UNIVERSITY OF SOUTHERN QUEENSLAND

PREDICTING MATURE CONSUMERS' ATTITUDES TOWARDS USE OF SELF-SERVICE TECHNOLOGIES IN THE FINANCIAL SERVICES CONTEXT

A Dissertation submitted by
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ABSTRACT

The combination of increased numbers of ageing consumers, decreased access to personal services, and reluctance to use self-service technologies (SSTs) among some mature consumers highlighted the need to identify the factors that influence the use of these technologies. In the Australian context, research investigating mature consumers is an emerging area with limited knowledge relating to their use of SSTs.

Through extending the original technology acceptance model (TAM), a well-established model from the information technology domain, this thesis incorporated six external variables into the model and investigated the use of SSTs among mature consumers in the financial services context. The thesis also examined the moderating effects of demographic characteristics on the relationships within the extended TAM (ETAM).

Using cross sectional data from a sample of 208 mature consumers in Study 1, the original TAM and ETAM were tested. Based on these findings, improvements were made for Study 2, where the modified models were tested on data from a national sample of 2,253 mature consumers. Path analysis indicated that self-efficacy, technology discomfort, perceived risk and personal contact made a significant unique contribution to predicting attitude and behaviour over and above the two belief variables in TAM, perceived usefulness and perceived ease of use. The four variables in the ETAM were significant predictors of perceived usefulness and perceived ease of use. Results also suggested that age and education act as moderating variables in this model. These findings can serve as a basis for designing educational and communication strategies to foster greater use of SSTs in the financial context among mature consumers.

A second aim of this thesis was to explore usage patterns of self-service banking technologies (SSBTs) among different segments of the mature consumer market in Australia. The diversity of the mature consumer market was reflected through establishing three behavioural segments, namely non-users, low users and medium-to-high users of SSBTs, providing a deeper understanding of mature consumers' knowledge and patterns of behaviour towards using these technologies and personal services in the financial context.

The findings contributed to the understanding of mature consumers' behaviour towards SSBTs for academics, financial practice and policy formation by government and not-for-profit senior organisations responsible for improving financial literacy and productive ageing among mature consumers.

CERTIFICATION OF DISSERTATION

I certify that the ideas, research work, results, analyses and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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Signature of Candidate Date

ENDORSEMENT

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Signature of Supervisor Date

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Chapter 1

INTRODUCTION

1.1. RESEARCH DOMAIN

In the global economy, technological change is a strong external force that has a far-reaching impact on the competitive landscape of the service industry. The adoption of information technology, in particular the internet, is not only a key driver of internal firm change (Jayawardhena & Foley 2000), but has created a totally new service delivery concept and service environment (Suoranta & Mattila 2004). Traditionally, the service encounter was based on interpersonal interactions between the customer and the firm's service personnel (Bitner, Booms & Tetreault 1990; Keaveney 1995), however technology has enabled the customer to produce the service through a 'technological interaction', either as a substitute or complement to face-to-face service delivery (Meuter & Bitner 1998; Parasuraman 2000; de Jong, de Ruyter & Lemmink 2003).

These technological interfaces that enable customers to perform the entire service delivery independent of direct involvement from service firm personnel are referred to as self-service technologies (SSTs) (Meuter et al. 2000). The result of firms effectively managing the infusion of these technologies into the 'marketspace' (Rayport & Sviokla 1995) provides users with many benefits including convenience, flexibility, customisation, control, enjoyment, improved service over the face-to-face encounter (saves time and money, easier to use etc.), and greater satisfaction (Dabholkar 1996; Bitner, Brown & Meuter 2000; Meuter et al. 2000). However, some consumers have negative experiences and feelings towards self-service technologies (Mick & Fournier 1998) due to technology failure during and post technology interaction, poor technology and service design features, and their own inabilities to perform the task (Meuter et al. 2000). Further, some customers prefer personal interaction with service personnel and other customers and may be less than eager or could even resist using SSTs (Lee & Allaway 2002).

The infusion of technological innovations into the service delivery process is ubiquitous and continues to increase. Investment in information technologies is substantial for most firms, with its value being realised only when it is utilised by the intended users. Understanding and managing the acceptance and use of information technologies by employees in firms is a mature research area (Venkatesh et al. 2003), however empirical research focused on predicting consumers' intention to use self-service technologies is an emerging area of marketing research (Dabholkar 1996; Meuter et al. 2000; Dabholkar & Bagozzi 2002; Walker et al. 2002; Curran, Meuter & Surprenant 2003; Dabholkar, Bobbitt & Lee 2003; Lee, Lee & Eastwood 2003; Meuter et al. 2003; Curran & Meuter 2005; Meuter et al. 2005). Current SST research tends towards a pro-innovation bias (Sheth 1981; Rogers 1983) with less attention given to understanding why consumers limit their use or don't adopt SSTs. Empirical research by Szmigin and Foxall (1998) on consumers' resistance to technological innovation and the technology readiness index developed by Parasuraman (2000) to identify drives and inhibitors of technology behaviour, provide some insight into reasons for resistance and low adoption of technology.

Consumers more likely to trial and adopt SSTs are younger, more affluent, and better educated (Lee, Lee & Eastwood 2003; Meuter et al. 2005), however it cannot be assumed that it is the 'senior' market segment that represents the last bastion of resistance toward SSTs (Barnes, Dunne & Glynn 2000). Mature consumers are more heterogeneous than younger consumer groups (Carrigan 1998; Moschis 2003) and their differences in behaviour and use of technologies is influenced by factors like innovativeness, cognitive age, physiological factors, and attitude towards technologies (Szmigin & Carrigan 2000, 2001b; Eastman & Iyer 2004), with chronological age having less of an influence (Ahmad 2002; Szmigin 2003).

The scope of empirical research on mature consumers has primarily been descriptive in nature, with very few studies examining specific factors that influence attitude and behaviour towards using SSTs (Mattila, Karjaluoto & Pento 2003; Eastman & Iyer 2004). Further, SST studies in general have focused on predicting behaviour intention, however Shih and Venkatesk (2004) suggest that usage rate and variety of use are more meaningful measures than adoption or intention to use SSTs as the extent of diffusion is described. Therefore, examining mature consumers' beliefs,

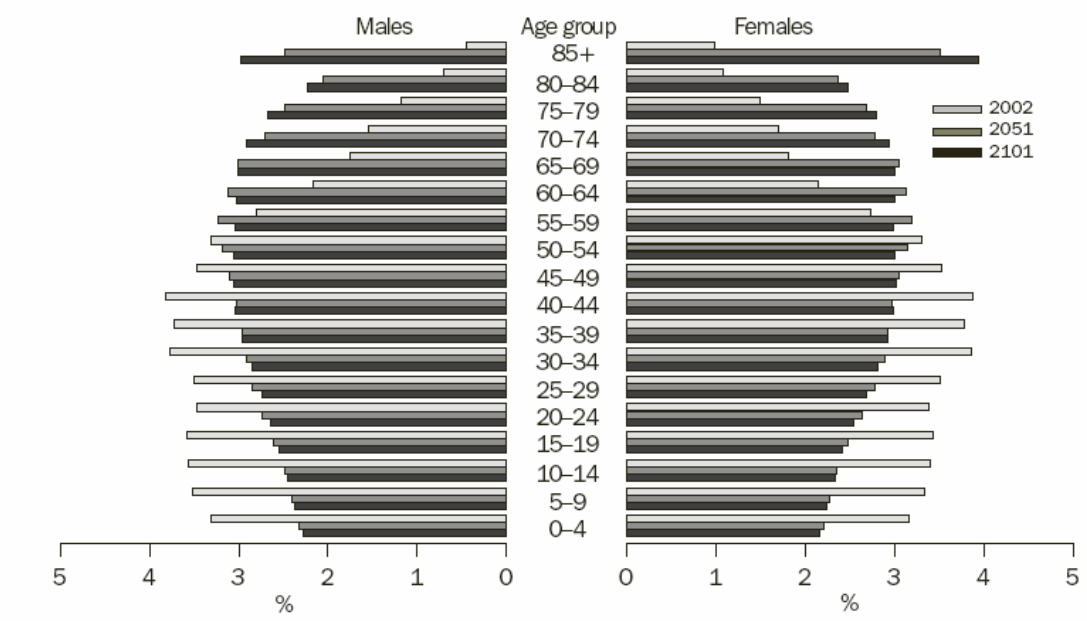
attitudes and behaviour towards using SSTs would contribute to our understanding of the behaviour of mature consumers.

This thesis proposes a theoretical framework incorporating factors that explain mature consumers' usage behaviour of SSTs. The conceptual model is tested empirically in the financial service industry. This context was important as it allowed consumers a choice of self-service banking technologies (SSBTs) to suit their circumstances that included EFTPOS, ATMs, telephone, and internet banking and a non-technology based delivery option, the bank teller. The specific age designated as becoming a mature consumer is arbitrary as consumers' age at different rates (Moschis & Mathur 1993). The scope of this study is limited to consumers over the age of 50, a cut-off age that is supported by previous research (Szmigin & Carrigan 2001a). In the next section of this chapter an overview of the senior Australian consumer market is provided to contextualise this study. The overview is followed by the research questions. The theoretical framework and a brief account of the method and findings from the two empirical studies are then presented. The contribution of this research is addressed in the concluding section of this chapter.

1.2. SENIOR CONSUMER MARKET AND THE RESEARCH QUESTIONS

The ageing of the world's population is an important demographic shift, with the proportion of the Australian population aged 50 years and over projected to increase from 29 per cent at June 2002 to between 46 per cent and 50 per cent in 2051. The number of people aged 85 years and over will increase the fastest, from 1.5 per cent in 2004 to 6 to 8 per cent in 2051 (Australian Bureau of Statistics 2003, p. 35). These demographic shifts are displayed in Figure 1.1.

Figure 1.1. Projected population age structure 2002, 2051, 2101 for Australia



Source: (Australian Bureau of Statistics 2003, p. 36)

The mature Australian consumers (over 55 years of age) are a financially powerful group controlling over 39 percent of the household wealth and one quarter of all disposable income (Access Economics 2001, p.49). As a growing sector of the Australian population they have a strong need for financial services, with financial institutions increasingly delivering a large part of these services through SSTs. In a study conducted in 2000 by the Australian Bureau of Statistics, 74 per cent of all adults used ATMs, 66 per cent used EFTPOS, and 49 per cent used telephone banking (Australian Bankers' Association 2004b). The usage level for these banking technologies is considerably lower for the 55-64 age group and much lower for the 65 or over age group (Appendix A, Table A.1). As a new technology, the take up rate of internet banking has been faster than ATMs or telephone banking (Australian Bankers' Association 2004b), however the usage rate for the over 55 age group is only about 30 per cent of those mature consumers who have access to the internet (Appendix A, Tables A.1 & A.2). This evidence suggests that some mature consumers find it difficult to adapt to SSBTs. With people living longer, many consumers may find it more difficult in future years to deal with their financial needs if access to non-technology based services is reduced.

This combination of increased numbers of ageing consumers, decreased access to personal services, and reluctance to adopt SSTs highlights the need to identify factors that influence take up of new technologies. We know some of these factors already. The relationship that mature consumers have with technology is influenced by differences in their ageing processes, which include physiological, social, and psychological ageing (Moschis 2003). Mature consumers face difficulties associated with vision, hearing, motor functions and cognitive capabilities that may influence technology interaction (Mayhorn et al. 2004). Psychological ageing resulting in changes in attitude, personality, and needs (Kennett, Moschis & Bellenger 1995) may influence mature consumers' willingness to accept change and adapt to using new technologies. Mature consumers who perceive themselves as younger in age and outlook, more in control of their lives, and more self-confident (Mathur, Sherman & Schiffman 1998) will be more accommodating of SSTs.

To enable more mature consumers to adapt to using SSTs suited to their needs in the financial sector, we require a deeper understanding of the drivers and inhibitors of consumers' attitudes and behaviour towards using SSBTs. Mattila, Karjaluoto and, Pento (2003, p. 524) specifically stated in the conclusions to their research on internet banking adoption among mature consumers in Finland that '…future work should diversify the discussion into attitude development…'. Research findings of this nature will provide meaningful information that can serve as a basis for designing educational and communication strategies to foster greater use of SSBTs among mature consumers.

Given that mature consumers have not adapted as readily to SSTs available in the financial services context, this research focuses on three questions:

> *How does usage behaviour of mature consumers' vary across SSTs in the financial services context?*
>
> *What are the key factors influencing mature consumers' attitudes, intentions, and behaviour in relation to the use of SSTs in the financial services context?*

Study 1 addresses these questions by collecting descriptive data to discover more about usage patterns across the mature consumer market and by developing and testing a conceptual model specifying key determinants of SST attitudes and the relationships among those determinants. In addition to the above research questions, Study 2 explored the following question:

> *What moderating effects do demographic characteristics such as gender, age, and education have on relationships specified within the model?*

1.3. OVERVIEW OF STUDIES AND MAIN FINDINGS

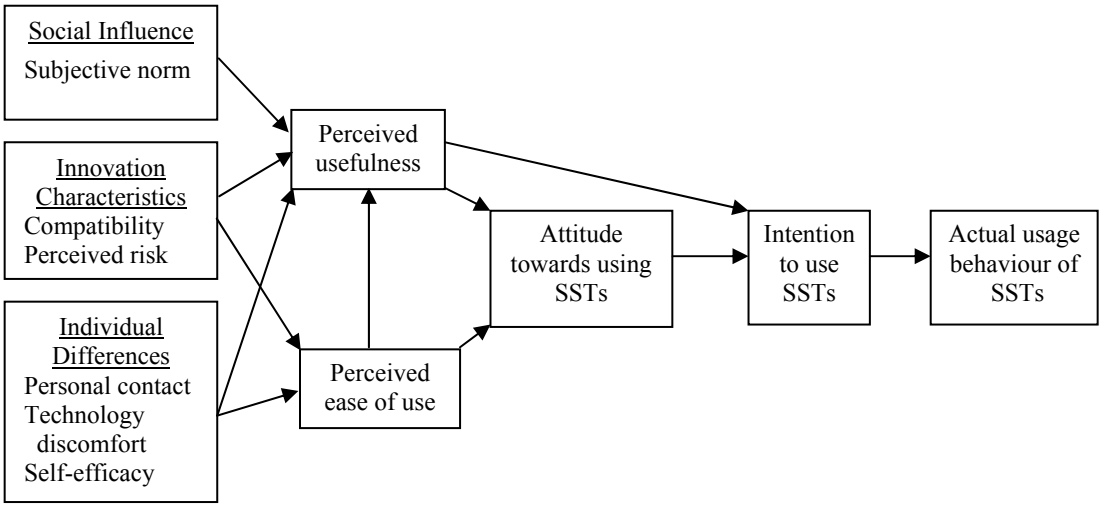
This study has a multidisciplinary focus, as it integrates the literature on user acceptance of information technology (information systems domain), self-service technology (services marketing domain), and electronic banking technology (financial marketing domain) to inform the development of a theoretical framework. Literature relating to the needs of mature consumers and their use of technologies will assist in refining the conceptual model.

Information technology acceptance research grounded in psychology, sociology, and information systems has resulted in the development of several theoretical models that are based on a range of theories including the theory of reasoned action (TRA), the theory of planned behaviour (TPB), innovation diffusion theory, social cognitive theory, and motivational theory (cf. Venkatesh et al. 2003). The dominant model to emerge from this research area is the technology acceptance model (TAM) (Davis, Bagozzi & Warshaw 1989), adapted from the TRA (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980) to predict acceptance and use of information technologies in organisations. In the original model, actual system use is determined by behavioural intention to use, which is in turn jointly determined by attitude towards using and perceived usefulness. Perceived ease of use is a direct determinant of attitude and perceived usefulness. The model does not attempt to explain the origins of perceived usefulness and perceived ease of use, however external variables are proposed to influence the belief factors (Davis, Bagozzi & Warshaw 1989). As stated by Venkatesh, '…while parsimony is TAM's strength, it is also the model's key limitation' (2000, p. 344). Gaining an understanding of the antecedents of perceived

ease of use and perceived usefulness will enable the development of more meaningful design and training interventions to improve user acceptance and use of information technologies (Venkatesh & Davis 1996).

The original TAM forms the theoretical foundation for the research to be described in this thesis. The aim of the research was to identify the key factors influencing mature consumers' attitudes, intentions, and behaviour towards using SSTs by extending the original TAM in directions suggested by Venkatesh and Davis (1996). The model shown in Figure 1.2 posits that social influence (subjective norm), innovation characteristics (compatibility and perceived risk) and individual differences (personal contact, technology discomfort and self-efficacy) are underlying determinants of TAM's perceived usefulness and perceived ease of use and that the two TAM variables fully mediate the effect of the antecedents on the attitude and use variables.

Figure 1.2. Conceptual model of the determinants of consumers' attitude-use of self-service technologies (SSTs)



Source: developed for this study and based on Davis, Bagozzi and Warshaw (1989, p. 985)

Following a review of the literature in the areas mentioned above and in-depth interviews and focus groups with mature consumer users and non-users of SSBTs, this project empirically tests the validity of the conceptual model. In Study 1, a cross-sectional study of mature consumers (over 50 years of age) randomly selected from a large Queensland Seniors database in Australia resulted in 208 usable responses (35% response rate). The structural model (Figure 1.2) was tested using AMOS 6.0

(Arbuckle 2005) with the maximum likelihood estimation method. The fit of the structural model was improved by allowing the belief variables of TAM to partially mediate the retained antecedent variables. Subjective norm had no influence on perceived usefulness and compatibility was not tested in the final model due to the underlying cognitive alignment with attitude.

Based on the results of Study 1, the conceptual model with subjective norm and compatibility omitted was tested again in a cross-sectional study of mature consumers randomly selected from a large National database from across Australia resulting in 2,253 usable responses (38% response rate). All variables were modelled as reflective indicators and, using the asymptotically distribution-free (ADF) method in AMOS 6.0 (Arbuckle 2005), a two-step procedure was used to test the full model. Due to the high correlations between intention to use and actual behaviour and the focus on usage behaviour of SSBTs, intention was removed from testing in the final model. With these minor changes, all remaining paths in the original TAM were significant. Again, the belief variables of TAM partially mediated all antecedent variables except technology discomfort, which was fully mediated by perceived ease of use. Moderation effects were also noted for age and education.

Data from both studies were used to address the first research question. Three behavioural segments of users emerged, namely non-users (only use face-to-face banking), low users (that is, less than 55% of their transactions involved using SSBTs), and medium-to-high users (greater than or equal to 55% of their transactions involved using SSBTs). A rich demographics profile to support the usage segments for each study provides further insight into the behaviour of mature consumers in the financial services context.

1.4. CONTRIBUTION OF THE RESEARCH

This thesis applies the original TAM to the SST context and extends our understanding of the TAM by considering the antecedents of the TAM variables in the SST mature consumer context. In the financial services setting, knowledge of the drivers and inhibitors of mature consumers' attitudes and behaviour towards using SSBTs will be of value to the financial industry, government, and independent not-

for-profit senior organisations responsible for improving financial literacy and productive ageing among mature consumers. Further, findings from this study will be of value to researchers interested in explicating the paths through which behaviour towards using SSTs is manifested.

This study makes a further contribution by extending previous research through examining the degree of use and variety of use of SSTs in the financial services context. Prior SST research has focused on intention to use or intention to trial or adopt SSTs (Dabholkar & Bagozzi 2002; Curran & Meuter 2005; Meuter et al. 2005). However, the degree of use describes the extent of diffusion (Robertson & Gatignon 1986), and provides a deeper understanding of consumers' ability to develop new knowledge and patterns of behaviour (Shih & Venkatesh 2004). Further, a more meaningful approach to segmenting the mature consumer market beyond using only demographics is developed.

Finally, the thesis considers SST uptake in a population that has not attracted a great deal of attention: Australians over 50 years of age. Despite the range and diversity of marketing research conducted on mature consumers in the United States of America (Moschis 2003; Moschis, Bellenger & Folkman Curasi 2003), and to a lesser extent in the United Kingdom (Szmigin & Carrigan 2001a), research on this market in Australia is very limited (Cameron, Marquis & Webster 2001; Pettigrew, Mizerski & Donovan 2003; Darch & Caltabiano 2004). The relevance of research findings from overseas studies to the Australian context may be limited due to cultural differences and the nature and stage of development of technologies being studied. Mattila, Karjaluoto and Pento reinforce this point in saying '…mature consumer segments are not alike in different countries' (2003, p. 524). Therefore, this study seeks to advance our knowledge of SST use among mature Australian consumers. Further, mature consumers represent an increasingly important market due to growth in this population segment and the financial standing of its members. As stated by Harrison, '…there is a need to understand the attitudes, opinions and financial behaviour of this important segment, if financial institutions are to meet their needs' (2003, p. 294), and provide mature consumers with the capacity to use and ability to select desired SSTs for productive ageing. The final contribution of this study is to meet

this challenge and extend our knowledge of this heterogeneous market in the Australian context.

1.5. OVERVIEW OF THE STRUCTURE OF THIS THESIS

The chapters of this thesis are organised as follows. Chapter two begins with a discussion of the literature on user acceptance of information technology, self-service technologies, and electronic banking technology. This discussion informs the development of the theoretical framework for this study. The model is refined by drawing on the mature consumer literature and concludes with hypothesised relationships between variables which are described in the form of a conceptual model. Chapter three describes the research design adopted for Study 1, including details on how the variables were operationalised, the sampling method, and methods of data collection. The demographic and usage profile of SSBTs by mature respondents in Study 1 are discussed in chapter four along with the results of testing the conceptual model. Chapter five describes the refinements made to the measurement scales, sampling method, and data collection procedure for Study 2 which was designed to provide further descriptive information on the SST usage patterns of the Australian mature consumer market and to test for moderators of the relations described in the extended technology acceptance model (ETAM). In chapter six, a profile of the mature respondents is presented and the results from testing the model and moderating effects are presented. Chapter seven contains a discussion of the findings, theoretical contributions and implications for practice and policy, limitations of the study, and areas for further investigation. The thesis concludes with the appendices that contain valuable information supporting the study reported in the body of the thesis including a summary of consumer banking research studies, a detailed account of the in-depth interviews and focus group findings from the exploratory stages, questionnaires administered in Study 1 and Study 2, composition of measurement scales for both studies, and structural equation modelling output data.

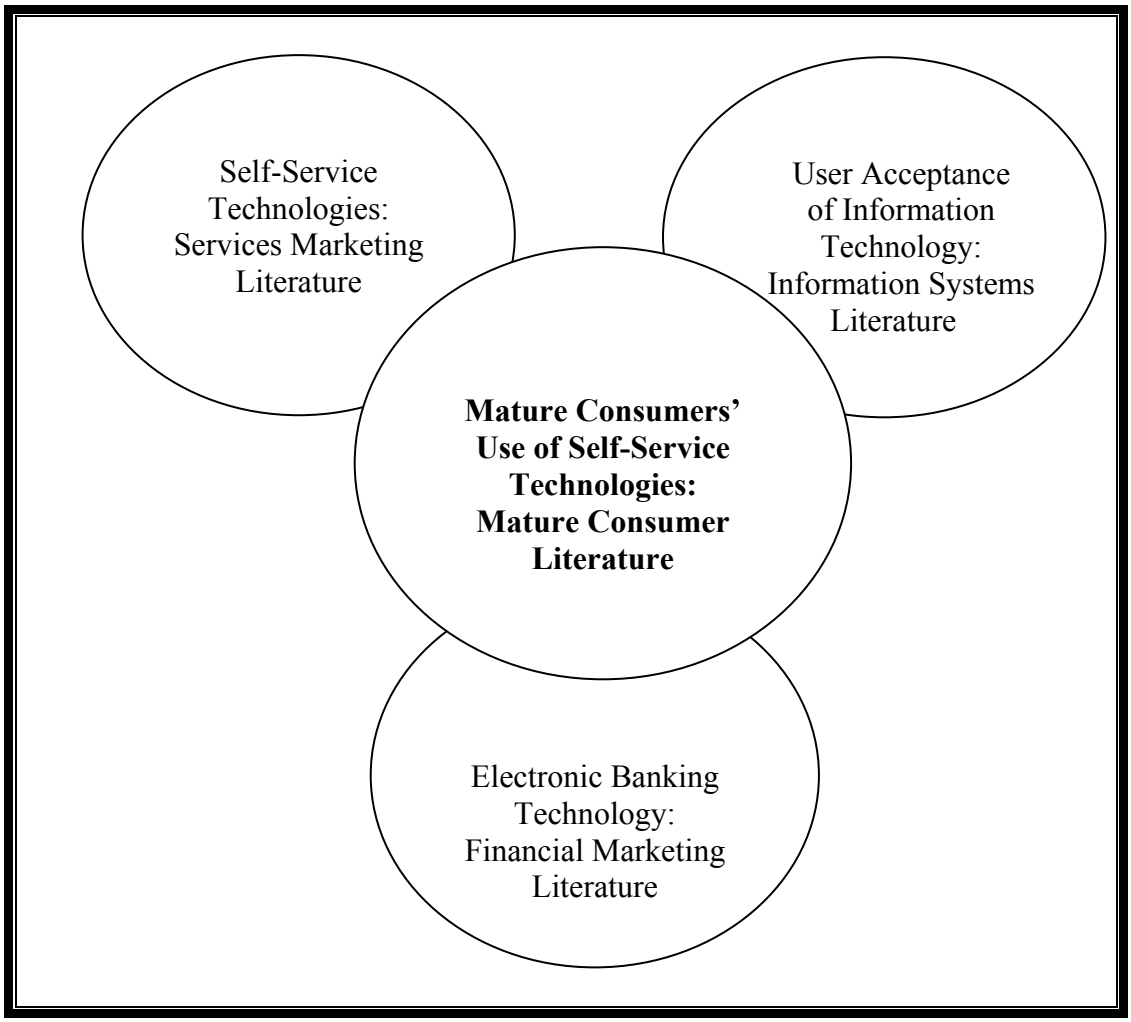
Chapter 2

LITERATURE REVIEW and MODEL DEVELOPMENT

2.1. INTRODUCTION

With the increasing diffusion of SSTs into the marketspace, understanding the factors that explain consumers' interaction and use of these service technologies is a vital issue for researchers and management. This chapter draws upon literature that addresses technology adoption and use from three research domains: information systems, services marketing and financial marketing. Relationships among these literature research domains are illustrated in Figure 2.1.

Figure 2.1. Literature research domains



Source: developed for this study

Research on technology use and the needs of mature consumers forms the focus of the literature review and provides the basis for developing a conceptual model that identifies the determinants of attitude-use behaviour in relation to SSTs. In the concluding section of this chapter, the specific variables in the conceptual model and related hypotheses are detailed. In the next section, literature from the information systems domain is reviewed.

2.2. USER ACCEPTANCE OF INFORMATION TECHNOLOGY

In the organisational context, information technology (IT) is a crucial prerequisite to supporting diverse strategic and operational requirements. The full value of the IT investment is achieved only through appropriate use of the technologies by employees. However, employees may exhibit behaviours ranging from rejection, to partial use of IT functions, through to embracing the technologies and reaping the rewards from use (Agarwal 2000). Over the past several decades a significant body of research has emerged that focuses on identifying factors that influence individual acceptance and use of IT and several theoretical models have been developed (Yi & Hwang 2003). Consumers, like employees, are often confronted with using technologies to provide services to meet their needs. The present study will draw upon the decades of research focused on individual user acceptance of IT to inform the development of a conceptual model in the consumer context.

In a recent review of the literature on individual acceptance of information technologies, Venkatesk et al. (2003) identified eight prominent models that employ intention and /or usage as a dependent variable. These models outlined in Table 2.1 have a strong theoretical grounding in psychology and sociology and are adapted and applied to understand individual use and acceptance of information technologies primarily in the organisational context.

Table 2.1. Models of user acceptance of information technology

Models and related theories of individual acceptance	Determinant variables of intention and/or usage of IT
Theory of Reason Action (TRA): Drawn from social psychology, TRA applied by Davis et al. (1989) to individual acceptance of IT and found variance explained was consistent with studies that had employed TRA in the context of other behaviours.	Attitude towards behaviour Subjective norm
Technology Acceptance Model (TAM): TAM (Davis 1986) is tailored to predict IT acceptance and usage on the job. Unlike TRA, the final conceptualisation of TAM excluded the attitude variable. TAM has been widely tested and applied (summary of studies in Lu, Yu, Liu, and Yao (2003); Sun and Zhang (2006)).	Attitude towards using (only in original TAM) Perceived usefulness Perceived ease of use
Theory of Planned Behaviour (TPB): TPB extends TRA by adding the variable of perceived behaviour control. TPB has been successfully applied to the understanding of individual acceptance and use of different ITs (Mathieson 1991; Taylor & Todd 1995b; Chau & Hu 2001). A related model to TPB is Decomposed Theory of Planned Behaviour (DTPB) where the belief structures of the determinant variables are 'decomposed' within the technology adoption context (Taylor & Todd 1995b).	Attitude towards behaviour Subjective norm Perceived behaviour control
Combined TAM and TPB (C-TAM-TPB): The TPB is extended to include perceived usefulness and perceived ease of use relationships from TAM into the TPB (Taylor & Todd 1995c).	Attitude towards behaviour Subjective norm Perceived behaviour control Perceived usefulness Perceived ease of use
Innovation Diffusion Theory (IDT): Grounded in sociology, IDT (Rogers 1983) has been used to study a variety of innovations. Within IS, Moore and Benbasat (1991) adapted and extended the innovation characteristics and refined a set of variables to be used to study individual technology acceptance. The Perceived Characteristics of Innovation (PCI) instrument has been used in a number of studies with only some variables significantly predicting usage behaviour (Agarwal & Prasad 1997; Karahanna, Straub & Chervany 1999; Plouffe, Vandenbosch & Hulland 2001)	Relative advantage Ease of use Image Visibility Compatibility Results demonstrability Trialability Voluntariness of use
Social Cognitive Theory (SCT): Compeau and Higgins (1995) applied and extended the social cognitive theory (Bandura 1986) in the context of computer use and in general the acceptance and use of information technologies. In a longitudinal study the original proposed model was supported (Compeau, Higgins & Huff 1999).	Outcome expectations – performance Outcome expectations – personal Computer self-efficacy Affect Anxiety
Motivational Model (MM): In psychology a significant body of research has supported general motivation theory as an explanation for behaviour. The theory has been adapted in several contexts and within the IS domain, Davis, Bogozzi, and Warshaw (1992) applied motivational theory to understand technology use. Venkatesh and Speier (1999) found support for the role of motivation in the technology use context.	Extrinsic motivation Intrinsic motivation
Model of PC Utilisation (MPCU): Derived from Triandis' (1980) theory of human behaviour, this model presents a competing perspective to that proposed by TRA and TPB. Thompson, Higgins, and Howell (1991) adapted Triandis' model to the IS context to predict PC utilisation.	Job-fit; Complexity Long-term consequences Affect towards use Social factors Facilitating conditions

Source: Adapted from (Venkatesh et al. 2003, pp. 428 - 32)

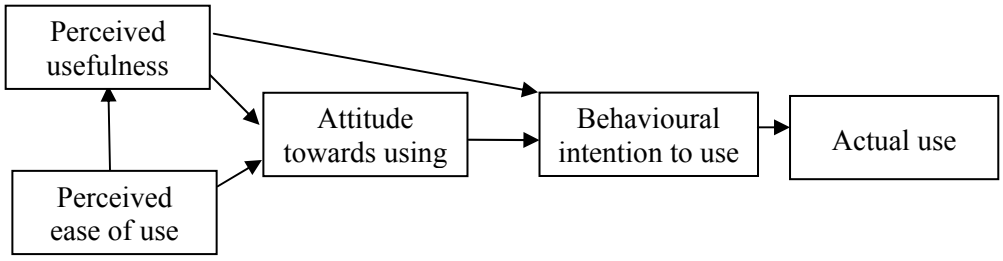
Some twenty-six different determinants of intention and/or use have been tested across the eight models as noted in the right hand column of Table 2.1. The models exhibit moderate explanatory power, with the R^2 for most studies less than 0.45. Also the relationships between variables display some degree of inconsistency (Venkatesh et al. 2003; Sun & Zhang 2006). Variation in the performance of these models could be explained through the high use of students as subjects in experimental settings and students participating to a lesser degree in field studies, where on average the R^2 is 0.50 and extending as high as 0.69. In the organisational setting where field studies are used, the average R^2 of these models is 0.25 with a few studies in the low 0.40. This lower performance of the models in applied settings could be due to employees facing a more complex environment and therefore additional factors need to be included in the model to capture the real context (Sun & Zhang 2006). However, across most models there exists a common theme that beliefs are important antecedents to intention and/or usage of IT in the form of innovation characteristics, perceptions, and outcome expectations. Further, the theoretical foundations and the operationalisation of these models focus on the individual as well as the social and environmental context within which intention to use and/or usage behaviour of technology is likely to be displayed (Agarwal 2000).

