design and deliver their products and services in a way that is consistent with customers' past experience, beliefs and the way they are accustomed to work (Chau & Lai, 2003). For instance, New Zealand customers prefer Internet banking services for all activities other than home loan and credit card services (refer section 2.3.6 of chapter 2) and also one-to-one service. As discussed before, personalisation of a website would assist banks to satisfy their customers further. Recognising such preferences would lead to a fit between banking services and the environment in which it will be utilised (Agarwal & Prasad, 1997).

With regard to *relative advantage* and *result demonstrability*, it is not only important for banks to promise the benefits of Internet banking services, but equally important to deliver on those promises. Banks could invest in campaigns and arrange information sessions to demonstrate the features of Internet banking services, and its benefits over traditional channels. Unless customers are convinced about its advantages, no amount of external information propagation will produce results (Agarwal & Prasad, 1997). Apart from implementing trouble-free access and a highly responsive website, banks might continue to investigate offering Internet banking services at a reduced cost to customers, including cheque cancellation. Since the operating cost of Internet banking is lower than any other channels of service (refer section 2.1 of chapter 2), banks may lower fees for wire transfers or may reduce home loan interest rates or may pay higher interest rates on deposits that can only be operated over the Internet.

In order to enhance the adoption or usage rate, banks might target more on the group of Internet-experienced non-users of Internet banking. This should enable banks to cover the majority of non-user customers (about 84% in this study) and might take less time due to their prior Internet experience.

Besides promoting Internet banking services, banks need to invest in enhancing resources to maintain and improve upon such services. In this process banks should allocate sufficient resources on staff education and training, so that the staff can explain and encourage non-users of Internet banking services. Further, banks need to equip themselves with more powerful and advanced computer technology with minimum downtime to support any increase in banking transactions over the Internet. Furthermore, banks can introduce mobile banking to supplement Internet banking. Currently, only ASB bank provides such services in New Zealand, with limited options.

6.5 Recommendations for future study

The discussed limitations and implications single out several avenues for future research. In the area of adoption and usage of Internet banking services in New Zealand, more works need to be carried out. This study has investigated intentions of individuals from the Auckland area, so future studies can build upon this study through replication across samples from different parts of New Zealand as well as different types of users, such as corporate customers. A comparison can be made between individual customer and corporate customer in terms of determinants influencing their adoption or usage behaviour.

Although the measurement scales used in this study were previously tested in technology acceptance and Internet banking samples, reliabilities for *visibility* and *trialability* were experienced low. Furthermore wording of items for *self-efficacy*, *risk*, *visibilities* and *trialability* were consistent with previous studies, but validity for these scales were found low in this study. Thus, characteristics of these scales need to be investigated. Future study may use both subjective and objective measures for research variables, since self-reported scale measure suggests the possibility of method bias. Alternately, additional instrument development research could seek to build these scales.

Given that the results of this study show that TAM can explain 22% and PCI can explain 23.8% of the variances in *intention*, further studies can be carried out to validate and improve these models by incorporating additional external constructs to suit Internet banking study. Prior research suggested trust-based construct (Gefen, Karahanna, & Straub, 2003), perceived financial cost (Luarn & Lin, 2004), subjective norms (Chan & Lu, 2004) and personalisation, alliance services, task familiarity and accessibility (Chau & Lai, 2003) are possible candidates. These constructs can be used with TAM in future research.

Issues of privacy and security risk of Internet banking services, although not significant in this study, need to be further tested in future research as other studies on Internet banking or e-shopping have found *risk* is a significant barrier to adoption. A final suggestion for future research should focus on longitudinal investigations involving samples from different locations or of different characteristics.

As an alternative approach suggested by Agarwal and Prasad (1997), a unitary model may not be suitable to explain users' intention to adopt the services in future adopt or current usage intentions and therefore different models might be necessary to develop that should include the nature of the technology, as not all perceptions may be salient for each technology. For instance, characteristic of Internet banking services is different to the e-shopping context. For instance risk was found significant in e-shopping study in New Zealand whereas found insignificant for Internet banking study.

6.6 Conclusion

As more and more banking and financial institutions implement Internet banking services, it is of paramount importance for these organisations to identify factors that influence users' intention to adopt or use those services. This study extended TAM with *risk* and *self-efficacy* and also used Moore and Benbasat's (1991) PCI model without *image* and *voluntariness* constructs. Models were empirically tested against data collected from 157 subjects using postal survey. Results were found consistent with prior studies except *risk*, which was found hindered adoption or use of online banking in USA, Thailand and Hong Kong. Further visibility and trialability were found insignificant for Internet banking context while *Self-efficacy* was found significant. Both the models were found to have similar capabilities in explaining the variance in intention to use Internet banking, although this was lower than expected and also lower than recent studies in other countries. Non-users' perceptions of Internet banking were lower than users in all aspects except perception of *risk*.

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APPENDICES

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Internet Banking in New Zealand

SURVEY QUESTIONNAIRE

Internet banking is where bank customers access their bank accounts and perform banking transactions using the Internet. Internet banking is an alternative to other banking options such as physically visiting a bank, using ATMs or phone banking.

This is an Auckland University of Technology survey designed to collect information on attitudes towards Internet banking. The information collected will be used to build a better understanding of what influences people's intentions to use Internet banking.

We would appreciate your help in this research, regardless of whether or not you have ever used Internet banking.

Enclosed are two short questionnaire forms. **Please complete only ONE form.** Complete:

EITHER

(a) the YELLOW form, if you currently USE or HAVE USED Internet banking

OR

(b) the BLUE form, if you have NEVER used Internet banking

When you have completed the form most appropriate for you, please return it to us using the enclosed pre-paid envelope.

Your response is anonymous. You also have the opportunity to request a copy of the survey results.

Thank you for participating in this survey

Queries regarding this survey can be directed to Professor Bill Doolin, Auckland University of Technology: bdoolin@aut.ac.nz, (09) 917 9999, ext 5807.

Concerns regarding the conduct of the research should be notified to Madeline Banda, Executive Secretary, AUT Ethics Committee: mbanda@aut.ac.nz, (09) 917 9999, ext 8044.

This research has been approved by the Auckland University of Technology Ethics Committee on 14 January 2004. AUTEC Reference Number: 04/235

ALL RESPONSES ARE ANONYMOUS AND WILL BE TREATED IN CONFIDENCE

Appendix B: Survey Questionnaire

Internet Banking Survey

COMPLETE THIS FORM ONLY IF YOU USE OR HAVE USED INTERNET BANKING

Thank you for taking the time to help us with our research. Your response is anonymous.

Please indicate the extent to which you agree or disagree with each of the following statements. Circle a number from 1 to 7 that best represents your level of agreement with the statement, where 1=“strongly disagree” and 7=“strongly agree”:

	Strongly disagree						Strongly agree
1. Internet banking enables me to accomplish my banking tasks more quickly	1	2	3	4	5	6	7
2. Internet banking makes it easier for me to do my banking	1	2	3	4	5	6	7
3. I find Internet banking useful	1	2	3	4	5	6	7
4. It was easy to become skilful at using Internet banking	1	2	3	4	5	6	7
5. I find Internet banking easy to use	1	2	3	4	5	6	7
6. Using Internet banking can often be frustrating	1	2	3	4	5	6	7
7. Internet banking can be complicated to use	1	2	3	4	5	6	7
8. I can use Internet banking without anyone around to show me how to do it	1	2	3	4	5	6	7
9. I can use Internet banking with only the online help function or instructions for assistance	1	2	3	4	5	6	7
10. I could use Internet banking even if I changed banks	1	2	3	4	5	6	7
11. Using Internet banking increases my cost of banking	1	2	3	4	5	6	7
12. Internet banking lacks the benefits of personal interaction with bank personnel	1	2	3	4	5	6	7
13. I can rely on Internet banking to work as expected	1	2	3	4	5	6	7
14. Using Internet banking may expose me to fraud or monetary loss	1	2	3	4	5	6	7
15. Using Internet banking may jeopardise my privacy	1	2	3	4	5	6	7
16. Internet banking is insecure	1	2	3	4	5	6	7
17. Using Internet banking increases the time it takes to do my banking	1	2	3	4	5	6	7
	Strongly disagree						Strongly agree

- | | | | | | | | |
|--|---|---|---|---|---|---|---|
| 18. Internet banking is more convenient than visiting a bank or phone banking | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. Internet banking is more accessible than visiting a bank or phone banking | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. Internet banking is less time-consuming than visiting a bank or phone banking | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 21. Internet banking gives me greater control over my finances than visiting a bank or phone banking | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 22. Internet banking is compatible with my lifestyle | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 23. Using Internet banking fits well with the way I like to manage my finances | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 24. The advantages and disadvantages of using Internet banking are obvious | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 25. I would have difficulty explaining why using Internet banking may or may not be beneficial | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 26. Internet banking is very visible in the public media | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 27. I have seen what others do using Internet banking | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 28. Internet banking is available for me to use on a trial basis | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 29. I am able to see how Internet banking works and what it can do | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 30. I know where I can get more information on Internet banking | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 31. I intend to use Internet banking in the future | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Please answer the following question by circling the number from 1 to 7 that best represents your level of use, where 1="not at all" and 7="frequently":

- | | Not at all | | | | Frequently | | |
|--|------------|---|---|---|------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 32. In the last 30 days, approximately how often have you used Internet banking? | | | | | | | |

Please answer the following question by writing the number that best reflects your level of use in the box provided:

33. In the last 30 days, approximately how many times have you used Internet banking?

Please answer the following questions by ticking the box with the most appropriate option:

- | | | | | | | | |
|-----|---|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|------------------------------------|
| 34. | What is your gender? | <input type="checkbox"/> Male | <input type="checkbox"/> Female | | | | |
| 35. | What is your age? | <input type="checkbox"/> <15 years | <input type="checkbox"/> 15-24 years | <input type="checkbox"/> 25-39 years | <input type="checkbox"/> 40-54 years | <input type="checkbox"/> 55-69 years | <input type="checkbox"/> >69 years |
| 36. | For how long have you used a computer? | <input type="checkbox"/> Never | <input type="checkbox"/> <1 year | <input type="checkbox"/> 1-2 years | <input type="checkbox"/> 3-5 years | <input type="checkbox"/> 6-10 years | <input type="checkbox"/> >10 years |
| 37. | For how long have you used the Internet? | <input type="checkbox"/> Never | <input type="checkbox"/> <1 year | <input type="checkbox"/> 1-2 years | <input type="checkbox"/> 3-5 years | <input type="checkbox"/> 6-10 years | <input type="checkbox"/> >10 years |
| 38. | For how long have you used Internet banking? | <input type="checkbox"/> Never | <input type="checkbox"/> <6 months | <input type="checkbox"/> 6-11 months | <input type="checkbox"/> 1-2 years | <input type="checkbox"/> 3-5 years | <input type="checkbox"/> >5 years |
| 39. | Do you currently have access to the Internet? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | | | |

☐ Yes, I would like to receive a copy of the survey results. If yes, please provide an email or postal address below:

Internet Banking Survey

COMPLETE THIS FORM ONLY IF YOU HAVE NEVER USED INTERNET BANKING

Thank you for taking the time to help us with our research. Your response is anonymous.

Please indicate the extent to which you agree or disagree with each of the following statements. Circle a number from 1 to 7 that best represents your level of agreement with the statement, where 1=“strongly disagree” and 7=“strongly agree”:

	Strongly disagree						Strongly agree
1. Internet banking enables me to accomplish my banking tasks more quickly	1	2	3	4	5	6	7
2. Internet banking makes it easier for me to do my banking	1	2	3	4	5	6	7
3. I find Internet banking useful	1	2	3	4	5	6	7
4. It was easy to become skilful at using Internet banking	1	2	3	4	5	6	7
5. I find Internet banking easy to use	1	2	3	4	5	6	7
6. Using Internet banking can often be frustrating	1	2	3	4	5	6	7
7. Internet banking can be complicated to use	1	2	3	4	5	6	7
8. I can use Internet banking without anyone around to show me how to do it	1	2	3	4	5	6	7
9. I can use Internet banking with only the online help function or instructions for assistance	1	2	3	4	5	6	7
10. I could use Internet banking even if I changed banks	1	2	3	4	5	6	7
11. Using Internet banking increases my cost of banking	1	2	3	4	5	6	7
12. Internet banking lacks the benefits of personal interaction with bank personnel	1	2	3	4	5	6	7
13. I can rely on Internet banking to work as expected	1	2	3	4	5	6	7
14. Using Internet banking may expose me to fraud or monetary loss	1	2	3	4	5	6	7
15. Using Internet banking may jeopardise my privacy	1	2	3	4	5	6	7
16. Internet banking is insecure	1	2	3	4	5	6	7
17. Using Internet banking increases the time it takes to do my banking	1	2	3	4	5	6	7
	Strongly disagree						Strongly agree
18. Internet banking is more convenient than visiting a bank or phone banking	1	2	3	4	5	6	7

19.	Internet banking is more accessible than visiting a bank or phone banking	1	2	3	4	5	6	7
20.	Internet banking is less time-consuming than visiting a bank or phone banking	1	2	3	4	5	6	7
21.	Internet banking gives me greater control over my finances than visiting a bank or phone banking	1	2	3	4	5	6	7
22.	Internet banking is compatible with my lifestyle	1	2	3	4	5	6	7
23.	Using Internet banking fits well with the way I like to manage my finances	1	2	3	4	5	6	7
24.	The advantages and disadvantages of using Internet banking are obvious	1	2	3	4	5	6	7
25.	I would have difficulty explaining why using Internet banking may or may not be beneficial	1	2	3	4	5	6	7
26.	Internet banking is very visible in the public media	1	2	3	4	5	6	7
27.	I have seen what others do using Internet banking	1	2	3	4	5	6	7
28.	Internet banking is available for me to use on a trial basis	1	2	3	4	5	6	7
29.	I am able to see how Internet banking works and what it can do	1	2	3	4	5	6	7
30.	I know where I can get more information on Internet banking	1	2	3	4	5	6	7
31.	I intend to use Internet banking in the future	1	2	3	4	5	6	7

Please answer the following questions by ticking the box with the most appropriate option:

32.	What is your gender?	<input type="checkbox"/> Male	<input type="checkbox"/> Female				
33.	What is your age?	<input type="checkbox"/> <15 years	<input type="checkbox"/> 15-24 years	<input type="checkbox"/> 25-39 years	<input type="checkbox"/> 40-54 years	<input type="checkbox"/> 55-69 years	<input type="checkbox"/> >69 years
34.	For how long have you used a computer?	<input type="checkbox"/> Never	<input type="checkbox"/> <1 year	<input type="checkbox"/> 1-2 years	<input type="checkbox"/> 3-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> >10 years
35.	For how long have you used the Internet?	<input type="checkbox"/> Never	<input type="checkbox"/> <1 year	<input type="checkbox"/> 1-2 years	<input type="checkbox"/> 3-5 years	<input type="checkbox"/> 6-10 years	<input type="checkbox"/> >10 years

36.	Do you currently have access to the Internet?	?	?
		Yes	No

☐ Yes, I would like to receive a copy of the survey results. If yes, please provide an email or postal address below:

Appendix C: Survey Area

Blockhouse bay area



Royal Oak area



Appendix D: Survey distribution

Distribution of survey instruments in Royal oak community

Road / Street Name	Number of houses	Distribution pattern	Document distributed
Royal Oak Community (ROC)			
Acron Street	30	One in every three houses	10
Adrienne Palce	15	Alternate Houses	8
Ambury Avenue	18	Alternate Houses	9
Baker Place	20	Alternate Houses	10
Backenham Avenue	54	One in every three houses	18
Banvillie Place	12	Alternate Houses	6
Bingley Avenue	12	Alternate Houses	6
Boyd Avenue	49	One in every three houses	17
Brookfield Avenue	39	One in every three houses	13
Buckley Road	68	One in every three houses	23
Budock Road	22	One in every three houses	8
Campbell Road	20	Alternate Houses	10
Chandler Avenue	8	Alternate Houses	4
Clarke Road	44	One in every three houses	15
Crown Street	21	One in every three houses	7
Elgar Street	9	Alternate Houses	5
Epworth Avenue	20	Alternate Houses	10
Erson Avenue	30	One in every three houses	10
Fernleigh Avenue	47	One in every three houses	16
Greenfield Road	22	One in every three houses	8
Gorrie Avenue	21	One in every three houses	8
Hollywood Avenue	48	One in every three houses	16
Inkerman Street	45	One in every three houses	15
Kingsway	8	Alternate Houses	4
Korma Road	40	One in every three houses	14
Lauchlan Avenue	8	Alternate Houses	4
Liverpool Street	82	One in every three houses	28
Manukau Road	146	Not clear about area under ROC	0
Mt Albert Road	119	Provision for second survey	0
Mt Smart Road	149	Provision for second survey	0
Oak Street	29	One in every three houses	10
Pah Road	137	One in every three houses	46
Peet Avenue	26	One in every three houses	9
Peglar Avenue	11	Alternate Houses	6
Queensway	27	One in every three houses	9
Quentin Avenue	19	Alternate Houses	9
Raurenga Avenue	25	One in every three houses	9
Rewi Road	45	One in every three houses	15
Rongo Road	10	Alternate Houses	5
Rowan Road	31	One in every three houses	11
St. Andrew Road	75	Not clear about area under ROC	0
Torrance Road	64	One in every three houses	22
Tansley Avenue	20	Alternate Houses	10
Turama Road	60	One in every three houses	20
Vagus Place	30	One in every three houses	10
Winchlane	14	Alternate Houses	7
Total	1849		500

(source: www.wises.co.nz)

Distribution of survey instruments in Blockhouse bay community

Road / Street Name	Number of houses	Distribution pattern	Document distributed
Blockhouse Bay Community (BBC)			
Barton (east) street	31	One in every three houses	11
Blockhouse Bay Road	40	One in every three houses	14
Bolton Road	40	One in every three houses	14
Boundary Road	25	One in every three houses	9
Connaught Street	78	One in every three houses	26
Connel Street	109	One in every three houses	37
Donovan Street	40	One in every three houses	14
Dundale Avenue	91	Provision for second survey	0
Endeavour Street	67	One in every three houses	23
Ernie Pinches	77	Provision for second survey	0
Exminister Street	60	One in every three houses	20
Francis Curtis	62	One in every three houses	21
Gill Crescent	25	One in every three houses	9
Heaphy Street	92	One in every three houses	31
Kay Drive	79	One in every three houses	27
Kinross Street	80	One in every three houses	27
Lewis Street	54	One in every three houses	18
Lucknow Place	16	Alternate Houses	8
Lynbrook Avenue	126	One in every three houses	42
Mcfadzean Drive	76	One in every three houses	26
Mulgan Street	86	Provision for second survey	0
New Windsor Street	173	Provision for second survey	0
Portage Road	14	Alternate Houses	7
Rathlin Street	44	One in every three houses	15
Tania Place	17	Alternate Houses	7
Taylor Street	30	One in every three houses	10
Temuka Gardens	120	One in every three houses	40
Terry Street	44	One in every three houses	15
Whitney Street	48	One in every three houses	16
Windermere Crescent	38	One in every three houses	13
Wolverton Street	65	Provision for second survey	0
Total	1947		500