The dominant model to emerge from this research area is the technology acceptance model (TAM), introduced by Davis and his colleagues (Davis 1989; Davis, Bagozzi & Warshaw 1989) this model has extensive empirical support (cf. Sun & Zhang 2006) through studies that have validated, applied, and replicated the findings. The result is a well-established, robust, and parsimonious model for explaining and predicting usage intention and technology acceptance behaviour (Venkatesh & Davis 2000; Yi & Hwang 2003). Based on a sound theoretical foundation, the TAM provides a framework suitable for investigating the relationship between variables and predicting general individual consumer usage behaviour of technologies. In extending the application of TAM from the organisational context to general consumer use of SST, an opportunity for additional theory-testing in a relatively new context emerges, thus providing further insight into the robustness of the model. In the following section, the TAM is discussed in more detail including limitations of the model and further model developments through the inclusion of external variables.

2.2.1. TECHNOLOGY ACCEPTANCE MODEL

Adapted from the TRA (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980), TAM draws on the theoretical basis of TRA to specify the causal linkages among beliefs, user attitudes, intentions, and actual behaviour. In the original TAM, actual system use is determined by behavioural intention to use, which is in turn jointly determined by attitude towards using and perceived usefulness. Perceived ease of use is a direct determinant of perceived usefulness and a direct and indirect determinant of attitude (Davis, Bagozzi & Warshaw 1989). This model is presented in Figure 2.2. In the context of this model, perceived usefulness refers to the users' perception of the degree to which using the system will improve their job performance and perceived ease of use, the belief that using the system will be free of effort (Davis 1989). In the original model, Davis, Bagozzi, and Warshaw (1989) also proposed that perceived usefulness and perceived ease of use fully mediate the effects of all external variables such as individual differences, situational constraints, and system design characteristics on an individual's attitude and usage behaviour.

Figure 2.2. Original technology acceptance model (TAM)



Source: (Davis, Bagozzi & Warshaw 1989, p. 985)

Despite the similar underlying theoretical structure, the original TAM differs from TRA in several important aspects. First, subjective norm is omitted from the model due to '…its uncertain theoretical and psychometric status' (Davis, Bagozzi & Warshaw 1989, p. 986). Second, perceived usefulness, in addition to attitude, has a direct effect on behaviour intention. Finally, the two belief variables, perceived usefulness and perceived ease of use, are postulated a priori and are treated as two distinct variables influencing attitude towards using (Davis, Bagozzi & Warshaw 1989).

After initial testing of TAM, Davis, Bagozzi, and Warshaw (1989) omitted the variable attitude towards using due to the marginal contribution it made to explaining the belief-intention causal link. The strong direct link between perceived usefulness and intention to use in the organisation context was interpreted as employees intending to use a technology because it was useful and assisted career development even though they may not have had a positive attitude towards using (Venkatesh 2000). In their review of 55 TAM studies published in IS journals, Sun and Zhang (2006) found that fewer than half of these studies retained the attitude variable. Based on the inconsistent use of TAM, its strong theoretical foundation in TRA, and the consumer context of this research study, the original TAM was adopted as the foundation for the current research.

Across a wide body of literature, researchers have acknowledged the parsimony of TAM, its robustness, and the ease with which it can be applied in different situations. However, as stated by Venkatesh, '…while parsimony is TAM's strength, it is also the model's key limitation' (2000, p. 344). Gaining an understanding of the antecedents of perceived ease of use and perceived usefulness will enable the development of more meaningful design and training interventions to improve user acceptance and use of information technologies. Further, the inclusion of external variables as proposed in the original TAM (Davis, Bagozzi & Warshaw 1989) will improve the explanatory power of the model (Venkatesh & Davis 1996).

Early research work by Davis, Bagozzi, and Warshaw (1992) and Davis (1993) found support for perceived usefulness and perceived ease of use as mediators of the effects of systems characteristics and perceived output quality on usage behaviour. External variables examined in more recent research include computer self-efficacy (Igbaria & Iivari 1995; Venkatesh & Davis 1996; Agarwal & Karahanna 2000; Hong et al. 2002), system quality (Fogarty et al. 2003), information quality and importance of the system (Armstrong et al. 2005), variety of individual and situational influences (Agarwal & Prasad 1999), computer anxiety (Igbaria & Iivari 1995), mood (Venkatesh & Speier 1999), social presence, social influence, perceived accessibility, and training and support (Karahanna & Straub 1999), cognitive absorption (Agarwal & Karahanna 2000), and trust (Gefen, Karahanna & Straub 2003). In two key studies Venkatesh (2000) examined the impact of social influences (subjective norm,

voluntariness, and image) and cognitive instrumental process (job relevance, output quality, and results demonstrability) on perceived usefulness. In the second study, Venkatesh and Davis (2000) examined control (computer self-efficacy and facilitating conditions), intrinsic motivation (computer playfulness), and emotion (computer anxiety) on perceived ease of use. In this second study the moderation effects of perceived enjoyment and objective usability on perceived ease of use was considered as employees increase their IT experience. To consolidate the extensive research in this area, Venkatesh, Morris, Davis and Davis (2003) formulated a unified theory of acceptance and use of technology model (UTAUT) to capture the essential elements of previously established models.

Outside of the IS domain, few studies have examined extensions to TAM. Some of the external variables considered in relation to consumer use of internet banking are trust (Suh & Han 2002), computer self-efficacy and perceived credibility (Wang et al. 2003). In relation to explaining consumers' intention to use mobile services, perceived expressiveness, perceived enjoyment, normative pressure and behavioural control were incorporated in an extended TAM (Nysveen, Pedersen & Thorbjornses 2005). In the area of internet retailing, perceived risk (Featherman & Pavlou 2003), enjoyment (Childers et al. 2001), and personality, web experience, and shopping orientation (O'Cass & Fenech 2003) have been investigated.

In conclusion, the user acceptance of information technology literature is a rich and robust body of knowledge that has aided researchers and practitioners to better understand determinants of individual intention and/or usage behaviour of technology in the organisational context. In particular, the sound theoretical foundation, robustness, and parsimony of TAM provides a strong framework to investigate antecedents of the key TAM variables. Understanding individual user differences, situational factors, and social influences in the consumer context provides opportunities to enhance user acceptance and usage of technologies. While adoption of the original TAM in the service marketing domain is limited, this study develops an extended TAM to advance our understanding of the key factors influencing attitude, intention, and behaviour in relation to the use of SSTs from the mature consumer perspective. In the following section, the self-service technology

literature from the services marketing domain is examined to contextualise and inform the development of the extended TAM in the consumer context.

2.3. SELF-SERVICE TECHNOLOGIES

For many mature consumers, the service encounter experience with firms has been dominated by interpersonal interactions. However, all consumers are increasingly being required to take a more active role in producing services. Dabholkar (1990) defines customer participation as … 'the degree to which the customer is involved in producing and delivering the service' (p. 484). Extending the customer participation literature, Meuter and Bitner (1998, p. 14) identified three types of service production based on customer participation: firm production, joint production, and customer production. *Firm production* occurs when the service is produced entirely by the firm, for example a car wash, while in *joint production* customers are involved with the firm's employees to jointly produce the service, also referred to as *co-production* (Bendapudi & Leone 2003). In the purest form of *customer production*, referred to as 'self-service', the service is produced entirely by the customer with no assistance from the firm or its employees. The adoption of technology-based systems has enabled firms to move the production of services from joint production to customer production through SSTs. The focus of this next section is on the latter type of production that involves technology-customer interactions.

According to the literature (Mick & Fournier 1998; Parasuraman 2000), consumers interacting directly with technology simultaneously experience positive and negative feelings about using SSTs. Based on extensive qualitative research investigating consumers' reaction to technology, Mick and Fournier (1998) identified eight technology paradoxes with which consumers need to cope: control/chaos; freedom/ enslavement; new/obsolete; competence/incompetence; efficiency/inefficiency; fulfils/creates needs; assimilation/isolation; engaging/disengaging. Interacting with technologies can trigger an array of feelings and emotions as implied by these paradoxes. As an example, Mick and Fournier (1998, p.126) describe competence/incompetence paradox as '…technology can facilitate feelings of intelligence or efficacy, and technology can lead to feelings of ignorance or ineptitude'. Based on the emotions triggered, consumers engage in coping strategies

to deal with the technologies that range from ignoring and refusal to mastering their use (Mick & Fournier 1998).

The challenge confronting researchers investigating consumers' reactions to SSTs is centred on understanding the belief/feelings that influence their evaluation of and behaviour towards SSTs. Findings from descriptive research in the 1980's have contributed towards the development and testing of conceptual models in the late 1990's that begin to address this research challenge. Early findings indicated that some consumers view the service encounter as a social interaction and prefer to deal with people rather than technology (Ledingham 1984; Zeithaml & Gilly 1987; Ram & Sheth 1989; Cowles & Crosby 1990). Another group of consumers see no benefit in using the technology as the cost of learning and switching is too great, while others resist change so as to maintain their current habits (Langeard et al. 1981; Murdock & Franz 1983; Zeithaml & Gilly 1987; Ram 1989; Gatignon & Robertson 1991). Further, some consumers fear using computerised machines due to the inherent perceived risks including functional, physiological, social/psychological, and financial (Murdock & Franz 1983; Farmer 1984; Ram & Sheth 1989). For those consumers who prefer SSTs, time savings, convenience, greater control, and reduced waiting time in line were found to be important (Langeard et al. 1981; Ledingham 1984; Zeithaml & Gilly 1987; Marshall & Heslop 1988; Leblanc 1990). Finally, in terms of demographics, users of SSTs tend to be younger, have a higher income, be better educated, and have higher status occupations (Zeithaml & Gilly 1987; Marshall & Heslop 1988; Taube 1988; Leblanc 1990). This body of research has contributed towards developing a profile of users and non-users of SSTs, and provides a sound foundation to facilitate the development of theoretical models to investigate factors influencing consumers' acceptance and adoption of SSTs.

The more recent self-service technology research has been well grounded in theory drawn from cognitive psychology and social psychology. Consumer decision making and choice models based on the information-process paradigm were borrowed from cognitive psychology, while attitudinal research that links cognitive (thinking), affective (feeling), and conative (behaviour) components are based on social psychological theory (Johnson & Puto 1987; Dabholkar 1992, 1994). Drawing from these theoretical areas, Dabholkar has developed and tested a range of models using

a scenario and questionnaire approach with college students in a context where they use a computerised touch screen to order a meal in a fast food restaurant versus placing a verbal order with an employee. Findings from Dabholkar's (1992) earlier study indicated that prior use of computerised products positively affects attitude towards general use of computerised products and, in turn, positively affects attitude towards using a computerised self-service (SS) option. The need to interact with service employees has a negative effect on attitude towards using a computerised SS option. High prior use of computerised products was found to attenuate the relationship between need for interaction and attitude towards using a computerised SS option. In a further study, Dabholkar (1996) examined evaluations of SST quality by comparing an attribute based model and an overall affect model. Results indicate that the attribute based model explained far more of the variance in service quality, and that enjoyment and control are the two most influential attributes, followed closely by ease of use. Details of these two studies along with further findings and limitations are outlined in Table 2.2 at the end of this section.

In a more recent study, Dabholkar and Bagozzi (2002) adapted an attitudinal model and examined the influence of perceived ease of use, perceived performance (accuracy, reliability), and perceived fun (enjoyment) on attitude towards using and, in turn, intention to use a technology based self-service. Consumer traits (self-efficacy, inherent novelty seeking, need for interaction, and self-consciousness) and situational factors (perceived waiting time and social anxiety) moderated the relationships in the core model. The core model was well supported and a range of moderation effects were discovered. Those moderator effects that are relevant to this research are briefly reported here. The first of the moderation effects was that high self-efficacy attenuated the relationship between ease of use and attitude such that ease of use is not as important for users with high self-efficacy. Further, a high need for interaction also strengthened this same relationship indicating that the technology must be much easier to use for consumers to have a more favourable attitude towards using it. In terms of situational factors, greater perceived waiting time and higher social anxiety strengthened the relationship between ease of use and attitude, thus indicating that under these situations firms must ensure that technologies are easier for consumers to use so as to have a more positive influence on attitude. For a more

detailed account of all the moderation effects on the core model refer to Dabholkar and Bagozzi (2002). Further aspects of this study are provided in Table 2.2.

The attitude-based model was well supported in these studies and significant moderating effects from a variety of consumer traits and situational factors were identified. The studies appear to have been conducted in a sound and rigorous manner, however the student sample restricts the generalisability of the results. Further, the computerised, touch screen self-service technology scenario context is a low risk, simple technology that does not capture the complex nature of SSTs that consumers are required to interact with today. Opportunities exist to extend the attitude-based model and incorporate additional influencing factors for testing in a real world context with more complex SSTs.

Extending previous research and investigating consumer experiences across a broader range of SSTs, Meuter, Ostrom, Roundtree and Bitner (2000) examined sources of dis/satisfaction underlying SST experiences. They also explored customer attribution with respect to SST outcomes and post-encounter behaviour based on the SST experience. The perceived relative advantages from using SSTs over personal interactions was the main satisfying reason, while a number of dissatisfying factors were equally important including technology failure, process failure, and poor design. Further details on these categories are included in Table 2.2. In terms of attribution, users of SSTs were more likely to attribute the outcome of the encounter to technology, with this attribution occurring more for dissatisfying than satisfying encounters. Further, over 50 per cent of dissatisfied customers complained, with their future use of SSTs being most affected by design problems and process failure (Meuter et al. 2000). These findings further support the notion that consumers experience a range of feelings when using SSTs and that future behaviour towards using SSTs will be influenced by these past experiences. These findings are consistent with the notion of 'technology paradoxes' discussed earlier in this section (Mick & Fournier 1998).

Parasuraman (2000) incorporated the range of positive and negative feelings consumers experience towards using technology into the 'technology readiness' construct, which refers to '…people's propensity to embrace and use new

technologies for accomplishing goals in home life and at work' (p. 308). The technology readiness index (TRI) scale comprises four dimensions: optimism, innovativeness, discomfort and insecurity. As a global index, TRI does not predict intention or behaviour, but merely provides a measure of how ready a market is to adopt technologies. In a recent European airline study, a composite measure of TRI plus individual measures of optimism and innovativeness dimensions were found to be very weak predictors of attitude towards using specific SSTs (Liljander et al. 2006). Further qualitative findings from this study align with previously reported profiles of users and non-users of SSTs are reported in Table 2.2.

The proliferation of SSTs has resulted in the emergence of further research exploring specific and global attitudes towards service technologies and intention to use SSTs (Curran, Meuter & Surprenant 2003). Results indicate that regular users rely on specific attitudes towards SSTs, while infrequent users depend on global attitudes to determine their intention to use SSTs. In a further study, using an adapted version of TAM that included measures of perceived risk and need for interaction as antecedents of attitude, Curran and Meuter (2005) found that risk was the only predictor of attitude in the online banking context model, usefulness in the telephone context model, and usefulness plus ease of use in the ATM context model. The need for interaction was not significant across all three models. The lack of support for variables across the three models is troubling when all variables have had a significant role in predicting attitude toward using SSTs in previous studies (Dabholkar 1992; Dabholkar & Bagozzi 2002; O'Cass & Fenech 2003). A more detailed account of these studies including limitations is provided in Table 2.2.

In gaining an understanding of factors that motivate consumers to use self-scanning in a retail setting, Dabholkar, Bobbitt, and Lee (2003) explored a range of reasons with regular users more likely to perceive this option to be more reliable, to provide greater control, to be easier to use, to offer greater enjoyment, to help avoid contact with employees and, under crowded conditions, to be a faster option. Further quantitative findings are reported in Table 2.2 to expand on the above qualitative results. Even though the results are limited to the study respondents, the findings support the outcomes of previous SST research. In a further study, the capacity and willingness of consumers to adopt SSTs was investigated (Walker et al. 2002).

Willingness to adopt was found to positively correlate with perceived relative advantage, desire for control, technical reliability, and capacity; while perceived risk and individual need fulfilment were negatively correlated. Perceived accessibility and complexity negatively influenced capacity; that is, the ability to use SSTs. The results did not support the proposed variables with six factors emerging.

In recent literature, a more comprehensive theoretical model for predicting consumers' trial of SST was developed and empirically tested in two separate studies to examine prescription refill ordering through an interactive voice response (IVR) telephone system and an internet-based SST in the pharmacy industry in the US (Meuter et al. 2005). This model (see Table 2.2) is grounded in innovation diffusion and adoption theory (Rogers 1995), motivation theory (Vroom 1964), and social cognitive theory (Bandura 1977). It also draws upon literature from a number of streams including human resources, consumer behaviour, and self-service technologies. The central construct of this model is 'consumer readiness' which is believed to mediate the influence of innovation characteristics and individual differences on consumers' trial of SSTs. In general, findings indicated that all consumer readiness variables (role clarity, extrinsic and intrinsic motivation, and ability) had a significant positive influence on trial. Further, one or more of the consumer readiness variables mediated the direct effect of antecedent predictors on trial, the only exception being relative advantage. Compatibility and perceived risk were the dominant innovation characteristics to influence consumer readiness, while need for interaction, previous experience, technology anxiety and age were dominant for the individual differences variables. The study is conceptually sound and has been rigorously tested, however the findings are limited to one organisation.

Overall, empirical findings from the SST literature have found support for a range of factors that influence attitude, intention or trial for an array of SSTs in different contexts. Further, the role of moderators has provided a more meaningful insight into the core attitudinal model for SSTs (Dabholkar & Bagozzi 2002). While researchers have made significant progress in this field, further research is required to extend the attitudinal-based model to include usage behaviour and to retest a select array of influencing factors in other SST contexts and cultures.

In conclusion, the research on SST has been well grounded in theory and a number of conceptual models have been tested. However, to advance the conceptual development in this area, Bobbitt and Dabholkar (2001) and more recently Lam and Parasuraman (2005) have each proposed technology frameworks that attempt to explain the complex interrelationships in a more unifying conceptual framework. Bobbitt and Dabholkar included aspects of several attitudinal theories and previous research findings by Dabholkar (1991, 1994, 1996) to explain consumer motivation and behaviour towards SSTs and discussed the framework in the context of internet shopping. Lam and Parasuraman devised two frameworks to capture determinants of consumers' adoption and determinants of consumers' usage of technology innovations in general. The researchers proposed that the conceptual framework offers '…a deeper, more comprehensive treatment of factors…' (Lam & Parasuraman 2005, p. 170). Empirical evidence to support either research framework has not been published. While the latter framework is positioned to consider general technology innovations, the Bobbitt and Dabholkar framework focuses more narrowly on SSTs and thus is more relevant for consideration in this study.

A summary of the empirical self-service technology studies cited in this section are provided in Table 2.2. While progress has been made towards understanding a range of factors that influence the behaviour intention of consumers towards using SSTs, opportunities exist to extend models such as the attitude-based model and investigate the relationships among variables in new SST contexts.

Table 2.2. Empirical self-service technology studies

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Dabholkar (1992) Use of computerised, touch screen to order vs personal order in a fast food restaurant scenario, USA.	Investigate the determinants of consumer attitudes towards new SS options and moderating effects.	Information processing paradigm (Johnson & Puto 1987) and concept of category-based affect (Fiske & Pavelchak 1986).	**Dependent:** Attitude towards using a new computerised SS option (ATS) **Mediator:** attitude towards using computerised products in general (ATC) **Independent:** prior use of computerised products (PRIOR); need for interaction with service employee (NFI); **Moderators:** gender; PRIOR.	Scenario and questionnaire approach; sample -141 undergraduate students, mean age 26; variables measured using multi-item seven-point scale; data analysed using LISREL 7 and MANOVA and regression analysis.	Model has a good fit; PRIOR – ATC (0.22)* ATC – ATS (0.67) NFI – ATS (-0.48) R^2 ATS (0.32) ; ATC (0.21); *Moderation* – PRIOR has an attenuating effect on NFI-ATS; women had a more favourable attitude than men towards using new computerised SS options. * standardised path coefficient.	Limited generalisibility of findings; convenience sample of students; scenario based; cross sectional.
Dabholkar (1996) Use of computerised, touch screen to order vs personal order in a fast food restaurant scenario, USA. (lower risk, on-site service encounter).	To test alternative models of service quality for technology-based self-service options (attribute based model & overall affect model).	1) attribute based model: cognitive approach to decision making (2) overall affect model: affective approach to decision making (Johnson 1984;	**Dependent:** Intention to use technology-based self-service option **Mediator:** expected service quality of technology-based self-service option **Independent:** Model 1: expected-speed of service, ease of use, reliability, enjoyment, control; Model 2:	Experimental design; scenario approach; 3 groups - low waiting time, high waiting time & control; 505 undergraduate students; Service quality measured as a global measure (3 items); other scales adapted or developed for this study; waiting time was the manipulated	**Model 1** – attribute model in all three situations performed better with R^2 for services quality 0.55(L), 0.73(H), 0.70(C); intention > 0.50; sig moderation effects for 3 situations -control, enjoyment, quality-intention; ease of use (H & control); **Model 2** - affects models - R^2 service quality 0.23, 0.17, 0.37 and intention > 0.50; sig moderation effects on all paths; Waiting time had a sig. effect on	Findings limited to this study context; student sample limits variance; only one intervention variable used - waiting time; SST was relatively low risk and very low level of expertise required to use SST thus limiting robust testing of model.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
		Dabholkar 1994).	attitude towards using technology, need for interaction **Moderator -** waiting time (High, Low, Control).	variable.	service quality & intention for H & L groups when modelled as an independent variable.	
Dabholkar & Bagozzi (2002) Use of computerised, touch screen to order vs personal order in a fast food restaurant scenario, USA.	To determine the moderating effects of consumer traits and situational influences on the attitudinal model of technology-based self-service (TBSS).	Attitudinal model (Dabholkar 1994) based on Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980).	**Dependent:** intention to use **Mediator:** attitude towards using TBSS **Independent**: perceived ease of use, perceived performance, perceived fun **Moderators:** Consumer traits – self-efficacy, inherent novelty seeking, need for interaction, self-consciousness; Situational factors - perceived waiting time, social anxiety.	2X2 research design ; data collected from 392 college students; core measures developed in previous studies by Dabholkar (1994); some moderator scales sourced from other studies; variable validity and discriminant validity tested.	Core model tested using SEM; EOU – ATT = 0.36* Perf – ATT = 0.12 Fun – ATT = 0.52 ATT – Intention = 0.8 ATT R^2 = 0.56 Intention R^2 = 0.64 9 of the 14 moderating hypotheses for consumer traits supported with a mean split & 5 of the 6 for situational factors supported; **main finding** – promote ease of use if target market is low in self-efficacy and a high need for interaction. * standardised path coefficient.	Student sample restricts generalisability; scenario approach less applicable to real world; SST was relatively low risk and very low level of expertise required to use SST.
Dabholkar, Bobbitt & Lee (2003) Consumer motivation and behaviour related	To determine the reasons consumers use (or avoid) self-scanning checkouts.	Adoption literature (Rogers 1983; Gatignon & Robertson 1985) and literature on	Variables from literature relating to **use** – faster, greater control, reliable, easier to use, enjoyable, avoid interaction with	Survey, personal interview in-store – 101 respondents throughout store (users & non-users), 49 self-scanner respondents; qualitative data collected from	Differences (sig.) between plan to use self-scanner regularly and did not plan to use regularly – greater control, more reliable, easier to use, greater enjoyment, greater overall preference (speed not sig.); under crowded	Small sample from only one store, limits generalisability; data collection method limits the extent of data collected

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
to the use of self-scanning in retailing, USA.		technology based self-service (Dabholkar 1992, 1994; Prendergast & Marr 1994; Dabholkar 1996; Meuter et al. 2000).	service employee, preferred over traditional, favourable attitude towards using technology; prefer to use other technologies; have greater access to the internet **Non-users** – greater control with traditional option, value human interaction, unfavourable attitude towards technology **Situational factors** – waiting time , crowding.	open-ended questions; of the respondents over 55 years of age, 17% shopped in-store, while 14% used self-scanner; no demographic difference between users and non-users of self-scanning.	conditions self-scanner faster Qualitative results – **Users** – no waiting, easy to use, convenient, enjoyable, control, reliability, speed, avoid interaction with employees, will use other technology-based self-service options – internet & ATMs; **Non-users** – like to interact with employees; scanning impersonal, difficult to use; dislike automation, uncomfortable with using self-scan; **Reason for using ATMs** – fast, convenient, accessible, easy to use, to avoid tellers; **Not use ATMs** – liking interaction with employees; employees are friendly, helpful, assistance, social experience; unfavourable attitude towards technology.	
Meuter, Ostrom, Roundtree & Bitner (2000) Encounters involving self-service technologies (SST), USA.	Sources of customer satisfaction and dissatisfaction with SST and related evaluation and behaviour based on experience - attribution, WOM, complaining,		Exploratory study	Web survey; data base of internet users from Mkt research firm; 1000 responses in 2 wks; questionnaire – current level of use of a range of technologies; report on satisfactory or dissatisfactory	823 usable incidents -56% sat.; 44% dissat; respondents younger, higher education and income than population; **Satisfying incidents due to :** 1. solved intensified need (11%), 2. better than the alternative (68%) - easy to use, avoid service personnel, saved time,	Participants may have a more positive attitude towards SSTs; other categories could be identified with less experienced SST users; non-random sample.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
	repurchase intention among users of SSTs.			experience; attribution, behaviour intention, WOM, repeat purchase measured on single item 7 point scale; Critical incident technique (CIT) used to categorise dis/sat experiences; chi-square analysis to examine relationships - attribution and postencounter behaviour.	when I want, where I want, saved money 3. did its job (21%) **Dissatisfying incidents due to :** 1. technology failure (43%), 2. process failure (17%), 3. poor design (36%) – technology design problems, service design problems, 4. customer-driven failure (4%) *Attribution* – blame technology in dissatisfying & credit technology & themselves when satisfied; main *complain areas* – process failure, technology failure & service design; if satisfied positive *future behaviour,* under some dissatisfied situations will engage in future behaviour.	
Meuter, Ostrom, Bitner & Roundtree (2003) Self-service technology use, USA.	To determine the influence of technology anxiety (TA) & demographics on SST usage and TA's influence on SST experiences.		**Dependent:** SST experience (satisfaction, WOM, repeat use, attribution); SST usage (used for travel, daily use, internet, limited) **Independent:** Technology anxiety, demographics –age, gender, education, income	Web survey; data base of internet users across USA, from Mkt research firm; 1000 responses in 2 wks; TA scale was modified from computer anxiety scale (Raub, 1981); psychometric properties of TA tested on a sample (*n*=54); usage rate of 14 SST - four-point scale, never use to	823 usable surveys; respondents younger, higher education and income than population; Usage rate of some mentioned technologies– ATMs 76% use regularly, 6% never; Phone banking 38% regularly, 22% never; *benefits* – effective process (convenience, ease to use); enjoyment; service quality; cost; no other option; TA significant negative	Testing of psychometric properties of TA scale against venturesomeness and self-confidence scales was limited as the later two variables are very different to TA; findings limited to respondents of study.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
				regularly user (factor analysed to create 4 usage clusters – travel/business, daily use, internet and limited use).	influence on use of travel, daily use & internet, some demographics significant; R^2 relatively low (0.04); Satisfactory Exp - with increased TA less satisfied, less likely to use SST again, less likely to spread positive WOM; Dissatisfactory Exp: increased TA more neg WOM; Less TA more likely to take credit for outcome.	
Meuter, Bitner, Ostrom & Brown (2005) Consumers' prescription refill ordering through IVR telephone system & internet for a mail-order pharmacy, USA.	To determine the influence of 'consumer readiness', a mediator between antecedent variables (innovation characteristics & individual differences) and trial for two new SST options; Study 1 IVR telephone based SST; Study 2 internet based SST.	Diffusion of innovation and adoption theory (Rogers 1995); Motivation (Vroom 1964); Social Cognitive Theory (Bandura 1977)	**Dependent:** trial **Mediators:** consumer readiness – role clarity, motivation (extrinsic, intrinsic), ability **Independent:** innovation char – compatibility, relative advantage, complexity, observability, trialability, perceived risk; individual differences - inertia, technology anxiety, need for interaction, previous experience, demographics.	Survey mailed to 2000 respondents (800 users & 1200 non-users); Study 1: 407 users, 499 non-users (41% effective response rate); Study 2: 401 users, 333 non-users (37% effective response rate); Scales for most variables adapted from other research; scale purification process used prior to study 1 data collection; Study 1& 2 – 75% respondents aged between 40 & 69; 20% graduate degrees.	Direct effect of consumer readiness variables on trail significant in both models (test – logistic regression); role clarity and extrinsic motivation dominant variables in predicting trail; 10 of the 14 antecedent variables had a mediated effect on trail and only relative advantage was not mediated by any consumer readiness variables in Study 1; Study 2 all 10 variables were mediated by at least one consumer readiness variable; some slight difference exist in sig. variables between study 1 & 2 (refer summary figure 2, p.77 in journal article).	Limited generalisability to other context as study conducted in one organisation; cross sectional study.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Curran, Meuter & Surprenant (2003) Self-service technologies (SSTs) - ATMs, telephone and online banking, USA.	To determine the influence of specific attitudes on global attitudes and the influence of both on intention to use three banking SSTs.	Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980), Theory of Planned Behaviour (TPB) (Ajzen 1985) and composite attitude-behaviour model (Eagly & Chaiken 1993).	**Dependent (3):** Intention to use - ATMs, telephone, online banking **Mediators:** global attitude towards SSTs; global attitudes towards firms **Independent:** attitude towards staff, attitude towards ATMs; attitudes towards telephone banking, attitude towards online banking; and the direct effect on intention is also hypothesised.	Survey of 2,352 people by telephone with 628 participating, 27% response rate; multi-item attitude measures – attitude towards staff, attitudes towards specific technologies & global attitude measures (towards firm & SSTs) guided by previous research & measured using a seven-point bipolar semantic differential scale; behaviour intention - single item seven-point Likert type scale.	32% aged over 50; range of income and education levels represented; 24% use employees at banks only; 80% ATMS, 27% telephone, 13% online banking; 50% go to bank 75% of time; 50 % of respondents not sure that banks offered telephone or online banking; factor analysis - 4 specific attitude & 2 general attitudes as planned; 5 models tested using SEM; *regular SST users* (use > 25% of time) rely on attitudes towards specific SSTs (i.e.ATMs, telephone) to determine intention to use (R^2 0.18 to 0.35); *infrequent users* (< 25%) depend on global attitudes and some specific attitudes to determine intentions to use (R^2 0.09 to 0.24).	Findings limited to sample respondents and geographical region; model only tested on selected individual self-service banking technologies; three item measures of each attitudes towards specific SSTs not adequate to capture the multi-dimensional nature of variables, in particular the difference between specific and global attitudes.
Curran & Meuter (2005) Self-service technologies (SSTs) - ATMs, telephone and online banking, USA.	To assess the critical variables that contribute to consumer attitude towards and intention to use SSTs.	Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989); Attitude-behaviour (Fishbein & Ajzen 1975).	**Dependent:** Intention to use SST; **Mediator:** Attitude towards SST; **Independent:** perceived ease of use, perceived usefulness, need for interaction, perceived risk.	Survey of 2,352 people by telephone with 628 participating; 27% response rate; 3 version of the survey - ATMs (215 responses), telephone (207), online (206); multi-item scales adapted from previous research; questionnaire pre-tested & scales	Demographics as per (Curran, Meuter & Surprenant 2003); models tested using SEM; sig. variables in each banking model ATM - usefulness, ease of use, attitude $R^2 = 0.58$ Telephone – usefulness, attitude $R^2 = 0.48$ Online - risk(+), attitude $R^2 = 0.40$; Intention to use ATM $R^2 = 0.42$;	Findings limited to sample respondents and geographical region; role of 'need for interaction' needs further contextualisation to banking context; perceived risk is too narrowly defined; lacking variable

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
				factors analysed prior to main study; 80% used ATMs , 27% used telephone and 13% used internet banking.	telephone 0.32; online 0.19; need for interaction not significant in any model.	validity.
Parasuraman (2000) Technology Readiness of US consumers.	Develop and test a Technology Readiness Index (TRI).			Survey (National Technology Readiness Survey NTRS) 3000 college students, 40% response rate (1,200); 44 items developed and tested; 2nd study - scale expanded to broaden scope – 66 items; telephone interview of 1,000 cross section of adults random number selection.	Factor anaylsis, varimax rotation resulted in 28 items retained, 4 factors; Drivers - optimism; innovativeness, Inhibitors -discomfort, insecurity 2nd study - after analysis, 36 item scale with same 4 factors; Cronbach alpha's > 0.74 (dimensional structure tested using LISREL 8.14 – reasonable fit); variable validity tested.	Limited rigorous testing of instrument; findings limited to sample; more extensive testing is required to assess validity and reliability
Walker, Craig-Lees, Hecker & Francis (2002) General public - willingness to adopt technology, Australia.	To determine why consumers adopt or reject technologically facilitated means of service delivery.		Perceived accessibility & complexity; perceived technical reliability; perceived relative advantage; individual needs fulfilment; perceived risk, desire for control - variables that would influence capacity and willingness to use leading to adoption.	Based on initial review of literature and focus groups, 25 scale items developed; scales pilot tested and reconceptualised as needed; Survey, personal interview 210 respondents in inner city locations.	Correlation matrix & relationships discussed; principal axis factoring, varimax rotation resulting in 6 factors (54 % cum var) (items not holding to original variables); factors not named k-means cluster analysis (based on factor analysis) - 4 clusters people-people pragmatists(34%); techno-waries (33%); techno-beneficiaries (16%); techno-phobes (17%).	Variables lack clear definition; factor analysis requires further cleaning - remove items loading < 0.5; proposed variables don't hold & new variables emerge from factor analysis; weak factors are then cluster analysed; limited generalisibility.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
O'Cass & Fenech (2003) WEB retailing behaviour, Australia.	To determine factors that influence adoption or non-adoption of WEB shopping.	Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989).	**Dependent:** adoption/non-adoption behaviour; **Mediators:** attitude towards WEB retailing mediates perceived usefulness and ease of use; **Independent:** *personality* – opinion leadership & buying impulsiveness; *WEB experience* – internet self-efficacy, WEB security, satisfaction, and compatibility; *shopping orientation* – economic/ recreational.	Self-completed Web based survey; 392 responses; multi-item scales drawn from previous research and adapted when required to study context; younger respondents 10% of respondents aged 56-68 years of age; 50% had made a WEB purchase.	Partial least squares (PLS) method used to test hypotheses. All proposed paths were significant in model except shopping orientation on ease of use and usefulness; personality and WEB experience predicted ease of use R^2 (0.33) and usefulness R^2 (0.16) and the two TAM variables fully mediated ; attitude R^2 (0.35) and behaviour R^2 (0.28).	Usefulness – ease of use path omitted from TAM; explanatory power of TAM low; findings limited to study.
Liljander, Gillberg, Gummerus & van Riel (2006) Adoption of SST airline check-in services, European airline.	To determine the influence of technology readiness on consumers attitudes towards using SST airline check-in services, service quality, satisfaction, loyalty.		**Dependent:** attitude towards mobile, internet, kiosk and personal check-in methods; service quality, satisfaction, loyalty; adoption of internet or kiosk **Independent:** Technology Readiness Index (TRI) scale (Parasuraman 2000) –	Survey – online and mail; 1258 usable responses ; 5% used internet check-in; 38% kiosk check-in; mobile not reported; 12 item TRI scale used; 16 items scale to measure quality of internet check-in; 5 item scale to measure satisfaction; 5 item for loyalty; personal	Only 2 dimensions of TRI confirmed - optimism (Opt) and innovativeness (Inn); an overall TRI measure was constructed; personal service negative correlated with TRI index, Opt, Inn, mobile & internet attitude; TRI, Opt & Inn weak predictors of attitude towards mobile, internet, kiosk, personal service R^2 range 0.05 to 0.26 and service quality, satisfaction, loyalty R^2 range 0.09 to 0.18.	Attitude is a single item measure for each technology; 12 item TRI index was used and not the full 36 item index; low explanatory power of models; validity of TRI.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
			optimism, innovativeness, insecurity, discomfort.	service – dichotomous.	**Qualitative results**: *want to use* SS check-in – efficiency (save time, avoid queues, easy); control (select seat, flexibility); *not use* – lack of benefits, like personal service, inconvenient, lack trust.	

As the context of this study is focused on electronic banking technologies, a specific form of self-service production, the next section of this chapter reviews research findings related to consumers evaluation of and behaviour towards ATMs, EFTPOS, telephone and internet banking.

2.4. ELECTRONIC BANKING TECHNOLOGIES

Consumers have increasing access to an array of electronic banking technologies that have emerged over the past decades. The first ATMs were introduced in Australia in 1977, followed by EFTPOS in 1985 and telephone banking in the late 80's (Australian Bankers' Association 2004a). By the end of 1997 only one of our four major banks in Australia provided internet banking services (Sathye 1999). In contrast to Australia, Finland is a leading provider of electronic banking services with over 70 per cent of customers visiting a branch office less than twice a year (Suoranta & Mattila 2004). Some forms of mobile banking services have been available in Finland since the early 90's with WAP mobile banking being launched in 1999 (Suoranta, Mattila & Munnukka 2005) while in Australia, Citibank was the first to launch this service in 2005 using the Telstra i-mode® platform (Citibank 2005). With further advances in technology, more consumers are using electronic mobile services in Finland and as a result the number of bank branches is decreasing (Suoranta & Mattila 2004). The number of bank and non-bank branches in Australia declined by 30% in the late 90's (Australian Bankers' Association 2005). However in 1996 Australia Post introduced giroPost, a limited personal banking service that has links to some banks, building societies and credit unions across Australia, thus easing the impact of branch closures, particularly in rural and regional centres.

As technology continues to be an important element in financial service delivery, understanding the factors that influence the behaviour of consumers towards using electronic banking technologies will continue to be an important area of research (Howcroft, Hamilton & Hewer 2002; Suoranta & Mattila 2004). The early research on self-service banking technologies focused on ATMs and revealed that important factors leading to non-use included the desire to interact with human tellers for personal service, social experience and enjoyment (Zeithaml & Gilly 1987; Marshall & Heslop 1988; Kwan 1991; Prendergast & Marr 1994; Bednar, Reeves & Lawrence

1995; Rugimbana 1995; Rogers, Gilbert & Cabrera 1997), and perceived risk in terms of the fear of not being able to operate the machine correctly, personal safety, fear of financial loss, while social and psychological risk was found to be more strongly correlated with resistance to use (Murdock & Franz 1983; Leblanc 1990; Burgoyne et al. 1992; Smither & Braun 1994; Rogers, Gilbert & Cabrera 1997). A number of other factors noted in the literature included complexity, lack of control, no need, and habit (Leblanc 1990; Burgoyne et al. 1992; Marr & Prendergast 1993; Lockett & Littler 1997). Further details on ATM studies cited in this section including study purpose, research design, major findings and limitations are provided in Appendix B, Table B.1.

According to the literature, the main factors influencing adoption of ATMs included convenience and 24 hour a day accessibility of the service, ease of use and feeling comfortable using the service, and its compatibility with individual consumer's lifestyles and technology experience (Zeithaml & Gilly 1987; Leblanc 1990; Kwan 1991; Burgoyne et al. 1992; Marr & Prendergast 1993; Smither & Braun 1994; Rugimbana 1995; Joseph, McClure & Joseph 1999; Moutinho & Smith 2000; Darch & Caltabiano 2004; Curran & Meuter 2005). Additional factors cited less often in the literature were positive attitude towards ATMs and technology in general (Marshall & Heslop 1988; Lockett & Littler 1997; Thornton & White 2001), faster transactions and less queuing than the traditional method (Leblanc 1990; Burgoyne et al. 1992), perceived control over finances (Darch & Caltabiano 2004), and feeling confident using ATMs (Thornton & White 2001). In terms of a demographic profile, findings from across a number of studies indicate that users of ATMs are younger in age, have a higher education level (degree), higher income level, and are more likely to be engaged in a professional occupation (Marshall & Heslop 1988; Taube 1988; Rugimbana 1995; Lee & Lee 2000).

Research on the adoption of EFTPOS is very limited. Findings from one study indicated that users are more convenience oriented, are comfortable with technology, and feel confident using EFTPOS to access their finances (Thornton & White 2001), while Zeithaml and Gilly (1987) found that the elderly are more enthusiastic about using EFTPOS than ATMs and cite convenience and safety as reasons.

Research findings in relation to telephone banking indicate that consumers who feel more confident and comfortable with technology in general are more likely to use telephone banking (Thornton & White 2001). Curran and Meuter (2005) found perceived usefulness to be the only predictor of attitude towards telephone banking in their study. Barczak, Scholder Ellen and Pilling (1997) developed a typology of consumer motives for the use of banking technologies. They focused on ATMs, telephone banking, and debit cards and found that of the four motivational clusters identified, the 'instant gratification' cluster used telephone banking most often due to their spending habits and convenience orientation. Members of this cluster were also found to be younger.

In a more recent study, Howcroft, Hamilton, and Hewer (2002) investigated factors that encourage or discourage adoption of telephone banking and found that lower fees, improved service quality, time saving, and 24 hour service as key factors to encourage adoption, while recommendations by family and friends were not at all important. Key factors that discouraged adoption were concerns over security and fear over the likelihood of errors, while lack of face-to-face contact was rated as being extremely or very important to only 27% of respondents. Consumers aged over 56 years expressed the least preference for telephone usage to access financial services. Further details on this study are provided in Appendix B, Table B.1.

The findings from studies cited in this section provide a profile of users and non-users of ATMs and to a much less extent EFTPOS and telephone banking. Due to the restricted sampling designs, the external validity of some of these studies is questionable. Further, a great deal of this early research on electronic banking technologies is exploratory and lacking a theoretical framework to guide and inform the studies. Moreover, the measurement of variables with single item measures has not captured the complexity of these variables and thus limits the construct validity and reliability of these studies. A more detailed assessment of these studies including purpose, research design, major findings and limitations is provided in Appendix B, Table B.1.

Technology advances enabled internet banking to offer consumers a faster and more convenient approach to handling their financial affairs from home or office (Kaynak

& Harcar 2005). As internet banking is a relatively new area of interest in the field of financial marketing research, early studies focused on determining the characteristics of users and non-users. These studies show that the more important factors deterring consumers from using internet banking include security and risk concerns, fear of making errors, difficult to use and time consuming to learn, not being able to see the benefits, resistance to change, lacking personal service, fees attached to the service, no computer/internet, and a general dislike of computers, internet and email (Sathye 1999; Mattila, Karjaluoto & Pento 2001; Howcroft, Hamilton & Hewer 2002; Karjaluoto, Mattila & Pento 2002b; Mattila, Karjaluoto & Pento 2002; Karjaluoto, Koivumaki & Salo 2003; Mattila, Karjaluoto & Pento 2003; Kaynak & Harcar 2005). While these factors may contribute to consumer resistance, there are many factors cited in the literature that motivate consumers to use internet banking including convenience, greater accessibility from a time and place viewpoint, time saving, compatible with past technology experience, ease of use, relative cheapness, improved service quality, and satisfactory personal experience with other banking technologies (Joseph, McClure & Joseph 1999; Mattila, Karjaluoto & Pento 2001; Howcroft, Hamilton & Hewer 2002; Karjaluoto, Mattila & Pento 2002a; Mattila, Karjaluoto & Pento 2002; Gerrard & Cunningham 2003; Kolodinsky, Hogarth & Hilgert 2004; Lee, Kwon & Schumann 2005).

Demographic factors have also been found to be associated with adoption of internet banking with adopters being younger, more educated, having a high-level of occupation, and wealthier (Sathye 1999; Karjaluoto, Mattila & Pento 2002a; Mattila, Karjaluoto & Pento 2003; Kolodinsky, Hogarth & Hilgert 2004). Findings indicate more males than females use internet banking (Karjaluoto, Koivumaki & Salo 2003; Kaynak & Harcar 2005).

In examining respondents' behaviour towards internet banking, researchers typically focus on users and non-users, however Mattila, Karjaluoto, and Pento (2002) formed segments based on experience, leading to non-users, new users (less than three years of use) and old users (more than three years). In another study, frequency of use categorised respondents as non-users, low frequency (one to three times per month) and high users (Karjaluoto, Koivumaki & Salo 2003). In a further study, respondents were grouped as infrequent users of SSTs (less than 25% of the time) and regular

users (more than 25%) (Curran, Meuter & Surprenant 2003). Only one study segmented the non-adopters into prospective adopters (to adopt in the next year) and persistent non-adopters (not likely to adopt in the next year) and compared these two groups with an adopter group (Lee, Kwon & Schumann 2005).

Gerrard and Cunningham (2003) reported that consumers are concerned about the confidentiality of personal information provided online and how banks may use this information. This concern was expressed by both adopters and non-adopters of online banking. Other studies, however, have shown that the confidentiality element may act as a positive force so that 'feeling comfortable about providing personal information through electronic banking system' positively influences adoption of internet banking (Lee, Lee & Eastwood 2003; Kolodinsky, Hogarth & Hilgert 2004). In terms of other dimensions of risk, the results are also inconsistent with Curran and Meuter (2005) finding that consumers felt secure and safe conducting their banking on-line, believing that transactions will be handled correctly, thus leading to a very positive attitude towards on-line banking. Further, some consumers believe their money to be as safe with this method as other electronic methods, thus positively influencing their adoption of internet banking (Lee, Lee & Eastwood 2003; Kolodinsky, Hogarth & Hilgert 2004). Regarding functional risk, findings indicate that this form of risk will have a negative impact on willingness to adopt internet banking (Jih, Wong & Chang 2005; Lee, Kwon & Schumann 2005).

Using the TRA/TPB (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980) as a basis for prediction, researchers expect to find that family and friends would have a positive influence on attitude and behaviour intention towards internet banking. Findings based on a study in the United Kingdom indicated that over 43% of respondents claim to not be influenced by recommendations from family and friends to use internet banking (Howcroft, Hamilton & Hewer 2002). Further, Shih and Fang (2004) in a study comparing TRA to two versions of TPB models, found that the subjective norm variable was not significant when the models were tested in the internet banking context. Although this evidence suggests that subjective norms do not exert a strong influence on adoption of internet banking, the reference group variable appears to be more influential. Karjaluoto, Mattila, and Pento (2002a) found the inclusion of bank personnel into the group resulted in the reference group

variable having a significant mild negative influence on attitude towards and use of internet banking. This indicates that the more familiar consumers are with internet banking, the less reliance they place on bank personnel and others.

The desire for personal face-to-face service has been identified as a key reason for consumers not using internet banking (Kaynak & Harcar 2005). However over 50% of respondents in a study indicated lack of face-to-face contact did not discourage them from adopting internet banking (Howcroft, Hamilton & Hewer 2002). Further, Curran and Meuter (2005) found that need for interaction did not predict attitude towards internet banking, while in another study the importance attached to face-to-face contact positively predicted the importance of using internet banking (Durkin et al. 2003). This latter finding indicates that customers want increasing access to both services.

In contrast to earlier research on ATMs which lacked a theoretical framework, recent internet banking studies have drawn on the TRA (Karjaluoto, Mattila & Pento 2002a; Curran, Meuter & Surprenant 2003; Shih & Fang 2004), and diffusion of innovation theory (Gerrard & Cunningham 2003; Mattila, Karjaluoto & Pento 2003; Kolodinsky, Hogarth & Hilgert 2004; Lee, Kwon & Schumann 2005) to inform the development of conceptual models. The TAM has been used to guide a number of studies (Pikkarainen et al. 2004; Curran & Meuter 2005), however the original or modified TAM with limited extensions has been used in few electronic banking studies (Suh & Han 2002; Wang et al. 2003). Due to limitations in the sampling design, the findings of most studies have limited generalisability. Further, many studies lacked scale development and testing, thus limiting overall construct validity and reliability. Moreover, many variables are measured with only a single item. Further details on internet banking studies cited above are provided in Appendix B, Table B.2.

While most consumers continue to use multiple electronic banking technologies to provide the benefits they are seeking (Mattila, Karjaluoto & Pento 2002; Kaynak & Harcar 2005), very few completely abandon visits to the bank branch. Previous studies have generally focused on investigating only one form of electronic banking. Further, with the exception of only a few studies, researchers have not undertaken a

thorough investigation of the behaviour of mature consumers towards electronic banking. In the next section a brief review of these banking studies is provided and the issues mature consumers confront in this environment are considered.

2.5. MATURE CONSUMER USE OF SELF-SERVICE TECHNOLOGIES

As innovative technologies continue to diffuse into the market, the challenge is to understand the response of the diverse mature consumer market in terms of attitude and behaviour toward technological change (Mathur, Sherman & Schiffman 1998). Studies on mature consumers suggest that they oppose change that involves technologies and that fewer elderly are involved in the trial and adoption stages of several self-service technologies including ATMs and EFTPOS (Gilly & Zeithaml 1985; Zeithaml & Gilly 1987). Further, mature consumers expressed in interviews their resistance to change and an inherent sense of distrust when confronted with new situations, like using the internet, and stated they '…felt uneasy interacting with an unknown exchange partner' (Trocchia & Janda 2000, p. 610). Moreover, mature consumers prefer to deal with people than ATMs (Bednar, Reeves & Lawrence 1995), and a lack of personal service was identified as a barrier to using internet banking (Mattila, Karjaluoto & Pento 2003), while their pessimistic attitude towards technology may also hinder adoption (Eastman & Iyer 2004).

To understand why some mature consumers have a less than favourable attitude and exhibit aversive behaviour towards technology, consideration needs to be given to the physiological, social and psychological changes they experience due to ageing (Kennett, Moschis & Bellenger 1995; Moschis 2003). In terms of physiological change, consumers experience progressive deterioration in hearing and vision, onset of arthritis, decline in physical dexterity, and other chronic conditions and diseases at different ages and degrees of intensity thus influencing their ability to interact with technology (Smither & Braun 1994; Trocchia & Janda 2000; Moschis 2003). When using ATMs, mature consumers report having problems with 'seeing keys' and 'difficulty determining which keys line up with which button', and others reported 'difficulties seeing the screen due to glare' (Rogers, Gilbert & Cabrera 1997, p. 178). It is generally accepted that, when compared to younger consumers, older consumers

experience cognitive decline in perceptual speed, memory, and spatial ability that will impair their performance of computerised tasks. They require more time to complete tasks, experience difficulty remembering a sequence of steps or numbers, and are often unable to remember what information they have searched due to a decline in working memory. Further, due to a decline in spatial ability, mature consumers experience difficulty manipulating images on screen and navigating through systems (Mayhorn et al. 2004). These changes experienced by some mature consumers may influence their attitude and behaviour towards electronic banking technologies. However, mature consumers with a well-developed technology schema derived from prior experience are likely to feel more comfortable using self-service technologies (Trocchia & Janda 2000). Many mature consumers are expert technology users and positively embrace the challenge of using new technologies.

The needs of mature consumers will also differ due to 'life circumstances' that they experience at different ages (Moschis 2003) including events such as retirement, illness of a partner, death of a loved one, and movement into a retirement village. These experiences will influence their perspective on life and thus their needs, wants, roles, and attitude towards their willingness to accept change and adapt to new technologies.

As consumers mature in age they seek dependability and become risk-averse thus preferring more familiar products and processes (Moschis 2003). Research findings indicate that a significant reason for mature consumers not using ATMs and internet banking is due to concerns about safety and security issues (Kwan 1991; Rogers, Gilbert & Cabrera 1997; Mattila, Karjaluoto & Pento 2003), while Smither and Braun (1994) report that non-users of ATMs are more apprehensive and less assured. Lunsford and Burnett (1992) concluded that there is an inverse relationship between perceived risk and the trial of innovative products among older consumers.

The avoidance or reduced use of new technologies by consumers may suggest the existence of 'technophobia', which does not involve fear, but rather negative thoughts, anxiety about current or future interactions with technology, and negative attitude towards technology (Brosnan 1998; Cameron, Marquis & Webster 2001). Limited research findings indicate that older mature consumers feel less comfortable

using ATMs with some experienced users continuing to feel uncomfortable (Rogers et al. 1996). Further, mature consumers reported levels of frustration, anger and anxiety using an automated financial services call centre system (Grougiou & Wilson 2003). While in a further study, 50% of mature consumers reported feeling a level of anxiety when using phone banking to pay bills and transfer funds, 41% when using EFTPOS to pay for things and 30% when using an ATM at a bank (Cameron, Marquis & Webster 2001). Mayhorn and colleagues concluded that positive previous experience with using technology is instrumental in overcoming technology anxiety and thus building positive attitudes towards using technology among mature consumers (2004).

Many mature consumers have a positive view on technology developments such as the internet and view change as progress, something to look forward to and a route to improve themselves through education and leisure pursuits (Trocchia & Janda 2000; Szmigin & Carrigan 2001b). Further, Schiffman and Sherman (1991) describe the 'new-age elderly' as more self-confident, more willing to accept change, in control of their lives and are younger than the traditional elderly. They are more likely to 'want to learn new things' and to be interested in computers (Mathur, Sherman & Schiffman 1998). These findings align with the results from a study where significant predictors of ATM use were feeling in control over ATM banking, feeling comfortable using the technology, and technology experience. Mature users were younger and had a higher education level than non-users (Darch & Caltabiano 2004). Moreover, mature consumers are more likely to adopt innovative technologies if they are aware of the benefits and the technology meets their needs (Lunsford & Burnett 1992; Rogers, Mayhorn & Fisk 2004).

In conclusion, the descriptive findings reported in this section provide a profile of the characteristics and behaviour of users and non-users of SSTs in the mature consumer context. Findings from two exploratory studies identified use of technology as a significant predictor of ATM use among mature consumers (Rogers et al. 1996; Darch & Caltabiano 2004). Studies relating to mature consumers use of SSBTs are limited and primarily descriptive. A more concise account of each of these studies in terms of the research design and findings are provided in Appendix B, Table B.3. The aim of this study is to build on the body of literature discussed in this chapter

with a specific focus on determining key factors influencing mature consumers' attitudes and behaviour towards using SSTs in the financial services context. In the final section of this chapter, the conceptual model and related hypotheses are presented.

2.6. CONCEPTUAL MODEL AND HYPOTHESES

The original TAM forms the core of the conceptual model. Considerable support exists for this attitudinal based model in the marketing literature that focuses on self-service technology (Dabholkar 1992, 1994; Dabholkar & Bagozzi 2002; Curran & Meuter 2005) with Bobbitt and Dabholkar (2001) also proposing an integrated attitudinal based model to understand and predict use of technology-based self-services. They state that '…one way to truly understand what drives consumer decisions is to examine underlying consumer attitudes', and that in future research it is critical to study the behaviour of consumers towards SSTs in a variety of contexts (2001, p. 424)

Central to the original TAM are two belief variables, perceived usefulness and perceived ease of use, both are predictors of attitude towards using. Venkatesh and Davis (1996) recommend improving the model by incorporating 'external variables' as underlying determinants of the belief variables that fully mediate the influence of 'external variables' on the attitude and use variables. The conceptual model for this study is extended to include one social influence variable (subjective norm), two innovation characteristics variables (compatibility and perceived risk) and three individual differences variables (personal contact, technology discomfort, and self-efficacy), the selection of which are supported by prior studies from the three research domains and are considered important determinants of the two central TAM belief variables in the context of this study.

The three categories the antecedent variables are grouped under for the proposed model are derived from the core of the consumer diffusion paradigm proposed by Gatignon and Robertson (1991). They proposed at a conceptual level that within these categories there is a range of variables that will influence (facilitate and inhibit) the adoption (use) and diffusion process of innovations. Within the innovation

characteristic category, observability which refers to social relevance was excluded as SSTs in the context of this study were not considered to have social value. Divisibility or trial likelihood for a period of time was also not relevant in this study. The remaining innovation characteristics are included in the model for this study. While Gatignon and Robertson (1991) refer to the next category as personal influence, this encapsulates the role of social pressures by members of the social system and motivation, the essence of subjective norm in the context of the proposed model in this study. The final category in the paradigm proposed by Gatignon and Robertson (1991) is referred to as personal characteristics. This aligns directly with individual differences in the model for this study.

In the next section the specific hypotheses relating to the original TAM are presented first followed by the hypotheses relating to the proposed variable relationships in the extended model.

2.6.1. ORIGINAL TECHNOLOGY ACCEPTANCE MODEL

Attitude-Intention-Behaviour

Actual performance of a specific behaviour is determined directly by a person's intention to perform the behaviour. When attitude concerns a specific behaviour such as using SSTs, and not attitudes towards general SSTs, the relationship between attitude, intention and behaviour will be stronger (Fishbein & Ajzen 1975; Davis, Bagozzi & Warshaw 1989). Strong research evidence supports the attitude towards using – intention to use relationship in the self-service technology literature (Dabholkar 1994; Dabholkar & Bagozzi 2002; Curran & Meuter 2005) and more widely in the IS technology literature (Davis, Bagozzi & Warshaw 1989; Hartwick & Barki 1994; Agarwal & Prasad 1999; Karahanna, Straub & Chervany 1999). In terms of the intention to use – actual use behaviour relationship, evidence to support this relationship is provided in the self-service technology literature (Suh & Han 2002; Shih & Fang 2004), and it is strongly supported in the IS technology literature (Davis, Bagozzi & Warshaw 1989; Taylor & Todd 1995b; Venkatesh & Davis 2000). Therefore, based on the theoretical and empirical support, it is hypothesised:

H1. Intention to use SSTs will have a direct, positive effect on actual use behaviour of SSTs.

H2. Attitude towards using SSTs will have a direct, positive effect on intention to use SSTs.

Perceived Usefulness

In the IS context, usefulness is the subjective probability that using a particular technology will enhance the user's job performance (Davis 1989) and productivity, thus providing extrinsic motivation to use the technology (Venkatesh & Speier 1999). Due to the high use-performance relationship in work settings, technology may be used even if the user does not have a positive attitude towards using technology (Davis & Venkatesh 1996). Perceived usefulness and relative advantage (Rogers 1983) are regarded as similar variables in the IS field (Taylor & Todd 1995b; Agarwal & Prasad 1997; Karahanna, Straub & Chervany 1999) with both having a positive influence on performance. However, it is unlikely that consumers will use SSTs unless there is a clear benefit and the technology enabled service offers greater perceived value over their current offering (Lunsford & Burnett 1992). Further, the perceived usefulness - attitude to use relationship is expected to be stronger than the relationship between perceived usefulness - intention due to the importance of personal financial matters to mature consumers.

In the context of this study, perceived usefulness refers to the extent to which consumers view SSTs as providing more convenience and flexibility, greater control, security and economic benefits, and an improvement in service over face-to-face service (Taylor & Todd 1995b; Agarwal & Prasad 1999). In the original TAM, perceived usefulness has a significant effect on attitude and intention and these relationships are well supported in the IS literature. Findings outside this area are limited and inconsistent with both paths found to be significant in an internet banking study (Suh & Han 2002). The perceived usefulness - attitude path was found significant in an ATM and telephone banking study (Curran & Meuter 2005). Evidence suggests that mature consumers who view computer technology as being useful to them are more likely to have positive attitudes towards computers (Mayhorn et al. 2004). Based on the original TAM findings and those relating to SSTs it is hypothesised that:

H3a. The perceived usefulness of SSTs will have a direct, positive effect on attitude towards using SSTs.

H3b. The perceived usefulness of SSTs will have a direct, positive effect on intention to use SSTs.

Perceived Ease of Use

Perceived ease of use is the second belief variable in the TAM and in the IS context refers to the individual's perception of the amount of effort needed to interact with technologies (Davis 1989). Variables in other studies similar to perceived ease of use included ease of use (Moore & Benbasat 1991; Karahanna, Straub & Chervany 1999), and complexity (Thompson, Higgins & Howell 1991), the latter an innovation characteristic (Rogers 1983). In the context of the TAM, perceived ease of use is posited to have a direct effect on attitude and perceived usefulness. This latter relationship is important as the lower the cognitive burden imposed by a technology, the easier the system is to use, and the more useful it can be for the user (Agarwal & Karahanna 2000). Empirical findings from numerous IS studies support the two relationships (Davis, Bagozzi & Warshaw 1989; Agarwal & Prasad 1999; Agarwal & Karahanna 2000; Venkatesh 2000; Hong et al. 2002).