(source: www.wises.co.nz)

Appendix E: Survey data (original data)

resp_no	res	q1_ q2_	q3_ q4_	q5_ q6_	q7_ q8_	q9_ q10_	q11_ q12_	q13_ q14_	q15
1	1	7 7	7 7	7 7	7 7	1 7	1 3	3 6	6
2	2	1 6	7 6	5 5	5 5	4 6	6 6	4 5	1 5
3	3	1 4	5 5	5 5	5 6	6 4	4 5	2 6	4 6
4	4	1 7	7 7	7 7	7 5	7 1	3 1	1 1	7 4
5	5	1 4	5 5	5 5	3 1	2 6	6 5	1 7	6 7
6	6	1 7	7 7	7 7	7 6	6 7	2 7	1 3	1 1
7	7	1 7	7 7	7 7	7 7	7 7	4 6	1 4	1 3
8	8	0 6	5 5	4 6	6 3	6 6	6 5	6 3	2 1
9	9	0 5	5 5	5 5	5 4	6 6	6 6	2 7	2 6
10	10	0 6	6 6	6 7	5 4	5 6	6 6	5 4	2 7
11	11	0 1	2 1	1 1	1 4	4 1	1 1	4 6	5 5
12	12	1 7	7 7	7 6	6 7	6 5	2 5	1 4	3 4
13	13	1 7	7 7	7 7	7 7	7 1	7 7	1 3	2 4
14	14	0 3	3 3	3 6	2 6	6 6	6 5	2 6	4 7
15	15	1 7	7 7	7 7	7 7	7 7	7 7	1 1	1 4
16	16	1 5	4 4	3 3	4 3	4 3	3 99	4 5	4 7
17	17	1 7	7 7	7 7	7 6	7 7	5 7	2 5	2 6
18	18	1 7	7 7	7 7	7 6	7 7	6 7	1 2	1 4
19	19	1 7	7 7	7 7	7 6	6 7	7 6	1 99	2 4
20	20	1 5	5 6	6 5	6 6	6 7	2 6	4 4	5 6
21	21	1 7	7 7	7 5	7 5	5 3	7 7	4 7	1 7
22	22	1 5	3 3	3 4	4 2	2 6	6 4	4 7	4 4
23	23	0 2	2 2	2 3	2 6	5 2	4 3	4 6	5 6
24	24	0 5	4 4	4 4	4 4	4 1	1 2	1 7	4 5
25	25	1 6	6 6	6 6	6 4	4 6	6 6	3 6	3 5
26	26	0 4	3 3	3 3	4 5	4 3	4 3	5 6	3 7
27	27	0 4	5 5	5 3	3 4	5 2	3 2	4 6	4 5
28	28	1 6	6 6	6 5	6 6	6 7	7 6	2 3	2 6
29	29	1 7	7 7	7 7	7 7	7 7	7 7	1 1	1 2
30	30	1 5	7 6	6 6	7 7	7 7	7 7	3 2	6 4
31	31	1 7	7 7	7 7	7 7	7 7	7 7	5 1	1 1
32	32	1 7	6 6	6 6	7 6	6 2	2 6	2 2	2 3
33	33	0 3	3 3	3 3	5 5	5 4	6 6	7 7	7 7
34	34	1 7	7 7	7 7	7 6	6 7	7 5	6 1	1 5
35	35	1 6	6 7	7 5	1 5	7 7	7 7	1 1	2 7
36	36	1 7	7 7	7 7	7 6	5 4	3 7	4 6	2 5
37	37	0 1	2 2	2 1	1 1	1 2	4 1	7 7	7 7
38	38	1 7	6 6	6 6	6 5	6 1	1 7	1 6	2 5
39	39	0 7	7 7	7 6	5 4	4 5	6 6	5 7	3 7
40	40	1 7	7 7	7 7	7 6	3 7	7 7	5 1	1 6
41	41	1 5	4 7	4 4	4 3	4 4	4 7	1 1	2 1
42	42	1 6	4 5	5 5	5 3	5 5	5 4	2 5	3 5
43	43	1 7	6 7	7 6	6 6	6 7	7 7	1 1	1 3

q16	q17	q18	q19	q20	q21	q22	q23	q24	q25	q26	q27	q28	q29	q30	q31	q32	q33	q34
1	4	1	7	5	5	5	6	6	6	4	4	3	5	7	7	5	6	0
2	4	3	7	7	7	7	7	6	4	6	4	1	6	4	7	7	17	0
3	4	4	4	4	5	5	4	4	4	4	3	4	4	5	5	7	7	0
4	2	1	1	1	1	1	1	6	6	6	99	99	99	7	99	7	8	0
5	4	4	6	5	5	4	7	5	3	3	4	4	1	5	6	7	5	20
6	2	2	7	5	7	7	7	7	7	7	4	3	2	7	7	7	7	90
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8	1	5	3	3	4	3	3	4	6	5	3	5	5	4	3	3	0	0
9	6	3	3	6	6	3	5	3	4	5	6	1	7	7	7	2	0	0
10	7	2	7	7	7	5	6	6	4	5	5	1	1	5	7	0	0	1
11	5	4	1	1	1	1	2	1	4	3	5	5	5	5	1	0	0	0
12	2	1	6	6	6	6	6	6	4	7	4	4	3	5	4	6	5	10
13	2	7	7	7	7	7	7	7	7	4	7	5	2	1	2	7	7	6
14	4	2	4	3	6	4	4	3	6	6	5	5	5	2	6	4	0	0
15	4	1	7	7	7	7	7	7	7	7	7	4	4	1	7	7	7	10
16	6	4	4	5	3	3	3	4	3	5	4	5	99	3	4	4	2	1
17	4	1	6	6	6	6	6	5	5	2	5	5	4	5	5	7	6	7
18	2	1	7	7	7	7	7	7	6	7	6	2	99	99	6	7	3	4
19	4	1	7	7	7	7	7	7	6	6	5	2	4	4	7	7	4	5
20	6	3	6	4	4	5	5	6	7	5	4	4	2	6	6	5	5	8
21	5	1	7	7	7	7	7	7	7	6	2	2	4	3	6	7	5	1
22	4	4	1	1	1	4	2	2	4	4	6	4	6	6	6	2	1	0
23	6	4	4	3	3	3	2	2	4	5	3	2	4	4	3	1	0	0
24	5	4	6	6	6	4	2	2	4	7	4	1	4	5	6	1	0	0
25	3	3	6	6	6	6	6	6	5	5	5	3	4	5	5	6	6	10
26	7	5	4	5	5	4	3	3	5	2	5	3	4	4	3	2	0	0
27	5	4	3	4	3	2	2	2	2	3	3	3	3	4	3	2	0	0
28	5	1	6	5	5	7	7	7	3	6	3	3	6	7	7	7	5	3
29	1	1	7	7	7	6	7	7	6	7	5	6	99	7	5	7	7	7
30	3	1	6	7	7	7	7	6	5	5	6	2	2	6	3	6	5	10
31	3	1	7	7	7	1	7	7	3	7	5	5	5	7	7	7	5	1
32	3	2	6	6	6	4	6	6	4	6	3	3	2	5	6	6	4	6
33	7	4	3	3	3	1	3	2	7	6	4	4	4	4	6	1	0	0
34	6	1	7	7	7	7	7	7	7	5	1	1	7	7	7	7	40	0
35	4	1	7	7	7	7	7	7	5	7	3	1	3	4	5	7	7	10
36	4	1	7	6	7	7	7	7	4	4	5	2	1	6	4	7	5	8
37	7	6	2	1	1	2	1	2	4	2	7	4	1	4	4	1	0	0
38	3	2	7	7	7	4	6	6	4	1	4	2	4	5	7	6	5	0
39	5	4	7	7	7	6	7	6	5	6	2	3	6	5	4	7	0	0
40	6	1	7	7	7	4	7	7	5	3	5	3	5	5	5	7	5	5
41	1	1	7	7	7	4	4	4	5	5	4	4	1	4	7	4	2	0
42	3	2	4	5	5	3	4	5	5	6	4	2	2	5	4	5	6	20
43	2	1	7	7	7	7	7	7	6	7	5	4	4	4	7	7	5	4

q35	q36	q37	q38	q39	q40
1	3	6	5	5	1
2	3	4	3	4	1
3	3	4	4	3	1
4	3	6	4	4	1
5	6	6	4	5	1
6	2	6	5	5	1
7	3	5	4	5	1
8	4	4	4	0	1
9	5	5	5	0	1
10	5	6	5	0	1
11	6	1	1	0	1
12	4	5	3	4	1
13	3	5	4	5	1
14	6	6	6	0	1
15	3	6	5	5	1
16	2	5	4	2	1
17	3	6	6	4	1
18	4	6	5	5	1
19	5	6	4	4	1
20	3	6	6	4	1
21	4	6	4	4	1
22	3	5	4	4	1
23	6	4	4	0	1
24	4	3	1	0	1
25	3	6	5	5	1
26	6	5	4	0	1
27	5	1	1	0	0
28	3	6	4	4	1
29	3	5	4	5	1
30	3	6	4	5	1
31	3	6	6	5	1
32	4	6	5	5	1
33	5	6	4	0	1
34	3	5	4	5	1
35	3	6	5	5	1
36	4	5	4	5	1
37	6	1	1	0	0
38	5	6	6	6	1
39	4	6	5	0	1
40	3	6	5	5	1
41	2	5	5	2	0
42	4	6	5	5	1
43	3	6	6	4	1

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1	23A Torrance St, Epsom, Auckland
2	
3	4/36A, Pak Road, Epsom, Auckland
4	
5	
6	mail@synergyperformance.com
7	
8	
9	P Robinson, 38a Torrance St, Auckland
10	
11	
12	cutickand@dynathene.co.nz
13	
14	
15	
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17	
18	Ann Everett II, P.O. Box29088, Greenwoods Crn, Auckland
19	palnelson@extra.co.nz
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21	
22	12 Tansley Avenue, Epsom, Auckland
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26	matlen@clearnet.nz
27	
28	
29	
30	
31	nick@theneigenz
32	
33	
34	
35	chris.ford@hypernet.nz
36	
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resp_no	res	q1_q2	q3_q4	q5_q6	q7_q8	q9_q10	q11_q12	q13_q14	q15
44	44	1 7 5	7 7 7	7 6 6	6 7 7	7 7 7	1 7 7	1 7 7	7
45	45	1 7 7	7 7 7	7 6 6	6 7 7	7 7 7	2 7 7	2 5 5	5
46	46	1 6 6	6 6 6	6 6 6	6 6 6	2 6 6	6 4 3	6 6 6	6
47	47	0 5 6	6 4 4	4 3 3	4 3 3	5 3 3	4 5 5	5 6 6	6
48	48	1 6 7	6 7 6	6 2 2	4 6 6	5 7 6	6 7 3	7 7 7	7
49	49	1 6 6	6 5 5	5 6 6	6 7 6	6 6 4	4 4 2	7 7 7	7
50	50	0 1 1	1 1 1	1 7 7	4 1 1	1 1 5	4 5 1	1 1 1	1
51	51	1 7 7	6 6 6	6 5 5	5 6 6	2 6 6	2 5 3	5 5 5	5
52	52	0 4 4	5 6 6	6 3 3	5 5 5	5 6 4	6 5 6	6 6 6	6
53	53	0 4 3	4 5 5	4 3 3	5 5 5	5 5 5	5 7 5	3 3 3	3
54	54	1 7 7	7 7 7	7 2 2	4 7 7	1 7 7	1 5 3	6 6 6	6
55	55	1 7 7	7 7 7	7 6 7	7 7 5	5 5 2	3 2 5	5 5 5	5
56	56	1 7 7	7 7 7	7 7 5	7 5 7	1 5 1	5 1 5	5 5 5	5
57	57	0 1 1	1 1 1	1 3 3	4 1 1	1 1 4	4 4 4	4 4 4	4
58	58	1 7 7	7 7 7	7 5 5	4 7 7	4 6 3	4 3 5	6 6 6	6
59	59	0 4 1	1 1 1	1 1 1	1 1 1	1 1 2	7 7 7	7 7 7	7
60	60	0 5 5	4 5 5	4 5 5	5 5 5	5 5 3	7 3 6	5 5 5	5
61	61	1 7 7	7 7 7	7 6 6	5 7 7	1 5 1	5 6 6	6 6 6	6
62	62	1 7 7	7 7 7	7 2 2	5 3 3	4 6 2	4 2 6	6 6 6	6
63	63	0 4 2	3 5 5	4 3 3	4 3 3	3 3 5	5 6 7	7 7 7	7
64	64	1 7 7	7 6 7	7 7 7	6 6 6	1 7 2	6 3 3	6 6 6	6
65	65	1 7 7	7 7 7	7 7 7	7 7 7	7 4 4	7 1 6	6 6 6	6
66	66	1 7 7	7 7 7	7 6 7	7 7 7	3 4 1	4 4 4	4 4 4	4
67	67	1 6 6	6 6 6	6 6 5	5 6 2	5 1 4	3 5 2	2 2 2	2
68	68	1 7 7	7 7 7	7 4 2	7 7 4	1 4 1	1 7 5	5 5 5	5
69	69	1 7 7	7 7 7	7 7 7	7 7 1	1 7 1	1 1 5	4 4 4	4
70	70	0 4 4	6 6 6	6 5 5	4 2 3	3 2 7	4 7 6	6 6 6	6
71	71	1 7 7	7 5 5	6 5 5	4 6 5	4 2 3	2 5 4	4 4 4	4
72	72	1 7 6	6 5 5	5 6 6	6 7 1	5 2 3	4 6 6	6 6 6	6
73	73	1 7 7	7 6 7	7 7 7	7 7 7	99 6 2	6 5 5	5 5 5	5
74	74	0 3 3	3 4 4	4 2 2	2 2 4	4 7 6	5 5 5	5 5 5	5
75	75	0 1 1	1 1 1	1 1 1	1 1 1	3 7 7	7 7 7	7 7 7	7
76	76	1 6 6	7 4 5	5 6 4	6 5 5	2 4 2	4 4 4	4 4 4	4
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78	78	1 7 7	7 7 7	7 7 7	7 7 7	1 1 2	3 3 3	3 3 3	3
79	79	1 7 7	7 7 7	7 7 7	7 7 7	7 7 1	1 4 4	4 4 4	4
80	80	1 7 7	7 7 7	7 6 7	7 7 1	6 2 2	1 5 5	5 5 5	5
81	81	0 1 1	2 6 3	1 2 2	6 1 4	7 5 7	7 7 7	7 7 7	7
82	82	0 7 6	7 7 6	2 4 4	4 1 3	4 2 4	4 4 4	4 4 4	4
83	83	1 4 5	5 4 5	6 6 6	6 4 2	6 3 4	5 5 5	5 5 5	5
84	84	1 3 3	4 5 5	1 3 5	5 5 4	1 5 1	1 1 1	1 1 1	1
85	85	1 7 7	7 7 7	7 7 7	7 7 7	1 4 1	1 2 1	1 1 1	1
86	86	0 1 1	1 1 1	1 1 1	1 1 1	1 7 7	99 7 7	7 7 7	7

q16	q17	q18	q19	q20	q21	q22	q23	q24	q25	q26	q27	q28	q29	q30	q31	q32	q33	q34
44	3	1 7	4 7	3 6	5 5	1 4	1 1	1 1	1 1	7 2	2 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
45	4	1 6	6 7	4 6	5 5	5 4	1 4	5 5	7 6	10 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
46	5	2 5	6 6	4 4	4 5	3 3	1 1	5 6	5 4	4 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
47	6	5 3	3 3	3 4	3 4	4 6	2 4	5 5	4 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
48	3	1 7	7 7	7 7	7 3	4 7	4 7	7 7	7 7	15 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
49	6	1 5	5 6	6 5	5 4	4 6	2 4	3 3	6 5	5 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
50	1	3 3	3 4	1 4	1 1	1 3	1 1	1 1	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
51	4	6 5	5 5	4 4	4 5	4 5	4 3	4 4	5 5	6 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
52	7	5 6	6 6	6 6	6 5	4 5	4 4	4 5	4 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
53	3	4 3	3 3	3 1	1 4	4 4	4 4	4 4	1 0	0 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
54	5	1 7	7 7	7 7	6 5	7 5	4 2	6 5	7 6	10 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
55	3	2 7	6 7	7 7	7 4	6 3	2 2	2 5	7 3	2 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
56	2	1 7	7 7	7 7	7 5	3 4	4 4	7 7	7 7	10 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
57	4	4 1	1 1	1 1	1 1	1 1	1 4	4 1	4 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
58	3	1 7	7 7	7 7	6 7	5 4	2 4	2 5	7 7	10 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
59	7	1 1	1 1	1 1	1 1	1 7	1 1	1 1	1 0	0 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
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65	4	1 7	5 5	5 7	7 7	7 7	4 4	4 7	7 6	4 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
66	6	1 7	7 7	7 7	7 7	7 5	4 4	7 7	7 7	20 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
67	4	1 6	7 7	7 6	6 6	6 2	2 4	5 6	7 7	20 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
68	3	2 7	7 7	7 7	5 5	6 2	3 5	7 7	7 4	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
69	3	1 7	7 7	7 7	7 4	1 5	6 3	7 7	7 7	40 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
70	5	3 7	7 6	5 4	4 4	4 5	2 4	4 3	2 0	0 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
71	3	2 7	7 6	6 6	6 4	99 99	99 99	5 2	6 6	15 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
72	3	2 6	6 6	6 6	6 6	2 6	5 2	3 2	7 5	10 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
73	6	1 7	7 7	7 7	7 6	7 5	1 5	5 5	7 7	30 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
74	6	4 3	3 3	3 2	3 3	6 5	3 3	3 3	1 0	0 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
75	7	4 1	4 1	1 1	1 1	1 4	5 1	1 4	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
76	1	1 6	6 5	4 6	6 5	6 4	5 5	5 5	6 4	5 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
77	3	2 6	6 6	6 6	6 4	5 6	6 6	6 6	6 7	15 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
78	3	1 7	7 7	7 7	7 7	1 4	3 3	5 3	7 5	5 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
79	4	1 7	7 7	7 7	7 5	5 99	99 99	99 7	7 7	90 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
80	4	1 7	7 7	6 6	6 6	2 6	2 2	7 5	7 6	20 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
81	4	6 1	1 1	1 1	1 1	1 4	1 6	1 5	5 5	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
82	6	2 6	6 6	5 5	5 7	3 4	7 5	4 5	4 0	0 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
83	4	2 99	99 99	99 99	99 99	99 99	99 99	99 99	99 99	99 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
84	2	4 4	4 4	4 4	3 4	1 7	7 7	7 7	4 2	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
85	2	1 7	7 7	7 7	7 7	7 7	5 1	7 7	7 4	4 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
86	7	4 4	2 4	1 1	1 1	1 1	1 1	1 1	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0