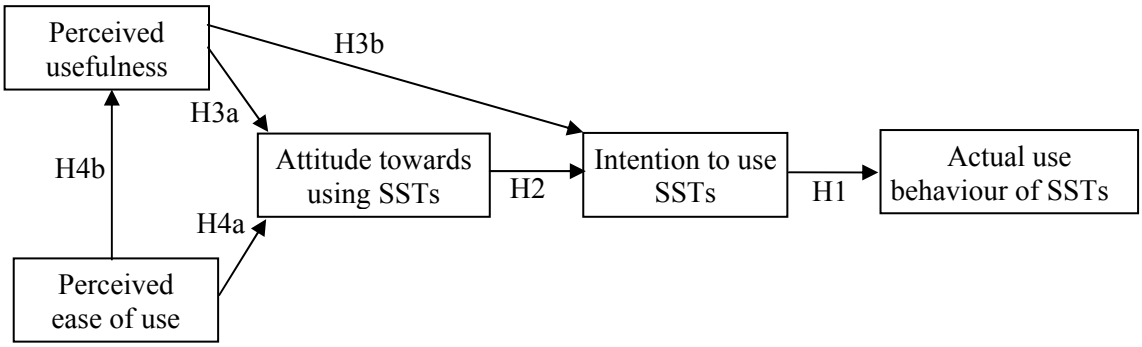
Perceived ease of use in the context of this study refers to the degree to which consumers believe that using SSTs would be free from effort and thus easy to understand, learn and use. In the SST and electronic banking literature some support exists for the perceived ease of use – attitude relationship (Dabholkar & Bagozzi 2002; O'Cass & Fenech 2003), however in the study by Curran and Meuter (2005) support existed for this relationship only in the ATM model context. Further results were found to be significant when both relationships were included and tested in the internet banking context (Suh & Han 2002). In a mature consumer study, users reporting less difficulty in using ATMs had a more favourable attitude towards using ATMs (Smither & Braun 1994), while Moschis (2003) advises that mature consumers prefer products that minimise problems and should be easy to use. Therefore in the context of this study it is hypothesised that:

H4a. The perceived ease of use of SSTs will have a direct, positive effect on attitude towards using SSTs.

H4b. The perceived ease of use of SSTs will have a direct, positive effect on perceived usefulness of SSTs.

The proposed hypothesised relationships are displayed in Figure 2.3.

Figure 2.3. Hypothesised relationships in the original Technology Acceptance Model (TAM)



Source: (Davis, Bagozzi & Warshaw 1989, p. 985)

2.6.2. ANTECEDENT VARIABLES OF THE ORIGINAL TECHNOLOGY ACCEPTANCE MODEL

Social Influence

Subjective norm is a TRA variable (Fishbein & Ajzen 1975) that in this study refers to the degree of social pressure consumers believe that family, friends and professionals (bank tellers and financial service advisors) place on them to use SSTs and their motivation to comply with these desires (Davis 1993; Agarwal 2000; Venkatesh & Davis 2000). Venkatesh and Davis (2000) found in the TAM that subjective norm had a significant influence on perceived usefulness and behaviour intentions when use of the technology was mandatory. When technology use was voluntary, subjective norm still influenced perceived usefulness but did not have a direct influence on behaviour intention. Other studies have not found an influence of subjective norm (Chau & Hu 2001; Shih & Fang 2004), with further empirical tests of TAM producing mixed and inconclusive results (Ma & Liu 2004).

Bobbit and Dabholkar (2001) chose not to include subjective norm in their model and focused instead on the attitudinal hierarchy for explaining intention and behaviour due to the expected minimal influence of subjective norm and the role of cross-over effects. Additional qualitative findings relating to mature consumers indicate that they prefer minimal influence from others (Wolfe 1997) and they are offended by the implication that they cannot handle their own financial affairs (Kennett, Moschis & Bellenger 1995). Peer pressure from family and friends were found to be the least important factor in encouraging the adoption of telephone and Internet banking in a United Kingdom study (Howcroft, Hamilton & Hewer 2002). However, further findings suggest that mature consumers may initiate using the internet due to being urged by relatives so they can stay in closer communication (Eastman & Iyer 2004). This latter finding could suggest that if mature consumers find the technology useful, then they could consider adopting it. Previous findings allude to the mild positive influence of subjective norms on the perceived usefulness of using SSTs. If mature consumers perceive SSTs to be useful, they will master the skills to use the technology. Therefore subjective norms are not considered to have an influence on perceived ease of use. Based on the findings of TAM in a voluntary context and limited evidence relating to mature consumers, it is hypothesised that:

H5. Subjective norm will have a direct, positive effect on perceived usefulness of SSTs.

Innovation Characteristics

Although all of the innovation characteristics are important in the product adoption literature (Ostlund 1974; Rogers 1983), a more parsimonious set that is salient to SST usage and the context of this study will be examined. In the IS domain compatibility has been found to be a significant predictor of technology adoption (Moore & Benbasat 1995; Agarwal & Prasad 1997; Plouffe, Vandenbosch & Hulland 2001), while Meuter and colleagues in the SST context found compatibility to be the dominant innovation characteristic to indirectly influence trial through the mediating variables of consumer readiness (Meuter et al. 2005).

Compatibility in this study refers to consumers' perception that SSTs are consistent with their existing approach, previous skills and experiences and align with their

current needs (Rogers 1983; Moore & Benbasat 1995; Taylor & Todd 1995b). Consumers are more likely to be motivated and willing to use SSTs if they have some related technology experience (Trocchia & Janda 2000). Further, consumers are likely to consider SSTs easy to use when adoption does not require change or acquisition of new skills (Chau & Hu 2001). Empirical findings from two mature consumer studies found that experience with technology emerged as a significant predictor of ATM use (Rogers et al. 1996; Darch & Caltabiano 2004), while positive perceptions towards computers were found to be strongly associated with mature consumers' use of internet banking (Mattila, Karjaluoto & Pento 2003). However, some mature consumers may perceive SSTs to be less compatible than their preferred approach due to certain consumption patterns established early in life (Kennett, Moschis & Bellenger 1995). Drawing from this evidence, it is hypothesised that:

H6a. Compatibility with SSTs will have a direct, positive effect on perceived usefulness of SSTs.

H6b. Compatibility with SSTs will have a direct, positive effect on perceived ease of using SSTs.

Perceived risk is included in this study as previous research found this variable to be an important innovation characteristic that influences innovative technology adoption behaviour (Ostlund 1974; Venkatraman 1991; Lunsford & Burnett 1992; Featherman & Pavlou 2003; Meuter et al. 2005). Following Stone and Gronhaug's (1993, p. 42) conceptualisation, perceived risk is defined in this study as '…the subjective expectation of loss', and the overall risk variable is comprised of the following dimensions, performance, financial, psychological, and physical. Within the e-service context Featherman and Pavlou (2003) proposed privacy risk as an additional risk dimension that indirectly is addressed in this study under the dimension of financial risk. The importance or level of each risk dimension will vary across technologies. However, overall the risk dimensions will explain a significant portion of the variable perceived risk (Stone & Gronhaug 1993).

Perceived risk is expected to be a significant barrier to the use of SSTs, especially among mature consumers and their interaction with electronic banking technologies.

The physiological changes experienced due to ageing will increase performance risk, while their desire to reduce stressful situations and remain personally safe could increase their assessment of physical risk. Further, due to the general risk-adverse nature of this population, higher levels of perceived financial risk are expected. Overall, as mature consumers experience higher levels of perceived risk, their negative assessment will decrease their desire to learn these technologies and thus they will perceive SSTs as being less useful and easy to use. Therefore, it is hypothesised that:

H7a. The perceived risk of using SSTs will have a direct, negative effect on perceived usefulness of SSTs.

H7b. The perceived risk of using SSTs will have a direct, negative effect on perceived ease of using SSTs.

Individual Differences

The mature consumer market is more heterogeneous than its younger counterpart, and this diversity increases with age (Moschis 2003). The present study explores the relationship between the individual differences variables of personal contact, technology discomfort, and self-efficacy and the TAM variables perceived usefulness and perceived ease of use.

According to the literature, personal contact is important to mature consumers who prefer face-to-face service as it is a valued aspect of the service consumption experience (Dabholkar 2000; Moschis 2003). The need for higher levels of personal interaction were found to be more important when consumers were less ready to interact with technology (Meuter et al. 2005), while consumers with a high need for interaction require the technology to be easier to use and more fun before evaluating the technology more favourably (Dabholkar & Bagozzi 2002). The 'desire to deal with people' and 'enjoy the personal interaction' were the main reasons cited by mature consumers for not adopting electronic banking technology methods (Zeithaml & Gilly 1987; Bednar, Reeves & Lawrence 1995; Mattila, Karjaluoto & Pento 2003).

In the present study, personal contact refers to the importance of greater reassurance, control, feedback and social presence in the personal service experience (Marshall &

Heslop 1988; Cowles & Crosby 1990; Dabholkar & Bagozzi 2002). Mature consumers desiring a higher level of personal contact will perceive SSTs to be more difficult to use and less useful. Therefore, it is hypothesised that:

H8a. Personal contact will have a direct, negative effect on perceived usefulness of SSTs.

H8b. Personal contact will have a direct, negative effect on perceived ease of using SSTs.

Mature consumers have reported experiencing some level of technology discomfort even when they are regular users of the technology (Rogers et al. 1996; Cameron, Marquis & Webster 2001). Consumers lack of willingness to use a technology due to a perceived lack of control over technology and a feeling of being overwhelmed by it was identified as an inhibiting factor in the technology readiness index (Parasuraman 2000). In the SST context, the concept of technology anxiety was developed by Meuter and colleagues (2003) and found to have a negative effect on use. Computer anxiety is a related concept that produces a negative affective reaction towards computer use. Based on a significant body of research in IS and psychology, computer anxiety has been shown to significantly impact on attitude, intention, behaviour, learning and performance (Venkatesh 2000). In extending the TAM, technology anxiety was found to be a significant negative predictor of perceived ease of use, even after three months experience (Venkatesh 2000).

In the context of the present study, technology discomfort refers to the tendency of consumers to feel uneasy, apprehensive, uncomfortable, or anxious towards current or future use of SSTs (Heinssen Jr, Glass & Knight 1987; Igbaria & Parasuraman 1989). In extending the work of Venkatesh (2000), this study proposes that technology discomfort will have a negative effect on perceived ease of use and consumers' assessment of the perceived usefulness of SST, a relationship that has not been tested in previous research. It is hypothesised that:

H9a. Technology discomfort will have a direct, negative effect on perceived usefulness of SSTs.

H9b. Technology discomfort will have a direct, negative effect on perceived ease of using SSTs.

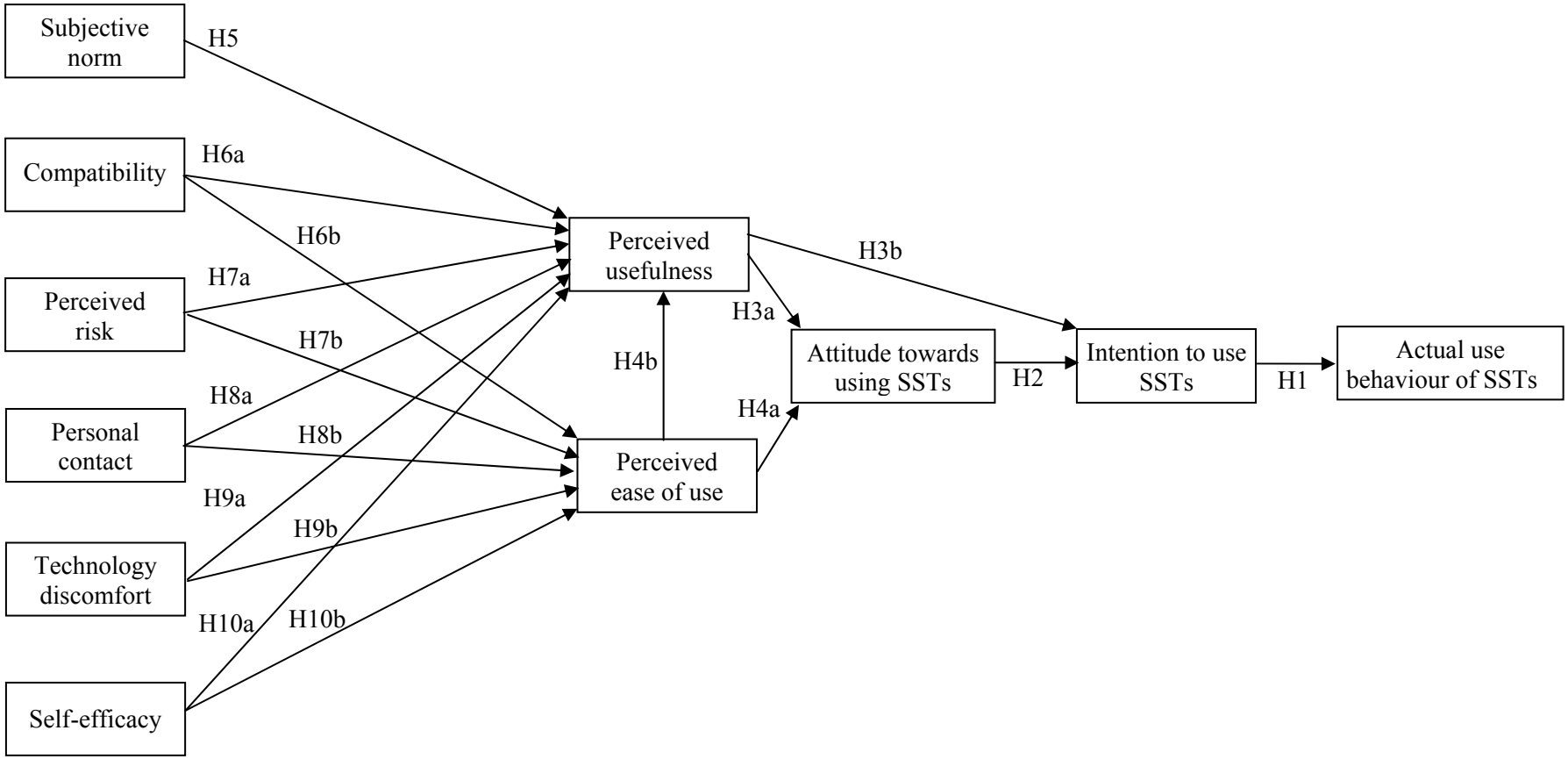
Self-efficacy in this present study refers to a belief in one's perceived capability and confidence to perform a specific behaviour related to using a SST (Bandura 1977). Consumers with direct experience or who are more familiar with using SSTs are expected to have a higher self-efficacy, while consumers who feel less capable of performing the behaviour will select an alternative that is more comfortable even if they acknowledged that the other option is better (Scholder Ellen, Bearden & Sharma 1991). Consumers who have no direct experience with a SST will base their perceptions on more abstract criteria that will in turn affect their perceptions of ease of use and usefulness (Venkatesh & Davis 1996). Consumers who expect positive benefits from using SST are more highly motivated to perform a specific behaviour to achieve these outcomes. Such outcome expectancies have been equated with the notion of perceived usefulness (Agarwal & Karahanna 2000). Empirical findings indicate a positive relationship between computer self-efficacy and perceived usefulness (Agarwal & Karahanna 2000) and also between computer self-efficacy and perceived ease of use (Venkatesh 2000). In the SSTs literature, these relationships were supported in the internet banking context (Wang et al. 2003). Therefore in the context of this study, it is hypothesised that:

H10a. Self-efficacy will have a direct, positive effect on perceived usefulness of SSTs.

H10b. Self-efficacy will have a direct, positive effect on perceived ease of using SSTs.

The proposed hypothesised relationships are displayed in Figure 2.4

Figure 2.4. Hypothesised relationships among the determinants of consumers' attitude-use of self-service technologies



Source: developed for this study based on the original TAM (Davis, Bagozzi & Warshaw 1989, p. 985)

2.7. CONCLUSION

This chapter has provided a review of technology adoption and use literature from three research domains that forms the foundation of the mature consumer self-service technology attitude-use behaviour model. The model is based on the original TAM and extended to include social influence, innovation characteristics and individual difference variables. Drawing on the literature, hypotheses have been developed and empirical tests will be discussed in the chapters to follow.

Chapter 3

RESEARCH METHOD and DATA COLLECTION – STUDY 1

3.1. INTRODUCTION

The chapter presents the research design and method developed to test the hypotheses outlined in the previous chapter, and the development of the instrument used in collecting primary data. A brief overview of the data entry procedure, data analysis and rationale for using structural equation modelling for testing the model and hypotheses are presented.

The data collection instrument is developed through a five stage process. Stages one and two were exploratory stages where a series of in-depth interviews and focus groups were conducted. Stage three involved the development of scales to measure the variables included in this study. In stage four the scales were pilot tested and modifications completed before mailing the final instrument to a sample of mature consumers in stage five. The chapter commences with a description of the overall research design.

3.2. RESEARCH DESIGN

3.2.1. METHOD SELECTION

Empirical studies cited in the literature in this thesis have used a range of survey data collection methods including personal interviews conducted in shopping malls and in-store, telephone interviews, self-administered mail, and web and e-mail surveys. When reviewing mature consumers studies, most reported the main data collection method as a self-administered mail survey (Lee, Moschis & Mathur 2001; Szmigin & Carrigan 2001b; Moschis, Bellenger & Folkman Curasi 2003; Eastman & Iyer 2004). While this method suffers from several disadvantages such as low response rates, response accuracy, no opportunity for probing or explanation, lack of control over

how respondents answer the questionnaire, and slow collection of data (Dillman 2000; Zikmund 2003), for this study there are several factors that favour its adoption. A cross-sectional study of mature consumers using a self-administered mail questionnaire was considered most appropriate for Study 1. This method of data collection has the advantages of low cost per response, access to a wide range of respondents across the region of interest (Queensland, Australia), respondent anonymity and confidentiality, and the opportunity for respondents to complete the questionnaire at their leisure and under their control (Zikmund 2003). Further, this method can more adequately accommodate the physical and psychological changes that accompany the ageing process of mature consumers. With a decline in information processing abilities, a natural consequence of the ageing process, mature consumers can overcome learning deficiencies if allowed to self-pace the information acquisition. Therefore, it is highly recommended to use a mail self-administered questionnaire (Gruca & Schewe 1992). In terms of physical changes, a decline in vision will impact on the ability of mature consumers to complete the questionnaire. However, incorporating design aspects such as larger font, using traditional black print on white background, avoiding glossy paper, and adequate spacing in the questionnaire will improve the visual appeal and readability of the questionnaire for mature consumers (Gruca & Schewe 1992; Kennett, Moschis & Bellenger 1995; Long 1998).

3.2.2. SAMPLING AND SAMPLING FRAME

The sampling frame consisted of mature consumers over 50 years of age registered as members of the National Seniors Association (NSA) in the state of Queensland, Australia. The NSA at the time of this study was the largest not-for-profit senior consumer organisation in Australia with just over 90,000 members in Queensland. The sampling frame in terms of age categories was very closely aligned with the population age categories provided by the Australian Bureau of Statistics (2001a).

To ensure that the findings from Study 1 were representative of all age groups in the population, a proportional stratified sample of 600 member names was drawn from eight age categories: 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, and 85+. For

each age group, names were selected at random from the database in proportion to the size of the state's population in the corresponding age bracket.

The sample size of 600 was based on the expected response rate of 40%, as this response rate was achieved in a previous study using the National Seniors database (Ruys & Wei 1998). Other mature studies conducted outside of Australia have reported response rates ranging from as low as 15% to greater than 46% (Mathur, Sherman & Schiffman 1998; Szmigin & Carrigan 2001b). For the initial study, Clark and Watson (1995) recommend a sample of 100 to 200, while Devellis (1991) suggests that the sample should be in the 300 range. With an expected response rate of 40%, a sample size of 240 responses would be in the acceptable range.

The sampling unit for the purpose of this study was defined as an individual person. Even if there were two or more NSA members living at the same address, a single name was selected from the database and a questionnaire was mailed specifically to that person. The views and practices towards banking methods were required of one person, even if that person was not responsible for the main financial matters of the household. This approach assisted with the aim of gathering responses from both users and non-users of self-service banking technologies.

3.3. EXPLORATORY STAGES

In the exploratory stages of this research, a series of in-depth interviews and focus groups were conducted with mature consumers to gain a depth of understanding about their technology use and, more specifically, their perceptions, attitudes, and behaviour towards using self-service banking technologies and face-to-face banking practices. More details of the rationale, methodology, and a summary of the main findings can be found in Appendix C for in-depth interviews and Appendix D for focus groups.

The exploratory stages were valuable in this research process with the following findings providing a deeper contextual understanding of the variables in this study. First, users of SSBTs were more aware of their benefits, while non-users, if aware of any benefits, did not believe them to be of sufficient value to encourage them to

change their approach to banking. In comparison to users, non-users were far more resistant to change. Second, for both users and non-users it was important that they were in control of their banking. However, non-users indicated that this control was through personal interaction with a bank teller, while SSBTs provided users with more personal control over their banking affairs. Third, non-users expressed a strong need for personal interaction with a service provider, while the social interaction that these encounters provided, be it with the service provider and/or other people, appeared to be just as important. Some users of SSBTs also had these same desires, with the social element appearing to be a more dominant motive. A fourth finding related to respondents' perception of risk with both groups articulating their concerns about personal safety, ATMs taking their card, security of finances, and personal details. However, these risks did not appear to impede users of SSBTs.

In terms of physical and psychological ageing factors experienced by the participants such as a decline in vision, hearing, physical dexterity, learning ability, and memory, non-users tended to see these as barriers to using SSBTs, while users acknowledged they have some difficulties but still continue to use SSBTs. Related to the ageing process, non-users appeared to be less motivated and pessimistic towards using technology and were just coping with life, while users were more positive, confident and willing to try new technologies. In conclusion, both groups commented on the desire to have training more suited to their needs and delivered by people of their own age.

3.4. DEVELOPMENT OF MEASUREMENT SCALES

Following procedures outlined by Churchill (1979) and DeVellis (1991), the scale development process consisted of a number of steps that commenced with variable definition and delineation of the content domain for the variables. This was followed by item generation, and item validation through engaging experts to judge the degree to which the items represented each variable's definition and domain. The final step involved a pre-test validation.

As stated by Churchill, '…the researcher must be exacting in delineating what is included in the definition and what is excluded' (1979, p. 67) for the specific domain

of the variable. Clarity of the definition for each of the variables in this study was achieved through a literature review of the relevant domains. The substantive theory addressed in chapter two guided the development of the definitions that are outlined in brief in Table 3.1 and in more detail in the previous chapter.

The next step in the scale development process involved the construction of a set of items that tapped the domain of each latent variable. Attitude, intention, behaviour and subjective norm were not included in the scale development process outlined in the following sections. These items were developed or adapted from previous research (as indicated in Table 3.1) and are included in Section C to E of the questionnaire in Appendix F.

Table 3.1. Variable-item development for study

Variable	Key Literature Used for Item Development	Adapted or Developed	Brief Description
Behaviour	Agarwal & Prasad (1997)	1 item developed	Performance of a specific behaviour (SST)
Intention	Venkatesh & Davis (1996)	3 items developed	Strength of one's intention to perform a specific behaviour
Attitude	Taylor & Todd (1995b); Agarwal & Prasad (1999)	4 items adapted	Positive or negative feelings about performing the specific behaviour
Perceived usefulness	Davis (1989); Agarwal & Prasad (1999)	2 items adapted 4 items developed	SST provides convenience, flexibility, control, and improvements in service
Perceived ease of use	Davis (1989); Moore & Benbasat (1991); Walker et al. (2000)	5 items adapted 2 items developed	SSTs are free from effort and easy to understand, learn and use
Subjective norm	Taylor & Todd (1995b)	Normative belief 4 items adapted Motivational 4 items adapted Overall influence 2 items developed	Degree of social pressure important people place on them to use SSTs & their motivation to comply
Compatibility	Moore & Benbasat (1991); Plouffe, Vandenbosch & Hulland (2001)	4 items adapted 2 items developed	SSTs are consistent with existing approach, previous skills and experience and aligned with current needs
Perceived risk	Parasuraman (2000); Kwan (1991)	4 items adapted 4 items developed	Subjective expectation of loss; dimensions physical, financial, performance, psychological
Personal contact	Walker et al. (2000); Dabholkar (1996); Cowles & Crosby (1990) Marshall & Heslop (1988); Zeithaml & Gilly (1987)	4 items adapted 2 items developed	Interaction with service person for reassurance, feedback, control, and social presence
Technology discomfort	Parasuraman (2000); Kwan (1991); Heinssen, Glass & Knight (1987)	5 items adapted 2 items developed	Feeling uneasy, apprehensive, anxious towards current or future use of SSTs
Self-efficacy	Meuter (1999); Taylor & Todd (1995b); Scholder Ellen, Bearden & Sharma (1991); Bandura (1977)	4 items adapted 2 items developed	Belief in one's perceived capability and confidence to perform a specific SST behaviour

Source: developed for this study

3.4.1. ITEM GENERATION AND SOURCES

The initial items were derived from the literature cited in chapter two. Further items were generated from the findings of the in-depth interviews and focus groups conducted at an earlier stage in the research process. Based on the knowledge gained from the exploratory stages, items generated from the literature were adapted to the context of this study to enhance face validity.

With a pool of items generated, the next stage in the process was to ensure that the items were written in a short and simple manner and any jargon included in the statements from other sources was removed. Where possible, the items were worded positively to improve the information processing capability of mature consumers. The final step was to remove any items that were too similar to another item and therefore only reflecting trivial differences.

In total, fifty-two items were generated through this process. Due to the anticipated information processing difficulties that mature consumers could be expected to experience in the judging process, a smaller pool of items was retained than suggested by Churchill (1979) and DeVellis (1991).

3.4.2. CONTENT VALIDITY OF VARIABLES

Content validity represents '…the degree to which elements of a measurement instrument are relevant to and representative of the targeted construct for a particular assessment purpose' (Haynes, Richard & Kubany 1995, p. 238). The purpose of assessing content validity is to ensure that the items developed in the previous steps reflect the content areas encompassed in the specific variables included in this study. Development of content valid measures is enhanced through the creation of a pool of items and then the evaluation of items by expert judges.

An expert judge was defined as a person who is knowledgeable in the content area and included academics and members of the study population. The optimal number of judges will vary, however using more than five facilitates the detection and exclusion of rater outliers (Haynes, Richard & Kubany 1995). For the purpose of this

study, seven expert judges were used in this process, including four academics and three mature consumers from the study population.

3.4.3. DATA COLLECTION – EXPERT JUDGES

The item-variable matching instrument (refer Appendix E) was personally delivered to each expert judge and the process explained. The context of the study and definitions of each variable were provided on the first page of the instrument. The expert judges were required to match each item to a variable by ticking the respective box or, if unsure, by ticking 'Don't know'. They also evaluated each item's clarity and conciseness and were invited to propose new items. The instrument was collected from each expert judge at a later time when differences in the matching process and feedback on the items were discussed.

The criterion to retain an item was set at 85% agreement among judges (Zaichkowsky 1985). Items that achieved between 70% and 84% agreement among judges were examined and, based on feedback, some items were modified and retained. Two new items were developed based on feedback from expert judges. The final number of items retained to form scales to measure each of the variables is included in Table 3.1.

The final scales developed in this section to measure each of the variables are included in Section B of the questionnaire in Appendix F. In the questionnaire the items measuring self-efficacy were grouped under the heading capability and items measuring technology discomfort were grouped under the heading self-service banking technology. These headings were more suited for the mature consumer sample. All items were measured using a five-point Likert response format in the questionnaire.

3.4.4. PRE-TEST VALIDATION

The final questionnaire was assembled for an initial pre-test with ten university academic and administrative staff over 50 years of age. The questionnaire consisted of the following sections:

Section A Six questions profiled the banking practices of mature consumers. These included questions relating to:

- length of time each SSBT method had been used;
- usage profile of each SSBT and face-to-face banking method;
- how often each method was used including credit card use; and
- type of banking/payment method used for an array of financial activities.

Section B Views on banking methods in terms of personal contact, self-service banking technology, perceived usefulness, ease of use, capability, compatibility, and perceived risk

Section C Social influence in terms of family, friends and professionals

Section D Attitude towards self-service banking methods

Section E Banking intention and use

Section F Official and cognitive age

Section G Demographics

The ten academic and administrative staff were personally invited to complete the questionnaire and provide feedback on the clarity and interpretation of the items in the questionnaire. Based on the feedback gained from respondents when each questionnaire was personally collected, minor changes were made to the wording and format.

A second pre-test was conducted by administering the revised survey to 20 mature respondents over 50 years of age from the local community. A complete survey package was personally delivered to each respondent and collected at a prearranged time. Respondents were asked to record any points of concern about the questionnaire and these issues were discussed with them at collection time. The mature respondents provided some additional feedback and, based on this information, a few further changes were made to the questionnaire.

3.5. DATA COLLECTION

The tailored design method proposed by Dillman (2000) guided the final data collection stage for this study. This involved establishing respondent trust in the process so that the expected rewards from responding would outweigh the anticipated social costs, and therefore lead to a reduction in non-response error.

To establish trust with the respondents, the study was sponsored by the National Seniors Association (NSA), to which all members of the sampling frame belonged. The cover letter was on NSA letterhead and the invitation to participate in the study was extended to the members by the Chief Executive of the NSA. The importance of the study was outlined in the cover letter along with an assurance that the NSA would receive a comprehensive report on the study. Further, the Chief Executive acknowledged the legitimate standing of the researcher and her University.

Rewards for completing and returning the questionnaire were extended to the respondent through providing an opportunity for them to voice their opinion on the topic of financial banking services. Further, the questionnaire was presented in a professional manner with an attractive cover positioned to communicate directly with the respondent (refer Appendix F). A tea bag in an attractive package was included as a token of appreciation. The respondents were thanked again on completion of the questionnaire and invited to include their views on financial banking matters in the space provided.

The social costs were minimised through providing a questionnaire that was very easy to complete with most responses requiring the respondent to tick a box. The questionnaire was printed in A4 book format and was mailed in an A4 envelope to avoid folding and thus making it more convenient for mature consumer to open and manage. The respondents were able to respond to the mail questionnaire at a time and location convenient to them. Further, a reply paid self-addressed envelope was included to avoid any inconvenience in returning the questionnaire.

No pre-notification of the survey was communicated to the potential respondents prior to mailing 600 survey packages. With considerable attention given to designing

the questionnaire and sponsorship from the NSA, a reminder letter was not forwarded to respondents.

One week after mailing, 139 (23%) questionnaires were returned and a further 78 questionnaires were received over the following two weeks resulting in a 36% response rate. At the screening stage, nine questionnaires were removed due to being incomplete. The final usable response rate was 35% (208 usable questionnaires). Sixteen additional questionnaires were returned during the three week period with eight incorrectly addressed, four not completed due to illness, and a further four questionnaires not attempted. Overall, the response rate was slightly lower than the target of 40% but still at an acceptable level for Study 1.

3.6. DATA ENTRY AND PREPARATION FOR ANALYSIS

The remaining 208 questionnaires were prepared for data entry with some additional coding required before the data were entered into the software package, Statistical Package for Social Sciences (SPSS). After the data were entered, a random sample of 20% of the questionnaires were checked for data entry errors.

To check the representativeness of the sample, a chi-square goodness of fit test was conducted on two key variables: age and usage level of each SSBT by age categories. The Australian Bureau of Statistics (Australian Bureau of Statistics 2000, 2001a) data were compared with respondent data on these dimensions and no significant differences were identified at the 0.05 level.

To create a measure of the level of SSBT use among respondents, data collected from question three in section A were used to form an index, with zero representing 100% face-to-face banking and ten representing 100% use of SSBT methods. An index of five meant that half of their banking is completed using face-to-face service, while the other half can be any combination of the SSBT methods, including EFTPOS, ATM, telephone banking, and internet banking.

In preparing the items for further analysis, negatively worded items or items not in the same direction as other items in the scale were reversed. This included five items

measuring perceived ease of use, one item each for compatibility, perceived risk, attitude, and intention.

3.7. ANALYSIS

Analysis of the data for Study 1 was conducted in three stages. The initial stage involved presenting descriptive statistics to provide a demographic profile of the respondents and their banking practices. In the second stage, factor analysis was used to test for unidimensionality of the measurement scales for each variable before aggregating the items measuring each variable into a single composite score (Baumgartner & Homburg 1996). The final stage involved using structural equation modelling (SEM) to test hypothesised linear structural relationships between variables. The SEM approach is most suited to testing the model and hypotheses in this study as a number of interrelationships among several endogenous and exogenous variables are tested simultaneously (Steenkamp & Baumgartner 2000).

3.8. CONCLUSION

This chapter describes the research design and process used to develop the measurement instrument for data collection for Study 1. This process encompassed five stages: two exploratory stages, a scale development and questionnaire construction stage, a pilot testing stage, and an instrument administration stage. In the next chapter, a profile of the respondents and their banking practices is provided followed by further variable development, and testing the model and hypotheses developed in chapter two.

Chapter 4

ANALYSIS AND RESULTS – STUDY 1

4.1. INTRODUCTION

In this chapter the results of the data analysis for Study 1 are presented. A description of the respondents who participated in the study is initially reported, followed by a profile of their banking practices including results for each user segment. The final stage of the variable development process is then addressed. An exploratory factor analysis was conducted to test for unidimensionality of each variable in conjunction with internal consistency reliability (alpha) checks. Based on the results from this stage, composite measures were constructed from the items to reflect their respective variables. In the concluding section of this chapter, the structural relationships among variables in the model are tested using SEM. The findings are discussed and limitations are briefly outlined.

4.2. PROFILES OF MATURE CONSUMER SEGMENTS

For Study 1, a usable sample of 208 mature consumers completed the self-administered mail questionnaire, resulting in a 35% response rate. Respondents ranged in age from 50 to over 85 years with an average age of 63 years. The average cognitive age, which is the age respondents perceive themselves to be in terms of feel, looks, doing/acts and interest was 56 years, with a range from 35 to 85 years of age. Cognitive age was measured using a four-item, seven-point summated rating scale. Scores were computed by calculating the average of the decade midpoint for the four items (Bruner II & Hensel 1996, p. 147).

The demographic details are provided in Table 4.1, with the profile provided on an aggregate basis and broken down for each user segment, namely non-users, low users, and medium-to-high users.

Table 4.1. Demographic profile of mature consumer respondents

Demographic Variables		*N* = 208[1]	Non-Users of SSBTs: *n* = 40 (used 0%)	Low Users of SSBTs: *n* = 40 (used < 55%)	Med - High Users of SSBTs: *n* = 128 (used ≥ 55%)
		No. (%)	No. (%)	No. (%)	No. (%)
Official Age:	50-59	83 (42)[2]	5 (13)	18 (45)	60 (50)
	60-69	66 (33)	13 (33.5)	14 (35)	39 (32)
	70+	51 (25)	21 (53.5)	8 (20)	22 (18)
Cognitive Age:	Average	56[3]	65	56	54
Gender:	Male	75 (36)	17 (42)	18 (45)	40 (31)
	Female	133 (64)	23 (58)	22 (55)	88 (69)
Marital Status:					
	Never Married	17 (8)	2 (5)	6 (15)	9 (7)
	Married	141 (67)	27 (67)	24 (60)	90 (71)
	Divorced/Separated	25 (12)	4 (10)	5 (12.5)	16 (13)
	Widowed	25 (12)	7 (18)	5 (12.5)	13 (10)
Household:	1 Person	58 (28)	19 (47)	10 (25)	29 (22)
	2 Persons	129 (62)	19 (47)	25 (62)	85 (67)
	3+ Persons	21 (10)	2 (5)	5 (12)	14 (12)
Income:	< 19,999 (AUS $)	64 (31)	17 (43)	12 (30)	35 (28)
	20,000 – 39,999	69 (33)	10 (25)	15 (38)	44 (34)
	40,000 – 59,999	33 (16)	6 (17)	6 (15)	21 (16)
	>60,000	28 (13)	1 (2)	6 (15)	21 (16)
	Not stated	14 (7)	6 (15)	1 (2)	7 (6)
Education:	Primary/Secondary	42 (20)	10 (26)	6 (15)	26 (21)
	Completed Junior	56 (27)	16 (40)	9 (23)	31 (24)
	Completed Senior	34 (16)	5 (12)	8 (20)	21 (16)
	Skill Vocational	31 (15)	4 (10)	5 (12)	22 (17)
	Diploma	15 (7)	2 (5)	3 (7)	10 (8)
	Degree/Postgrad	30 (15)	3 (7)	9 (23)	18 (14)
Employment:	Full time	33 (16)	4 (10)	11 (27)	18 (14)
	Part time	38 (18)	5 (12)	4 (10)	29 (23)
	Retired	100 (48)	25 (64)	18 (45)	57 (45)
	Home duties	22 (11)	4 (10)	4 (10)	14 (11)
	Other	15 (7)	2 (2)	3 (7)	10 (7)
Occupation:	Management	43 (21)	8 (20)	10 (25)	25 (20)
	Professional	64 (31)	8 (20)	14 (35)	42 (33)
	Clerical	53 (25)	12 (30)	8 (20)	33 (26)
	Trade/Labourer	24 (12)	7 (17)	4 (10)	13 (10)
	Home duties	21 (10)	3 (8)	4 (10)	14 (10.5)
	Other	3 (1)	2 (5)	-	1 (0.5)

[1] Some areas have a small amount of missing data.
[2] The percentages given in brackets are based on column totals.
[3] Figure represents an average (mean) only for cognitive age variable.

4.2.1. PROFILE OF USERS VERSUS NON-USERS

As outlined in the previous chapter, an index was created to measure the level of use of SSBTs among respondents based on the proportion of their normal banking practices attributed to each SSBT, including face-to-face banking. The level of use of SSBTs varied across the sample with 19% (40) non-users (that is, they used only face-to-face banking services); 19% (40) low users (that is, less than 55% of their banking transactions involved using SSBTs) and 62% (128) medium-to-high users (that is, greater than or equal to 55% of their banking transactions involved SSBTs). The split in respondents between low versus medium-to-high usage level was based on the 25th percentile and a ten-point gap existing in the data points. These cut-off points were arbitrary but they did permit the foundation of groups and ad hoc analyses of differences among groups.

Table 4.1 shows the various demographic characteristics listed under their respective headings in the first column. The second column reports the number and corresponding percentages for each of these demographic categories in this sample of 208. The remaining three columns show the numbers within each demographic category falling into the non-user, low user, and medium-to-high user groups. The percentages to the right of each of these figures are based on the group number indicated at the head of each of the last four columns. Thus, the table shows that 5 respondents in the 50-59 age category rated themselves as non-users of SSBT, which represents 13% of the non-user group (5/40). By comparing each of the percentages in the last three columns with the percentage shown in the second column, it is possible to see whether or not members of each of the demographic categories are spread evenly over the different user groups. To complete the example started above, 42% (83) of the sample were in the 50-59 age category, but we can see looking at the percentages across the row that they were not evenly distributed among the three user segments. A very low percentage (13%) described themselves as non-users. The same visual checking process can be used for other rows to gain an intuitive understanding of the trends in these data.

At a more formal level, chi-square goodness of fit tests were used to test for differences between observed and expected frequencies within each demographic

category. Results indicated that there was a significant effect for Official Age: χ^2 (4) = 25.13, $p < .01$. Follow-up tests showed that the discrepancy was due to the low proportion of the 50-59 age group describing themselves as non-users and also to the high proportion of the 70+ age group that fell into this category. There was also a significant effect for Household: χ^2 (4) = 9.99, $p < .05$. In this case, the effect was due to the high proportion of 1-person households falling into the non-user category. There were no other differences but several trends were evident that just failed to reach significance: users of SSBT tend to be better educated, still working, and to have higher incomes. These findings are supported by Kwan (1991), Marshall and Heslop (1988) and Darch and Caltabiano (2004) who found that users of ATMs tend to be younger mature consumers, better educated and to have held professional jobs in the past. Further, Zeithaml and Gilly (1987) concluded that in relation to ATMs and EFTPOS, elderly consumers were more likely to prefer the customary way of conducting transactions and enjoyed the personal interaction with the bank employee.

4.2.2. PROFILE OF LOW VERSUS MEDIUM-TO-HIGH LEVEL USERS

The preceding analyses dealt with the characteristics of users and non-users in relation to SSBTs. Turning our attention to the different types of SSBTs, we can also differentiate between the low user and the medium-to-high user groups in terms of the technologies they prefer. For the purposes of this comparison, we have included face-to-face banking. Table 4.2 contains this information.

Table 4.2. Level of use of banking methods

		N = 208 (%)	Non-Users of SSBTs: *n* = 40 (used 0%)	Low Users of SSBTs: *n* = 40 (used <55%)	Med - High Users of SSBTs: *n* = 128 (used ≥ 55%)
Face-to-Face Banking:	No of Users	196[1] (94)	40 (100)	40 (100)	116[1](90)
	Median use %	20	100	65	10
	Minimum use %	1	100	25	1
	Maximum use %	100	100	99	40
EFTPOS:	No of Users	118 (56)	-	18 (45)	100 (78)
	Median use %	35	-	20	40
	Minimum use %	1	-	2	1
	Maximum use %	99	-	50	99
ATMs:	No of Users	141 (67)	-	25 (62)	116 (90)
	Median use %	35	-	25	40
	Minimum use %	1	-	1	1
	Maximum use %	100	-	50	100
Telephone Banking:	No of Users	86 (41)	-	16 (40)	70 (55)
	Median use %	10	-	7.5	18
	Minimum use %	1	-	1	1
	Maximum use %	89	-	50	89
Internet Banking:	No of Users	31 (15)	-	5 (13)	26 (20)
	Median use %	10	-	10	12.5
	Minimum use %	1	-	1	2
	Maximum use %	80	-	30	80

[1] 12 respondents reported not using face-to-face banking

Overall the usage levels of individual SSBTs were as follows: EFTPOS was used by 56% (118) of the sample; ATM, 67% (141); telephone banking, 41% (86); internet banking, 15% (31); and face-to-face banking was used by 94% (196) of the respondents. For low users and medium-to-high users, the level of use for each SSBT is presented in the last two columns of Table 4.2. The percentage of mature consumers using each SSBT method among medium-to-high users is approximately one and half times greater than for low users. Face-to-face banking is used considerably more among the low users. Based on further analysis, data indicated that usage level of EFTPOS, ATMs, and telephone banking of respondents for people less than 65 years of age is on average 25% higher than that of the respondents aged 65 years and above. However, for internet banking, only 3 of the 31 respondents using this method were over the age of 65.

4.2.3. LENGTH OF TIME USING SSBTS

In terms of the number of years mature consumers reported using the various SSBTs, findings indicate for EFTPOS, low and medium-to-high users' range was from 0.3 to 20 years with a median of 5 to 6 years. For ATMs, usage was 0.1 to 25 years with a median of 10 years for both groups. Telephone banking use among low users was 1 to 6 years with a median of 2 years and 0.8 to 15 years with a median of 3 years for medium-to-high users. Finally, for internet banking, usage by low users was 1 to 3 years with a median of 1.5 year and 0.5 to 4 years with a median of 2 years for medium-to-high users. These findings indicate that the diffusion of SSBT methods into the mature consumer market is similar across the two groups, however in the low user group there are fewer mature consumers using these methods as reported in Table 4.2.

4.2.4. FREQUENCY OF USING BANKING METHODS

To examine the usage level in further depth, data were collected on the frequency of usage for each of the banking methods. These results are outlined in Table 4.3 with the highest frequency category (apart from the never-use category) for each method underlined.

Table 4.3. Frequency of use of banking methods

Frequency of use	Banking Methods				
	Face-to-face No. (%)	EFTPOS No. (%)	ATMs No. (%)	Telephone No. (%)	Internet No. (%)
Never use	15 (7)	90 (43)	67 (32)	122 (59.5)	177 (85.5)
Rarely	80 (39)	24 (12)	30 (14)	29 (14)	8 (4)
Few times a month	77 (37)	26 (12.5)	45 (23)	39 (19)	12 (6)
Once a week	30 (14)	26 (12.5)	43 (21)	11 (5)	2 (.5)
2-3 times a week	6 (3)	33 (16)	20 (9)	6 (3)	6 (3)
> 4 times a week	0 (0)	9 (4)	3 (1)	1 (.5)	3 (1)

Medium-to-high users of SSBTs tend to rarely use face-to-face banking, with most low users or non-users of SSBTs tending to use this method a little more regularly. Most respondents in the low use category use EFTPOS rarely or a few times a month, while medium-to-high users of SSBTs indicated they are more frequent users of EFTPOS. The results for ATMs and telephone banking for each segment are the

same as for EFTPOS. Respondents who had adopted internet banking tend to be the highest users of SSBTs. These users were mostly from the 50-59 or 60-69 age groups.

4.2.5. FREQUENCY OF CREDIT CARD USE AND SITUATION

The purpose of examining credit card use in the context of this study was to determine if non-users of SSBTs used credit cards such as Visa, Mastercard and Bankcard as a possible substitute for SSBTs. Use of credit cards is another approach to managing one's financial affairs and for the mature consumers it further reduces the amount of cash they need to withdraw and handle, thus reducing personal risk. Previous research has stressed that frequency of credit card use is a more accurate measure than just the number of cards one holds (Mathur & Moschis 1994). It is also important to consider the situation in which credit cards are used. Findings are presented in Table 4.4.

Table 4.4. Frequency of credit card use by situation

Credit Card Use		*N* = 208 %	Non-Users of SSBTs: *n* = 40 (used 0%) (%)	Low Users of SSBTs: *n* = 40 (used <55%) (%)	Med - High Users of SSBTs: *n* = 128 (used ≥ 55%) (%)
In-store:	Users	170 (81) [1]	28 (70)	32 (80)	110 (86)
	Never use	38	12	8	18
	Rarely	40	9	8	23
	Few times a month	56 (33) [2]	14 (50)	10 (31)	32 (29)
	Once a week	10	1	2	7
	2-3 times a week	43 (25) [2]	3	9	31 (28)
	> 4 times a week	21	1	3	17
Telephone:	Users	111 (53) [1]	14 (35)	14 (35)	83 (65)
	Never use	97	26	26	45
	Rarely	58 (52) [2]	9 (64)	9 (64)	40 (48)
	Few times a month	38	4	4	30
	Once a week	8	0	0	8
	2-3 times a week	6	0	1	5
	> 4 times a week	1	1	0	0
Internet:	Users	25 (12) [1]	0	1 (2.5)	24 (19)
	Never use	183	40	39	104
	Rarely	16 (64) [2]	0	1 (100)	15 (63)
	Few times a month	4	0	0	4
	Once a week	4	0	0	4
	2-3 times a week	1	0	0	1

[1] percentage of total for column
[2] percentage of users for the category of credit card use in the column

The findings indicate that 70% (28) of non-users of SSBTs make use of credit cards for in-store purchases, while 35% (14) of this segment use credit cards for payments by telephone. The modal response for frequency of use for in-store purchases was 'a few times a month'. In-store credit card users are from across all age categories with half of the users in the 70+ age bracket. They are mostly retired and half of the credit card users in this segment have a household income of less than AUS$30,000. The profile of respondents using a credit card over the telephone is similar to the in-store usage profile.

The low user group indicated a high level of in-store credit card use (80%) and, as before, the frequency of use was mostly 'a few times a month'. The medium-to-high group exhibited a similar level of adoption to that of lower users (86%) with frequency of use being shared between 'a few times a month' and '2-3 times a week'. This group also reported a moderate level of credit card use by telephone (65%) and much lower use by internet (19%). Only 35% of the low use group use credit cards over the phone and 2.5% (1) over the internet. From these results, we can infer that users of SSBTs prefer to have a range of banking and payment options available to them to suit the situation as it arises.

Further exploratory analyses were conducted to determine if there was a relationship between credit card use for each of the three situations and age of respondent (three age groups). The results from a series of chi-square tests indicated that the relationships were not significant. These findings are contrary to those reported by Mathur and Moschis (1994), where they found that credit card use is inversely related to age. Mathur and Moschis (1994), however, tested if there were differences between respondents under 50 years of age against those 75+. This current research study focused on three age groups in the 50+ market and this could account for the different outcomes. Their research was also conducted a decade ago when usage rates for credit cards were likely to have been lower across all age groups.

4.2.6. BANKING AND PAYMENT METHODS USED FOR SELECTED FINANCIAL ACTIVITIES

In this section, findings are reported in relation to how the different groups in the sample prefer to handle their daily financial transactions. To elicit this information, the questionnaire contained a table where respondents were required to tick the main banking/payment method they used. In terms of *withdrawing money*, non-users and low users mostly use face-to-face banking, while medium-to-high users show a much stronger tendency to withdraw money from ATMs. The majority of mature consumers *deposit money* during a face-to-face service encounter at a bank, with a small percentage of medium-to-high users (6%) depositing money through an ATM or at the Australia Post Office (13%). On average about 60% of mature consumers *check their account balances*, with non-users doing this during face-to-face banking, low users using the same method or telephone banking, and medium-to-high users mostly using ATMs and telephone banking and some internet banking. Mature consumers normally receive by mail a monthly bank account statement, thus reducing the need for this activity. Finally, in relation to the *transfer of funds between accounts*, non-users rely solely on face-to-face banking, low users employ the same method or use telephone banking. Medium-to-high users of SSBTs use a variety of methods including (in order of preference) telephone banking, face-to-face banking, internet banking, ATMs, and cheque.

Two further financial activities were selected for analysis on the basis that all mature consumers would need to deal with these activities at least a couple of times per month. Firstly, *paying for groceries*, where non-users indicated that their main payment method was cash, with some using a credit card and a very few paying by cheque. Low users equally use cash or credit card with a small number reporting using EFTPOS, while medium-to-heavy users mostly use EFTPOS, followed by equal use of a credit card or cash.

Payment of the *main household accounts* - for example electricity, gas, rates and telephone - are dealt with by all segments in a variety of ways. Non-users mostly use cheque, followed by credit card (Visa, Mastercard or Bankcard as specified by the service provider), Australia Post Office, and then cash. Low users indicated that their main payment method was cheque, followed by credit card and Australia Post

Office. Finally, medium-to-heavy users reported using a credit card as their main payment method followed very closely by telephone banking (BPAY – bill payment, whereby individuals can contact their bank and make a direct withdrawal from a select bank account to the service provider), then cheque, EFTPOS, Australia Post Office, internet banking (using another variant of BPAY) and, lastly, cash.

4.2.7. FUTURE BANKING PRACTICES

In this concluding section, findings relating to mature consumers' future banking practices is reported and discussed. Some 98% of non-users indicated that they would not be trialling or using SSBT methods in the next six months. Further, this group also did not intend to search for information relating to one of the SSBT methods. These findings suggest that non-users are resistant to change in their banking practices and set in their current habits, findings supported by Marr and Prendergast (1993).

For users of SSBT methods, 13% intended to decrease their use of face-to-face banking and 12% indicated that they would trial or use a new SSBT method in the next six months. While most current users of SSBT methods did not expect to change their current banking practices, there is evidence to suggest that some current users are more open to considering new approaches to handling their financial matters.

In conclusion, the various profiles of respondents' characteristics and banking practices reported in section 4.2 provide a deeper understanding of the behaviour of mature consumers towards using SSBTs. While in previous studies the analysis has focused on one SSBT, this study has considered a portfolio of SSBTs. Findings indicate that 50% of low users actively use two or more SSBTs in conjunction with face-to-face banking, while 88% of medium-to-high users actively use two or more SSBTs. Further, by analysing the usage levels across four main SSBTs, the findings provide a more complete picture of usage behaviour of mature consumers towards SSBTs. In the next section of this chapter, the final stage of the scale development process is described. This is followed by the testing of the conceptual model and a discussion of the main findings.

4.3. SCALE PREPARATION AND ANALYSIS

4.3.1. MISSING DATA

Prior to data entry, questionnaires with more than 5% missing data were removed. The remaining 208 questionnaires had on average less than 1% missing data that were missing at random (MAR). There are several methods of dealing with missing data, however in this study the expectation-maximization (EM) algorithm was employed (McDonald & Ho 2002). With this method, multiple data sets are created through a two-step iterative process. After convergence is achieved, the values to replace the missing data are saved. This procedure has the advantage of avoiding impossible matrices, avoiding overfitting, and producing realistic estimates of variance (Tabachnick & Fidell 2001; McDonald & Ho 2002).

4.3.2. EXPLORATORY FACTOR ANALYSIS

It is normal practice to test the dimensionality of scales and check for evidence of internal consistency reliability (Cronbach's alpha) before using these scales in further analyses. Exploratory factor analysis (EFA) was used to check the dimensionality of scales. The extraction method was principal axis factoring followed by an oblique rotation of the axes to account for the expected correlations among the variables (Gerbing & Anderson 1988; Netemeyer, Bearden & Sharma 2003). The factor solution was restricted to ten a priori theoretically derived factors aligned with the model variables. As behaviour was measured with one item, it was excluded from the EFA.

An analysis of the pattern matrix revealed that perceived ease of use, self-efficacy and perceived risk items loaded across more than one factor, thus displaying multidimensional characteristics. In a closer examination of the items that underlie these variables, it was apparent some of the items do not conform to the principles of scale construction. For example, the perceived ease of use variable required participants to indicate how easy they thought it would be to understand, learn and use different types of banking technology. There is no underlying expectation that people who find one form of SSBT easy to use will necessarily find another easy to use, so there is no requirement for the items to be inter-correlated. In such situations,

it is not helpful to conduct factor analyses or to look for evidence of internal consistency among the items. Some researchers have referred to these measures as indexes rather than scales (e.g., Diamantopoulos & Winklhofer 2001). Despite the lack of internal consistency, indexes can still be formed by aggregating the items, and that practice was followed here.

A further examination of the pattern matrix revealed that compatibility and attitude loaded on the same factor. In this study, compatibility referred to consumers' perception that SSTs are consistent with their existing approach, previous skills and experiences, and align with their current needs. This definition draws from previous research, and findings indicate there are two types of compatibility. The first of these are normative or cognitive compatibility, referring to what people feel or think about technology. The second is practical or operational compatibility, referring to what people do (Tornatzky & Klein 1982; Karahanna, Straub & Chervany 1999). The compatibility items in this study measured cognitive compatibility. As a result, the way mature consumers feel or think about SSBTs is very closely linked to their attitude towards using SSBTs. Both are positively related to usage behaviour of SSBTs and exhibit high inter-correlation at 0.83 (see Table 4.7). The measure of compatibility was judged to be redundant and was therefore omitted in further analysis. Attitude, a key variable in TAM was retained.

The remaining variables can be treated as scales and were subjected to factor analysis. In all six cases, unidimensionality was evident with most factor loadings significant at above 0.65 (Tabachnick & Fidell 2001). Further EFA details are provided in Appendix G, Table G.1.

In conjunction with the EFA, internal consistency reliability (alpha) and corrected item-to-total correlations checks were conducted to determine item deletion or retention. All retained variables had an alpha of 0.80 and above (see Table 4.6), and corrected item-to-total correlations of 0.50 and above, as per the minimum levels recommended by Netemeyer, Bearden and Sharma (2003, p. 126).

4.3.3. DESCRIPTIVE STATISTICS

A summary of the characteristics of each variable is presented in Table 4.5 including the number of items used to measure each variable. The responses for negatively worded items were reversed and the items were summed for each variable and then averaged to create the mean values and standard deviations reported in the table. The mean value for each variable is also reported for each of the three SSBT usage groups: non-users, low users and medium-to-high users. The mean value is higher for non-users on personal contact, technology discomfort, and perceived risk. For all other variables, the means are lower for non-users. For example, non-users perceive SSBTs as less useful and less easy to use than low or medium-to-high users. The mean value at the item level is reported in Appendix G, Tables G.1 and G.2.

Table 4.5. Descriptive statistics for scales and indexes

Variables	No. of Items	Mean for SSBT Usage groups			Mean of Sample $N = 208$	Standard Deviation	Reliability[4]
		Non[6]	Low	M-H			
Behaviour (B)	1[3]	1.6	4.7	5.6	4.6[1]	1.88	-
Intention (I)	3	1.3	3.9	4.6	3.85	1.51	0.97
Attitude (A)	4	1.8	3.0	3.7	3.18	1.42	0.97
Perceived usefulness (PU)	6	2.0	2.8	4.0	3.03	1.15	0.92
Perceived ease of use (EOU)	7	2.5	3.0	3.4	3.13	0.82	-
Self-efficacy (SE)	6	2.9	3.8	4.1	3.76	0.99	-
Subjective norm (SN) ($n_i m_i$)	1[2]	6.1	7.6	8.5	7.81	6.20	0.97
Personal contact (PC)	6	4.8	4.4	3.4	3.88	1.16	0.95
Technology discomfort (TD)	7	3.5	2.7	2.2	2.59	1.15	0.90
Perceived risk (PR)	8	3.8	3.5	3.1	3.24	0.97	-
Compatibility (C)[5]	6	1.8	2.6	3.5	2.99	1.08	-

[1] 6-point likely scale 1- extremely unlikely; 6 – extremely likely
[2] 5-point Likert scale for each scale item and then multiplied; range 1 to 25
[3] All other measures on a 5-point Likert scale 1- strongly disagree; 5 strongly disagree
[4] Internal consistency reliability (Cronbach's alpha) for unidimensional scales
[5] Variable removed from model
[6] Non = non-users of SSBTs; Low = low users SSBTs (< 55%); M-H= medium-to-high users SSBTs (≥ 55%)

To determine if there were differences between the mean values for each user group reported in Table 4.5, a series of Kruskal-Wallis one-way analysis of variance tests were conducted. The findings reported in Table 4.6 indicate that the mean group

rankings differ across the three groups with all chi-square values significant ($p < .05$) except for subjective norm. The results of the follow-up group comparison tests indicated that all compared group rankings were significantly different ($p < .05$), except for perceived risk where there was no significant difference between non-user and low user groups in the mean ranking. This result indicates that mature consumers belonging to these two groups hold the same perception about perceived risk towards using SSBTs.

Table 4.6. Kruskal-Wallis tests of mean differences

Variables	Mean Group Rankings			Chi-Square *df* (2) $p < .05$	Multiple Group Comparisons $p < .05$
	Non-Users $n = 40$	Low Users $n = 40$	Med-High Users $n = 128$		
Behaviour (B)	23.84	97.01	132.05	120.11	All sig. different
Intention (I)	23.45	92.18	133.68	112.72	All sig. different
Attitude (A)	46.66	92.85	126.21	55.94	All sig. different
Perceived usefulness (PU)	53.43	94.73	123.52	42.75	All sig. different
Perceived ease of use (PEOU)	59.11	93.59	122.09	35.09	All sig. different
Self-efficacy (SE)	58.45	95.38	121.74	35.01	All sig. different
Subjective norm (SN)	87.35	103.09	110.30	4.85^{ns}	
Personal contact (PC)	159.76	126.21	80.45	60.98	All sig. different
Technology discomfort (TD)	152.53	112.94	86.86	37.33	All sig. different
Perceived risk (PR)	141.99	119.95	87.96	27.87	All sig. different except non & low
Compatibility (C)	40.60	82.95	131.20	75.59	All sig. different

ns – not significant

4.3.4. CONVERGENT AND DISCRIMINANT VALIDITY

The final step prior to testing the model involved the assessment of convergent and discriminant validity among the variables. Evidence of convergent validity is assessed by significant and strong correlations between different measures of the same construct (Netemeyer, Bearden & Sharma 2003). Alternative measures of the variables included in this study were not available to assess convergent validity in this manner. However, some evidence of convergent validity in this study can be

gleaned from the results of factor analysis, where items developed to measure a specific variable loaded highly on the same factor.

Discriminant validity is evident when correlations among measures of different constructs are not too high (Netemeyer, Bearden & Sharma 2003). With the exception of compatibility, which was discarded because of multicollinearity, correlations among the scaled variables have no more than 50% overlap between any two variables (refer Table 4.7).

Table 4.7. Inter-correlations among variables

Model Variables	B	I	A	PU	EOU	SE	SN	PC	TD	PR
Behaviour (B)	—									
Intention (I)	0.95	—								
Attitude (A)	0.70	0.68	—							
Perceived usefulness (PU)	0.49	0.49	0.60	—						
Perceived ease of use (EOU)	0.55	0.52	0.67	0.41	—					
Self-efficacy (SE)	0.57	0.52*	0.56	0.42	0.68	—				
Subjective norm (SN)	0.18*	0.18	0.20	0.18*	0.07^{ns}	0.11^{ns}	—			
Personal contact (PC)	-0.54	-0.53	-0.72	-0.49	-0.63	-0.52	-0.16*	—		
Technology discomfort (TD)	-0.54	-0.51	-0.61	-0.33	-0.73	-0.73	-0.02^{ns}	0.64	—	
Perceived risk (PR)	-0.46	-0.47	-0.69	-0.45	-0.70	-0.59	-0.09^{ns}	0.71	0.69	—
Compatibility (C)	0.71	0.69	0.83	0.60	0.73	0.71	0.17*	-0.73	-0.72	-0.74

^{ns} not significant; *$p < .05$; all other correlations are significant at $p < .01$ (2-tailed)

Based on these results there is modest support for convergent and discriminant validity in the present study. In the next section of this chapter, the testing of the model and hypotheses using SEM is discussed.

4.4. MODEL TESTING

To examine the structural relationships among the variables in the model developed for this study, structural equation modelling (SEM) was employed as the most suited technique for this purpose. Because of the combination of scales and indices in this study and the special SEM requirements of the latter (MacCallum & Browne 1993), measurement models were not specified, but rather the sets of items developed to

measure each variable were aggregated to form single-indicator variables. This is an accepted alternative approach to the two-step measurement and structural approach proposed by Anderson and Gerbing (1988) (Baumgartner & Homburg 1996; McDonald 1996; McDonald & Ho 2002).