	q35	q36	q37	q38	q39	q40
	++	5	+	+	+	1
45	3	6	6	5	1	99
46	5	+	+	+	1	99
47	+	+	+	0	1	99
48	+	5	5	5	1	99
49	+	6	+	5	1	99
50	6	1	1	0	0	99
51	+	6	5	5	1	99
52	+	6	6	0	1	99
53	6	+	1	0	0	99
54	3	6	5	5	1	99
55	3	6	5	6	1	99
56	2	+	+	+	1	1
57	5	6	6	0	1	99
58	3	5	5	6	1	99
59	6	+	+	0	1	99
60	5	6	5	0	1	99
61	+	6	6	6	1	99
62	+	5	5	99	1	99
63	6	5	+	0	1	99
64	3	6	6	5	1	99
65	3	5	+	5	1	99
66	+	6	5	5	1	99
67	3	6	5	6	1	99
68	3	6	5	+	1	99
69	+	6	5	6	1	99
70	6	2	2	0	1	99
71	5	6	+	5	1	99
72	+	6	3	3	1	99
73	+	6	5	5	1	99
74	5	2	2	0	1	1
75	5	6	+	0	0	99
76	2	5	5	1	1	99
77	3	6	5	6	1	1
78	3	6	5	+	1	99
79	3	6	6	6	1	1
80	5	+	+	5	1	99
81	5	+	+	0	1	99
82	3	5	+	0	1	1
83	3	5	5	+	1	1
84	+	6	6	5	1	1
85	5	5	5	5	1	1
86	6	+	+	0	1	99

	q40_gd42
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56	5 Beckenham Avenue Epsom,aki,lessex@compass.net.nz
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72	
73	v.g.Hill@xtra.co.nz
74	54 Liverpool Street, Epsom, Auckland
75	
76	
77	31 Temuka gardens, Blockhouse Bay, AKL
78	
79	John Minicic, 112A Taylor Road, B B C, AKL
80	T Wood, PO Box 15-284, New Lynn
81	
82	Robert Yang, 10 Terracotta dr, B B C, AKL
83	Uango Huo, 1/5A Bolton St, B B C, AKL
84	jibihara@manukau.govt.nz
85	dawn@maxnet.co.nz
86	

resp_no	res	q1_	q2_	q3_	q4_	q5_	q6_	q7_	q8_	q9_	q10_	q11_	q12_	q13_	q14_	q15_
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88	88	1	7	7	6	7	6	6	6	7	6	4	4	5	1	5
89	89	1	7	7	7	7	7	7	7	1	7	1	4	1	4	4
90	90	1	3	4	4	5	4	4	6	6	6	4	7	2	6	6
91	91	1	7	7	7	7	6	6	7	7	7	1	1	1	2	2
92	92	1	7	7	6	5	5	7	1	1	3	5	1	7	3	7
93	93	1	6	5	6	6	6	5	5	6	6	3	3	3	2	4
94	94	0	5	5	7	4	7	1	7	7	7	7	1	7	4	4
95	95	1	4	4	5	5	5	5	5	5	1	4	4	5	4	4
96	96	1	7	6	7	6	6	6	6	6	4	5	1	7	2	3
97	97	1	6	6	6	6	6	99	6	6	99	5	2	1	99	5
98	98	0	2	2	2	5	5	4	3	5	5	4	3	6	5	1
99	99	1	7	4	4	4	4	7	7	7	7	5	3	5	2	3
100	100	0	6	6	5	6	6	5	5	6	6	6	4	7	3	7
101	101	1	7	7	7	7	6	7	3	7	7	6	1	3	2	2
102	102	1	7	7	7	7	7	4	5	7	7	7	3	5	2	4
103	103	1	7	7	7	7	7	7	6	7	7	7	1	4	1	4
104	104	1	7	7	7	6	7	6	7	7	7	7	1	1	1	4
105	105	1	7	7	7	7	7	7	7	7	7	99	4	1	1	4
106	106	1	7	7	7	6	6	7	7	7	7	6	1	2	1	2
107	107	1	6	6	6	5	6	7	7	6	6	6	1	4	2	4
108	108	1	7	5	7	6	6	3	7	5	3	5	2	2	2	4
109	109	1	7	7	7	7	7	7	7	7	7	7	5	1	7	7
110	110	0	6	5	2	6	3	7	5	2	3	4	6	7	1	6
111	111	0	4	4	5	6	6	3	5	4	5	5	4	6	2	5
112	112	0	2	2	2	7	7	7	7	7	7	7	1	4	1	7
113	113	1	7	7	7	7	7	4	7	7	99	7	4	1	1	4
114	114	1	7	7	7	7	7	6	6	7	1	7	1	2	1	3
115	115	1	6	6	5	5	6	5	5	6	6	4	4	3	2	5
116	116	0	1	1	1	1	1	7	7	1	1	1	7	7	7	7
117	117	0	3	4	4	6	4	3	3	2	3	4	5	6	5	5
118	118	0	6	6	5	5	6	5	5	6	5	6	3	7	2	6
119	119	0	5	5	4	5	6	4	5	3	5	3	3	4	5	4
120	120	0	3	3	2	3	5	1	2	6	4	6	4	7	7	1
121	121	0	5	6	6	6	6	5	5	6	6	99	99	1	2	7
122	122	1	4	5	4	5	4	1	4	4	5	4	5	7	4	7
123	123	0	4	4	5	4	6	4	6	6	6	6	4	5	6	5
124	124	0	4	4	4	4	5	3	4	3	3	3	5	7	4	7
125	125	0	5	4	4	6	6	4	7	6	6	6	2	7	3	5
126	126	1	7	7	7	7	7	7	7	7	7	5	1	1	1	2
127	127	1	7	7	7	7	7	6	6	7	7	6	1	4	3	6
128	128	1	7	7	7	7	7	7	7	7	1	7	1	4	1	1
129	129	0	3	1	1	7	7	2	5	2	3	4	7	7	3	7

q16	q17	q18	q19	q20	q21	q22	q23	q24	q25	q26	q27	q28	q29	q30	q31	q32	q33	q34
87	7	2	7	7	7	7	6	6	6	6	6	7	7	7	6	0	0	1
88	5	1	6	6	7	5	6	6	6	3	5	4	1	4	5	6	4	0
89	3	1	7	7	7	7	7	7	3	3	1	4	7	7	7	6	1	
90	6	5	3	3	3	4	4	4	4	6	4	5	1	5	5	7	6	15
91	2	1	7	6	6	7	6	6	6	3	3	2	2	7	6	7	7	30
92	5	7	4	5	5	1	2	3	7	7	7	1	1	3	1	5	2	2
93	4	3	6	4	5	5	5	5	4	5	4	3	1	5	5	5	5	20
94	4	7	7	7	1	7	1	4	7	7	4	7	4	7	7	7	0	0
95	4	3	5	5	5	4	5	4	4	4	4	4	3	4	4	5	4	3
96	5	1	7	7	7	7	7	7	5	7	5	6	1	7	7	7	7	9
97	2	2	7	6	6	4	6	6	5	6	5	5	1	6	4	6	7	24
98	4	3	6	6	5	1	3	3	99	4	3	1	1	1	3	2	0	0
99	5	1	6	3	6	5	6	6	6	5	5	2	1	6	6	6	7	10
100	6	4	6	6	6	3	6	4	6	5	6	4	6	6	6	1	0	0
101	2	2	7	6	6	6	6	6	6	3	1	2	2	5	5	6	6	15
102	3	1	7	7	7	4	7	7	7	1	7	3	4	7	7	7	7	20
103	2	7	7	7	7	7	7	7	4	4	4	1	4	4	7	7	4	3
104	3	1	7	7	7	7	7	7	7	2	7	1	4	4	6	7	7	20
105	4	1	7	7	7	7	7	7	4	7	7	4	4	7	7	7	5	10
106	7	1	7	7	7	7	7	7	7	5	6	5	2	4	5	6	7	6
107	6	2	6	6	7	7	7	7	7	3	4	2	1	3	5	7	7	15
108	4	2	6	6	6	6	6	6	3	5	5	3	4	4	4	6	7	30
109	5	1	6	5	5	5	7	7	5	6	4	1	4	7	7	7	3	3
110	99	2	6	6	6	5	2	3	6	2	7	2	6	7	6	2	0	0
111	3	3	5	5	5	3	6	5	4	5	5	5	4	7	7	4	0	0
112	7	1	3	2	2	1	4	4	7	7	4	1	4	4	1	1	0	0
113	4	1	7	7	7	7	5	4	6	7	4	3	99	7	4	7	5	7
114	2	1	7	7	7	5	7	7	7	7	5	1	4	7	5	7	5	4
115	4	3	6	6	6	4	4	6	4	4	5	2	4	4	1	6	6	10
116	7	7	1	1	1	1	1	1	7	1	4	4	1	1	1	1	0	0
117	4	4	3	4	4	3	3	3	4	4	4	3	4	4	5	4	0	0
118	5	2	5	5	4	4	4	3	5	5	5	5	4	4	6	2	0	0
119	4	2	4	4	5	5	4	5	4	4	5	3	4	6	2	3	0	0
120	1	2	2	3	3	6	1	1	7	1	2	7	6	6	1	0	0	0
121	3	6	6	6	6	6	6	6	6	7	99	1	99	6	6	3	0	0
122	4	4	4	5	5	4	4	4	4	3	5	1	1	4	4	4	4	2
123	6	4	6	6	5	3	3	3	5	4	4	4	4	5	5	5	0	0
124	7	5	4	4	4	4	3	3	2	3	2	2	4	4	4	3	0	0
125	5	4	4	4	4	3	2	2	4	4	2	1	2	4	6	4	0	0
126	1	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	15	1
127	5	1	7	7	7	5	7	6	6	4	6	1	7	5	7	7	8	1
128	1	1	7	7	7	7	7	7	5	7	6	1	4	7	7	7	25	0
129	7	6	4	4	5	1	3	2	7	7	6	6	1	7	6	1	0	0

q35	q36	q37	q38	q39	q40
87	3	6	6	0	1
88	2	4	4	3	1
89	4	4	4	5	1
90	4	6	4	5	1
91	3	6	4	5	1
92	4	2	2	2	1
93	6	6	5	6	1
94	2	6	5	0	1
95	3	5	4	4	1
96	4	6	5	6	1
97	4	6	5	5	1
98	4	6	5	0	1
99	4	6	6	6	1
100	5	5	5	0	1
101	2	4	4	4	1
102	3	6	6	6	1
103	3	6	5	5	1
104	3	6	5	5	1
105	5	6	6	5	1
106	4	6	5	6	1
107	4	6	4	5	1
108	4	5	4	5	1
109	3	6	6	5	1
110	6	5	4	0	1
111	4	6	2	0	1
112	5	6	4	0	1
113	3	6	5	5	1
114	4	6	5	5	1
115	4	5	4	4	1
116	6	6	6	0	1
117	4	5	5	0	1
118	4	6	4	0	1
119	2	3	3	0	0
120	5	6	5	0	1
121	5	5	5	0	1
122	5	2	2	3	1
123	2	5	4	0	1
124	4	6	4	0	1
125	3	5	4	0	1
126	4	6	5	6	1
127	4	6	5	4	1
128	3	5	5	5	1
129	4	6	6	0	1

	q40_0142
87	
88	
89	
90	gran@baytax.co.nz
91	
92	rengalanika35@yahoo.com
93	
94	3a Bolton St, B&C, AKL
95	bridalve1620@hotmail.com
96	theadams1@clear.net.nz
97	
98	
99	
100	
101	
102	
103	
104	h@fronalesward.co.nz
105	
106	sales@urgent.co.nz
107	
108	
109	
110	
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112	
113	
114	
115	
116	
117	
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119	
120	mmargold@gmail.com
121	
122	
123	
124	
125	
126	
127	turcom@thug.co.nz
128	
129	

resp_no	res	q1_	q2_	q3_	q4_	q5_	q6_	q7_	q8_	q9_	q10_	q11_	q12_	q13_	q14_	q15_
130	130	1	7	7	7	7	3	3	7	7	6	1	7	2	5	6
131	131	1	6	5	6	5	5	5	7	7	4	1	1	1	5	5
132	132	1	5	5	5	5	5	4	5	6	4	6	3	5	4	6
133	133	0	7	7	7	6	6	7	4	3	7	7	7	7	1	6
134	134	1	6	7	6	6	5	3	4	7	6	6	2	4	3	6
135	135	1	7	7	7	7	7	3	3	.	7	5	5	7	1	5
136	136	1	7	7	7	7	7	4	4	7	7	7	1	4	1	3
137	137	1	7	7	7	7	7	5	7	7	7	7	1	7	1	5
138	138	0	1	1	1	4	3	7	2	6	4	6	4	1	6	1
139	139	1	7	7	7	7	7	6	99	7	1	7	2	7	1	5
140	140	0	3	2	2	4	3	4	4	5	5	5	6	5	3	5
141	141	1	7	7	6	6	7	6	6	5	6	6	1	1	3	5
142	142	1	5	5	7	5	6	6	2	6	3	2	6	2	2	5
143	143	0	5	5	6	5	5	4	5	6	6	5	3	4	3	7
144	144	0	2	1	2	3	2	1	1	2	2	2	5	7	7	1
145	145	0	7	7	7	7	7	7	7	6	6	6	2	2	2	2
146	146	1	6	5	6	5	5	5	3	6	6	5	3	5	3	5
147	147	1	5	5	6	6	6	5	6	7	7	6	5	4	2	4
148	148	1	7	7	7	7	7	7	7	7	6	5	2	2	1	4
149	149	1	7	7	7	7	7	7	7	7	1	7	1	5	1	5
150	150	1	7	7	7	7	6	5	7	7	1	7	1	6	2	2
151	151	1	7	7	7	7	7	4	6	6	7	7	2	1	2	2
152	152	1	5	7	6	6	6	3	3	7	4	3	6	1	4	6
153	153	1	7	7	7	7	7	5	7	7	6	7	3	4	6	6
154	154	1	7	7	7	7	7	7	7	6	6	6	1	2	2	2
155	155	1	7	7	7	7	7	1	7	7	7	6	1	1	1	5
156	156	1	7	7	7	7	6	6	6	5	6	6	2	2	2	2
157	157	1	5	5	5	5	5	3	6	2	3	4	3	5	3	7

q16	q17	q18	q19	q20	q21	q22	q23	q24	q25	q26	q27	q28	q29	q30	q31	q32	q33	q34
130	3	1	7	7	7	7	7	5	7	5	1	1	7	7	7	5	4	1
131	3	3	7	7	7	5	6	6	4	5	3	6	3	3	6	7	5	5
132	4	3	4	5	3	3	4	4	2	4	4	2	4	4	3	3	2	1
133	3	1	5	7	7	7	7	6	7	7	6	7	7	7	7	0	0	0
134	3	1	6	6	5	3	5	4	5	5	2	2	2	5	6	7	5	4
135	5	5	7	7	7	7	7	7	7	3	7	7	7	7	7	7	30	0
136	2	1	7	7	7	7	7	7	7	99	99	7	7	7	7	5	2	0
137	2	1	7	7	7	4	7	4	4	4	5	2	4	5	5	7	2	1
138	1	1	4	4	3	1	1	1	1	6	4	4	4	4	7	1	0	0
139	5	1	7	7	7	7	7	6	6	4	2	99	2	6	7	5	6	0
140	3	5	4	4	5	2	3	3	4	3	99	5	4	5	6	2	0	1
141	4	4	5	6	6	7	6	7	6	5	2	2	2	4	6	6	6	29
142	4	1	6	6	6	6	7	7	5	6	4	2	1	4	2	6	5	10
143	7	2	4	6	6	4	4	3	4	5	5	2	5	4	2	4	0	1
144	1	4	4	4	4	2	2	1	2	5	6	4	1	1	5	1	0	1
145	1	5	6	6	5	5	4	4	5	3	2	2	4	3	4	6	0	1
146	5	2	6	6	6	5	6	5	4	5	5	3	4	5	6	6	5	1
147	4	2	5	6	6	4	6	5	4	4	5	6	1	4	2	6	5	5
148	5	7	7	7	7	7	7	7	7	4	5	3	3	3	5	7	7	25
149	2	1	7	7	7	7	7	7	5	7	4	3	4	6	7	7	7	20
150	1	2	7	7	7	7	7	6	4	6	5	1	5	5	5	7	5	20
151	2	2	7	7	7	7	7	6	6	7	2	2	2	6	7	7	6	30
152	5	1	6	4	5	4	6	4	7	5	2	1	1	5	3	6	3	2
153	4	2	7	7	7	7	7	7	7	6	6	6	6	7	3	7	7	20
154	2	2	7	7	7	7	7	6	5	6	4	5	3	7	6	6	4	10
155	2	2	7	7	7	7	6	7	7	6	3	2	2	6	6	7	6	25
156	2	2	7	7	7	7	7	6	6	3	3	3	2	5	6	7	6	25
157	5	3	4	3	4	5	4	5	3	5	3	1	1	1	4	6	5	2

q35	q36	q37	q38	q39	q40_
130	5	4	4	5	1
131	2	6	5	3	1
132	3	5	4	2	1
133	3	6	1	0	0
134	5	6	6	4	1
135	5	4	4	4	1
136	3	6	5	6	1
137	3	6	4	5	1
138	4	6	4	0	1
139	5	6	4	4	1
140	6	5	5	0	1
141	4	5	5	5	1
142	3	6	5	5	1
143	5	5	4	0	1
144	6	1	1	0	0
145	4	5	5	0	1
146	4	6	5	4	1
147	4	6	6	5	1
148	4	6	6	5	1
149	3	6	3	4	1
150	3	6	4	5	1
151	4	5	5	5	1
152	2	5	4	4	1
153	3	6	5	5	1
154	4	4	4	2	1
155	3	3	3	2	1
156	4	5	5	5	1
157	3	6	5	4	1

q40_q42
130
131 216 Oak st, Epsom, Auckland
132
133
134 Po Box 29049, Greenwicks cm, Epsom, AKL
135 rubyma33@hotmail.com
136
137 maur199@hotmail.com
138
139
140
141
142
143 hawthorn@thug.co.nz
144
145
146 thutler@xiba.co.nz
147
148 gantam64@slingshot.co.nz
149
150
151
152 102a Taylor Rd, BEO, AKL
153
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Appendix F: Box-Cox transformed data

	pu1	pu2	pu3	peou	peou	peou3	peou4	se1	se2	se3	flsk1
1	49	49	49	49	49	18.89168	25.95647	49	1	41.80310	1
2	36	49	36	25	25	11.36547	10.17487	36	11	31.10140	1
3	16	25	25	25	25	14.96812	20.05452	16	6	21.92205	1
4	49	49	49	49	49	11.36547	25.95647	1	4	1.000000	1
5	16	25	25	25	9	1.000000	3.189608	36	11	21.92205	1
6	49	49	49	49	49	14.96812	20.05452	49	3	41.80310	1
7	49	49	49	49	49	18.89168	25.95647	49	6	31.10140	1
8	36	25	16	36	36	5.254731	20.05452	36	11	21.92205	1
9	25	25	25	25	25	8.113971	20.05452	36	11	31.10140	1
10	36	36	36	49	25	8.113971	14.78104	36	11	31.10140	1
11	1	4	1	1	1	8.113971	10.17487	1	1	1.000000	1
12	49	49	49	36	36	18.89168	20.05452	25	3	21.92205	1
13	49	49	49	49	49	18.89168	25.95647	1	14	41.80310	1
14	9	9	9	36	4	14.96812	20.05452	36	11	21.92205	1
15	49	49	49	49	49	18.89168	25.95647	49	14	41.80310	1
16	25	16	16	9	16	5.254731	10.17487	9	4	24.51473	1
17	49	49	49	49	49	14.96812	25.95647	49	9	41.80310	1
18	49	49	49	49	49	14.96812	25.95647	49	11	41.80310	1
19	49	49	49	49	49	14.96812	20.05452	49	14	31.10140	1
20	25	25	36	25	36	14.96812	20.05452	49	3	31.10140	1
21	49	49	49	25	49	11.36547	14.78104	9	14	41.80310	1
22	25	9	9	16	16	2.848903	3.189608	36	11	14.28803	1
23	4	4	4	9	4	14.96812	14.78104	4	6	8.227992	1
24	25	16	16	16	16	8.113971	10.17487	1	1	3.779951	1
25	36	36	36	36	36	8.113971	10.17487	36	11	31.10140	1
26	16	9	9	9	16	11.36547	10.17487	9	6	8.227992	1
27	16	25	25	9	9	8.113971	14.78104	4	4	3.779951	1
28	36	36	36	25	36	14.96812	20.05452	49	14	31.10140	1
29	49	49	49	49	49	18.89168	25.95647	49	14	41.80310	1
30	25	49	36	49	36	14.96812	25.95647	49	14	41.80310	1
31	49	49	49	49	49	18.89168	25.95647	49	14	41.80310	1
32	49	36	36	36	49	14.96812	20.05452	4	3	31.10140	1
33	9	9	9	9	25	11.36547	14.78104	16	11	31.10140	1
34	49	49	49	49	49	14.96812	20.05452	49	14	21.92205	1
35	36	36	49	49	25	1.000000	14.78104	49	14	41.80310	1
36	49	49	49	49	49	14.96812	14.78104	16	4	41.80310	1
37	1	4	4	4	1	1.000000	1.000000	4	6	1.000000	1
38	49	36	36	36	36	11.36547	20.05452	1	1	41.80310	1
39	49	49	49	36	25	8.113971	10.17487	25	11	31.10140	1
40	49	49	49	49	49	14.96812	6.287063	49	14	41.80310	1
41	25	16	49	16	16	5.254731	10.17487	16	6	41.80310	1
42	36	16	25	25	25	5.254731	14.78104	25	9	14.28803	1
43	49	36	49	49	36	14.96812	20.05452	49	14	41.80310	1

	disk2	disk3	disk4	disk5	disk6	disk7	rel1	rel2	rel3
1	2.804851	9.961492	12.93137	9.651605	2.930243	1	49	25	25
2	4.530811	1.000000	9.961492	5.778168	2.930243	1	49	49	49
3	5.376620	9.961492	12.93137	7.663215	2.930243	1	16	16	16
4	1.000000	9.961492	7.245789	5.778168	1.711795	1	1	1	1
5	6.213801	9.961492	16.11695	11.73026	2.930243	1	36	25	25
6	2.804851	1.000000	1.000000	1.000000	1.711795	1	49	25	49
7	3.674508	1.000000	4.803987	2.403782	1.711795	1	49	49	36
8	2.804851	9.961492	1.000000	1.000000	1.000000	1	9	9	16
9	6.213801	9.961492	12.93137	9.651605	4.012954	1	9	36	36
10	3.674508	9.961492	16.11695	11.73026	4.522537	1	49	49	49
11	5.376620	9.961492	9.961492	7.663215	3.483841	1	1	1	1
12	3.674508	9.961492	7.245789	5.778168	1.711795	1	36	36	36
13	2.804851	9.961492	7.245789	5.778168	1.711795	0	49	49	49
14	5.376620	9.961492	16.11695	5.778168	2.930243	1	16	9	36
15	1.000000	1.000000	7.245789	5.778168	2.930243	1	49	49	49
16	4.530811	9.961492	16.11695	9.651605	4.012954	1	16	25	9
17	4.530811	9.961492	12.93137	7.663215	2.930243	1	36	36	36
18	1.916901	1.000000	7.245789	2.403782	1.711795	1	49	49	49
19	4.018441	9.961492	7.245789	5.778168	2.930243	1	49	49	49
20	3.674508	9.961492	12.93137	7.663215	4.012954	1	36	16	16
21	6.213801	1.000000	16.11695	5.778168	3.483841	1	49	49	49
22	6.213801	9.961492	7.245789	5.778168	2.930243	1	1	1	1
23	5.376620	9.961492	12.93137	9.651605	4.012954	1	16	9	9
24	6.213801	9.961492	9.961492	7.663215	3.483841	1	36	36	36
25	5.376620	9.961492	9.961492	7.663215	2.344296	1	36	36	36
26	5.376620	9.961492	16.11695	11.73026	4.522537	1	16	25	25
27	5.376620	9.961492	9.961492	7.663215	3.483841	1	9	16	9
28	2.804851	9.961492	12.93137	9.651605	3.483841	1	36	25	25
29	1.000000	1.000000	2.691800	1.000000	1.000000	1	49	49	49
30	1.916901	9.961492	7.245789	5.778168	2.344296	1	36	49	49
31	1.000000	1.000000	1.000000	5.778168	2.344296	1	49	49	49
32	1.916901	9.961492	4.803987	5.778168	2.344296	1	36	36	36
33	6.213801	9.961492	16.11695	11.73026	4.522537	1	9	9	9
34	1.000000	1.000000	9.961492	9.651605	4.012954	1	49	49	49
35	1.000000	9.961492	16.11695	11.73026	2.930243	1	49	49	49
36	5.376620	9.961492	9.961492	5.778168	2.930243	1	49	36	49
37	6.213801	9.961492	16.11695	11.73026	4.522537	1	4	1	1
38	5.376620	9.961492	9.961492	7.663215	2.344296	1	49	49	49
39	6.213801	9.961492	16.11695	9.651605	3.483841	1	49	49	49
40	1.000000	1.000000	12.93137	9.651605	4.012954	1	49	49	49
41	1.000000	9.961492	1.000000	2.403782	1.000000	1	49	49	49
42	4.530811	9.961492	9.961492	4.015175	2.344296	1	16	25	25
43	1.000000	1.000000	4.803987	4.015175	1.711795	1	49	49	49

	rel4	com1	com2	obs1	obs2	obs3	obs4
1	8.739162	16.89636	14.96812	12.93137	9.651605	4.607811	1.664044
2	13.74977	30.42519	18.89168	12.93137	5.778168	7.203680	1.664044
3	8.739162	16.89636	8.113971	7.245789	5.778168	4.607811	1.497163
4	1.000000	1.000000	1.000000	12.93137	9.651605	7.203680	1.533082
5	6.470502	30.42519	11.36547	4.803987	4.015175	4.607811	1.664044
6	13.74977	30.42519	18.89168	16.11695	11.73026	4.607811	1.497163
7	13.74977	30.42519	18.89168	16.11695	1.000000	2.146581	1.289978
8	4.391907	6.876960	8.113971	12.93137	7.663215	3.355885	1.806194
9	4.391907	16.89636	5.254731	7.245789	7.663215	7.203680	1.664044
10	8.739162	23.21319	14.96812	7.245789	7.663215	5.892417	1.806194
11	1.000000	3.375902	1.000000	7.245789	4.015175	5.892417	1.806194
12	11.17177	23.21319	14.96812	7.245789	11.73026	4.607811	1.664044
13	13.74977	30.42519	18.89168	7.245789	11.73026	5.892417	1.289978
14	6.470502	11.39401	5.254731	12.93137	9.651605	5.892417	1.806194
15	13.74977	30.42519	18.89168	16.11695	11.73026	4.607811	1.664044
16	4.391907	6.876960	8.113971	4.803987	7.663215	4.607811	1.806194
17	11.17177	23.21319	11.36547	9.961492	2.403782	5.892417	1.806194
18	13.74977	30.42519	18.89168	12.93137	11.73026	7.203680	1.289978
19	13.74977	30.42519	18.89168	12.93137	9.651605	5.892417	1.289978
20	8.739162	16.89636	14.96812	16.11695	7.663215	4.607811	1.664044
21	13.74977	30.42519	18.89168	16.11695	9.651605	2.146581	1.289978
22	6.470502	3.375902	2.848903	7.245789	5.778168	7.203680	1.664044
23	4.391907	3.375902	2.848903	7.245789	7.663215	3.355885	1.289978
24	6.470502	3.375902	2.848903	7.245789	11.73026	4.607811	1.000000
25	11.17177	23.21319	14.96812	9.961492	7.663215	5.892417	1.497163
26	6.470502	6.876960	5.254731	9.961492	2.403782	5.892417	1.497163
27	2.543718	3.375902	2.848903	2.691800	4.015175	4.607811	1.497163
28	13.74977	30.42519	18.89168	4.803987	9.651605	3.355885	1.497163
29	11.17177	30.42519	18.89168	12.93137	11.73026	5.892417	1.931308
30	13.74977	30.42519	14.96812	9.961492	7.663215	7.203680	1.289978
31	1.000000	30.42519	18.89168	4.803987	11.73026	5.892417	1.806194
32	6.470502	23.21319	14.96812	7.245789	9.651605	3.355885	1.497163
33	1.000000	6.876960	2.848903	16.11695	9.651605	4.607811	1.664044
34	13.74977	30.42519	18.89168	16.11695	11.73026	5.892417	1.289978
35	13.74977	30.42519	18.89168	9.961492	11.73026	3.355885	1.000000
36	13.74977	30.42519	18.89168	7.245789	5.778168	5.892417	1.289978
37	2.543718	1.000000	2.848903	7.245789	2.403782	8.537535	1.664044
38	6.470502	23.21319	14.96812	7.245789	1.000000	4.607811	1.664044
39	11.17177	30.42519	14.96812	9.961492	9.651605	2.146581	1.497163
40	6.470502	30.42519	18.89168	9.961492	4.015175	5.892417	1.497163
41	6.470502	11.39401	8.113971	9.961492	7.663215	4.607811	1.664044
42	4.391907	11.39401	11.36547	9.961492	9.651605	4.607811	1.289978
43	13.74977	30.42519	18.89168	12.93137	11.73026	5.892417	1.664044

	hl1	hl2	hl3	hl4
1	1.959364	8.739162	22.14410	25.95647
2	1.000000	11.17177	9.086177	25.95647
3	2.336728	6.470502	12.96123	14.78104
4	2.038335	8.271614	17.32966	16.29497
5	1.000000	8.739162	17.32966	25.95647
6	1.528636	13.74977	22.14410	25.95647
7	1.528636	13.74977	3.014329	25.95647
8	2.678803	6.470502	5.747767	6.287063
9	3.291599	13.74977	22.14410	3.189808
10	1.000000	1.000000	12.96123	25.95647
11	2.678803	8.739162	12.96123	1.000000
12	1.959364	8.739162	9.086177	20.05452
13	1.000000	2.543718	22.14410	25.95647
14	2.678803	2.543718	17.32966	10.17487
15	1.000000	13.74977	22.14410	25.95647
16	2.038335	4.391907	9.086177	10.17487
17	2.336728	8.739162	12.96123	25.95647
18	2.038335	8.271614	17.32966	25.95647
19	2.336728	6.470502	22.14410	25.95647
20	1.528636	11.17177	17.32966	14.78104
21	2.336728	4.391907	17.32966	25.95647
22	2.995154	11.17177	17.32966	3.189808
23	2.336728	6.470502	5.747767	1.000000
24	2.336728	8.739162	17.32966	1.000000
25	2.336728	8.739162	12.96123	20.05452
26	2.336728	6.470502	5.747767	3.189808
27	1.959364	4.391907	9.086177	3.189808
28	2.995154	13.74977	22.14410	25.95647
29	2.038335	13.74977	12.96123	25.95647
30	1.528636	11.17177	5.747767	20.05452
31	2.678803	13.74977	22.14410	25.95647
32	1.528636	8.739162	17.32966	20.05452
33	2.336728	6.470502	17.32966	1.000000
34	1.000000	13.74977	22.14410	25.95647
35	1.959364	6.470502	12.96123	25.95647
36	1.000000	11.17177	9.086177	25.95647
37	1.000000	6.470502	9.086177	1.000000
38	1.528636	6.470502	12.96123	25.95647
39	2.995154	8.739162	9.086177	25.95647
40	2.678803	8.739162	12.96123	25.95647
41	1.000000	6.470502	22.14410	10.17487
42	1.528636	8.739162	9.086177	14.78104
43	2.336728	6.470502	22.14410	25.95647

pu1	pu2	pu3	peou	peou1	peou3	peou4	re1	re2	re3	rlk1
44	49	25	49	49	14.96812	20.05452	49	14	41.80310	1
45	49	49	49	25	14.96812	14.78104	49	14	41.80310	1
46	36	36	36	36	14.96812	20.05452	36	3	31.10140	1
47	25	36	36	16	5.254731	10.17487	9	9	8.227992	1
48	36	49	36	49	2.848503	10.17487	36	9	41.80310	1
49	36	36	36	25	14.96812	20.05452	49	11	31.10140	1
50	1	1	1	1	18.89168	10.17487	1	1	1.000000	1
51	49	49	36	36	11.36547	14.78104	36	3	31.10140	1
52	16	16	25	36	5.254731	14.78104	25	9	31.10140	1
53	16	9	16	25	8.113971	6.287063	25	9	21.92205	1
54	49	49	49	49	2.848503	10.17487	49	1	41.80310	1
55	49	49	49	49	14.96812	25.95647	49	9	21.92205	1
56	49	49	49	49	18.89168	14.78104	49	9	41.80310	1
57	1	1	1	1	5.254731	10.17487	1	1	1.000000	1
58	49	49	49	49	11.36547	10.17487	49	6	31.10140	1
59	16	1	1	1	1.000000	1.000000	1	1	1.000000	1
60	25	25	16	25	11.36547	14.78104	16	9	21.92205	1
61	49	49	49	49	14.96812	14.78104	49	14	41.80310	1
62	49	49	49	49	2.848503	14.78104	9	6	31.10140	1
63	16	4	9	25	5.254731	10.17487	9	4	8.227992	1
64	49	49	49	36	18.89168	25.95647	36	11	31.10140	1
65	49	49	49	49	18.89168	25.95647	49	14	14.28803	1
66	49	49	49	49	14.96812	25.95647	49	14	41.80310	1
67	36	36	36	36	14.96812	14.78104	36	3	21.92205	1
68	49	49	49	49	8.113971	3.189808	49	14	14.28803	1
69	49	49	49	49	18.89168	25.95647	49	1	41.80310	1
70	16	16	16	36	11.36547	10.17487	4	4	8.227992	1
71	49	49	49	25	11.36547	10.17487	36	9	14.28803	1
72	49	36	36	25	14.96812	20.05452	49	1	21.92205	1
73	49	49	49	36	18.89168	25.95647	49	14	41.80310	1
74	9	9	9	16	8.113971	10.17487	4	3	3.779951	1
75	1	1	1	1	1.000000	1.000000	1	1	1.000000	1
76	36	36	49	16	14.96812	10.17487	36	9	21.92205	1
77	36	36	25	25	14.96812	20.05452	49	11	31.10140	1
78	49	49	49	49	18.89168	25.95647	49	14	41.80310	1
79	49	49	49	49	18.89168	25.95647	49	14	41.80310	1
80	49	49	49	49	14.96812	25.95647	49	1	31.10140	1
81	1	1	4	36	1.000000	3.189808	4	11	1.000000	1
82	49	36	49	49	2.848503	10.17487	16	6	1.000000	1
83	16	25	25	16	14.96812	20.05452	36	11	14.28803	1
84	9	9	16	25	1.000000	6.287063	25	9	21.92205	1
85	49	49	49	49	18.89168	25.95647	49	14	41.80310	1
86	1	1	1	1	1.000000	1.000000	1	1	1.000000	1

rlk2	rlk3	rlk4	rlk5	rlk6	rlk7	rel1	rel2	rel3
44	6.213801	1.000000	16.11695	11.73026	2.344296	1	49	16
45	6.213801	.9721047	9.966177	7.663215	2.930243	1	36	49
46	3.674508	.9961492	12.93137	9.651605	3.483841	1	25	36
47	4.530811	.9364199	12.93137	9.651605	4.012954	1	9	9
48	6.213801	.9961492	16.11695	11.73026	2.344296	1	49	49
49	3.674508	.9721047	16.11695	11.73026	4.012954	1	25	25
50	3.674508	.9364199	1.000000	1.000000	1.000000	1	9	16
51	4.530811	.9961492	9.966177	7.663215	2.930243	1	25	25
52	5.376620	.9364199	12.93137	9.651605	4.522537	1	36	36
53	6.213801	.9364199	4.803987	4.015175	2.344296	1	9	9
54	4.530811	.9961492	12.93137	9.651605	3.483841	1	49	49
55	2.804851	.9721047	9.966177	7.663215	2.344296	1	49	36
56	4.530811	1.000000	9.966177	7.663215	1.711795	1	49	49
57	3.674508	.9449876	7.245789	5.778168	2.930243	1	1	1
58	3.674508	.9961492	9.966177	9.651605	2.344296	1	49	49
59	6.213801	.9236474	16.11695	11.73026	4.522537	0	1	1
60	6.213801	.9961492	12.93137	7.663215	3.483841	1	16	25
61	4.530811	1.000000	9.966177	9.651605	3.483841	1	49	49
62	3.674508	.9721047	12.93137	9.651605	1.711795	1	36	36
63	4.530811	.9294772	16.11695	11.73026	4.012954	1	9	9
64	6.213801	.9721047	12.93137	4.015175	3.483841	1	49	49
65	6.213801	1.000000	12.93137	9.651605	2.930243	1	49	25
66	3.674508	1.000000	7.245789	5.778168	4.012954	1	49	49
67	3.674508	.9961492	9.966177	2.403782	2.930243	1	36	49
68	3.674508	1.000000	16.11695	7.663215	2.344296	1	49	49
69	1.000000	1.000000	9.966177	5.778168	2.344296	1	49	49
70	6.213801	.9449876	16.11695	9.651605	3.483841	1	49	36
71	2.804851	.9721047	9.966177	5.778168	2.344296	1	49	36
72	2.804851	.9449876	12.93137	9.651605	2.344296	1	36	36
73	5.376620	.9721047	12.93137	7.663215	4.012954	1	49	49
74	6.213801	.9449876	12.93137	7.663215	4.012954	1	9	9
75	6.213801	.9236474	16.11695	11.73026	4.522537	1	1	16
76	3.674508	.9721047	7.245789	5.778168	1.000000	1	36	25
77	4.530811	.9294772	7.245789	4.015175	2.344296	1	36	36
78	1.000000	.9721047	4.803987	4.015175	2.344296	1	49	49
79	1.000000	1.000000	7.245789	5.778168	2.930243	1	49	49
80	1.916901	1.000000	9.966177	7.663215	2.930243	1	49	49
81	6.213801	.9364199	16.11695	11.73026	2.930243	1	1	1
82	3.674508	.9721047	7.245789	5.778168	4.012954	1	36	36
83	5.376620	.9961492	7.245789	7.663215	2.930243	1	31	30
84	1.000000	.9364199	1.000000	1.000000	1.711795	1	16	16
85	3.674508	1.000000	2.691800	1.000000	1.711795	1	49	49
86	6.213801	.9588455	16.11695	11.73026	4.522537	1	16	4