Two further issues require consideration before applying the SEM method. In relation to sample size, Hair, Anderson, Tatham and Black (1998) recommended a minimum of 200 respondents, with at least five respondents for each estimated parameter. Anderson and Gerbing (1988) suggested 150 or more cases would be needed to obtain parameter estimates that have standard errors small enough to be of practical use. Study 1 meets these minimum sample size requirements with 208 respondents and 39 parameters requiring estimation. The second issue to consider is multivariate normality. While mild levels of skewness and kurtosis were present for some variables, the levels were not excessive. Furthermore, McDonald and Ho (2002) suggest that much social and behavioural science data may fail to satisfy the assumption of normality. Selecting an appropriate SEM estimation technique that is fairly robust against violations of normality such as maximum likelihood (ML) was the approach adopted for Study 1 (Hoyle & Panter 1995; McDonald & Ho 2002). AMOS 6.0 (Arbuckle 2005) was used for all SEM analyses.

4.4.1. STRUCTURAL MODEL TESTING

To assess the overall goodness-of-fit of the SEM, a number of criteria were employed. The *chi-square (χ^2) statistic* is the most fundamental measure of overall model fit. This statistic should be large and nonsignificant ($p > .05$) to indicate that the observed and model implied matrices do not differ. The χ^2 statistic is sensitive to sample size, so a more meaningful statistic often used is the *ratio of χ^2 to degrees of freedom* (χ^2/df) (represented as CMIN/*df* in AMOS output (CMIN – chi-square minimum sample discrepancy)). Arbuckle suggests a ratio in the range of 2 to 1 or 3 to 1 as indicative of an acceptable fit (2005, p. 493). Two further absolute indices considered to assess the model fit are the *root mean squared error of approximation* (RMSEA) and the *adjusted goodness-of-fit index* (AGFI).

The RMSEA estimates how well the fitted model approximates the population covariance matrix per degree of freedom (Baumgartner & Homburg 1996). Values of RMSEA below 0.05 indicate a good fit and values less than 0.08 correspond to an acceptable fit (Browne & Cudeck 1993). More recently, a value of 0.06 or less has been proposed as desirable (Hu & Bentler 1999). The AGFI uses a weighted proportion of variance in the sample covariance matrix and takes into account the degrees of freedom available for testing the model (Tabachnick & Fidell 2001; Arbuckle 2005). A value of greater than 0.90 is recommended, with a value of 0.95 or greater representing a good overall model fit (Hu & Bentler 1995).

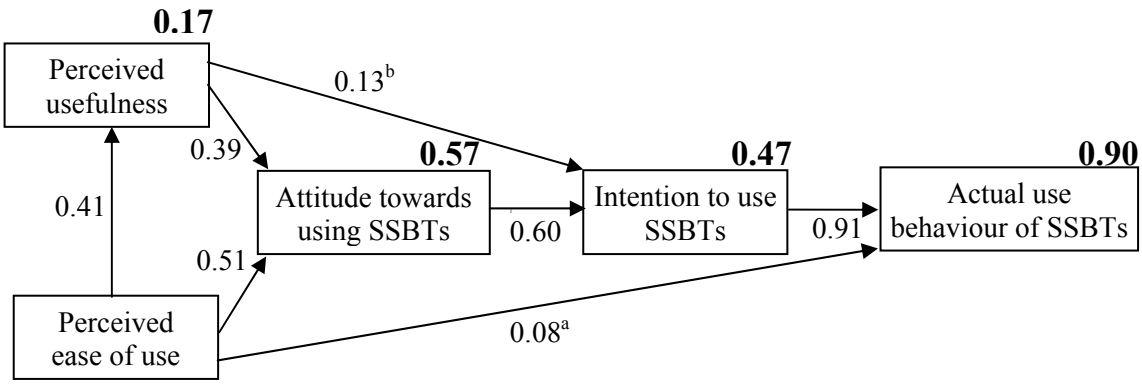
Two additional goodness-of-fit statistics classified as incremental fit indices are the *comparative fit index* (CFI) and *Tucker-Lewis index* (TLI). These fit indices are based on a comparison of the fit of the hypothesised model against the fit of a baseline model (Baumgartner & Homburg 1996; Byrne 2001). A value of 0.90 or greater is recommended (Hair et al. 1998), while values greater then 0.95 are indicative of good-fitting models (Hu & Bentler 1999).

The conceptual model for this study was based on the original TAM. The initial structural model testing will begin by cross-validating this part of the model before estimating the structural parameters of the extended TAM.

Technology Acceptance Model (TAM)

With the estimation method and fit criteria determined, the results of the SEM can be interpreted and evaluated for TAM. The initial overall model fit was as follows: χ^2 (4) = 15.70, $p < .003$, CMIN/*df* = 3.9, RMSEA = 0.12, AGFI = 0.89, CFI = 0.98 and TLI = 0.96. The absolute fit indices were slightly lower than recommended. The structural paths were checked to determine whether improvements could be made that were theoretically and practically meaningful. A path was added between perceived ease of use and behaviour, resulting in an acceptable model fit as follows: χ^2 (3) = 7.30, $p < .064$, CMIN/*df* = 2.4, RMSEA = 0.083, AGFI = 0.93, CFI = 0.99 and TLI = 0.98. The standardised path coefficients and regression weights (in bold) for the respecified TAM are shown in Figure 4.1.

Figure 4.1. Technology acceptance model (TAM)



All standardised path coefficients significant at $p < .001$ except [a] $p < .01$, [b] $p < .05$
Error and residual terms omitted for clarity from diagram

Extended Technology Acceptance Model (ETAM)

The respecified TAM was extended with the addition of the following exogenous variables: subjective norm, personal contact, perceived risk, technology discomfort and self-efficacy. The exogenous variables were allowed to be correlated in the model, in accordance with what is known about the behaviour of these variables. The initial results indicated that the model fit was less than acceptable, with χ^2 (19) = 95.85, $p < .000$, CMIN/df = 4.59, RMSEA = 0.132, AGFI = 0.80, CFI = 0.96 and TLI = 0.90.

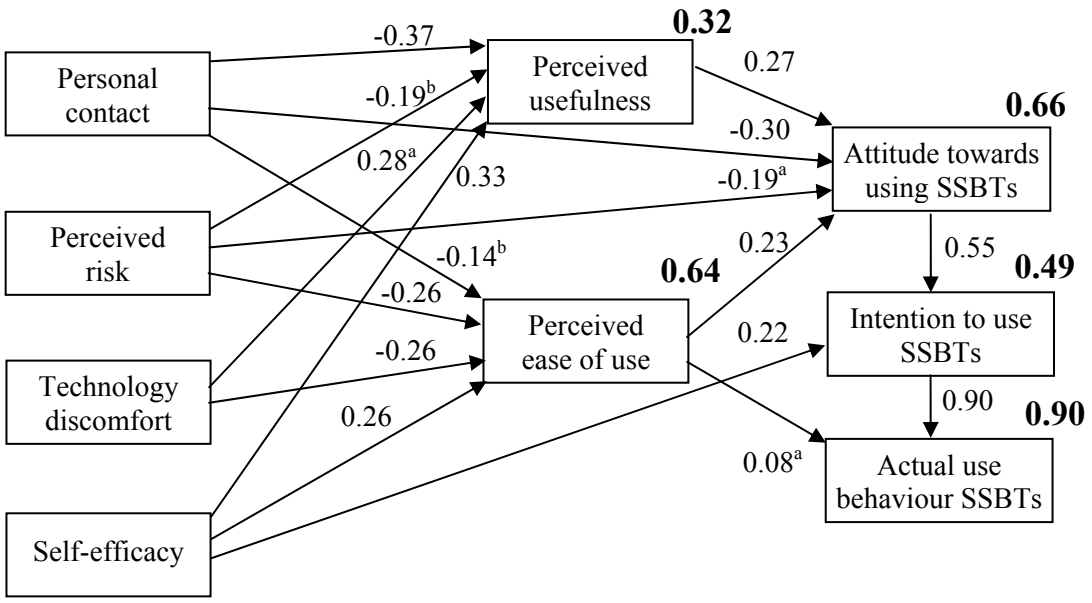
The structural pathways were checked to determine whether improvements could be achieved. An evaluation of the path estimates indicated that three of the critical ratios were not significant at $p < .05$ and were subsequently removed from the model. Further modifications were made to the model with the addition of four pathways that improved the overall fit of the model to an acceptable level. The new pathways were included based on theoretical and practical grounds. The following pathways were excluded:

Subjective norm → Perceived usefulness

Perceived ease of use → Perceived usefulness

Perceived usefulness → Intention

Figure 4.2. Extended technology acceptance model (ETAM)



All standardised path coefficients significant at $p < .001$ except [a] $p < .01$, [b] $p < .05$
Error and residual terms omitted for clarity from diagram

The respecified model including the following additional pathways is presented in Figure 4.2.

Personal contact → Attitude
Self-efficacy → Intention
Perceived risk → Attitude
Perceived ease of use → Behaviour

In the ETAM model presented above the standardised path coefficients and regression weights (in bold) are shown. Table 4.8 contains the fit statistics and R^2 values for the original and the respecified structural models.

Table 4.8. Fit indices and explanatory power for original and respecified models

Fit Indices(acceptable level) and R^2	Original Model $N = 208$	Respecified Model $N = 208$
χ^2	87.37 ($p = .000$)	24.5 ($p = .040$)
df	19	14
CMIN/*df*	4.59	1.75
RMSEA	0.132	0.060
AGFI	0.799	0.921
CFI	0.957	0.993
TLI	0.898	0.983
R^2_B	0.90	0.90
R^2_I	0.47	0.49
R^2_A	0.57	0.66
R^2_{PU}	0.32	0.32
R^2_{EOU}	0.64	0.64

The parameter estimates and their standard errors, along with the standardised total, direct and indirect effects are reported in Appendix H, Tables H.1 and H.2.

In the extended TAM (ETAM) for Study 1, four variables acted as significant predictors of perceived usefulness and perceived ease of use. They were personal contact, perceived risk, technology discomfort, and self-efficacy. Subjective norm had no influence on perceived usefulness and we can infer from this that important other people in the lives of mature consumers do not have a powerful influence on their acceptance and use of SSBTs. Prior qualitative findings indicate that mature consumers prefer minimal influence from others and are offended by the implication that they cannot handle their own financial affairs (Kennett, Moschis & Bellenger 1995; Wolfe 1997).

Other changes shown in Figure 4.2 included the fitting of direct pathways from personal contact and perceived risk to attitude. In other words, these effects are not totally mediated, as proposed in the conceptual model. A direct pathway was also fitted between perceived self-efficacy and intention, and between perceived ease of use and behaviour. The complete mediation proposed in the conceptual model is rarely observed with behavioural data and therefore partial mediation as achieved in this model is a more realistic expectation (Davis 1993; Meuter et al. 2005).

The direct path between perceived usefulness and intention was not significant in the ETAM and therefore deleted. The lack of a need for a pathway between perceived usefulness and intention may be due to the dynamics operating in a non-organisational context where positive or negative feelings are more strongly shaped by perceived usefulness of SSBTs. Further, extrinsic rewards to entice mature consumers to consider using SSBTs are minimal, unlike technology use in an organisational context. Therefore intention to use is less likely to occur without prior feeling towards the intended behaviour (Davis, Bagozzi & Warshaw 1989). This attitude → intention relationship is fundamental to TRA (Fishbein & Ajzen 1975).

In TAM a significant path exists between perceived ease of use and perceived usefulness, however the absence of this path in the ETAM can be explained by the correlated predictors. Table 4.7 indicates that there is indeed a correlation between these two variables (r = 0.41) but this does not translate into a significant regression pathway when other variables are entered into the equation. This finding is consistent with that obtained by Agarwal and Karahanna (2000).

In terms of the relationship between technology discomfort and perceived usefulness, these variables are negatively correlated (r = -0.33) as shown in Table 4.7, but the standardised path coefficient shown in the ETAM in Figure 4.2 is positive (β = 0.28). This reversal is due to correlations among the predictor variables giving rise to a statistical phenomenon known as a suppressor effect (McClendon 1994). There is no suggestion that increases in technology discomfort increase perceived usefulness.

Structural equation modelling is well suited to testing a group of hypotheses simultaneously (in the form of a model), but it helps to unpack these hypotheses and to consider each one individually. Compatibility was not tested in the final model due to the underlying cognitive alignment with attitude. Three hypotheses were not supported and a rationale for these non-significant relationships has been provided above. Of the 15 proposed hypotheses tested, 12 hypotheses were supported (see Table 4.9).

Table 4.9. Summary of hypotheses and the level of support - Study 1

Hypothesis	Description	Support
H1	Intention to use → Actual behaviour	supported
H2	Attitude toward using → Intention to use	supported
H3a	Perceived usefulness → Attitude toward using	supported
H3b	Perceived usefulness → Intention to use	not supported
H4a	Perceived ease of use → Attitude toward using	supported
H4b	Perceived ease of use → Perceived usefulness	not supported
H5	Subjective norm → Perceived usefulness	not supported
H6a	Compatibility → Perceived usefulness	not tested
H6b	Compatibility → Perceived ease of use	not tested
H7a	Perceived risk → Perceived usefulness	supported
H7b	Perceived risk → Perceived ease of use	supported
H8a	Personal contact → Perceived usefulness	supported
H8b	Personal contact → Perceived ease of use	supported
H9a	Technology discomfort → Perceived usefulness	supported
H9b	Technology discomfort → Perceived ease of use	supported
H10a	Self-efficacy → Perceived usefulness	supported
H10b	Self-efficacy → Perceived ease of use	supported

Source: developed for this study

It can be seen that most hypotheses were supported. In those cases where the hypotheses were not supported, correlations were significant and in the expected directions. In the case of subjective norm the correlation is weak and the descriptive statistics indicate that important other people were found to have little influence on the perceptions held by mature consumers in relation to SSBTs. The remaining non-significant pathways resulted from the presence of correlated independent variables in the model. In such situations, replication is essential for these two path relationships before concluding that these pathways are not needed. The need for replication is addressed in the second study, shortly to be discussed.

In summary, the findings from Study 1 extend our understanding of external factors influencing mature consumers' attitudes and behaviour towards using SSBTs with four significant factors explaining 64% variance in perceived ease of use and 32% variance in perceived usefulness. Some 66% of the variance in attitude was explained, which is 9% more than is predicted by TAM components. An additional 2% variance in intention was explained over and above the 47% variance predicted

in TAM and 90% of the variance was explained in behaviour. In other words, the extensions to the model not only help to understand the precursors to perceived usefulness and perceived ease of use, they also improve the prediction of attitude and intention to use SSBTs.

While the findings from Study 1 provide reasonable support for the conceptual model, the study is not without limitations. The measurement scales require further refinement, with the items measuring perceived ease of use, perceived risk, and self-efficacy, requiring rewording to ensure scales are unidimensional. The approach used to specify the model in Study 1 can be improved by using a combined measurement model and structural model, thereby more accurately accounting for measurement error and improving model fit (MacCallum & Browne 1993). While the sample size was just adequate to test the aggregate model, with an increased number of parameters in a full latent variable model, a much larger sample would be required. The current model was tested on a representative sample of respondents from one state of Australia, however these results cannot be extrapolated across the mature Australian population with any certainty. To address these proposed improvements in testing the conceptual model developed for this research, a national study with a much larger sample size, using a full latent variable model will be implemented for Study 2.

4.5. CONCLUSION

The results from Study 1 provided a demographic profile of the respondents and their usage behaviour of SSBTs in terms of three user segments. The results from testing the model using SEM provided some support for the model. Proposed improvements to Study 1 will be implemented in a second study. In the next chapter the revised research method and data collection for Study 2 are discussed.

Chapter 5

RESEARCH METHOD and DATA COLLECTION – STUDY 2

5.1. INTRODUCTION

This chapter presents a modified research design and method for Study 2 based on the findings from testing the conceptual model in Study 1. The chapter commences with a description of the method and sampling procedures for Study 2, followed by an account of the modifications made to the measurement scales and pre-test validation of the instrument. The data collection procedure is then outlined. In the concluding section of this chapter, data entry procedures and techniques for preparation of the data for further analysis using structural equation modelling are discussed.

5.2. RESEARCH DESIGN

For Study 2, the data were collected using a self-administered mail questionnaire. Following the same method of data collection used in Study 1 assisted in comparing findings between the two studies.

The sampling frame for Study 2 consisted of mature consumers over 50 years of age registered as members of the Council of the Ageing (COTA) / National Seniors in Australia. The COTA National Seniors at the time of this study was the largest not-for-profit senior organisation in Australia with just over 240,000 members. To ensure that the findings from Study 2 will be representative of all age groups in the population, a proportional stratified sample of 6,000 member names was drawn from eight age categories: 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84 and 85+. The age categories were closely aligned with the population age categories provided by the Australian Bureau of Statistics (2002). For each age group, names were selected at random from the database in proportion to the size of each state/territory's population in the corresponding age bracket.

In determining the sample size for Study 2, a number of factors were considered. First, the model in this study was tested using the two-step measurement and structural approach proposed by Anderson and Gerbing (1988). With a full-information estimation method the required sample size must to be larger to obtain meaningful parameter estimates (Baumgartner & Homburg 1996). Second, much of the data collected in social and behavioural sciences are not normally distributed (Curran, West & Finch 1996). In dealing with non-normal multivariate data, Browne's (1984) asymptotic distribution free (ADF) method of estimation is a suitable technique, but a very large sample size of greater then 2,000 is recommended when using this estimation method (West, Finch & Curran 1995; Tabachnick & Fidell 2001). Finally, based on the usable response rate of 35% achieved in Study 1, a sample of 6,000 respondents will be required to achieve a sample size of 2,100 responses, allowing the model to be estimated using the ADF method.

The sampling unit for this study is an individual mature person, the same as outlined and justified for Study 1. To enable Study 1 and Study 2 results to be compared, where appropriate, the same sample process has been followed.

5.3. MODIFICATIONS TO MEASURMENT SCALES

Through a scale development process, a set of items was developed to measure each variable in the conceptual model. This process (outlined in chapter three) ensured that scales were based on solid theoretical foundations. Results from Study 1 indicate that the items developed to measure perceived ease of use, perceived risk, and self-efficacy displayed multidimensional properties, while the scale items measuring each of the remaining variables exhibit unidimensional characteristics.

To address the issue of multidimensional properties exhibited by the first three scales, direct references to a specific SSBT - such as ATMs or EFTPOS - were replaced with the more general term 'self-service banking methods' where possible. The items were examined to ensure that the scale still captured the full meaning of the variable being measured. As a result, one new item was developed for each of perceived ease of use, perceived risk and self-efficacy. A final modification was

made to three perceived ease of use items so that all items were stated in the positive, thus reducing confusion in the mind of the respondent and reducing the possibility of multidimensionality arising from method effects, a phenomenon often noted with reverse-scored items (Marsh 1996).

The number of items measuring the variable attitude was reduced from four to two items. All four items were highly correlated in Study 1 ($r = 0.85$; $p < .01$) with little additional variance in the data being explained with more than two items. As single indicator variables can be unreliable (Baumgartner & Homburg 1996), the number of items measuring the variable behaviour was increased to two items, the minimum number of indicators desirable per factor (Marsh et al. 1998).

The variables compatibility and subjective norm were omitted from Study 2 based on the findings from Study 1. Further rationalisation of the conceptual model occurred with the deletion of the variable intention. This was based on the findings from Study 1, where a high correlation between intention and behaviour ($r = 0.95$, $p < .01$) resulted, thus indicating that both variables are measuring the same outcome behaviour.

Finally, a small number of items were modified to ensure more concise wording. No changes were made to the section measuring age and demographic variables. The question relating to how long the respondent had been using a specific SSBT was modified to provide categories, for example 'less than 2 years', which reduced the burden on the mature consumer to recall a specific number of years.

5.3.1. PRE-TEST VALIDATION

The questionnaire for Study 2 was assembled for a pre-test with an academic staff member and four doctoral research students. The questionnaire consisted of the following sections:

Section A Six questions profiled the banking practices of mature consumers. These included questions relating to:

- length of time each SSBT method had been used;
- usage profile of each SSBT and face-to-face banking method;

- how often each method was used including credit card use; and
- type of banking/payment method used for an array of financial activities.

Section B Views on banking methods in terms of personal contact, self-service banking technology, perceived usefulness, ease of use, capability, and perceived risk

Section C Attitude towards self-service banking methods

Section D Banking behaviour

Section E Official and cognitive age

Section F Demographics

In a group setting the five participants were provided with a copy of the questionnaire and definitions of the variables. They were instructed to complete the questionnaire as though they were respondents in the study and to provide feedback on the clarity and interpretation of the items measuring each variable, and other sections of the questionnaire. To ensure that the retained items reflected the content area encompassed in each variable, the participants were required to assess the items for each variable against the definitions. Based on the collective feedback gained from this group setting, minor changes were made to the wording and format of the questionnaire.

5.4. DATA COLLECTION

The questionnaire was prepared for mailing with the process being guided by the tailored design method (Dillman 2000) as outlined and justified in chapter three. The complete questionnaire package was presented in a professional manner following the design and approach adopted for Study 1 (refer Appendix I).

Within two weeks of mailing the questionnaires to all states and territories in Australia, 1,813 (30.2%) questionnaires were returned, and a further 583 (9.7%) questionnaires were received over the following three weeks. The response rate for the study was 40% (2,396 responses), and the effective response rate was 38% (2,253 responses). Return to sender, deceased, health reasons and incomplete questionnaires reduced the usable number of questionnaires to 2,253 (38%).

5.5. DATA ENTRY AND PREPARATION FOR ANALYSIS

The remaining 2,253 questionnaires were scanned for any evidence of errors by respondents on completion. Questions were then post-coded prior to the data being entered into the software package, SPSS. A random sample of 20% of the questionnaires was drawn to check for data entry errors.

To check the representativeness of the sampling frame, a chi-square goodness of fit test was conducted on age distribution at the national level and the population of mature consumers from each state and territory. The Australian Bureau of Statistics (2002) data were compared with respondent data on these two dimensions and no significant differences were identified at the 0.05 level. Data relating to the usage level of SSBTs could not be compared with the respondent data as this specific data are no longer collected by Australian Bureau of Statistics (2002 and 2003).

5.6. ANALYSIS

The data collected for Study 2 were initially analysed to provide a descriptive profile of respondents and their banking practices. A two-step approach was then used to assess convergent and discriminant validity of the measurement scales prior to estimating the structural model (Anderson & Gerbing 1988). The final stage of the analysis focused on assessing the moderating effects of external variables including gender, age and education on the relationships within the structural model.

5.7. CONCLUSION

This chapter describes the modifications to the research design and method for Study 2 based on the approach adopted for Study 1. In the next chapter, findings from analysing the descriptive data and model will be discussed with comparisons between Study 1 and Study 2 addressed where appropriate.

Chapter 6

ANALYSIS AND RESULTS – STUDY 2

6.1. INTRODUCTION

In this chapter the results of the data analysis for Study 2 are presented. A description of the respondents and a profile of their banking practices are initially reported. These findings are compared with the results from Study 1 in relation to mature consumers' use of SSBTs. Preparations for model testing are then described. Initially the measurement model was estimated, before cross-validating the structural paths of TAM and then estimating the fit statistics and parameters for the extended TAM (ETAM) structural model. Multigroup analyses were then conducted to explore whether demographic variables moderate the structural path relationships in the ETAM.

6.2. PROFILING OF MATURE CONSUMER SEGMENTS

For Study 2, a usable sample of 2,253 mature consumers from across Australia completed the self-administered mail questionnaire, resulting in a 38% response rate. Respondents ranged in age from 50 to over 85 years with an average age of 64 years. The average cognitive age, which is the age respondents perceive themselves to be in terms of feel, looks, doing/acts and interest was 56, with a range from 25 to over 85 years of age. The demographic details are presented in Table 6.1, with the profile provided on an aggregate basis and broken down for each user segment. Some response categories have been collapsed for reporting in Table 6.1 so that findings can be compared with Study 1 results. Full demographic details are provided in Appendix J.

Table 6.1. Demographic profile of mature consumer respondents

Demographic Variables		*N* = 2,253[1]	Non-Users of SSBTs: *n* = 319 (used 0%)	Low Users of SSBTs: *n* = 327 (used < 55%)	Med - High Users of SSBTs: *n* = 1,607 (used ≥ 55%)
		No. (%)[2]	No. (%)	No. (%)	No. (%)
Official Age:	50-59	901 (40)	45 (14.5)	115 (36)	741 (46.5)
	60-69	673 (31)	76 (24)	100 (31)	497 (31)
	70+	655 (29)	192 (61.5)	106 (33)	357 (22.5)
Cognitive Age:	Average	56[3]	64	58	55
Gender:	Male	978 (44)	146 (47)	136 (43)	696 (44)
	Female	1,236 (56)	164 (53)	182 (57)	890 (56)
Marital Status:					
	Never Married	73 (3)	20 (6.5)	9 (3)	44 (3)
	Married	1,702 (77)	194 (62)	248 (78)	1260 (80)
	Divorced/Separated	196 (9)	26 (8.5)	21 (7)	149 (9)
	Widowed	240 (11)	71 (23)	38 (12)	131 (8)
Household:	1 Person	416 (19)	97 (31)	71 (23)	248 (16)
	2 Persons	1,395 (63)	180 (59)	197 (62)	1018 (64)
	3+ Persons	393 (18)	30 (10)	48 (15)	315 (20)
Income:	< 19,999 (AUS $)	382 (17)	96 (30)	67 (20)	219 (14)
	20,000 – 39,999	668 (30)	90 (28)	111 (34)	467 (29)
	40,000 – 59,999	443 (20)	40 (13)	46 (14)	357 (22)
	>60,000	534 (23)	39 (12)	55 (17)	440 (27)
	Not stated	226 (10)	54 (17)	48 (15)	124 (8)
Education:	Primary/Secondary	339 (15)	85 (28)	63 (20)	191 (12)
	Completed Junior	367 (17)	49 (16)	49 (16)	269 (17)
	Completed Senior	258 (12)	42 (14)	43 (14)	173 (11)
	Skill Vocational	376 (17)	58 (19)	53 (17)	265 (17)
	Diploma	394 (18)	35 (11)	53 (17)	306 (19)
	Degree/Postgrad	461 (21)	38 (12)	49 (16)	374 (24)
Employment:	Full time	515 (23)	34 (11)	60 (19)	421 (26.5)
	Part time	345 (16)	28 (9)	39 (12)	278 (17.5)
	Retired	1,114 (50)	206 (66)	174 (55)	734 (46)
	Home duties	147 (7)	32 (10)	22 (7)	93 (6)
	Other	94 (4)	11 (4)	22 (7)	61 (4)
Occupation:	Management	520 (24)	65 (21)	69 (22)	386 (25)
	Professional	747 (34)	79 (26)	93 (29)	575 (36)
	Clerical	529 (24)	61 (20)	83 (26)	385 (24)
	Trade/Labourer	227 (10)	55 (18)	37 (12)	135 (9)
	Home duties	125 (6)	36 (12)	20 (6)	69 (4)
	Other	53 (2)	8 (3)	15 (5)	30 (2)

[1] Some areas have a small amount of missing data.
[2] The percentages given in brackets are based on column totals.
[3] Figure represents an average (mean) only for cognitive age variable.

6.2.1. PROFILE OF USERS VERSUS NON-USERS

An index was created to measure the level of use of SSBTs among respondents for Study 2, based on the same approach used in Study 1. This resulted in the formation of three user groups with 14% (319) classified as non-users of SSBTs (that is, they use only face-to-face banking); 15% (327) low users of SSBTs (that is, less than 55% of their banking transactions involved SSBTs) and 71% (1,607) medium-to-high users (that is, greater or equal to 55% of their banking transactions involved SSBTs). Slightly fewer respondents were classified as non-users and low users in Study 2, a drop of 5% and 4% respectively relative to Study 1. This decrease could be due to limitations in the sampling method or to a genuine shift during the two and half year period between the studies, with more mature consumers using or having increased their use of SSBTs by the time of the second study.

Table 6.1 presents the demographic characteristics of the respondents at the aggregate level and for each user group. By comparing the aggregate column data against the final three columns of data, an intuitive understanding of the trends in the data can be gained. In terms of official age, non-users of SSBTs have a lower proportion of respondents in the 50-59 age group and a much higher proportion in the 70+ age group. For cognitive age, non-users are also older. In comparing non-users with low and medium-to-high user groups, the non-user respondents were more likely to be single or widowed, have a lower household income, and more likely to be retired. Further, they were more likely to have attained a lower educational level and to have worked as a tradesperson, plant/machinery operator, labourer or in home duties. Chi-square goodness of fit tests indicated that these trends were all significant ($p < .01$). There was no gender effect. The findings indicate that medium-to-high users of SSBTs are younger, married, have a higher income, are better educated, tend to have managerial/professional backgrounds, and to be still working. These findings are supported by trends reported in other mature consumer banking research (Marshall & Heslop 1988; Kwan 1991; Mattila, Karjaluoto & Pento 2003; Darch & Caltabiano 2004). The implications of these findings will be discussed in the final chapter.

The sample for Study 2 when compared to Study 1 was slightly older, contained a greater proportion of males, was more likely to be married, had a higher household income and education level, and contained a greater proportion of managerial and professional occupations.

6.2.2. PROFILE OF LOW VERSUS MEDIUM-TO-HIGH LEVEL USERS

The analysis in the previous section focused on the demographic characteristics of users and non-users of SSBTs. In this section, the differences between low users and medium-to-high user groups in relation to each SSBTs are compared. Table 6.2 contains this information.

Table 6.2. Level of use of banking methods

		***N* = 2,253 (%)**	**Non-Users of SSBTs: *n* = 319 (used 0%)**	**Low Users of SSBTs: *n* = 327 (used <55%)**	**Med - High Users of SSBTs: *n* = 1,607 (used ≥ 55%)**
Face-to-Face Banking:	No of Users	2,045[1] (91)	319 100%)	326[1] (99)	1,400[1](87)
	Median use %	15	100	75	10
	Minimum use %	.5	100	1	.5
	Maximum use %	100	100	99	50
EFTPOS:	No of Users	1,380 (61)	-	156 (48)	1,224 (76)
	Median use%	30	-	10	30
	Minimum use %	1	-	1	1
	Maximum use %	100	-	50	100
ATMs:	No of Users	1,676 (74)	-	218 (66)	1,458 (91)
	Median use %	30	-	15	35
	Minimum use %	.1	-	.5	1
	Maximum use %	100	-	54	100
Telephone Banking:	No of Users	931 (41)	-	103 (31)	828 (52)
	Median use%	15	-	10	15
	Minimum use %	.3	-	1	.3
	Maximum use %	90	-	50	90
Internet Banking:	No of Users	679 (30)	-	43 (13)	636 (40)
	Median use%	30	-	10	30
	Minimum use %	1	-	1	1
	Maximum use %	99	-	50	99

[1] 208 respondents reported not using face-to-face banking

For Study 2, the overall usage levels of individual SSBTs were as follows: EFTPOS was used by 61% of the respondents; ATMs by 74%; telephone banking by 41%; internet banking by 30%; and face-to-face banking was used by 91% of the sample.