	rel4	com 1	com 2	obs 1	obs 2	obs 3	obs 4
44	4.39 1907	23.21319	11.36547	9.966177	1.000000	4.607811	1.000000
45	6.47 0902	23.21319	11.36547	9.966177	7.663215	4.607811	1.000000
46	6.47 0902	11.39401	8.113971	9.966177	4.015175	3.355885	1.000000
47	4.39 1907	11.39401	5.254731	7.245789	5.778168	7.203680	1.289978
48	13.7 4977	30.42519	18.89168	4.803967	5.778168	8.537536	1.664044
49	11.17 177	16.89636	11.36547	7.245789	5.778168	7.203680	1.289978
50	1.00 0000	11.39401	1.000000	1.000000	1.000000	3.355885	1.000000
51	6.47 0902	11.39401	8.113971	9.966177	5.778168	5.892417	1.664044
52	11.17 177	23.21319	14.96812	9.966177	5.778168	5.892417	1.664044
53	4.39 1907	1.000000	1.000000	7.245789	5.778168	4.607811	1.664044
54	13.7 4977	30.42519	14.96812	9.966177	11.73035	5.892417	1.664044
55	13.7 4977	30.42519	18.89168	7.245789	9.651605	3.355885	1.289978
56	13.7 4977	30.42519	18.89168	9.966177	4.015175	4.607811	1.664044
57	1.00 0000	1.000000	1.000000	1.000000	11.73035	1.000000	1.000000
58	6.47 0902	30.42519	14.96812	16.11695	7.663215	4.607811	1.289978
59	1.00 0000	1.000000	1.000000	1.000000	1.000000	8.537536	2.043827
60	6.47 0902	23.21319	5.254731	9.966177	7.663215	4.607811	1.000000
61	11.17 177	23.21319	18.89168	12.93137	9.651605	2.146581	1.289978
62	13.7 4977	30.42519	18.89168	12.93137	2.403782	4.607811	1.289978
63	4.39 1907	6.876960	2.848903	9.966177	2.403782	4.607811	1.000000
64	13.7 4977	30.42519	18.89168	12.93137	11.73035	5.892417	1.000000
65	8.739162	30.42519	18.89168	16.11695	11.73035	8.537536	1.664044
66	13.7 4977	30.42519	18.89168	16.11695	11.73035	5.892417	1.664044
67	13.7 4977	23.21319	14.96812	12.93137	9.651605	2.146581	1.289978
68	13.7 4977	30.42519	11.36547	9.966177	9.651605	2.146581	1.497163
69	13.7 4977	30.42519	18.89168	7.245789	1.000000	5.892417	1.931308
70	8.739162	11.39401	8.113971	7.245789	5.778168	5.892417	1.289978
71	11.17 177	23.21319	14.96812	7.245789	7.086137	5.246466	1.533082
72	11.17 177	23.21319	14.96812	12.93137	2.403782	7.203680	1.806194
73	13.7 4977	30.42519	18.89168	12.93137	11.73035	5.892417	1.000000
74	4.39 1907	3.375902	5.254731	4.803967	9.651605	5.892417	1.497163
75	1.00 0000	1.000000	1.000000	1.000000	1.000000	4.607811	1.806194
76	6.47 0902	23.21319	14.96812	9.966177	9.651605	4.607811	1.806194
77	11.17 177	23.21319	14.96812	7.245789	7.663215	7.203680	1.931308
78	13.7 4977	30.42519	18.89168	16.11695	1.000000	4.607811	1.497163
79	13.7 4977	30.42519	18.89168	9.966177	7.663215	5.246466	1.533082
80	11.17 177	23.21319	14.96812	12.93137	2.403782	7.203680	1.289978
81	1.00 0000	1.000000	1.000000	7.245789	1.000000	7.203680	1.000000
82	8.739162	16.89636	11.36547	16.11695	4.015175	4.607811	2.043827
83	8.50 4960	18.05755	11.71050	9.966177	7.086137	5.246466	1.533082
84	6.47 0902	11.39401	5.254731	7.245789	1.000000	8.537536	2.043827
85	13.7 4977	30.42519	18.89168	16.11695	11.73035	8.537536	1.806194
86	1.00 0000	1.000000	1.000000	7.245789	1.000000	1.000000	1.000000

	pu1	pu2	pu3	peou	peou1	peou3	peou4	se1	se2	se3	nsk1
87	36	36	36	49	49	14.96812	20.05452	49	14	+1.80310	1
88	49	49	36	49	36	14.96812	20.05452	49	11	14.28803	1
89	49	49	49	49	49	18.89168	25.99647	49	1	+1.80310	1
90	9	16	16	25	16	8.113971	10.17487	36	11	31.10140	1
91	49	49	49	49	36	14.96812	25.99647	49	14	+1.80310	1
92	49	49	36	25	25	18.89168	1.000000	1	+	21.92205	1
93	36	25	36	36	36	11.36547	14.78104	36	11	8.227992	1
94	25	25	49	16	49	1.000000	25.99647	49	14	+1.80310	1
95	16	16	25	25	25	11.36547	14.78104	25	1	14.28803	1
96	49	36	49	36	36	14.96812	20.05452	36	6	21.92205	1
97	36	36	36	36	36	11.02394	20.05452	36	8	21.92205	1
98	4	4	4	25	25	8.113971	6.287063	25	9	14.28803	1
99	49	16	16	16	16	18.89168	25.99647	49	14	21.92205	1
100	36	36	25	36	36	11.36547	14.78104	36	11	31.10140	1
101	49	49	49	49	36	18.89168	6.287063	49	14	31.10140	1
102	49	49	49	49	49	8.113971	14.78104	49	14	+1.80310	1
103	49	49	49	49	49	18.89168	20.05452	49	14	+1.80310	1
104	49	49	49	36	49	14.96812	25.99647	49	14	+1.80310	1
105	49	49	49	49	49	18.89168	25.99647	49	14	24.51473	1
106	49	49	49	36	36	18.89168	25.99647	49	14	31.10140	1
107	36	36	36	25	36	18.89168	25.99647	36	11	31.10140	1
108	49	25	49	36	36	5.254731	25.99647	25	4	21.92205	1
109	49	49	49	49	49	18.89168	25.99647	49	14	+1.80310	1
110	36	25	4	36	9	18.89168	14.78104	4	4	14.28803	1
111	16	16	25	36	36	5.254731	14.78104	16	9	21.92205	1
112	4	4	4	49	49	18.89168	25.99647	49	14	+1.80310	1
113	49	49	49	49	49	8.113971	25.99647	49	8	+1.80310	1
114	49	49	49	49	49	14.96812	20.05452	49	1	+1.80310	1
115	36	36	25	25	36	11.36547	14.78104	36	11	14.28803	1
116	1	1	1	1	1	18.89168	25.99647	1	1	1.000000	1
117	9	16	16	36	16	5.254731	6.287063	4	4	14.28803	1
118	36	36	25	25	36	11.36547	14.78104	36	9	31.10140	1
119	25	25	16	25	36	8.113971	14.78104	9	9	8.227992	1
120	9	9	4	9	25	1.000000	3.189808	36	6	31.10140	1
121	25	36	36	36	36	11.36547	14.78104	36	11	24.51473	1
122	16	25	16	25	16	1.000000	10.17487	16	9	14.28803	1
123	16	16	25	16	36	8.113971	20.05452	36	11	31.10140	1
124	16	16	16	16	25	5.254731	10.17487	9	4	8.227992	1
125	25	16	16	36	36	8.113971	25.99647	36	11	31.10140	1
126	49	49	49	49	49	18.89168	25.99647	49	14	21.92205	1
127	49	49	49	49	49	14.96812	20.05452	49	14	31.10140	1
128	49	49	49	49	49	18.89168	25.99647	49	1	+1.80310	1
129	9	1	1	49	49	2.848903	14.78104	4	4	14.28803	1

	rls k2	rls k3	rls k4	rls k5	rls k6	rls k7	rel 1	rel 2	rel 3
87	1.916901	.9721047	16.11695	11.73026	4.522537	1	49	49	49
88	4.530811	1.000000	9.966177	7.663215	3.483841	1	36	36	49
89	3.674908	1.000000	7.245789	5.778168	2.344296	1	49	49	49
90	6.213801	.9721047	12.93137	9.651605	4.012954	1	9	9	9
91	1.000000	1.000000	2.691800	2.403782	1.711795	1	49	36	36
92	6.213801	.9961492	16.11695	11.73026	3.483841	0	16	25	25
93	2.804851	.9721047	7.245789	5.778168	2.930243	1	36	16	25
94	6.213801	.9445876	7.245789	5.778168	2.930243	0	49	49	1
95	4.530811	.9445876	7.245789	5.778168	2.930243	1	25	25	25
96	6.213801	.9721047	4.803987	7.663215	3.483841	1	49	49	49
97	1.000000	.9588495	9.966177	2.403782	1.711795	1	49	36	36
98	5.376620	.9364199	1.000000	5.778168	2.930243	1	36	36	25
99	4.530811	.9721047	4.803987	5.778168	3.483841	1	36	9	36
100	6.213801	.9961492	16.11695	11.73026	4.012954	1	36	36	36
101	2.804851	.9721047	2.691800	2.403782	1.711795	1	49	36	36
102	4.530811	.9721047	7.245789	4.015175	2.344296	1	49	49	49
103	3.674908	1.000000	7.245789	5.778168	1.711795	0	49	49	49
104	1.000000	1.000000	7.245789	9.651605	2.344296	1	49	49	49
105	1.000000	1.000000	7.245789	5.778168	2.930243	1	49	49	49
106	1.916901	1.000000	2.691800	2.403782	4.522537	1	49	49	49
107	3.674908	.9721047	7.245789	5.778168	4.012954	1	36	36	49
108	1.916901	.9721047	7.245789	5.778168	2.930243	1	36	36	36
109	4.530811	1.000000	16.11695	11.73026	3.483841	1	36	25	25
110	6.213801	1.000000	12.93137	9.651605	2.930243	1	36	36	36
111	5.376620	.9721047	9.966177	5.778168	2.344296	1	25	25	25
112	3.674908	1.000000	16.11695	11.73026	4.522537	1	9	4	4
113	1.000000	1.000000	7.245789	5.778168	2.930243	1	49	49	49
114	1.916901	1.000000	4.803987	4.015175	1.711795	1	49	49	49
115	2.804851	.9721047	9.966177	7.663215	2.930243	1	36	36	36
116	6.213801	.9236474	16.11695	11.73026	4.522537	0	1	1	1
117	5.376620	.9364199	9.966177	5.778168	2.930243	1	9	16	16
118	6.213801	.9721047	12.93137	9.651605	3.483841	1	25	25	16
119	3.674908	.9364199	7.245789	7.663215	2.930243	1	16	16	25
120	6.213801	.9236474	1.000000	1.000000	1.000000	1	4	9	9
121	1.000000	.9721047	16.11695	11.73026	2.344296	1	36	36	36
122	6.213801	.9445876	16.11695	9.651605	2.930243	1	16	25	25
123	4.530811	.9294772	9.966177	7.663215	4.012954	1	36	36	25
124	6.213801	.9445876	16.11695	11.73026	4.522537	1	16	16	16
125	6.213801	.9961492	9.966177	7.663215	3.483841	1	16	16	16
126	1.000000	1.000000	2.691800	1.000000	1.000000	0	49	49	49
127	3.674908	.9961492	12.93137	7.663215	3.483841	1	49	49	49
128	3.674908	1.000000	1.000000	1.000000	1.000000	1	49	49	49
129	6.213801	.9961492	16.11695	11.73026	4.522537	1	16	16	25

	rel 4	com 1	com 2	obs 1	obs 2	obs 3	obs 4
87	13.74977	30.42519	14.96812	12.93137	9.651605	7.203680	1.931308
88	8.739162	23.21319	14.96812	12.93137	4.015175	5.892417	1.664044
89	13.74977	30.42519	18.89168	16.11695	4.015175	3.355885	1.000000
90	6.470502	11.39401	8.113971	7.245789	9.651605	4.607811	1.806194
91	13.74977	23.21319	14.96812	12.93137	4.015175	3.355885	1.289978
92	1.000000	3.375902	5.254731	16.11695	11.73026	8.537536	1.000000
93	8.739162	16.89636	11.36547	7.245789	7.663215	4.607811	1.497163
94	13.74977	1.000000	8.113971	16.11695	11.73026	4.607811	2.043827
95	6.470502	16.89636	8.113971	7.245789	5.778168	4.607811	1.664044
96	13.74977	30.42519	18.89168	9.966177	11.73026	5.892417	1.931308
97	6.470502	23.21319	14.96812	9.966177	9.651605	5.892417	1.806194
98	1.000000	6.876960	5.254731	9.966177	5.778168	3.355885	1.000000
99	8.739162	23.21319	14.96812	12.93137	7.663215	5.892417	1.289978
100	4.391907	23.21319	8.113971	12.93137	7.663215	7.203680	1.664044
101	11.17177	23.21319	14.96812	12.93137	4.015175	1.000000	1.289978
102	6.470502	30.42519	18.89168	16.11695	1.000000	8.537536	1.497163
103	13.74977	30.42519	18.89168	7.245789	5.778168	4.607811	1.000000
104	13.74977	30.42519	18.89168	16.11695	2.403782	8.537536	1.000000
105	13.74977	30.42519	18.89168	7.245789	11.73026	8.537536	1.664044
106	13.74977	30.42519	18.89168	9.966177	9.651605	5.892417	1.289978
107	13.74977	30.42519	18.89168	16.11695	4.015175	4.607811	1.289978
108	11.17177	23.21319	14.96812	4.803987	7.663215	5.892417	1.497163
109	8.739162	30.42519	18.89168	9.966177	9.651605	4.607811	1.000000
110	8.739162	3.375902	5.254731	12.93137	2.403782	8.537536	1.289978
111	4.391907	23.21319	11.36547	7.245789	7.663215	5.892417	1.806194
112	1.000000	11.39401	8.113971	16.11695	11.73026	4.607811	1.000000
113	13.74977	16.89636	8.113971	12.93137	11.73026	4.607811	1.497163
114	8.739162	30.42519	18.89168	16.11695	11.73026	5.892417	1.000000
115	6.470502	11.39401	14.96812	7.245789	5.778168	5.892417	1.289978
116	1.000000	1.000000	1.000000	16.11695	1.000000	4.607811	1.664044
117	4.391907	6.876960	5.254731	7.245789	5.778168	4.607811	1.497163
118	6.470502	11.39401	5.254731	9.966177	7.663215	5.892417	1.806194
119	8.739162	11.39401	11.36547	7.245789	5.778168	5.892417	1.497163
120	11.17177	1.000000	1.000000	16.11695	1.000000	2.146581	2.043827
121	11.17177	23.21319	14.96812	12.93137	11.73026	5.246466	1.000000
122	6.470502	11.39401	8.113971	7.245789	4.015175	5.892417	1.000000
123	4.391907	6.876960	5.254731	9.966177	5.778168	4.607811	1.664044
124	6.470502	6.876960	5.254731	2.691800	4.015175	2.146581	1.289978
125	4.391907	3.375902	2.848903	7.245789	5.778168	2.146581	1.000000
126	13.74977	30.42519	18.89168	16.11695	11.73026	8.537536	2.043827
127	8.739162	30.42519	14.96812	12.93137	9.651605	4.607811	1.931308
128	13.74977	30.42519	18.89168	9.966177	11.73026	7.203680	1.000000
129	1.000000	6.876960	2.848903	16.11695	11.73026	7.203680	1.931308

	rls k2	rls k3	rls k4	rls k5	rls k6	rls k7	rel 1	rel 2	rel 3
87	3.291599	13.74977	22.14410	20.05452					
88	1.000000	6.470502	12.96123	20.05452					
89	2.336728	6.470502	22.14410	25.99647					
90	1.000000	8.739162	12.96123	25.99647					
91	1.528636	13.74977	17.32966	25.99647					
92	1.000000	4.391907	1.000000	14.78104					
93	1.000000	8.739162	12.96123	14.78104					
94	2.336728	13.74977	22.14410	25.99647					
95	1.959364	6.470502	9.086177	14.78104					
96	1.000000	13.74977	22.14410	25.99647					
97	1.000000	11.17177	9.086177	20.05452					
98	1.000000	1.000000	5.747767	3.189808					
99	1.000000	11.17177	17.32966	20.05452					
100	2.995154	11.17177	17.32966	1.000000					
101	1.528636	8.739162	12.96123	20.05452					
102	2.336728	13.74977	22.14410	25.99647					
103	2.336728	6.470502	22.14410	25.99647					
104	2.336728	6.470502	17.32966	25.99647					
105	2.336728	13.74977	22.14410	25.99647					
106	2.336728	8.739162	17.32966	25.99647					
107	1.000000	4.391907	12.96123	25.99647					
108	2.336728	6.470502	9.086177	20.05452					
109	2.336728	13.74977	22.14410	25.99647					
110	2.995154	13.74977	17.32966	3.189808					
111	2.336728	13.74977	22.14410	10.17487					
112	2.336728	6.470502	1.000000	1.000000					
113	2.038335	13.74977	9.086177	25.99647					
114	2.336728	13.74977	12.96123	25.99647					
115	2.336728	6.470502	1.000000	20.05452					
116	1.000000	1.000000	1.000000	1.000000					
117	2.336728	6.470502	12.96123	10.17487					
118	2.336728	6.470502	17.32966	3.189808					
119	2.336728	11.17177	3.014329	6.287063					
120	3.291599	11.17177	17.32966	1.000000					
121	2.038335	11.17177	17.32966	6.287063					
122	1.000000	6.470502	9.086177	10.17487					
123	2.336728	8.739162	12.96123	14.78104					
124	2.336728	6.470502	9.086177	6.287063					
125	1.528636	6.470502	17.32966	10.17487					
126	1.000000	13.74977	22.14410	25.99647					
127	1.000000	13.74977	12.96123	25.99647					
128	2.336728	13.74977	22.14410	25.99647					
129	1.000000	13.74977	17.32966	1.000000					

	pu1	pu2	pu3	peou	peou	peou3	peou4	se1	se2	se3	nsk1
130	49	49	49	49	49	5.254731	6.287063	49	14	31.10140	1
131	36	25	36	25	25	11.36547	14.78104	49	14	14.28803	1
132	25	25	25	25	25	8.113971	14.78104	36	6	31.10140	1
133	49	49	49	36	36	18.89168	10.17487	9	14	41.80310	1
134	36	49	36	36	25	5.254731	10.17487	49	11	31.10140	1
135	49	49	49	49	49	5.254731	6.287063	29	14	21.92205	1
136	49	49	49	49	49	8.113971	10.17487	49	14	41.80310	1
137	49	49	49	49	49	11.36547	25.95647	49	14	41.80310	1
138	1	1	1	16	9	18.89168	3.189808	36	6	31.10140	1
139	49	49	49	49	49	14.96812	15.78373	49	1	41.80310	1
140	9	4	4	16	9	8.113971	10.17487	25	9	21.92205	1
141	49	49	36	36	49	14.96812	20.05452	25	11	31.10140	1
142	25	25	49	25	36	14.96812	3.189808	36	4	3.779951	1
143	25	25	36	25	25	8.113971	14.78104	36	11	21.92205	1
144	4	1	4	9	4	1.000000	1.000000	4	3	3.779951	1
145	49	49	49	49	49	18.89168	25.95647	36	11	31.10140	1
146	36	25	36	25	25	11.36547	6.287063	36	11	21.92205	1
147	25	25	36	36	36	11.36547	20.05452	49	14	31.10140	1
148	49	49	49	49	49	18.89168	25.95647	49	11	21.92205	1
149	49	49	49	49	49	18.89168	25.95647	49	1	41.80310	1
150	49	49	49	49	36	11.36547	25.95647	49	1	41.80310	1
151	49	49	49	49	49	8.113971	20.05452	36	14	41.80310	1
152	25	49	36	36	36	5.254731	6.287063	49	6	8.227992	1
153	49	49	49	49	49	11.36547	25.95647	49	11	41.80310	1
154	49	49	49	49	49	18.89168	25.95647	36	11	31.10140	1
155	49	49	49	49	49	1.000000	25.95647	49	14	31.10140	1
156	49	49	49	49	36	14.96812	20.05452	25	11	31.10140	1
157	25	25	25	25	25	5.254731	20.05452	4	4	14.28803	1

	nsk2	nsk3	nsk4	nsk5	nsk6	nsk7	rel1	rel2	rel3
130	6.213801	9.721047	9.966177	9.651605	2.344296	1	49	49	49
131	1.000000	1.000000	9.966177	7.663215	2.344296	1	49	49	49
132	4.530811	9.449876	12.93137	7.663215	2.930243	1	16	25	9
133	6.213801	1.000000	12.93137	11.73026	2.344296	1	25	49	49
134	3.674908	9.961492	12.93137	5.778168	2.344296	1	36	36	25
135	6.213801	1.000000	9.966177	7.663215	3.483841	1	49	49	49
136	3.674908	1.000000	4.803987	4.015175	1.711795	1	49	49	49
137	6.213801	1.000000	9.966177	7.663215	1.711795	1	49	49	49
138	1.000000	9.294772	1.000000	1.000000	1.000000	1	16	16	9
139	6.213801	1.000000	9.966177	7.663215	3.483841	1	49	49	49
140	4.530811	9.961492	9.966177	7.663215	2.344296	1	16	16	25
141	1.000000	9.961492	9.966177	7.663215	2.930243	1	25	36	36
142	1.916901	9.721047	9.966177	7.663215	2.930243	1	36	36	36
143	3.674908	9.961492	16.11695	4.015175	4.522537	1	16	36	36
144	6.213801	9.236474	1.000000	1.000000	1.000000	1	16	16	16
145	1.916901	9.721047	2.691800	2.403782	1.000000	1	36	36	25
146	4.530811	9.961492	4.803987	7.663215	3.483841	1	36	36	36
147	3.674908	9.721047	7.245789	5.778168	2.930243	1	25	36	36
148	1.916901	1.000000	7.245789	7.663215	3.483841	0	49	49	49
149	4.530811	1.000000	9.966177	7.663215	1.711795	1	49	49	49
150	5.376620	9.721047	2.691800	2.403782	1.000000	1	49	49	49
151	1.000000	9.721047	2.691800	1.000000	1.711795	1	49	49	49
152	1.000000	9.449876	12.93137	11.73026	3.483841	1	36	16	25
153	3.674908	9.294772	12.93137	7.663215	2.930243	1	49	49	49
154	1.916901	9.721047	2.691800	2.403782	1.711795	1	49	49	49
155	1.000000	1.000000	9.966177	2.403782	1.711795	1	49	49	1
156	1.916901	9.721047	2.691800	2.403782	1.711795	1	49	49	49
157	4.530811	9.961492	16.11695	11.73026	3.483841	1	16	9	16

	rel4	com1	com2	obs1	obs2	obs3	obs4
130	13.74977	30.42519	18.89168	9.966177	11.73026	5.892417	1.000000
131	8.739162	23.21319	14.96812	7.245789	7.663215	3.355885	1.931308
132	4.391907	11.39401	8.113971	2.691800	5.778168	4.607811	1.289978
133	13.74977	30.42519	18.89168	12.93137	11.73026	8.537536	1.931308
134	4.391907	16.89636	8.113971	9.966177	7.663215	2.146581	1.289978
135	13.74977	30.42519	18.89168	16.11695	4.015175	8.537536	2.043827
136	13.74977	30.42519	18.89168	16.11695	11.73026	8.537536	1.533082
137	6.470902	30.42519	8.113971	7.245789	5.778168	5.892417	1.289978
138	1.000000	1.000000	1.000000	1.000000	9.651605	4.607811	1.964044
139	13.74977	30.42519	18.89168	12.93137	9.651605	4.607811	1.289978
140	2.543718	6.876960	5.254731	7.245789	4.015175	5.246466	1.806194
141	13.74977	23.21319	18.89168	12.93137	7.663215	2.146581	1.289978
142	11.17177	30.42519	18.89168	9.966177	9.651605	4.607811	1.289978
143	6.470902	11.39401	5.254731	7.245789	7.663215	5.892417	1.289978
144	2.543718	3.375902	1.000000	2.691800	7.663215	7.203680	1.864044
145	8.739162	11.39401	8.113971	9.966177	4.015175	2.146581	1.289978
146	8.739162	23.21319	11.36547	7.245789	7.663215	5.892417	1.497163
147	6.470902	23.21319	14.96812	7.245789	5.778168	5.892417	1.931308
148	13.74977	30.42519	18.89168	16.11695	5.778168	5.892417	1.497163
149	13.74977	30.42519	18.89168	9.966177	11.73026	4.607811	1.497163
150	13.74977	30.42519	14.96812	7.245789	9.651605	5.892417	1.000000
151	13.74977	30.42519	14.96812	12.93137	11.73026	2.146581	1.289978
152	6.470902	23.21319	8.113971	16.11695	7.663215	2.146581	1.000000
153	13.74977	30.42519	18.89168	16.11695	9.651605	7.203680	1.931308
154	13.74977	23.21319	14.96812	9.966177	9.651605	4.607811	1.806194
155	13.74977	23.21319	18.89168	16.11695	9.651605	3.355885	1.289978
156	13.74977	30.42519	14.96812	12.93137	4.015175	3.355885	1.497163
157	8.739162	11.39401	11.36547	4.803987	7.663215	3.355885	1.000000

	nl1	nl2	nl3	nl4
130	1.000000	13.74977	22.14410	25.95647
131	1.959364	4.391907	17.32966	25.95647
132	2.336728	6.470902	5.747767	6.287063
133	3.291599	13.74977	22.14410	25.95647
134	1.528636	8.739162	17.32966	25.95647
135	3.291599	13.74977	22.14410	25.95647
136	2.038335	13.74977	22.14410	25.95647
137	2.336728	8.739162	12.96123	25.95647
138	2.336728	6.470902	22.14410	1.000000
139	2.038335	2.543718	17.32966	25.95647
140	2.336728	8.739162	17.32966	3.189808
141	1.528636	6.470902	17.32966	20.05452
142	1.000000	6.470902	3.014329	20.05452
143	2.678803	6.470902	3.014329	10.17487
144	1.000000	1.000000	12.96123	1.000000
145	2.336728	4.391907	9.086177	20.05452
146	2.336728	8.739162	17.32966	20.05452
147	1.000000	6.470902	3.014329	20.05452
148	1.959364	4.391907	12.96123	25.95647
149	2.336728	11.17177	22.14410	25.95647
150	2.678803	8.739162	12.96123	25.95647
151	1.528636	11.17177	22.14410	25.95647
152	1.000000	8.739162	5.747767	20.05452
153	2.995154	13.74977	5.747767	25.95647
154	1.959364	13.74977	22.14410	20.05452
155	1.528636	11.17177	17.32966	25.95647
156	1.528636	8.739162	17.32966	25.95647
157	1.000000	1.000000	9.086177	20.05452

Appendix G: Survey data(after averaging items)

	pu	eu	ze	rk	ra	com	dem	vis	tl
1	7.00	7.00	5.00	5.33	5.90	5.90	6.00	4.00	5.00
2	6.33	4.75	6.00	4.33	7.00	7.00	6.00	5.00	3.67
3	4.67	5.90	4.33	5.00	4.25	4.50	4.00	3.90	4.33
4	7.00	6.90	1.67	3.33	1.00	1.00	6.00	4.58	5.02
5	4.67	2.75	5.67	6.00	5.00	6.00	3.00	4.00	4.00
6	7.00	6.90	5.33	1.33	6.90	7.00	7.00	3.50	5.33
7	7.00	7.00	5.67	2.33	6.75	7.00	7.00	2.00	3.67
8	5.00	5.25	5.67	1.00	3.25	3.50	6.00	4.00	4.00
9	5.00	5.00	6.00	6.00	4.90	4.00	4.00	3.50	7.00
10	6.00	5.25	6.00	7.00	6.90	6.00	4.00	5.00	2.33
11	1.33	2.90	1.00	5.00	1.00	1.90	4.00	5.00	5.00
12	7.00	6.25	4.00	3.33	6.00	6.00	4.00	4.00	4.00
13	7.00	7.00	5.00	3.33	7.00	7.00	4.00	3.50	3.33
14	3.00	5.00	5.67	5.00	4.25	3.50	6.00	5.00	4.33
15	7.00	7.00	7.00	4.00	7.00	7.00	7.00	4.00	5.00
16	4.33	3.90	3.75	6.33	3.75	3.50	3.00	4.50	3.41
17	7.00	6.75	6.33	5.00	6.00	5.90	5.00	5.00	4.67
18	7.00	6.75	6.67	2.67	7.00	7.00	6.00	4.00	4.69
19	7.00	6.90	6.67	4.00	7.00	7.00	6.00	3.50	5.00
20	5.33	5.75	5.00	5.67	4.75	5.50	7.00	4.00	4.67
21	7.00	5.90	5.67	5.33	7.00	7.00	7.00	2.00	4.33
22	3.67	3.00	5.33	4.00	1.75	2.00	4.00	5.00	6.00
23	2.00	4.00	3.00	6.00	3.25	2.00	4.00	2.50	3.67
24	4.33	4.00	1.33	5.00	5.90	2.00	4.00	2.50	5.00
25	6.00	5.00	6.00	4.33	6.00	6.00	5.00	4.00	4.67
26	3.33	4.00	3.33	7.00	4.90	3.00	5.00	4.00	3.67
27	4.67	3.75	2.33	5.00	3.00	2.00	2.00	3.90	3.33
28	6.00	5.75	6.67	5.67	5.75	7.00	3.00	3.00	6.67
29	7.00	7.00	7.00	1.33	6.75	7.00	6.00	5.90	5.08
30	6.00	6.90	7.00	3.67	6.75	6.90	5.00	4.00	3.67
31	7.00	7.00	7.00	2.67	5.90	7.00	3.00	5.00	6.33
32	6.33	6.25	3.33	3.33	5.90	6.00	4.00	3.00	4.33
33	3.00	4.90	5.33	7.00	2.90	2.90	7.00	4.00	4.67
34	7.00	6.90	6.33	5.67	7.00	7.00	7.00	3.00	5.00
35	6.33	4.90	7.00	6.00	7.00	7.00	5.00	2.00	4.00
36	7.00	6.25	4.67	4.33	6.75	7.00	4.00	3.90	3.67
37	1.67	1.25	2.33	7.00	1.90	1.90	4.00	5.90	3.00
38	6.33	5.75	3.00	4.33	6.25	6.00	4.00	4.00	3.67
39	7.00	4.75	5.67	6.00	6.75	6.90	5.00	2.90	5.00
40	7.00	5.75	7.00	6.00	6.25	7.00	5.00	4.00	5.00
41	5.33	3.75	5.00	1.33	6.25	4.00	5.00	4.00	4.00
42	5.00	4.90	4.67	3.67	4.25	4.90	5.00	3.00	3.67
43	6.67	6.25	7.00	2.67	7.00	7.00	6.00	4.90	5.00

	pu	eu	ze	rk	ra	com	dem	vis	tl
44	6.33	6.90	7.00	5.67	5.25	5.90	5.00	2.90	1.00
45	7.00	5.75	7.00	4.67	5.75	5.90	5.00	2.90	4.67
46	6.00	6.00	4.67	5.67	5.25	4.00	5.00	2.00	4.00
47	5.67	3.75	3.67	6.00	3.00	3.90	4.00	4.00	4.67
48	6.33	4.75	6.00	5.67	7.00	7.00	3.00	5.90	7.00
49	6.00	5.90	6.33	6.67	5.90	5.00	4.00	4.00	3.33
50	1.00	3.25	1.00	1.00	2.75	2.90	1.00	2.00	1.00
51	6.67	5.90	4.67	4.67	4.75	4.00	5.00	4.90	3.67
52	4.33	5.00	5.33	6.33	6.00	6.00	5.00	4.90	4.33
53	3.67	4.25	5.00	3.00	3.00	1.00	4.00	4.00	4.00
54	7.00	5.00	5.00	5.67	7.00	6.90	5.00	4.90	4.33
55	7.00	6.75	5.67	4.33	6.75	7.00	4.00	2.90	3.00
56	7.00	6.90	6.33	4.00	7.00	7.00	5.00	4.00	6.00
57	1.00	2.25	1.00	4.00	1.00	1.00	1.00	1.00	3.00
58	7.00	5.75	5.67	4.67	6.25	6.90	7.00	3.00	3.67
59	2.00	1.00	1.00	7.00	1.00	1.00	1.00	7.00	1.00
60	4.67	4.75	4.67	5.33	4.75	4.90	5.00	2.90	2.67
61	7.00	6.25	7.00	5.33	6.75	6.90	6.00	2.00	5.33
62	7.00	5.25	4.33	4.67	6.90	7.00	6.00	3.00	4.67
63	3.00	4.00	3.00	6.67	3.00	2.90	5.00	2.90	3.67
64	7.00	6.75	6.00	4.67	7.00	7.00	6.00	3.00	5.02
65	7.00	7.00	6.00	5.33	5.90	7.00	7.00	5.90	5.00
66	7.00	6.75	7.00	4.67	7.00	7.00	7.00	4.90	6.00
67	6.00	5.75	4.33	3.67	6.75	6.00	6.00	2.00	5.00
68	7.00	5.00	6.00	5.00	7.00	6.00	5.00	2.90	6.33
69	7.00	7.00	5.00	4.00	7.00	7.00	4.00	5.90	5.67
70	4.00	5.25	2.67	6.00	6.25	4.00	4.00	3.90	3.67
71	5.00	4.75	3.00	6.33	4.00	4.90	3.00	2.00	2.00
72	7.00	5.00	5.00	4.00	6.90	6.00	4.00	3.82	3.41
73	6.33	5.90	4.33	5.00	6.00	6.00	6.00	5.90	2.33
74	7.00	6.75	7.00	5.67	7.00	7.00	6.00	3.00	5.00
75	3.00	4.00	2.00	5.67	3.00	2.90	3.00	4.00	3.00
76	1.00	1.00	1.00	7.00	1.75	1.00	1.00	4.90	2.00
77	6.33	4.75	5.33	3.00	5.25	6.00	5.00	4.90	5.00
78	5.67	5.75	6.33	3.33	6.00	6.00	4.00	6.00	6.00
79	7.00	7.00	7.00	3.00	7.00	7.00	7.00	3.90	3.67
80	7.00	7.00	7.00	4.00	7.00	7.00	5.00	3.82	5.02
81	7.00	6.75	4.67	4.67	6.75	6.00	6.00	4.00	4.67
82	1.33	3.00	3.00	6.00	1.00	1.00	4.00	3.90	5.00
83	6.67	4.75	3.00	4.67	5.75	5.00	7.00	5.90	4.67
84	4.67	5.25	5.33	4.33	5.39	5.14	5.02	3.82	4.37
85	3.33	3.90	5.00	1.33	4.00	3.90	4.00	7.00	7.00
86	7.00	7.00	7.00	1.67	7.00	7.00	7.00	6.00	5.00