For low users and medium-to-high users, the level of use for each SSBT is presented in the last two columns of Table 6.2. The percentages of mature consumers using ATMs, EFTPOS and telephone banking among medium-to-high users are approximately one and half times greater than for low users, while internet banking use is three time greater. Face-to-face banking is used slightly more among the low user group. Not only are more medium-to-high users of SSBTs using each method, they also use these methods more often as represented by the higher median percentage level of use displayed in Table 6.3 for each SSBT.

Internet banking displayed the greatest change between Study 1 and Study 2 with a 100% increase over the usage level reported for Study 1. Small increases have occurred in the use of EFTPOS and ATMs, with no change in telephone banking. The full effect of the increase in internet banking is through the medium-to-high users with their median level of use increasing from 12.5% (Study 1) to 30% of their banking activities in Study 2. So not only are more mature consumers using internet banking, medium-to-high internet users have also increased their level of use of this method in proportion to the other SSBTs.

The level of use of individual SSBTs is higher among younger mature consumers (50 to 64 years of age) than older mature consumers (over 64 years of age). These findings are consistent across both studies with the percentage for each age group reported for each SSBT in Table 6.3.

Table 6.3. Level of use of banking methods compared: Study 1 and Study 2

	Study 1		**Study 2**	
	Age 50 – 64 years % (median %)[1] *n* = 128	**Age > 64 years % (median %) *n* = 80**	**Age 50 – 64 years % (median %) *n* = 1291**	**Age > 64 years % (median %) *n* = 962**
Face-to-Face Banking	91% (10)	99% (50)	89% (10)	93% (30)
EFTPOS	67% (37)	40% (20)	72% (30)	46% (30)
ATMs	79% (30)	50% (50)	83% (30)	62% (40)
Telephone Banking	50% (10)	28% (15)	45% (10)	35% (15)
Internet Banking	22% (10)	3% (10)	41% (30)	15% (30)

[1] median % - represents the midpoint as a percentage of the level of use for the specific SSBTs

A slightly higher percentage of older mature consumers in Study 2 when compared to Study 1 are using SSBTs, with use of internet banking having the highest increase. Of those respondents using a particular SSBT, the median use level of that SSBT across the two age groups is fairly consistent across Study 1 and Study 2.

6.2.3. LENGTH OF TIME USING SSBTS

To assist mature consumers to recall the length of time they had been using each SSBT, four response categories were provided. The findings for the low and medium-to-high user groups are presented in Table 6.4 with the highest percentage category underlined. Across all SSBTs, findings indicate that medium-to-high users have been using these methods for a longer period of time when compared with the low user group. While a reasonable percentage of low users in the last two years has commenced using EFTPOS, ATMs and telephone banking, the greatest growth for this group has been in the use of internet banking. The trends displayed in Table 6.4 support the results from Study 1.

Table 6.4. Length of time using SSBTs

	EFTPOS		ATM		Telephone Banking		Internet Banking	
Length of time using	**Low[1] %** ***n* = 156**	**M-H[2] %** ***n* = 1,224**	**Low %** ***n* = 218**	**M-H %** ***n* = 1,458**	**Low %** ***n* = 103**	**M-H %** ***n* = 828**	**Low %** ***n* = 43**	**M-H %** ***n* = 636**
< 2 years	24	6	16	3	25	14	<u>73</u>	40
2-8 years	<u>40</u>	<u>41</u>	<u>44</u>	32	<u>62</u>	<u>63</u>	27	<u>60</u>
9-15 years	24	37	25	<u>42</u>	13	23	-	-
> 15 years	12	16	15	23	-	-	-	-

[1] low user group
[2] medium-to-high user group

6.2.4. FREQUENCY OF USING BANKING METHODS

Examining the frequency of use for each banking method provides a deeper understanding of mature consumers' banking practices and supports the findings reported in section 6.2.2. The findings from Study 2 are presented in Table 6.5 with the highest frequency of use for each banking method underlined.

Table 6.5. Frequency of use of banking methods

Frequency of use	Banking Methods				
	Face-to-face No. (%)	EFTPOS No. (%)	ATMs No. (%)	Telephone No. (%)	Internet No. (%)
Never use	297 (13)	933 (42)	608 (27)	1,366 (60)	1,590 (70.5)
Rarely	994 (44.6)	280 (12)	328 (15)	339 (15)	146 (6.5)
Few times a month	649 (29)	282 (12)	565 (25)	348 (15.6)	179 (8)
Once a week	244 (11)	274 (11)	497 (22)	124 (6)	125 (5)
2-3 times a week	61 (3)	380 (17)	227 (10)	66 (3)	152 (7)
> 4 times a week	8 (.4)	131 (6)	28 (1)	10 (.4)	61 (3)

Most non-users and low users tend to use face-to-face banking a 'few times a month' with medium-to-high users 'rarely' using this method. For all other banking methods, low users report 'rarely' using these methods, with the exception of ATMs, where mature consumers indicated their second highest use level as a 'few times a month'. Most respondents in the medium-to-high user group used EFTPOS '2-3 times a week', while ATMs, telephone and internet banking were used a 'few times a month'. Trends for medium-to-high users indicate there are respondents that use ATMs and internet banking more frequently. The younger mature consumers (50 to 64 years of age) report the highest frequency of use of internet banking. These findings reflect similar patterns of use to those that were reported for Study 1.

6.2.5. FREQUENCY OF CREDIT CARD USE AND SITUATION

Credit cards provide mature consumers with another method of managing their financial affairs either as a substitute for, or in addition to, the use of SSBTs. Data were collected on credit card use for four situations and analysed for each SSBT user group. These results are outlined in Table 6.6 along with the frequency of use for each situation.

Table 6.6. Frequency of credit card use by situation

Credit Card Use		*N* = 2,253 (%)	Non-Users of SSBTs: *n* = 319 (used 0%) (%)	Low Users of SSBTs: *n* = 327 (used <55%) (%)	Med - High Users of SSBTs: *n* = ,1607 (used ≥ 55%) (%)
In-store:	Users	1,880 (83)[1]	208 (65)	267 (82)	1,405 (87)
	Never use	373	111	60	202
	Rarely	349	70	55	224
	Few times a month	517 (27)[2]	71 (34)	85 (63)	361 (26)
	Once a week	219	14	37	168
	2-3 times a week	505 (25)[2]	35	62	408 (29)
	> 4 times a week	290	18	28	244
Mail:	Users	990 (44)[1]	78 (25)	139 (43)	773 (48)
	Never use	1,263	241	188	834
	Rarely	769 (78)[2]	53 (68)	106 (76)	610 (79)
	Few times a month	169	20	23	126
	Once a week	41	4	9	28
	2-3 times a week	6	0	0	6
	> 4 times a week	5	1	1	3
Telephone:	Users	1,330 (59)[1]	91 (29)	188 (57)	1,051 (65)
	Never use	908	228	139	556
	Rarely	740 (56)[2]	48 (53)	103 (55)	589 (56)
	Few times a month	430	35	66	329
	Once a week	104	5	11	88
	2-3 times a week	43	2	3	38
	> 4 times a week	13	1	5	7
Internet:	Users	488 (22)[1]	8 (2.5)	36 (11)	444 (28)
	Never use	1,745	311	291	1,163
	Rarely	304 (62)[2]	7 (88)	32 (89)	265 (60)
	Few times a month	106	1	4	101
	Once a week	46	0	0	46
	2-3 times a week	28	0	0	28
	> 4 times a week	4	0	0	4

[1] percentage of total for column
[2] percentage of users for the category of credit card use in the column

For non-users of SSBTs, 65% of respondents make use of credit cards for in-store purchases, with the highest number selecting the frequency of use category 'a few times a month'. For this same segment, 25% use credit cards for payment by mail and a further 29% by telephone, with telephone use slightly down on the results from Study 1. While the use of credit cards for internet purchases increased by 10% across the sample for Study 2, a few non-users of SSBTs (2.5%) adopted this purchase method, an approach not previously used by respondents in Study 1. The overall use of credit cards by non-users of SSBTs is considerably lower when compared to the two SSBT user groups. However, some respondents in this segment used credit cards to assist in managing their financial affairs. For this group, respondents using credit

cards for in-store purchases were from across all age brackets, however they tended to have a higher income and managerial or professional backgrounds. At the full sample level, non-users of in-store credit cards have a similar demographic profile to non-users of SSBTs, as outlined in section 6.2.1.

Over 80% of respondents in the low and medium-to-high user groups used credit cards for in-store purchases, with the frequency of use mostly 'a few times a month'. The use of credit cards for mail purchases was considerably lower at 43% and 48% respectively for the two groups with most indicating usage as 'rarely'. The two groups reported a higher proportion of credit card use for transactions via telephone, with this method "rarely" used. For internet purchases, credit card use has increased to 11% for low users and 28% for medium-to-high users, an average of 8% higher than Study 1.

Further exploratory analyses were conducted to determine if there was a relationship between credit card use for each of the four situations and age of respondent (three age groups). A chi-square goodness of fit test indicated that for *in-store credit card purchases* there was a significant effect for age: χ^2 (8) = 55.74, $p < .01$. Follow-up analysis indicates that respondents over 70 years of age were likely to use a credit card for in-store purchases 'rarely' or a 'few times a month', while younger mature respondents were heavier users of credit cards in-store. These findings support those reported by Mathur and Moschis (1994) and extend them by identifying situations where the differences arise.

6.2.6. BANKING AND PAYMENT METHODS USED FOR SELECTED FINANCIAL ACTIVITIES

This section reports on the approaches the three groups of mature consumers use to handle their daily financial activities. The data were collected in the same manner as for Study 1 with the inclusion of an additional question on how respondents enquire about financial services. In terms of *withdrawing money*, non-users nearly exclusively use face-to-face banking, low users mostly use face-to-face banking with one-third using ATMs, and medium-to-high users show a much stronger tendency to withdraw money using ATMs while some use EFTPOS. The majority of respondents

who need to *deposit money* use face-to-face banking, while less than 10% of medium-to-high users deposit money through ATMs and the Australia Post Office. Some 74% of mature consumers indicated that they *check their account balance*. Non-users do this during face-to-face banking sessions. Low users either rely on face-to-face banking (41%), or ATMs, telephone banking, or the internet. Medium-to-high users equally use the internet or ATMs followed by telephone. The *transfer of funds between accounts* was handled through face-to-face banking for non-users, while low users adopted the same method with a few using the telephone or the internet. Medium-to-high users rely mostly on the internet and telephone with some face-to-face banking. Finally, in relation to *enquiries about financial service*, non-users and low uses mostly enquire during face-to-face service encounters, with medium-to-high users using the same method to a lesser degree along with telephone enquiry and the internet.

The two additional financial activities were *paying for groceries* and *main household accounts*. In relation to the first activity, non-users mostly paid using cash, with some using credit cards. Low users relied on cash or credit and EFTPOS. Medium-to-high users prefer credit cards or EFTPOS with some using cash as their payment method. Regarding the final financial activity, payment of the *main household accounts*, non-users preferred using cheques followed closely by credit cards and the Australian Post Office. Low users indicated using credit cards and, to a lesser degree, cheques, Australia Post Office, and the telephone. Finally, to pay their main household accounts, medium-to-high users preferred using credit cards followed by telephone and the internet.

When comparing the above findings with those reported for Study 1, the more significant changes are that low users are handling more of their financial activities through ATM use wherever possible and paying household accounts with credit cards. For medium-to-high users, the internet has emerged as a more prominent channel for handling a range of financial activities.

6.2.7. FUTURE BANKING PRACTICES

This concluding section focuses on mature consumers' expected future banking practices. Slightly fewer than 2% of non-users indicated that they would trial or use a SSBT method over the following six months. Nearly all respondents were in the 50 to 64 age bracket and stated that they would trial or use internet banking or ATMs. Users of SSBTs were slightly more positive with 9% indicating they would trial or use a method not previously used, with 62% indicating internet banking and 17% telephone banking. Two thirds of those respondents were 50 to 64 years of age. While these results are very similar to the findings from Study 1 with non-users of SSBTs being more resistant to changing their banking practices than users, evidence suggests that internet banking will be the main method considered for future adoption.

In conclusion, the profile of mature consumers' characteristics and banking practices discussed in this section offers some insights into the behaviour of mature respondents regarding SSBTs. The findings from Study 2 indicate that the adoption of SSBTs among mature consumers is slowly increasing, with most users embracing a number of SSBTs. For low users, 50% actively use two or more SSBTs in combination with face-to-face banking, while 95% of medium-to-high users are using two or more SSBTs, an increase from 88% reported for Study 1. The change in the use of SSBTs that has been most evident in Study 2 is an increase in mature consumers' adoption of internet banking.

The foregoing description of SSBT use patterns forms the backdrop to the investigation of the main aims of the study, which are more concerned with predicting attitude and behaviour towards using SSBTs. This next section is devoted to the development of measures for the variables that form part of the conceptual model that is believed to capture the main sources of variance in attitudes and actual use behaviour in relation to SSBTs.

6.3. MEASUREMENT SCALE PREPARATION AND ANALYSIS

6.3.1. MISSING DATA

The procedures for handling missing data were consistent with the process followed for Study 1. The 2,253 questionnaires for Study 2 had on average less than 0.2% missing data that were missing at random with no item having more than 13 data points missing across the data set. The missing data were replaced using the expectation-maximization (EM) method.

6.3.2. MEASUREMENT MODEL

The relationships among variables in Study 2 were examined using a two-step approach. Initially the measurement model was estimated using asymptotically distribution free (ADF) method, as testing for multivariate skewness and kurtosis revealed higher than acceptable levels of non-normal data. This technique is insensitive to non-normality of the data and therefore most suited for estimating the measurement model based on data collected for Study 2 (Hair et al. 1998; McDonald & Ho 2002). The same range of goodness-of-fit measures as discussed and applied in Study 1 were used to assess the measurement model fit in Study 2. These include both absolute and incremental fit measures.

The SEM measurement model performs the role of a confirmatory factor analysis and validates the scales for the measurement of the variables in the model (Hair et al. 1998). In constructing the measurement model, each factor was allowed to be correlated with the other factors in accordance with what is known about the behaviour of these variables in TAM and ETAM (Study 1). To complete the preparation, each latent variable in the model was made scale invariant through setting the loading of one item per latent variable to a value of 1.0 (Hair et al. 1998).

The model was first checked to ensure that there were no identification problems before evaluating the overall goodness-of-fit. The model had a less than acceptable fit, with χ^2 (832) = 5958.95, $p < .001$, CMIN/df = 7.16, RMSEA = 0.052, AGFI = 0.80, CFI = 0.62 and TLI = 0.59. In reviewing the modification indexes, in particular the cross-loading of regression weight items onto other factors, a number of items

were identified with high cross-loadings that accounted for substantial misspecification. These were progressively removed and the respecified model checked at each stage to determine if the difference in fit between the two models was statistically significant through examining χ^2 differences between the two models. In this refinement of the measurement scales, sufficient items were retained to define each of the latent variables with all belief variables being measured by a minimum of three or four items (Netemeyer, Bearden & Sharma 2003, p. 147). Twenty items across eight variables were removed resulting in an acceptable measurement model fit: χ^2 (202) = 731.11, $p < .001$, CMIN/df = 3.6, RMSEA = 0.034, AGFI = 0.94, CFI = 0.91 and TLI = 0.90.

The deletion of these items necessitated a follow-up check of the measurement properties of the various scales in the model. The factor loadings for all items are presented in Table 6.7. This table shows that all standardised factor loadings were greater than 0.70 (Hair et al. 1998). Furthermore, all item loadings were statistically significant with critical ratios greater than 2.57 (Netemeyer, Bearden & Sharma 2003).

The trimming of the measurement model resulted in a more parsimonious set items to reflect each of the latent variables in the model. The deletion of these items could be triggered by a method effect that is a result of correlated errors due to a high degree of overlap in item content (Byrne 2001). While all attempts were made to word each item differently, some items were essentially asking the same questions, thus the items became redundant. Further analysis of the measurement scales indicated that sound measures have been achieved.

Table 6.7. Measurement model statistics

Latent variables and measurement items	Standardised factor loadings	Critical ratios[1]	Composite reliability	Variance extracted (AVE)
Behaviour			.90	.83
Behaviour → B1	0.91	64.48		
Behaviour → B2	0.92	64.49		
Attitude			.97	.95
Attitude → A1	0.97	151.14		
Attitude → A2	0.98	151.13		
Perceived usefulness			.92	.79
Perceived usefulness → PU2	0.92	86.80		
Perceived usefulness → PU3	0.93	69.58		
Perceived usefulness → PU5	0.85	65.58		
Perceived ease of use			.89	.72
Perceived ease of use → EOU1	0.92	59.90		
Perceived ease of use → EOU2	0.90	60.38		
Perceived ease of use → EOU4	0.82	60.39		
Personal contact			.92	.76
Personal contact → PC1	0.88	81.15		
Personal contact → PC3	0.78	59.98		
Personal contact → PC5	0.90	95.79		
Personal contact → PC6	0.94	81.17		
Perceived risk			.84	.65
Perceived risk → PR3	0.70	36.46		
Perceived risk → PR6	0.87	37.14		
Perceived risk → PR7	0.83	36.46		
Technology discomfort			.88	.75
Technology discomfort → TD1	0.94	92.23		
Technology discomfort → TD2	0.96	113.39		
Technology discomfort → TD3	0.92	92.23		
Self-efficacy			.84	.65
Self-efficacy → SE1	0.82	43.80		
Self-efficacy → SE4	0.78	40.21		
Self-efficacy → SE7	0.90	43.81		

[1] *z*-statistic - all significant $p < .001$

Two further measures based on standardised factor loadings were used to evaluate the internal consistency of items in each measurement scale, with the results presented in the final two columns of Table 6.7. The first is composite reliability with all scales displaying a high degree of internal consistency with values greater than the minimum of 0.70 (Netemeyer, Bearden & Sharma 2003). The second measure is average variance extracted (AVE), an assessment of the amount of variance captured by a set of items for each scale relative to measurement error. All values exceeded the minimum variance level of 0.50 (Fornell & Larcker 1981).

The above findings demonstrate convergent validity among the items for each of the variables. At the variable level, discriminant validity was evident with the square of the correlation between any two variables being less than the average variance extracted for the two variables (Fornell & Larcker 1981). The scale inter-correlations based on aggregated items retained in the model are presented in Table 6.8. The measurement model as an AMOS output is provided in Appendix K and the measurement items retained and deleted for each variable are presented Appendix L.

Table 6.8. Scale inter-correlations

	B	**A**	**PU**	**PEOU**	**SE**	**PC**	**TD**	**PR**
Behaviour (B)	0.00							
Attitude (A)	0.74	0.00						
Perceived usefulness (PU)	0.60	0.72	0.00					
Perceived ease of use (PEOU)	0.51	0.68	0.58	0.00				
Self-efficacy (SE)	0.60	0.64	0.51	0.72	0.00			
Personal contact (PC)	-0.57	-0.69	-0.64	-0.59	-0.52	0.00		
Technology discomfort (TD)	-0.62	-0.72	-0.61	-0.72	-0.65	0.71	0.00	
Perceived risk (PR)	-0.43	-0.56	-0.48	-0.56	-0.48	0.62	0.62	0.00

All correlations significant at $p < .01$ (2-tailed)

6.3.3. DESCRIPTIVE STATISTICS

At the aggregate level, the means and standard deviations are presented for each variable in the last two columns of Table 6.9. The means for each of the three user groups are reported, providing a more detailed profile of the responses of mature consumers for each group. The magnitude and direction of the mean values are as expected and are very similar to the results reported in Study 1.

Table 6.9. Summary of measurement scales

Variables	No. of Items	Mean grouped by use level of SSBTs			Mean of Sample n = 2,253	Standard Deviation
		Non[3]	Low	M-H		
Behaviour (B)	2[1]	1.3	4.2	5.6	4.90	1.67
Attitude (A)	2[2]	1.5	2.7	4.0	3.50	1.35
Perceived usefulness (PU)	3	1.8	2.7	3.7	3.30	1.23
Perceived ease of use (PEOU)	3	2.5	3.1	3.8	3.57	1.08
Self-efficacy (SE)	3	2.9	3.9	4.5	4.19	0.96
Personal contact (PC)	4	4.7	4.3	3.0	3.42	1.24
Technology discomfort(TD)	3	4.1	3.4	2.0	2.53	1.33
Perceived risk (PR)	3	4.0	3.6	2.9	3.22	1.06

[1] Two behaviour items are an average of a 6-point 'likely' scale and a 7-point 'usage' scale
[2] All other variables are measured on a 5-point Likert scale 1- strongly disagree; 5 strongly disagree
[3] Non - non-users of SSBTs; Low-use SSBTs < 55%; M-H – medium-to-high users SSBTs ≥ 55%

To determine if there were differences between the mean values for beliefs, attitude and behaviour variables for each user group reported in Table 6.9, a series of Kruskal-Wallis one-way analysis of variance tests were conducted. The findings reported in Table 6.10 indicate that the mean group rankings differ across the three groups with all chi-square values significant ($p < .01$). The results of the follow-up group comparison tests indicated that all compared group rankings were significantly different ($p < .01$).

Table 6.10. Kruskal-Wallis tests of mean differences

Variables	Mean Group Rankings			Chi-Square *df* (2) *p* < .01	Multiple Group Comparisons *p* < .01
	Non-Users *n* = 319	Low Users *n* = 327	Med-High Users *n* = 1,607		
Behaviour (B)	166.80	601.20	1424.60	1314.44	All sig. different
Attitude (A)	307.00	729.35	1370.69	892.98	All sig. different
Perceived usefulness (PU)	414.00	782.07	1338.72	652.07	All sig. different
Perceived ease of use (PEOU)	553.63	808.75	1305.58	454.37	All sig. different
Self-efficacy (SE)	1819.00	1590.81	895.25	739.43	All sig. different
Personal contact (PC)	1628.26	1401.50	971.64	342.46	All sig. different
Technology discomfort (TD)	1825.79	1542.79	903.68	706.32	All sig. different
Perceived risk (PR)	472.38	875.12	1308.2	520.57	All sig. different

Medium-to-high users can be described as having a very positive attitude towards using SSBTs and perceive these methods as relatively useful, easy to use and believe they have the confidence and ability to use the banking technologies. They find far less discomfort in using these technologies than respondents in the low and non-user groups. Findings also indicate that they still have some desire for personal contact and perceive that there is a moderate level of risk in using SSBTs.

The scale inter-correlations presented in Table 6.8 display a moderate level of association among the measurement scales. A relatively high degree of consistency was found when comparing these correlations with those from Study 1, with only six out of twenty eight correlations differing ($p < .001$). These differences could be due to refinements made to the measurement scales for Study 2. Tests of differences (Fisher's *Z*) were also influenced by the high power of Study 1 and Study 2: small differences in correlations were significant. Overall, there was a strong correspondence in the results of the two studies. A full set of item correlations accompanied by means and standard deviations are provided in Appendix M. The scales were prepared for further analysis and testing using structural equation modelling. These tests are discussed in the next section.

6.4. STRUCTURAL MODEL TESTING

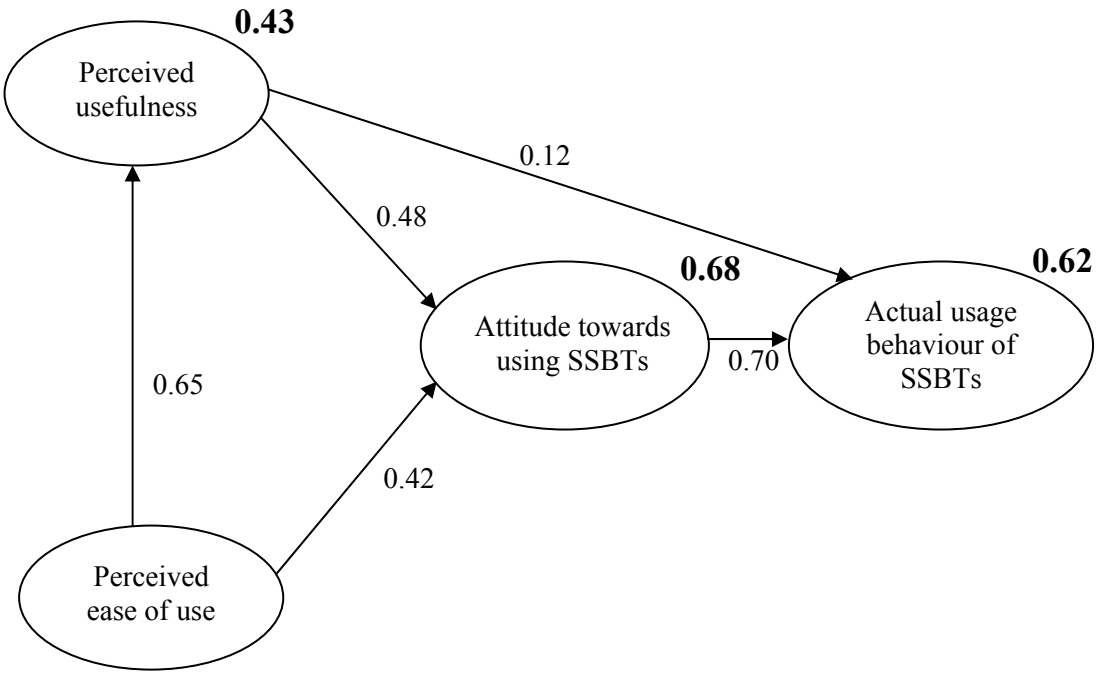
The original TAM forms the core of the conceptual model and was initially tested, before estimating the structural parameters of the ETAM.

6.4.1. TECHNOLOGY ACCEPTANCE MODEL (TAM)

As the conceptual model for this study was based on the original TAM, it was important to begin the model testing process by cross-validating this part of the ETAM. The overall model fit was good with the absolute and incremental fit measures as follows: χ^2 (30) = 96.71, $p < .001$, CMIN/*df* = 3.22, RMSEA = 0.031, AGFI = 0.97, CFI = 0.98 and TLI = 0.97. All structural paths in the model were significant.

The standardised path coefficients and regression weights (in bold) for the model are shown in Figure 6.1 and model statistics are presented in Table 6.11. The hypothesised relationships among variables as proposed in the conceptual TAM model were found to hold in the structural model tested with data from Study 2. The structural model as an AMOS output is provided in Appendix N.

Figure 6.1. Technology acceptance model (TAM)



All standardised path coefficients significant at $p < .001$
Variable items, error and residual terms omitted for clarity from diagram

Table 6.11. Technology acceptance model structural model statistics

Latent variables	Standardised regression weights	Critical ratios[1]	Squared multiple correlations (R^2)
Structural model			
Perceived ease of use → Perceived usefulness	0.65	30.54	
Perceived usefulness → Attitude	0.48	18.72	
Perceived ease of use → Attitude	0.42	16.04	
Attitude → Behaviour	0.70	23.73	
Perceived usefulness → Behaviour	0.12	4.18	
Behaviour			0.62
Attitude			0.68
Perceived usefulness			0.43

[1] *z*-statistic - all significant $p < .001$

6.4.2. EXTENDED TECHNOLOGY ACCEPTANCE MODEL (ETAM)

The ETAM was constructed based on the TAM estimated in the previous section and the addition of the measurement model for the exogenous latent variables, personal contact, perceived risk, technology discomfort and self-efficacy. Using the ADF estimation method, the overall structural fit of the model was assessed. The initial results indicated that the model fit was less than acceptable, with χ^2 (211) = 989.29, p < .001, CMIN/df = 4.68, RMSEA = 0.040, AGFI = 0.92, CFI = 0.87 and TLI = 0.85.

The structural pathways were checked to determine whether improvements could be effected here. An evaluation of the path estimates showed that five paths were not significant (p > .001) and were subsequently removed from the model:

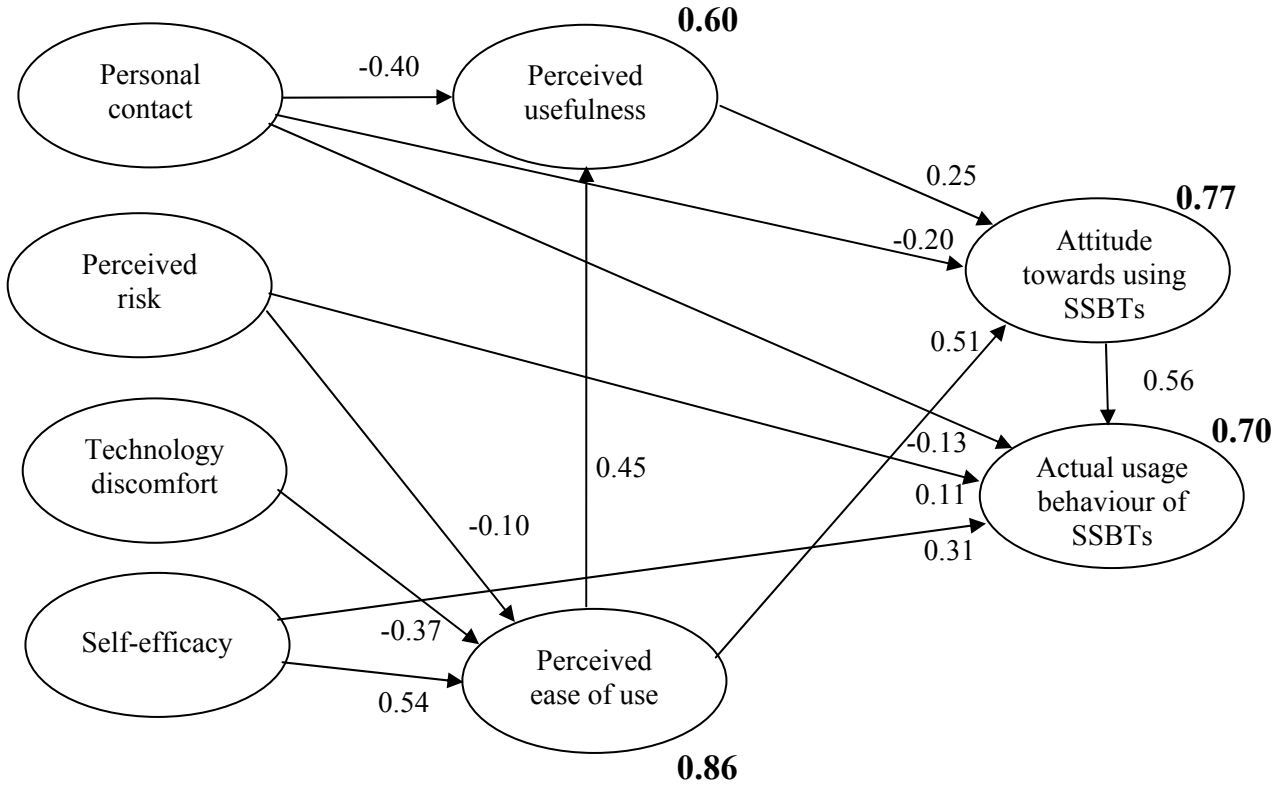
Personal contact → Perceived ease of use
Perceived risk → Perceived usefulness
Technology discomfort → Perceived usefulness
Self-efficacy → Perceived usefulness
Perceived usefulness → Behaviour

Further modifications that were theoretically and practically meaningful were made to the structural model. Specifically, the following pathways were added to the model, improving the fit to the point where the absolute fit measures were adequate and the incremental indices were equal to or close to the recommended value of 0.90 or greater (Hair et al. 1998, p. 657):

Personal contact → Attitude
Personal contact → Behaviour
Perceived risk → Behaviour
Self-efficacy → Behaviour

The final goodness-of-fit statistics for the ETAM were: χ^2 (212) = 863.10, p < .001, CMIN/df = 4.0, RMSEA = 0.037, AGFI = 0.94, CFI = 0.90 and TLI = 0.87. The standardised path coefficients and regression weights (in bold) for the respecified ETAM are shown in Figure 6.2, with structural model statistics presented in Table 6.12. The structural model as an AMOS output is provided in Appendix O and standardised effects are presented in Appendix P.