	pu	eu	se	rsk	ra	com	dem	vlr	tl
87	1.00	1.00	1.00	7.00	2.75	1.00	+0.00	1.00	1.74
88	6.00	6.90	7.00	7.00	7.00	6.90	6.00	6.00	7.00
89	6.67	6.25	5.67	5.00	6.00	6.00	6.00	+4.90	3.33
90	7.00	7.00	5.00	3.67	7.00	7.00	7.00	2.00	5.00
91	3.67	+4.25	6.00	6.00	3.25	+0.00	+0.00	+4.90	3.67
92	7.00	6.90	7.00	2.00	6.90	6.00	6.00	2.90	5.00
93	6.67	+4.90	3.00	6.33	3.75	2.90	7.00	+0.00	1.67
94	5.67	5.90	5.00	+0.00	5.00	5.00	+0.00	3.90	3.67
95	5.67	+4.75	7.00	+0.00	5.90	2.90	7.00	5.90	6.00
96	+4.33	5.00	3.33	+0.00	+4.75	+4.90	+0.00	+0.00	3.67
97	6.67	6.00	5.00	+4.33	7.00	7.00	5.00	5.90	5.00
98	6.00	5.73	5.27	3.00	5.75	6.00	5.00	5.00	3.67
99	2.00	+4.25	+6.67	3.00	+4.90	3.00	5.02	2.00	1.67
100	5.00	5.90	6.33	+0.00	5.00	6.00	6.00	3.90	+4.33
101	5.67	5.90	6.00	6.67	5.25	5.00	6.00	5.00	6.00
102	7.00	5.75	6.67	2.00	6.25	6.00	6.00	1.90	+0.00
103	7.00	5.75	7.00	3.33	6.25	7.00	7.00	5.00	6.00
104	7.00	6.75	7.00	3.33	7.00	7.00	+0.00	2.90	5.00
105	7.00	6.90	7.00	+4.33	7.00	7.00	7.00	+0.00	+6.67
106	7.00	7.00	6.43	+0.00	7.00	7.00	+0.00	5.90	6.00
107	7.00	6.90	6.67	3.67	7.00	7.00	5.00	3.90	5.00
108	6.00	6.25	6.00	+6.67	6.90	7.00	7.00	3.00	3.00
109	6.33	5.90	+4.33	+0.00	6.00	6.00	3.00	+0.00	+0.00
110	7.00	7.00	7.00	6.33	5.25	7.00	5.00	2.90	6.00
111	+4.33	5.25	3.00	5.32	5.75	2.90	6.00	+4.90	6.33
112	+4.33	5.00	+6.67	+0.00	+4.90	5.90	+0.00	5.00	6.00
113	2.00	7.00	7.00	7.00	2.00	+0.00	7.00	2.90	3.00
114	7.00	6.25	6.27	+0.00	7.00	+9.90	6.00	3.90	+7.44
115	7.00	6.90	5.00	2.67	6.90	7.00	7.00	3.00	5.33
116	5.67	5.25	5.33	+6.67	5.90	5.00	+0.00	3.90	3.00
117	1.00	+0.00	1.00	7.00	1.00	1.00	7.00	+0.00	1.00
118	3.67	+0.00	3.00	+4.33	3.90	3.00	+0.00	3.90	+4.33
119	5.67	5.25	5.67	5.67	+4.90	3.90	5.00	5.00	+6.67
120	+6.67	5.00	3.67	+4.33	+4.90	+4.90	+0.00	+0.00	+0.00
121	2.67	2.75	5.33	1.00	3.90	1.00	7.00	+4.90	6.33
122	5.67	5.90	5.76	5.67	6.00	6.00	6.00	2.73	5.08
123	+4.33	3.90	+4.33	5.67	+4.90	+0.00	+0.00	3.00	3.00
124	+4.33	5.00	6.00	5.33	5.00	3.00	5.00	+0.00	+6.67
125	+0.00	+0.00	3.00	7.00	+0.00	3.00	2.00	2.00	+0.00
126	+4.33	5.75	6.00	5.00	3.75	2.00	+0.00	1.90	+0.00
127	7.00	7.00	6.33	1.33	7.00	7.00	7.00	7.00	5.00
128	7.00	6.90	6.67	5.33	6.90	6.90	6.00	5.00	+4.33
129	7.00	7.00	5.00	1.00	7.00	7.00	5.00	3.90	6.00

	pu	eu	se	rsk	ra	com	dem	vlr	tl
130	1.67	5.25	3.00	7.00	3.90	2.90	7.00	6.00	+6.67
131	7.00	5.00	6.67	+6.67	7.00	7.00	5.00	3.00	5.00
132	5.67	5.00	6.00	+4.33	6.90	6.00	+0.00	+4.90	+0.00
133	5.00	+4.75	5.33	5.00	3.75	+0.00	2.00	3.00	3.67
134	7.00	5.75	5.67	5.33	6.90	7.00	6.00	6.90	7.00
135	6.33	+4.90	6.33	+4.33	5.00	+4.90	5.00	2.00	+4.33
136	7.00	5.00	5.79	5.00	7.00	7.00	7.00	7.00	7.00
137	7.00	5.90	7.00	2.67	7.00	7.00	7.00	5.08	5.74
138	7.00	6.90	7.00	+0.00	6.25	5.90	+0.00	3.90	+6.67
139	1.00	+0.00	5.33	1.00	3.00	1.00	1.00	+0.00	5.00
140	7.00	6.29	5.00	5.00	7.00	7.00	6.00	3.00	3.74
141	2.33	3.75	5.00	+4.33	3.75	3.00	+0.00	+4.73	5.00
142	6.67	6.25	5.67	+6.67	6.00	6.90	6.00	2.00	+0.00
143	5.67	+4.75	3.67	+6.67	6.00	7.00	5.00	3.00	2.33
144	5.33	+4.75	5.67	5.67	5.00	3.90	+0.00	3.90	3.67
145	1.67	1.75	2.00	1.00	3.90	1.90	2.00	5.00	2.33
146	7.00	7.00	6.00	1.67	5.90	+0.00	5.00	2.00	3.67
147	5.67	+4.90	5.67	+4.33	5.75	5.90	+0.00	+0.00	5.00
148	5.33	5.75	6.67	+0.00	5.25	6.00	+0.00	5.90	2.33
149	7.00	7.00	6.00	+6.67	7.00	7.00	7.00	+0.00	3.67
150	7.00	7.00	5.00	+0.00	7.00	7.00	5.00	3.90	5.67
151	7.00	6.25	5.00	1.67	7.00	6.90	+0.00	3.00	5.00
152	7.00	6.00	6.67	1.67	7.00	6.90	6.00	2.00	5.00
153	6.00	+4.90	+6.67	6.00	+4.75	5.00	7.00	1.90	3.00
154	7.00	6.90	6.67	5.00	7.00	7.00	7.00	6.00	5.33
155	7.00	7.00	6.00	2.00	7.00	6.00	5.00	+4.90	5.33
156	7.00	5.90	6.67	3.00	5.90	6.90	7.00	2.90	+6.67
157	7.00	6.25	5.67	2.00	7.00	6.90	6.00	3.00	+4.33

Appendix H: SPSS results

Correlations

		Correlation s				
		PU	BOU	GE	ROK	RA
PU	Pearson Correlation	1	.788**	.646**	-.242**	.840**
	Sig. (1-tailed)	.	.000	.000	.001	.000
	N	157	157	157	157	157
BOU	Pearson Correlation	.788**	1	.657**	-.272**	.722**
	Sig. (1-tailed)	.000	.	.000	.000	.000
	N	157	157	157	157	157
GE	Pearson Correlation	.646**	.657**	1	-.222**	.657**
	Sig. (1-tailed)	.000	.000	.	.003	.000
	N	157	157	157	157	157
ROK	Pearson Correlation	-.242**	-.272**	-.222**	1	-.272**
	Sig. (1-tailed)	.001	.000	.003	.	.000
	N	157	157	157	157	157
RA	Pearson Correlation	.840**	.722**	.657**	-.272**	1
	Sig. (1-tailed)	.000	.000	.000	.000	.
	N	157	157	157	157	157
COM	Pearson Correlation	.843**	.751**	.682**	-.205**	.892**
	Sig. (1-tailed)	.000	.000	.000	.005	.000
	N	157	157	157	157	157
DEM	Pearson Correlation	.495**	.522**	.445**	-.076	.427**
	Sig. (1-tailed)	.000	.000	.000	.171	.000
	N	157	157	157	157	157
VIS	Pearson Correlation	-.004	-.028	.057	-.030	.005
	Sig. (1-tailed)	.481	.366	.240	.353	.475
	N	157	157	157	157	157
TRI	Pearson Correlation	.370**	.348**	.453**	-.203**	.373**
	Sig. (1-tailed)	.000	.000	.000	.005	.000
	N	157	157	157	157	157
Intention	Pearson Correlation	.441**	.373**	.405**	-.139*	.451**
	Sig. (1-tailed)	.000	.000	.000	.041	.000
	N	157	157	157	157	157
Use_1	Pearson Correlation	.478**	.452**	.393**	-.176*	.437**
	Sig. (1-tailed)	.000	.000	.000	.014	.000
	N	157	157	157	157	157
Use_2	Pearson Correlation	.312**	.288**	.239**	-.132*	.296**
	Sig. (1-tailed)	.000	.000	.001	.049	.000
	N	157	157	157	157	157
Gender	Pearson Correlation	-.044	-.060	-.071	-.008	-.027
	Sig. (1-tailed)	.293	.229	.189	.493	.368
	N	157	157	157	157	157
Age	Pearson Correlation	-.314**	-.220**	-.278**	.125	-.271**
	Sig. (1-tailed)	.000	.003	.000	.093	.000
	N	157	157	157	157	157
Computer use	Pearson Correlation	.234**	.221**	.245**	-.080	.221**
	Sig. (1-tailed)	.002	.003	.001	.161	.003
	N	157	157	157	157	157
Internet use	Pearson Correlation	.188**	.173*	.234**	-.059	.210**
	Sig. (1-tailed)	.009	.015	.002	.109	.004
	N	157	157	157	157	157
Internet banking	Pearson Correlation	.452**	.415**	.391**	-.175*	.410**
	Sig. (1-tailed)	.000	.000	.000	.014	.000
	N	157	157	157	157	157

Correlation s

		COM	DEM	VIS	TRI	Intention
PU	Pearson Correlation	.843**	.496**	-.004	.370**	.441**
	Sig. (1-tailed)	.000	.000	.481	.000	.000
	N	157	157	157	157	157
BOU	Pearson Correlation	.751**	.522**	-.028	.348**	.373**
	Sig. (1-tailed)	.000	.000	.366	.000	.000
	N	157	157	157	157	157
GE	Pearson Correlation	.682**	.446**	.057	.453**	.406**
	Sig. (1-tailed)	.000	.000	.240	.000	.000
	N	157	157	157	157	157
RSK	Pearson Correlation	-.205**	-.076	-.030	-.203**	-.139*
	Sig. (1-tailed)	.005	.171	.353	.005	.041
	N	157	157	157	157	157
RA	Pearson Correlation	.892**	.427**	.005	.373**	.451**
	Sig. (1-tailed)	.000	.000	.475	.000	.000
	N	157	157	157	157	157
COM	Pearson Correlation	1	.420**	.026	.340**	.485**
	Sig. (1-tailed)	.	.000	.376	.000	.000
	N	157	157	157	157	157
DEM	Pearson Correlation	.420**	1	.059	.286**	.218**
	Sig. (1-tailed)	.000	.	.231	.000	.003
	N	157	157	157	157	157
VIS	Pearson Correlation	.026	.059	1	.304**	.001
	Sig. (1-tailed)	.376	.231	.	.000	.495
	N	157	157	157	157	157
TRI	Pearson Correlation	.340**	.286**	.304**	1	.143*
	Sig. (1-tailed)	.000	.000	.000	.	.037
	N	157	157	157	157	157
Intention	Pearson Correlation	.485**	.218**	.001	.143*	1
	Sig. (1-tailed)	.000	.003	.495	.037	.
	N	157	157	157	157	157
Use_1	Pearson Correlation	.488**	.311**	.018	.170*	.795**
	Sig. (1-tailed)	.000	.000	.414	.017	.000
	N	157	157	157	157	157
Use_2	Pearson Correlation	.347**	.242**	-.037	.043	.511**
	Sig. (1-tailed)	.000	.001	.322	.258	.000
	N	157	157	157	157	157
Gender	Pearson Correlation	-.040	-.037	-.071	-.205**	.014
	Sig. (1-tailed)	.312	.325	.190	.005	.429
	N	157	157	157	157	157
Age	Pearson Correlation	-.284**	-.161*	.005	-.215**	-.540**
	Sig. (1-tailed)	.000	.022	.475	.003	.000
	N	157	157	157	157	157
Computer use	Pearson Correlation	.268**	.130	-.040	.087	.437**
	Sig. (1-tailed)	.000	.053	.312	.140	.000
	N	157	157	157	157	157
Internet use	Pearson Correlation	.274**	.180*	.014	.060	.387**
	Sig. (1-tailed)	.000	.012	.430	.227	.000
	N	157	157	157	157	157
Internet banking	Pearson Correlation	.463**	.274**	.024	.157*	.797**
	Sig. (1-tailed)	.000	.000	.384	.024	.000
	N	157	157	157	157	157

Correlation 6

		Use_1	Use_2	Gender	Age	Computer use
PU	Pearson Correlation	.478**	.312**	-.044	-.314**	.234**
	Sig. (1-tailed)	.000	.000	.293	.000	.002
	N	157	157	157	157	157
EOU	Pearson Correlation	.452**	.288**	-.060	-.220**	.221**
	Sig. (1-tailed)	.000	.000	.229	.003	.003
	N	157	157	157	157	157
OE	Pearson Correlation	.359**	.239**	-.071	-.278**	.245**
	Sig. (1-tailed)	.000	.001	.189	.000	.001
	N	157	157	157	157	157
PSK	Pearson Correlation	-.176*	-.132*	-.008	.125	-.080
	Sig. (1-tailed)	.014	.049	.460	.060	.161
	N	157	157	157	157	157
RA	Pearson Correlation	.437**	.296**	-.027	-.271**	.221**
	Sig. (1-tailed)	.000	.000	.368	.000	.003
	N	157	157	157	157	157
COM	Pearson Correlation	.488**	.347**	-.040	-.284**	.268**
	Sig. (1-tailed)	.000	.000	.312	.000	.000
	N	157	157	157	157	157
DEM	Pearson Correlation	.311**	.242**	-.037	-.161*	.130
	Sig. (1-tailed)	.000	.001	.325	.022	.053
	N	157	157	157	157	157
VIS	Pearson Correlation	.018	-.037	-.071	.005	-.040
	Sig. (1-tailed)	.414	.322	.190	.475	.312
	N	157	157	157	157	157
TRI	Pearson Correlation	.170*	.043	-.206**	-.215**	.087
	Sig. (1-tailed)	.017	.298	.005	.003	.140
	N	157	157	157	157	157
Intention	Pearson Correlation	.795**	.511**	.014	-.540**	.437**
	Sig. (1-tailed)	.000	.000	.429	.000	.000
	N	157	157	157	157	157
Use_1	Pearson Correlation	1	.709**	.020	-.423**	.316**
	Sig. (1-tailed)	.	.000	.403	.000	.000
	N	157	157	157	157	157
Use_2	Pearson Correlation	.709**	1	.053	-.228**	.191**
	Sig. (1-tailed)	.000	.	.257	.002	.008
	N	157	157	157	157	157
Gender	Pearson Correlation	.020	.053	1	.285**	-.018
	Sig. (1-tailed)	.403	.257	.	.001	.412
	N	157	157	157	157	157
Age	Pearson Correlation	-.423**	-.228**	.285**	1	-.314**
	Sig. (1-tailed)	.000	.002	.001	.	.000
	N	157	157	157	157	157
Computer use	Pearson Correlation	.316**	.191**	-.018	-.314**	1
	Sig. (1-tailed)	.000	.008	.412	.000	.
	N	157	157	157	157	157
Internet use	Pearson Correlation	.320**	.206**	.044	-.246**	.734**
	Sig. (1-tailed)	.000	.005	.293	.001	.000
	N	157	157	157	157	157
Internet banking	Pearson Correlation	.904**	.881**	.010	-.408**	.394**
	Sig. (1-tailed)	.000	.000	.449	.000	.000
	N	157	157	157	157	157

Correlation s

		Internet use	Internet banking
PU	Pearson Correlation	.188**	.452**
	Sig. (1-tailed)	.009	.000
	N	157	157
EOU	Pearson Correlation	.173*	.415**
	Sig. (1-tailed)	.015	.000
	N	157	157
GE	Pearson Correlation	.234**	.391**
	Sig. (1-tailed)	.002	.000
	N	157	157
ROK	Pearson Correlation	-.069	-.175*
	Sig. (1-tailed)	.109	.014
	N	157	157
RA	Pearson Correlation	.210**	.410**
	Sig. (1-tailed)	.004	.000
	N	157	157
COM	Pearson Correlation	.274**	.463**
	Sig. (1-tailed)	.000	.000
	N	157	157
DEM	Pearson Correlation	.180*	.274**
	Sig. (1-tailed)	.012	.000
	N	157	157
VIS	Pearson Correlation	.014	.024
	Sig. (1-tailed)	.430	.384
	N	157	157
TRI	Pearson Correlation	.060	.157**
	Sig. (1-tailed)	.227	.024
	N	157	157
Intention	Pearson Correlation	.387**	.797**
	Sig. (1-tailed)	.000	.000
	N	157	157
Use_1	Pearson Correlation	.320**	.904**
	Sig. (1-tailed)	.000	.000
	N	157	157
Use_2	Pearson Correlation	.206**	.581**
	Sig. (1-tailed)	.005	.000
	N	157	157
Gender	Pearson Correlation	.044	.010
	Sig. (1-tailed)	.293	.446
	N	157	157
Age	Pearson Correlation	-.246**	-.408**
	Sig. (1-tailed)	.001	.000
	N	157	157
Computer use	Pearson Correlation	.734**	.394**
	Sig. (1-tailed)	.000	.000
	N	157	157
Internet use	Pearson Correlation	1	.396**
	Sig. (1-tailed)	.	.000
	N	157	157
Internet banking	Pearson Correlation	.396**	1
	Sig. (1-tailed)	.000	.
	N	157	157

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

Correlation s

			PU	EOU	OE
Kendall's tau_b	PU	Correlation Coefficient	1.000	.644**	.438**
		Sig. (1-tailed)	.	.000	.000
		N	157	157	157
	EOU	Correlation Coefficient	.644**	1.000	.435**
		Sig. (1-tailed)	.000	.	.000
		N	157	157	157
	OE	Correlation Coefficient	.438**	.435**	1.000
		Sig. (1-tailed)	.000	.000	.
		N	157	157	157
	PSK	Correlation Coefficient	-.263**	-.290**	-.148**
		Sig. (1-tailed)	.000	.000	.005
		N	157	157	157
	RA	Correlation Coefficient	.687**	.547**	.431**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	COM	Correlation Coefficient	.697**	.584**	.468**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	DEB	Correlation Coefficient	.366**	.346**	.297**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	VIB	Correlation Coefficient	-.042	-.013	.036
		Sig. (1-tailed)	.245	.414	.270
		N	157	157	157
	TRI	Correlation Coefficient	.293**	.247**	.309**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	Intention	Correlation Coefficient	.444**	.331**	.337**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	Use_1	Correlation Coefficient	.367**	.321**	.290**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	Use_2	Correlation Coefficient	.337**	.284**	.213**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	Gender	Correlation Coefficient	-.028	-.019	-.081
		Sig. (1-tailed)	.345	.390	.116
		N	157	157	157
	Age	Correlation Coefficient	-.227**	-.171**	-.205**
		Sig. (1-tailed)	.000	.003	.000
		N	157	157	157
	Computer use	Correlation Coefficient	.156**	.130*	.125*
		Sig. (1-tailed)	.009	.020	.025
		N	157	157	157
	Internet use	Correlation Coefficient	.116*	.084	.108*
		Sig. (1-tailed)	.036	.088	.043
		N	157	157	157
	Internet banking	Correlation Coefficient	.334**	.290**	.233**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157

Correlations

			RSK	RA	COM
Kendall's tau_b	PU	Correlation Coefficient	-.263**	.687**	.697**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	EOU	Correlation Coefficient	-.280**	.547**	.584**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	OE	Correlation Coefficient	-.148**	.431**	.468**
		Sig. (1-tailed)	.005	.000	.000
		N	157	157	157
	RSK	Correlation Coefficient	1.000	-.234**	-.203**
		Sig. (1-tailed)	.	.000	.000
		N	157	157	157
	RA	Correlation Coefficient	-.234**	1.000	.755**
		Sig. (1-tailed)	.000	.	.000
		N	157	157	157
	COM	Correlation Coefficient	-.203**	.755**	1.000
		Sig. (1-tailed)	.000	.000	.
		N	157	157	157
	DEI	Correlation Coefficient	-.074	.319**	.324**
		Sig. (1-tailed)	.111	.000	.000
		N	157	157	157
	VIS	Correlation Coefficient	-.021	.006	.010
		Sig. (1-tailed)	.360	.438	.436
		N	157	157	157
	TRI	Correlation Coefficient	-.174**	.291**	.284**
		Sig. (1-tailed)	.001	.000	.000
		N	157	157	157
	Intention	Correlation Coefficient	-.132*	.398**	.441**
		Sig. (1-tailed)	.016	.000	.000
		N	157	157	157
	Use_1	Correlation Coefficient	-.161**	.324**	.373**
		Sig. (1-tailed)	.004	.000	.000
		N	157	157	157
	Use_2	Correlation Coefficient	-.131*	.296**	.337**
		Sig. (1-tailed)	.013	.000	.000
		N	157	157	157
	Gender	Correlation Coefficient	.004	-.032	-.010
		Sig. (1-tailed)	.479	.322	.444
		N	157	157	157
	Age	Correlation Coefficient	.101	-.213**	-.202**
		Sig. (1-tailed)	.051	.000	.001
		N	157	157	157
	Computer use	Correlation Coefficient	-.101	.137*	.164**
		Sig. (1-tailed)	.057	.017	.006
		N	157	157	157
	Internet use	Correlation Coefficient	-.108*	.106*	.133*
		Sig. (1-tailed)	.042	.045	.019
		N	157	157	157
	Internet banking	Correlation Coefficient	-.158**	.275**	.329**
		Sig. (1-tailed)	.005	.000	.000
		N	157	157	157

Correlation s

			DEM	VID	TRI
Kendall's tau_b	PU	Correlation Coefficient	.366**	-.042	.293**
		Sig. (1-tailed)	.000	.245	.000
		N	157	157	157
	EQU	Correlation Coefficient	.346**	-.013	.247**
		Sig. (1-tailed)	.000	.414	.000
		N	157	157	157
	GE	Correlation Coefficient	.297**	.036	.309**
		Sig. (1-tailed)	.000	.270	.000
		N	157	157	157
	ROK	Correlation Coefficient	-.074	-.021	-.174**
		Sig. (1-tailed)	.111	.360	.001
		N	157	157	157
	RA	Correlation Coefficient	.319**	.006	.291**
		Sig. (1-tailed)	.000	.488	.000
		N	157	157	157
	COM	Correlation Coefficient	.324**	.010	.284**
		Sig. (1-tailed)	.000	.436	.000
		N	157	157	157
	DEM	Correlation Coefficient	1.000	.026	.199**
		Sig. (1-tailed)	.	.339	.001
		N	157	157	157
	VID	Correlation Coefficient	.026	1.000	.207**
		Sig. (1-tailed)	.339	.	.000
		N	157	157	157
	TRI	Correlation Coefficient	.199**	.207**	1.000
		Sig. (1-tailed)	.001	.000	.
		N	157	157	157
	Intention	Correlation Coefficient	.167**	.008	.142*
		Sig. (1-tailed)	.005	.446	.011
		N	157	157	157
	Use_1	Correlation Coefficient	.236**	.000	.109*
		Sig. (1-tailed)	.000	.499	.036
		N	157	157	157
	Use_2	Correlation Coefficient	.208**	-.010	.086
		Sig. (1-tailed)	.000	.431	.073
		N	157	157	157
	Gender	Correlation Coefficient	-.090	-.076	-.182**
		Sig. (1-tailed)	.243	.133	.004
		N	157	157	157
	Age	Correlation Coefficient	-.124*	-.021	-.147**
		Sig. (1-tailed)	.029	.368	.009
		N	157	157	157
	Computer use	Correlation Coefficient	.036	-.048	.021
		Sig. (1-tailed)	.296	.231	.370
		N	157	157	157
	Internet use	Correlation Coefficient	.098	.004	.021
		Sig. (1-tailed)	.068	.477	.371
		N	157	157	157
	Internet banking	Correlation Coefficient	.189**	.000	.081
		Sig. (1-tailed)	.002	.498	.096
		N	157	157	157

Correlation s

			Intention	Use_1	Use_2
Kendall's tau_b	PU	Correlation Coefficient	.444**	.367**	.337**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	EOU	Correlation Coefficient	.331**	.321**	.284**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	OE	Correlation Coefficient	.337**	.290**	.213**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	ROK	Correlation Coefficient	-.132*	-.161**	-.131*
		Sig. (1-tailed)	.016	.004	.013
		N	157	157	157
	RA	Correlation Coefficient	.368**	.324**	.296**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	COM	Correlation Coefficient	.441**	.373**	.337**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	DEM	Correlation Coefficient	.167**	.236**	.208**
		Sig. (1-tailed)	.005	.000	.000
		N	157	157	157
	VIS	Correlation Coefficient	.008	.000	-.010
		Sig. (1-tailed)	.446	.499	.431
		N	157	157	157
	TRI	Correlation Coefficient	.142*	.109*	.086
		Sig. (1-tailed)	.011	.036	.073
		N	157	157	157
	Intention	Correlation Coefficient	1.000	.621**	.553**
		Sig. (1-tailed)	.	.000	.000
		N	157	157	157
	Use_1	Correlation Coefficient	.621**	1.000	.812**
		Sig. (1-tailed)	.000	.	.000
		N	157	157	157
	Use_2	Correlation Coefficient	.553**	.812**	1.000
		Sig. (1-tailed)	.000	.000	.
		N	157	157	157
	Gender	Correlation Coefficient	.009	.031	.031
		Sig. (1-tailed)	.453	.331	.329
		N	157	157	157
	Age	Correlation Coefficient	-.362**	-.317**	-.246**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157
	Computer use	Correlation Coefficient	.327**	.208**	.188**
		Sig. (1-tailed)	.000	.001	.002
		N	157	157	157
	Internet use	Correlation Coefficient	.257**	.204**	.172**
		Sig. (1-tailed)	.000	.001	.004
		N	157	157	157
	Internet banking	Correlation Coefficient	.613**	.707**	.646**
		Sig. (1-tailed)	.000	.000	.000
		N	157	157	157

Correlation s

			Gender	Age	Computer use
Kendall's tau_b	PU	Correlation Coefficient	-.028	-.227**	.196**
		Sig. (1-tailed)	.345	.000	.009
		N	157	157	157
	EOU	Correlation Coefficient	-.019	-.171**	.130**
		Sig. (1-tailed)	.390	.003	.020
		N	157	157	157
	OE	Correlation Coefficient	-.081	-.206**	.125**
		Sig. (1-tailed)	.116	.000	.025
		N	157	157	157
	ROK	Correlation Coefficient	.004	.101	-.101
		Sig. (1-tailed)	.479	.051	.057
		N	157	157	157
	RA	Correlation Coefficient	-.032	-.213**	.137**
		Sig. (1-tailed)	.322	.000	.017
		N	157	157	157
	COM	Correlation Coefficient	-.010	-.202**	.164**
		Sig. (1-tailed)	.444	.001	.006
		N	157	157	157
	DBI	Correlation Coefficient	-.050	-.124*	.036
		Sig. (1-tailed)	.243	.029	.296
		N	157	157	157
	VIS	Correlation Coefficient	-.076	-.021	-.048
		Sig. (1-tailed)	.133	.368	.231
		N	157	157	157
	TRI	Correlation Coefficient	-.182**	-.147**	.021
		Sig. (1-tailed)	.004	.009	.370
		N	157	157	157
	Intention	Correlation Coefficient	.009	-.362**	.327**
		Sig. (1-tailed)	.453	.000	.000
		N	157	157	157
	Use_1	Correlation Coefficient	.031	-.317**	.208**
		Sig. (1-tailed)	.331	.000	.001
		N	157	157	157
	Use_2	Correlation Coefficient	.031	-.246**	.188**
		Sig. (1-tailed)	.329	.000	.002
		N	157	157	157
	Gender	Correlation Coefficient	1.000	.232**	.029
		Sig. (1-tailed)	.	.001	.390
		N	157	157	157
	Age	Correlation Coefficient	.232**	1.000	-.169**
		Sig. (1-tailed)	.001	.	.007
		N	157	157	157
	Computer use	Correlation Coefficient	.029	-.169**	1.000
		Sig. (1-tailed)	.390	.007	.
		N	157	157	157
	Internet use	Correlation Coefficient	.082	-.133*	.589**
		Sig. (1-tailed)	.132	.024	.000
		N	157	157	157
	Internet banking	Correlation Coefficient	.045	-.270**	.340**
		Sig. (1-tailed)	.267	.000	.000
		N	157	157	157

Correlation s

			Internet use	Internet banking
Kendall's tau_b	PU	Correlation Coefficient	.116*	.334**
		Sig. (1-tailed)	.036	.000
		N	157	157
	EOU	Correlation Coefficient	.084	.290**
		Sig. (1-tailed)	.088	.000
		N	157	157
	OE	Correlation Coefficient	.108*	.233**
		Sig. (1-tailed)	.043	.000
		N	157	157
	RSK	Correlation Coefficient	-.108*	-.158**
		Sig. (1-tailed)	.042	.005
		N	157	157
	RA	Correlation Coefficient	.106*	.275**
		Sig. (1-tailed)	.045	.000
		N	157	157
	COM	Correlation Coefficient	.133*	.329**
		Sig. (1-tailed)	.019	.000
		N	157	157
	DEM	Correlation Coefficient	.068	.189**
		Sig. (1-tailed)	.068	.002
		N	157	157
	VIS	Correlation Coefficient	.004	.000
		Sig. (1-tailed)	.477	.498
		N	157	157
	TRI	Correlation Coefficient	.021	.081
		Sig. (1-tailed)	.371	.096
		N	157	157
	Intention	Correlation Coefficient	.257**	.613**
		Sig. (1-tailed)	.000	.000
		N	157	157
	Use_1	Correlation Coefficient	.204**	.707**
		Sig. (1-tailed)	.001	.000
		N	157	157
	Use_2	Correlation Coefficient	.172**	.646**
		Sig. (1-tailed)	.004	.000
		N	157	157
	Gender	Correlation Coefficient	.082	.045
		Sig. (1-tailed)	.132	.267
		N	157	157
	Age	Correlation Coefficient	-.133*	-.270**
		Sig. (1-tailed)	.024	.000
		N	157	157
	Computer use	Correlation Coefficient	.559**	.340**
		Sig. (1-tailed)	.000	.000
		N	157	157
	Internet use	Correlation Coefficient	1.000	.343**
		Sig. (1-tailed)	.	.000
		N	157	157
	Internet banking	Correlation Coefficient	.343**	1.000
		Sig. (1-tailed)	.000	.
		N	157	157

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

Simple Linear Regression

Variables Entered / Removed (b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.441(a)	.195	.190	1.9911	.195	37.508	1	155	.000

a Predictors: (Constant), PU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	148.698	1	148.698	37.508	.000(a)
	Residual	614.490	155	3.964		
	Total	763.187	156			

a Predictors: (Constant), PU

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.223	.519		4.278	.000
	PU	.545	.089	.441	6.124	.000

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.373(a)	.139	.134	2.0588	.139	25.046	1	155	.000

a Predictors: (Constant), EOU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	106.166	1	106.166	25.046	.000(a)
	Residual	657.021	155	4.239		
	Total	763.187	156			

a Predictors: (Constant), EOU

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.024	.666		3.041	.003
	EOU	.604	.121	.373	5.005	.000

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.406(a)	.165	.159	2.0279	.165	30.584	1	155	.000

a Predictors: (Constant), SE

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	125.772	1	125.772	30.584	.000(a)
	Residual	637.415	155	4.112		
	Total	763.187	156			

a Predictors: (Constant), SE

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.389	.542		4.407	.000
	SE	.555	.100	.406	5.530	.000

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.139(a)	.019	.013	2.1973	.019	3.074	1	155	.082

a Predictors: (Constant), RSK

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.843	1	14.843	3.074	.082(a)
	Residual	748.344	155	4.828		
	Total	763.187	156			

a Predictors: (Constant), RSK

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.117	.524		11.680	.000
	RSK	-.195	.111	-.139	-1.753	.082

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.451(a)	.203	.198	1.9809	.203	39.496	1	155	.000

a Predictors: (Constant), RA

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	154.981	1	154.981	39.496	.000(a)
	Residual	608.207	155	3.924		
	Total	763.187	156			

a Predictors: (Constant), RA

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.019	.538		3.752	.000
	RA	.599	.095	.451	6.285	.000

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.485(a)	.235	.230	1.9405	.235	47.673	1	155	.000

a Predictors: (Constant), COM

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	179.519	1	179.519	47.673	.000(a)
	Residual	583.668	155	3.766		
	Total	763.187	156			

a Predictors: (Constant), COM

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.414	.439		5.498	.000
	COM	.552	.080	.485	6.905	.000

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.218(a)	.048	.041	2.1655	.048	7.754	1	155	.006

a Predictors: (Constant), DEM

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.359	1	36.359	7.754	.006(a)
	Residual	726.828	155	4.689		
	Total	763.187	156			

a Predictors: (Constant), DEM

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.622	.610		5.936	.000
	DEM	.325	.117	.218	2.785	.006

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.001(a)	.000	-.006	2.2190	.000	.000	1	155	.991

a Predictors: (Constant), VIS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	1	.001	.000	.991(a)
	Residual	763.186	155	4.924		
	Total	763.187	156			

a Predictors: (Constant), VIS

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.245	.561		9.353	.000
	VIS	.002	.139	.001	.012	.991

a Dependent Variable: Intention

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.143(a)	.021	.014	2.1960	.021	3.252	1	155	.073

a Predictors: (Constant), TRI

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.681	1	15.681	3.252	.073(a)
	Residual	747.506	155	4.823		
	Total	763.187	156			

a Predictors: (Constant), TRI

b Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.164	.628		6.626	.000
	TRI	.083	.046	.143	1.803	.073

a Dependent Variable: Intention

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	EOU(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	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.788(a)	.620	.618	1.10763	.620	253.133	1	155	.000

a Predictors: (Constant), EOU

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	310.554	1	310.554	253.133	.000(a)
	Residual	190.161	155	1.227		
	Total	500.715	156			

a Predictors: (Constant), EOU

b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.038	.358		.106	.916
	EOU	1.033	.065	.788	15.910	.000

a Dependent Variable: PU

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: EOU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.657(a)	.432	.428	1.03269	.432	117.729	1	155	.000

a Predictors: (Constant), SE

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	125.551	1	125.551	117.729	.000(a)
	Residual	165.299	155	1.066		
	Total	290.850	156			

a Predictors: (Constant), SE

b Dependent Variable: EOU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.483	.276		8.991	.000
	SE	.554	.051	.657	10.850	.000

a Dependent Variable: EOU

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	SE(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	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.646(a)	.417	.413	1.37269	.417	110.733	1	155	.000

a Predictors: (Constant), SE

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	208.652	1	208.652	110.733	.000(a)
	Residual	292.063	155	1.884		
	Total	500.715	156			

a Predictors: (Constant), SE

b Dependent Variable: PU

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.872	.367		5.100	.000
	SE	.715	.068	.646	10.523	.000

a Dependent Variable: PU

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: RSK

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.222(a)	.049	.043	1.55055	.049	8.000	1	155	.005

a Predictors: (Constant), SE

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.234	1	19.234	8.000	.005(a)
	Residual	372.651	155	2.404		
	Total	391.886	156			

a Predictors: (Constant), SE

b Dependent Variable: RSK

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.565	.415		13.422	.000
	SE	-.217	.077	-.222	-2.828	.005

a Dependent Variable: RSK

Variables Entered/Removed(b)

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

a All requested variables entered.

b Dependent Variable: Use_1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.795(a)	.632	.630	1.7209	.632	266.466	1	155	.000

a Predictors: (Constant), Intention

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	789.172	1	789.172	266.466	.000(a)
	Residual	459.052	155	2.962		
	Total	1248.224	156			

a Predictors: (Constant), Intention

b Dependent Variable: Use_1

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.603	.355		-4.518	.000
	Intention	1.017	.062	.795	16.324	.000

a. Dependent Variable: Use_1

Variables Entered/Removed(b)

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

a. All requested variables entered.

b. Dependent Variable: Use_2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.511(a)	.261	.256	8.9196	.261	54.656	1	155	.000

a. Predictors: (Constant), Intention

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4348.409	1	4348.409	54.656	.000(a)
	Residual	12331.764	155	79.560		
	Total	16680.173	156			

a. Predictors: (Constant), Intention

b. Dependent Variable: Use_2

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.401	1.839		-2.393	.018
	Intention	2.387	.323	.511	7.393	.000

a. Dependent Variable: Use_2

Multilinear linear regression – Model 1

Variables Entered/Removed(a)

Model	Variables Entered	Variables Removed	Method
1	PU	.	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: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.441(a)	.195	.190	1.9911	.195	37.508	1	155	.000
2	.469(b)	.220	.210	1.9662	.025	4.957	1	154	.027

a Predictors: (Constant), PU

b Predictors: (Constant), PU, SE

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	148.698	1	148.698	37.508	.000(a)
	Residual	614.490	155	3.964		
	Total	763.187	156			
2	Regression	167.859	2	83.929	21.711	.000(b)
	Residual	595.329	154	3.866		
	Total	763.187	156			

a Predictors: (Constant), PU

b Predictors: (Constant), PU, SE c Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.223	.519		4.278	.000
	PU	.545	.089	.441	6.124	.000
2	(Constant)	1.679	.568		2.955	.004
	PU	.380	.115	.307	3.300	.001
	SE	.284	.127	.207	2.226	.027

a. Dependent Variable: Intention

Excluded Variables(c)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	EOU	.067(a)	.569	.570	.046	.380
	SE	.207(a)	2.226	.027	.177	.583
	RSK	-.035(a)	-.467	.641	-.038	.942
2	EOU	-.016(b)	-.131	.896	-.011	.342
	RSK	-.021(b)	-.278	.781	-.022	.934

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

b. Predictors in the Model: (Constant), PU, SE

c. Dependent Variable: Intention

Model 2

Variables Entered/Removed(a)

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

a. Dependent Variable: Intention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.485(a)	.235	.230	1.9405	.235	47.673	1	155	.000

a. Predictors: (Constant), COM

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	179.519	1	179.519	47.673	.000(a)
	Residual	583.668	155	3.766		
	Total	763.187	156			

a. Predictors: (Constant), COM

b. Dependent Variable: Intention

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.414	.439		5.498	.000
	COM	.552	.080	.485	6.905	.000

a. Dependent Variable: Intention

Excluded Variables(b)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	RA	.088(a)	.566	.572	.046	.204
	EOU	.020(a)	.192	.848	.015	.437
	DEM	.017(a)	.225	.822	.018	.823
	VIS	-.011(a)	-.162	.871	-.013	.999
	TRI	-.024(a)	-.327	.744	-.026	.884

a Predictors in the Model: (Constant), COM

b Dependent Variable: Intention