Figure 6.2. Extended Technology Acceptance Model (ETAM)



All standardised path coefficients significant at $p < .001$
Variable items, error and residual terms omitted for clarity from diagram

Table 6.12. ETAM structural model statistics

Latent variables	Standardised regression weights	Critical ratios[1]	Squared multiple correlations (R^2)
Structural model			
Self-efficacy → Perceived ease of use	0.55	18.74	
Perceived risk → Perceived ease of use	-0.10	-5.58	
Technology discomfort → Perceived ease of use	-0.37	-11.82	
Perceived ease of use → Perceived usefulness	0.45	18.03	
Personal contact → Perceived usefulness	-0.40	-16.16	
Perceived usefulness → Attitude	0.25	9.14	
Perceived ease of use → Attitude	0.51	19.28	
Personal contact → Attitude	-0.20	-10.08	
Attitude → Behaviour	0.56	15.85	
Self-efficacy → Behaviour	0.31	9.86	
Personal contact → Behaviour	-0.13	-5.08	
Perceived risk → Behaviour	0.11[2]	4.56	
Perceived ease of use			0.86
Perceived usefulness			0.60
Attitude			0.77
Behaviour			0.70

[1] *z*-statistic - all significant $p < .001$
[2] sign suppressed

The findings from Study 2 provided support for four variables acting as significant predictors of perceived usefulness and perceived ease of use in the ETAM. Personal contact directly affected perceived usefulness, while perceived risk, technology discomfort and self-efficacy had an indirect effect on perceived usefulness through perceived ease of use.

While complete mediation was proposed in the conceptual model, only partial mediation was achieved with personal contact having a direct effect on attitude and behaviour, and perceived risk and self-efficacy on behaviour. The influence of technology discomfort was fully mediated by perceived ease of use in the ETAM. These findings support the outcome of previous research where achieving partial mediation with behavioural data appears to be a more realistic outcome (Davis 1993; Meuter et al. 2005). For Study 1, similar partial mediation results were achieved.

The findings from Study 2 indicated that a number of proposed paths in the model were not supported. While personal contact had a negative direct effect on perceived usefulness, the relationship with perceived ease of use was not significant. If mature consumers have a greater desire for personal contact, and thus perceive SSBTs to be of limited use, consideration of how easy SSBTs are to use will not be an important issue. Three further variables, perceived risk, technology discomfort and self-efficacy were only found to have an indirect direct relationship with perceived usefulness through perceived ease of use. This outcome could be reflected through the notion that mature consumers need to perceive SSBTs to be easier to use, that is, less risky, more comfortable to use and feel more confident before they perceived them as useful.

In terms of the relationship between perceived risk and behaviour, where these variables were negatively correlated (r = -0.43) as shown in Table 6.8, the standardised path coefficient shown in the ETAM in Figure 6.2 is positive ($\beta = 0.11$). This reversal is due to correlations among the predictor variables giving rise to a statistical phenomenon known as a suppressor effect ((McClendon 1994; Paulhus et al. 2004). There is no suggestion that increases in perceived risk increases usage behaviour of SSBTs. A different suppressor phenomenon was noted in Study 1.

As TAM forms the core of the ETAM, it is important to examine how TAM performed in the context of this study. As proposed in the TAM, perceived ease of use was a significant predictor of perceived usefulness ($R^2 = 0.43$) and both variables contributed to explaining 68% of the variance in attitude in Study 2. Attitude and perceived usefulness jointly explained 62% of the variance in behaviour. While the direct path between perceived usefulness and behaviour was significant in TAM, this path did not remain significant when the four antecedent variables were included in the ETAM. This does not imply there is no relationship between these two variables, as results in Table 6.8 indicate they are correlated ($r = 0.60$). Rather, that behaviour is also directly affected by the new variables added to ETAM and that these variables capture some of the variance attributed to perceived usefulness in TAM.

Although detailed results are not reported here, the findings from a series of hierarchical regression tests provided further insight into the significant contribution that predictor variables made to the dependent variables in TAM. In terms of behaviour, attitude explained 54% of the variance in behaviour with perceived usefulness contributing an additional 1%. Perceived ease of use was not a significant predictor of behaviour. With attitude as the dependent construct, perceived usefulness explained 52% of the variance in attitude and perceived ease of use made an additional contribution of 10%. Both constructs have made a unique contribution to explaining attitude. The detailed findings are reported in Appendix Q.

Compared with the TAM, the inclusion of the four antecedent variables in the ETAM significantly increased the amount of variance explained in perceived usefulness ($R^2\Delta = 0.17$), attitude ($R^2\Delta = 0.09$), and behaviour ($R^2\Delta = 0.08$). The results of the hierarchical regression tests provide support for these findings. Attitude contributed to explaining 54% of the variance in behaviour, with perceived usefulness and perceived ease of use contributing an additional 11% and the four antecedent variables explaining a further 5% of the variance in behaviour. With attitude as the dependent construct, perceived usefulness and perceived ease of use explained 62% of the variance, with an additional 7% variance explained by the four antecedent constructs. Perceived ease of use was a significant predictor and explained 34% of the variance in perceived usefulness, with three antecedent variables explaining an

additional 15%. Perceived risk was not significant. The results are provided in Appendix R.

Based on these findings, the four antecedent variables make a significant unique contribution to predicting attitude and behaviour over and above that contributed by the two belief variables in the original TAM. Further, it is clear from Figure 6.2 that these four variables are significant predictors of perceived usefulness and perceived ease of use, providing additional insight into factors to focus on when improving the perception held in the mind of mature consumers about SSBTs. Increasing the usage behaviour of SSBTs among mature consumers requires working backwards and creating a more positive attitude towards SSBTs, which in turn requires improving mature consumers' beliefs regarding SSBTs. These findings will be discussed further in chapter seven.

A number of hypotheses were tested in Study 2 based on a revised conceptual model. Table 6.13 provides a summary of the results. While support was found for eight hypotheses, a further five were not supported. These individual hypotheses concern pathways that are affected to some extent by some multicollinearity in the data. Regression coefficients are known to be unstable in the presence of multicollinearity. An examination of the bivariate correlations in Table 6.8 indicate that there are relationships among these variables, but in the presence of other variables in the model they fail to show a significant relationship in the model.

Table 6.13. Summary of hypotheses and the level of support – Study 2

Hypothesis number	Description	Support
H2a	Attitude → Behaviour	**supported**
H3a	Perceived usefulness → Attitude	**supported**
H3c	Perceived usefulness → Behaviour	not supported
H4a	Perceived ease of use → Attitude	**supported**
H4b	Perceived ease of use → Perceived usefulness	**supported**
H7a	Perceived risk → Perceived usefulness	not supported
H7b	Perceived risk → Perceived ease of use	**supported**
H8a	Personal contact → Perceived usefulness	**supported**
H8b	Personal contact → Perceived ease of use	not supported
H9a	Technology discomfort → Perceived usefulness	not supported
H9b	Technology discomfort → Perceived ease of use	**supported**
H10a	Self-efficacy → Perceived usefulness	not supported
H10b	Self-efficacy → Perceived ease of use	**supported**

Source: developed for this study
H2a and H3c modified hypotheses for Study 2

In conclusion, the findings from Study 2 have added support to the results achieved from Study 1 and further extended our understanding of the factors influencing mature consumers' attitude and behaviour towards using SSBTs. A more parsimonious model has emerged from the results of Study 2, with the four antecedent variables in ETAM making a significant contribution to predicting attitude and behaviour beyond that contributed by the two TAM belief variables. The theoretical contributions and implications for practice and policy of these findings will be discussed in chapter seven.

The final section of this chapter discusses findings from the multigroup analyses that were conducted to understand whether demographic variables including gender, age and education moderate the structural path relationships in the ETAM.

6.4.3. TESTING FOR MODERATING EFFECTS

An exploratory analysis was conducted with an aim to examine the role of moderating variables on the structural paths of the ETAM. Prior research has examined the direct effects of demographic variables as external factors in

technology based models (Agarwal & Prasad 1999; Meuter et al. 2005; Porter & Donthu 2006). However investigating the moderating effects of variables is suggested to be a more meaningful approach (Dabholkar & Bagozzi 2002). In the mature consumer context, prior research investigating the moderating effects of gender, age and education is very limited. Trends in relation to these variables indicate that gender, age, and education could have a moderating effect on one or more of the paths in the model (Mattila, Karjaluoto & Pento 2003). Further, Moschis (2003) suggests that the mature consumers are more heterogeneous than younger consumers and therefore demographic differences could have a moderating effect on the ETAM.

To investigate the possible moderating effects of gender, age and education, the sample was separated into groups on the basis of information provided in the demographic section of the questionnaire. The composition of each group and cell sizes are presented in Table 6.14. The sample for multigroup analyses was reduced to 2,176 due to a small amount of missing demographic data.

Table 6.14. Moderators, groups and cell sizes

Moderator/groupings	Group one	Group two
Gender	Male (963)	Female (1,213)
Age		
Young: 50 – 59 years of age	Young (888)	Older (627)
Middle: 60 – 69 years of age	Young (888)	Middle (661)
Older: > 69 years of age	Middle (661)	Older (627)
Education		
Low: primary, some secondary , completed junior	Low (699)	High (455)
Middle: senior, skilled vocational, diploma	Low (699)	Middle (1,022)
High: bachelor degree, postgraduate degree	Middle (1,022)	High (455)

The procedure as outlined by Byrne (2004) for testing moderating effects involves a series of steps with initially a global test of the invariance of structural path parameters across groups. That is, structural paths are constrained to be equal and the χ^2 of the constrained model is compared to the χ^2 of the same model where no equality constraints were imposed. If the difference between the two χ^2 values is not statistically significant, then the model is considered to fit both groups. In other

words, the variable used to form the groups is not acting as a moderator. This was the outcome for gender and therefore further analysis work involving gender should be based on a single-group.

If the χ^2 difference is significant, as was the case with age and education, then two-group model invariance testing is required to identify the cause of the difference. The paired groups as presented in Table 6.14 were tested using the approach outlined above. Four paired groups as presented in Table 6.15 were found to have significant χ^2 differences thus requiring further analysis to identify the source of the differences. Working with a single two-group constrained model, one structural path at a time was freed and the difference in the χ^2 calculated. If a significant difference between the χ^2 of the constrained and unconstrained model was observed at $p < .001$, this indicated that the beta coefficients for that path in the two-group model were significantly different and therefore evidence of a moderating effect. The path was then constrained and another path in the two-group model was freed. This process was repeated across all paths in each of the two-group models. The results of this analysis in terms of changes in standardised β coefficients (for group 1 to group 2) in the presence of a moderating variable are presented in Table 6.15.

Table 6.15. Results (change in standardised β coefficient values) for moderating effects

	Age[1]				Education[1]			
Relationship within extended SSBT model[2]	**Young** ***n*** **= 888**	**Older** ***n*** **= 627**	**Middle** ***n*** **= 661**	**Older** ***n*** **= 627**	**Low** ***n*** **= 699**	**High** ***n*** **= 455**	**Low** ***n*** **= 699**	**Middle** ***n*** **= 1022**
Attitude → Behaviour	0.36 to 0.62		0.53 to 0.65		0.62 to 0.47		0.64 to 0.50	
Perceived usefulness → Attitude	0.27 to 0.34		0.30 to 0.25		*no moderating effect*		0.25 to 0.32	
Personal contact → Attitude	-0.15 to -0.23		-0.17 to -0.21		-0.26 to -0.07		-0.06 to -0.15	
Perceived ease of use → Attitude	0.40 to 0.53		0.46 to 0.52		*no moderating effect*		0.56 to 0.60	
Personal contact → Behaviour	-0.06 to -0.20		*no moderating effect*		*no moderating effect*		-0.22 to -0.04	
Perceived risk → Behaviour	0.21 to -0.02		0.17 to 0.04		-0.02 to 0.26		-0.01 to 0.15	
Self-efficacy → Behaviour	0.05 to 0.41		0.10 to 0.31		0.36 to 0.02		0.32 to 0.11	

1. Moderating effects are investigated based on the following data splits. Age: young (50-59), middle (60-69), older (> 69); Education: low (primary to completed junior), middle (senior, skilled vocational, associate diploma, diploma) and, high (bachelor degree, postgraduate)
2. Change in chi-square value significant at $p < .001$

Note: No significant moderating effects found between: Gender (male, female); Age (young, middle) and; Education (middle, high).

Age and education were observed to have a moderating effect on up to seven structural paths across four groups. The path relationships are presented on the left side of Table 6.15. In terms of *age*, six paths were strengthened with age across the young and older group and four paths were strengthened across the middle and older group. That is, an increase in age strengthened the relationship between attitude and behaviour, personal contact and attitude, perceived ease of use and attitude, and self-efficacy and behaviour. Comparing just the young and older groups, the relationships between perceived usefulness and attitude, and personal contact and behaviour were also strengthened with an increase in age.

In relation to *education*, higher education level attenuated the relationship between attitude and behaviour, and self-efficacy and behaviour across the low and high, and low and middle groups. For the low and high group the relationship between personal contact and attitude was also attenuated, while the personal contact and behaviour relationship across the low and middle group was attenuated. These findings indicate that as the educational level of mature consumers increases, these specific relationships attenuate.

Contrary to expectations, the moderating effect of *age* on the relationships between perceived risk and behaviour across both groups and perceived usefulness and attitude across the middle and older group were attenuated instead of strengthened. For *education*, similar contrary moderating effects were evident with the relationship between perceived risk and behaviour across both groups and perceived usefulness and attitude, personal contact and attitude, and perceived ease of use and attitude across the low and middle group being strengthened instead of attenuated. The sign reversals for the relationships between perceived risk and behaviour that are contrary to expectations can occur when the effects of other correlated independent variables are controlled. This situation does not arise when the independent variables are uncorrelated but the risk increases when multicollinearity is present, leading to what are known as suppressor effects (Paulhus et al. 2004).

To investigate the moderating effects that appear to be contrary to expectations, the relationships between the variables across the four groups were analysed using bivariate regression. The results of these analyses are presented in Table 6.16. These

findings also assisted in clarifying the moderating effects of *age* and *education* on the relationship between perceived risk and behaviour. The beta coefficient signs were all negative, as expected. That is, as perceived risk increases, mature consumers are less likely to use SSBTs and this effect becomes stronger as one gets older. Also as expected, education has an attenuating effect on this relationship. That is, the effect of perceived risk on behaviour is not as strong for better educated people. All other moderating effects that were contrary to expectations were found to be insignificant at the bivariate level.

These findings indicate that it is very difficult to interpret the moderating effects of these relationships in the ETAM where there is a degree of multicollinearity among the predictor set of variables. However, the moderating effects of *age* and *education* on the relationships between attitude and behaviour, and self-efficacy and behaviour are in the expected direction and consistent across the respective groups. The implications of these findings will be discussed in chapter seven, while recommendations for future research investigating moderating effects will be outlined.

Table 6.16. Bivariate regression results (standardised β coefficient values) for each moderating group effect

	Age[1]				Education[1]			
Relationship within extended SSBT model	**Young *n* = 888**	**Old *n* = 627**	**Middle *n* = 661**	**Old *n* = 627**	**Low *n* = 699**	**High *n* = 455**	**Low *n* = 699**	**Middle *n* = 1022**
Attitude → Behaviour	0.67	0.76***	0.69	0.76**	0.75	0.72 n.s.	0.75	0.70**
Perceived usefulness → Attitude	0.67	0.70 n.s.	0.72	0.70 n.s.	0.72	0.67 n.s.	0.72	0.72 n.s.
Personal contact → Attitude	-0.67	-0.68 n.s	-0.66	-0.68 n.s.	-0.65	-0.69 n.s.	-0.65	-0.68 n.s.
Perceived ease of use → Attitude	0.68	0.63*	0.64	0.63 n.s.	0.67	0.64 n.s.	0.67	0.67 n.s.
Personal contact → Behaviour	-0.52	-0.59*	-0.55	-0.59 n.s	-0.60	-0.52*	-0.60	-0.54*
Perceived risk → Behaviour	-0.38	-0.51***	-0.38	-0.51***	-0.46	-0.36*	-0.46	-0.41 n.s.
Self-efficacy → Behaviour	0.56	0.60 n.s.	0.52	0.60*	0.62	0.50***	0.62	0.59 n.s.

1. The significant difference between the standardised β coefficients (correlation coefficient) for each group is displayed in the table above. The level of significant difference is denoted in the table as $p < .05$*; $p < .01$**; $p < .001$***; n.s. not significant
2. Moderating group effects are investigated based on the following data splits. Age: young (50-59), middle (60-69), old (> 69); Education: low (primary to completed junior), middle (senior, skilled vocational, associate diploma, diploma) and, high (bachelor degree, postgraduate)

6.5. CONCLUSION

Results from Study 2 provided a comprehensive profile of non-users, low users and medium-to-high users of SSBTs. There were a number of variations noted in SSBT usage between Study 1 and Study 2. Study 2 showed a greater proportion of mature consumers' using SSBTs and in particular internet banking than was evident in the sample from Study 1. However, there were significant differences in sample size in the two studies which could easily account for the differences. Testing of the revised ETAM showed that the data in the sample had captured the expected relationships and that the antecedent variables introduced for this study made a significant contribution to explaining the variables attitude and behaviour. The analysis further identified that the demographic variables age and education had a moderating effect on the model.

In conclusion, although the ETAM has been modified from its original conception, the substantive framework remains unchanged. The theoretical contributions and implications for practice and policy of these findings will be discussed in the next and final chapter.

Chapter 7

DISCUSSION, IMPLICATIONS AND FUTURE RESEARCH

7.1. INTRODUCTION

This thesis examined mature consumers' attitudes and behaviour towards using self-service technologies in the financial services context. Specifically, the study extended the original TAM and investigated the influence of external variables on the TAM belief variables. The research area was initially explored through qualitative investigations (discussed in chapter three) and was followed by a quantitative study designed to assess the usage behaviour of SSTs and test the conceptual model developed in chapter two. Based on the results of this study, the refinements were made and the model tested in a second quantitative study, with the results including moderating effects presented in chapter six.

Within this final chapter, four broad topics are discussed. First, the findings from the studies are discussed. Second, the theoretical contributions and implications for practice and policy are presented. Finally, limitations of the study and areas for further investigation are explored.

7.2. DISCUSSION OF RESULTS

To guide the research investigation three research questions were developed.

> *How does usage behaviour of mature consumers' vary across SSTs in the financial services context?*
>
> *What are the key factors influencing mature consumers' attitudes, intentions, and behaviour in relation to the use of SSTs in the financial services context?*

What moderating effects do demographic characteristics such as gender, age, and education have on relationships specified within the model?

The results will be discussed in relation to each of these research questions in the following three sections.

7.2.1. USAGE BEHAVIOUR OF SELF-SERVICE TECHNOLOGIES

The mature consumer market has been treated as a homogeneous market with most prior empirical research focusing on comparisons between younger and older consumers or considering the mature consumer market as a collective whole. The reality as presented by Moschis (2003) is that the mature consumer market is more heterogeneous than the younger market. Findings from this research study of mature consumers' use of SSTs in the financial services context provided support for this notion and that differences are driven by factors other than just age.

In gaining a more comprehensive account of mature consumers' use of self-service technologies (SSTs), this study focused on behaviour towards using self-service banking technologies (SSBTs) and the face-to-face banking service encounter. Acknowledging that all financial institutions offer EFTPOS, ATM, telephone and internet banking services in the Australian context, these services were regarded as a portfolio of financial services that mature consumers selected from and used to suit their own personal needs.

Adopting a behavioural segmentation approach, three mature consumer segments were identified among the respondents. These segments included non-users, low users and medium-to-high users of SSBTs. The non-user segment solely conducted their financial transactions on a personal contact basis using face-to-face banking services and this segment represented 19% of the sample for Study 1 and 14% for Study 2. As the smaller of the three segments, mature consumers in this group were significantly older, more likely to be single or widowed, have a lower household income, mostly retired, attained a lower educational level and worked in more manual type jobs or in home duties. Low users were on average using two SSBTs for less than 55% of their transactions, while still using face-to-face banking services to meet the remainder of their financial needs. This segment comprised 19% of the

sample for Study 1 and 15% for Study 2. Mature consumers in the medium-to-high user segment represented 62% of the sample for Study 1 and 71% for Study 2. They were more active users of SSBTs with equal to or greater than 55% of their financial activities transacted through two or more SSBTs. On average this segment had used these methods for a slightly longer period of time than low users. They were more likely to be younger, married, have a higher income, better educated, a managerial/professional background and still working. These findings support the assertion that the mature consumer group is a diverse market in terms of their usage behaviour and variety of use of SSTs in the financial services context.

While prior mature consumer research findings are limited and focused on one SSBT, the results in terms of ATM usage indicated that the level of use of this method has increased significantly from 20% reported in the early 90's (Kwan 1991), to over 50% by the late 90's (Rogers, Gilbert & Cabrera 1997). ATM users compared to non-users have been described as being younger mature consumers, having attained a higher education with a professional background, and use this method more than older users. The findings from this study concur with this demographic profile and that usage of ATMs has continued to increase, however findings indicate that the median level of use of ATMs is higher among older users. This is most likely to occur because younger mature consumers are now using a wider range of SSBTs and the proportion of use of any one method is lower than that of the older consumer group, who are more likely to use one or may be two SSBTs. While only two Australian ATM studies could be cited, the findings from one study indicated that regional ATM usage among mature consumers was significantly lower (Darch & Caltabiano 2004) when compared to the findings from this study at a state and national level. This could be due to sampling error in either study, however more likely explanations include the slower diffusion of ATMs into regional areas, and the stronger desire of mature consumers to use face-to-face financial services so as to retain these personal services for their local regional community.

In terms of internet banking, findings from this study indicated that 30% of mature consumers use this method with this level dropping to 15% among consumers over 65 years of age. While findings also show that the use of internet banking has doubled between the 2002 and 2004 study, usage level among mature Australians is

significantly lower than that of Finland, where internet banking is the highest in the world with 24% of consumers over 65 years of age reported using this method in a recent study (Mattila, Karjaluoto & Pento 2003). This difference in usage rate is most likely to occur due to the later availability of this service in Australia, so growth in internet banking use among the mature Australian consumer market could be expected to increase.

One of the difficulties that arose when analysing and comparing research findings across the mature consumer market related to what defines a mature consumer. While in this study consumers over the age of 50 were classified as mature, other more recent studies in the financial services context based their research on consumers over 55, 60, and even 65 years of age. Further, in most cases these studies examined the sample as one cohort with the exception of Rogers and colleagues (1996) that segmented the mature consumer sample into two groups, the young-old, 55 to 64 age group, and older, over 65 years of age. A more recent study that examined financial behaviour across all age brackets segmented the sample into non-users, new users and old users of internet banking (Karjaluoto, Mattila & Pento 2002b). While new users had an account for less than three years, many had not activated their account. To address this weakness they regrouped the sample based on non-users, low frequency users (one to three time a month) and high frequency users (Karjaluoto, Koivumaki & Salo 2003). Acknowledging that these approaches have contributed to the body of research findings, current research must seek to achieve a deeper understanding by focusing on more innovative ways to capture the variability in the way mature consumers' think and act towards using SSTs in the financial service context.

This study has provided a more comprehensive picture of the behaviour of mature consumers towards using SSBTs, and their variety and frequency of use of these methods. The three levels of usage coupled with examining all four SSBTs and face-to-face banking, demonstrated the wide variation in preferences desired by the mature consumer market. While ATMs appeared the dominant SST embraced by the mature market, other SSBTs including EFTPOS are extensively used with frequency of use of these methods varying across the mature market. Face-to-face banking still remains the desired form of service delivery for a segment of this market, with

almost all mature consumers visiting a financial institution at some point in time. While this breadth of SSBTs have not been studied together in previous mature consumer research, findings from research across all age segments in the market suggest that ATMs appear the most diffused SSBT (Lee & Lee 2000), with the use of EFTPOS then telephone banking the next most likely SSBTs used (Prendergast & Marr 1994; Thornton & White 2000). More recent studies report higher levels of use of internet banking, with Wan, Luk and Chow (2005) identifying internet banking as the second most used SSBT in Hong Kong after ATMs. General trends in mature consumers' use of SSBTs based on this study appear not to be too different from the general population, however frequency and variety of SSBTs used across the three mature consumer groups highlighted key differences.

The findings from this study indicated that the medium-to-high users are embracing a wide array of SSBTs and using these methods more frequently than low users. An opportunity exits for financial institutions to improve the level and variety of use of SSBTs among low users. As this market has some experience using one or more of these SSBTs, they are more likely to respond positively to approaches targeted at behavioural change. As for non-users, this group appears to be declining in size over time, however to decrease their dependence on face-to-face banking services, intervention strategies specific to the needs of this group must be developed.

While credit card use was not included as a SSBT in this study, results indicate that it was used as a substitute and/or complement to SSBTs. The non-user segment appears to resist using SSBTs, however 65% of this group are not averse to transacting some of their financial affairs through using a credit card for in-store purchases, with use at lower levels for mail and telephone transactions. Older mature consumers use credit cards less and their frequency of use is also lower across the sample compared to younger mature consumers. Mathur and Moschis (1994) suggested that changes in lifestyle and other circumstance associated with age, but not age per se causes this relationship. Older mature consumers in the medium-to-higher SSBT group displayed higher credit card usage and would appear to be more technology oriented. Thornton and White (2001) also found that usage of credit cards increased among consumers who were more comfortable with using technology. While consumption needs and changes in lifestyle may vary across the mature consumer market

influencing the frequency of credit card use in various situations, credit cards are another important financial method that used in conjunction with SSBTs and face-to-face banking enable mature consumers to manage their financial needs.

In summary, findings have indicated that there is a substantial group of mature consumers across all age brackets using a variety of SSBTs, while a smaller cohort of mature consumers still desire personal contact in the delivery of financial services. In the next section the discussion focuses on the perceptions, attitudes and behaviour of mature consumers towards using SSBTs.

7.2.2. EXTENDED TECHNOLOGY ACCEPTANCE MODEL

Based on an understanding of mature consumers' usage behaviour of SSBTs and face-to-face banking services, this research investigation then focused on predicting mature consumers' attitudes and behaviour towards using SSTs in the financial services context. The original TAM formed the core of the conceptual model with perceived usefulness and perceived ease of use proposed to fully mediate the influence of external variables on attitude and behaviour.

While the original TAM had not been tested in the mature consumer SSBT context in prior research, the results from this study provided support for the model. Findings indicated that perceived ease of use and perceived usefulness are strong predictors of attitude. Mature consumers who believe that SSBTs are easy to learn and operate, and that these methods provide greater convenience, flexibility and more services to meet their needs, have a more positive attitude towards using SSBTs. This positive predisposition was found to have a positive effect on intention to use and actual use behaviour of SSBTs. Support was also found for perceived ease of use predicting perceived usefulness in the original TAM. The positive relationships found between beliefs, attitude and behaviour indicated that an improvement in the beliefs held by mature consumers would lead to a more positive attitude. This could result in low users potentially increasing their level of use, while trial and adoption by non-users could be encouraged. Working to improve the perception that SSBTs are easy to learn and operate is a critical starting point. Further, for mature consumers to consider learning how to use SSBTs, they also need to perceive that there are

genuine benefits in using these methods that outweigh monetary and non-monetary costs.

As the original TAM was developed and tested in the organisational context, strong support was found for the relationship between perceived usefulness and intention/behaviour. Findings from this study found this relationship to be weak in the TAM and not significant in the ETAM. While these variables are related, perceived usefulness has a stronger influence on shaping mature consumers' positive or negative feelings towards using SSBTs. Contrary to TAM where employees may receive rewards for adopting new technology, extrinsic rewards to entice mature consumers to consider using SSBTs are minimal. Thus it is not surprising to find that no path relationship exists between these two variables in the consumer context.

The central focus of the conceptual model developed in chapter two was on determining the influence that external variables had on TAM. Social influence, innovation characteristics and individual differences were proposed as underlying determinants of the TAM belief variables. The contribution these variables made to the model will be discussed in the remainder of this section.

Social influence

The social pressure family, friends and professionals (bank tellers and financial service advisors) place on mature consumers to use SSBTs and their motivation to comply, was investigated through the variable subjective norm. In this study the proposed relationship between subjective norm and perceived usefulness was not significant. This finding suggested that important other people in the lives of mature consumers have minimal influence on altering the perceptions they hold about the benefits of using SSBTs, and thus their attitude and usage behaviour of SSBTs. While mature consumers may be influenced by family and friends to use technology such as the internet, when it comes to financial matters they prefer minimal influence from others. These findings strengthen prior research results in the financial context (Lee & Lee 2000; Howcroft, Hamilton & Hewer 2002) and qualitative findings relating to mature consumers (Kennett, Moschis & Bellenger 1995; Wolfe 1997), where recommendations from family, friends and professionals were found to have little effect on decision making.

Innovation Characteristics

Perceived risk and compatibility were both proposed as predictors of perceived usefulness and perceived ease of use. Perceived risk was found to make a significant contribution in ETAM, while compatibility was omitted in the scale development stage for Study 1 due to the high inter-correlation with attitude. Based on the descriptive results for compatibility from Study 1, findings indicated that non-users of SSBTs perceived these methods as inconsistent with their existing financial needs and experiences. Medium-to-high users hold a more positive perception that SSBTs were more compatible with their needs and experiences. For non-users, this negative perception potentially poses a barrier that is aligned with their negative attitude towards SSBTs, therefore reducing the likelihood that they would consider using SSBTs.

The relationship between perceived risk and the TAM belief variables were found to be negative, with these variables consistently performing a partial mediation role in the model. Across the two studies a consistent negative relationship existed between perceived risk and perceived ease of use. In the presences of other external variables in the model, findings indicated that perceived risk played an important role as an inhibitor to the use of SSBTs.

Findings indicated that medium-to-high users of SSBTs perceived some level of risk when using SSBTs in terms of financial, functional and physical risk. However, it did not appear to deter medium-to-high users from embracing two or more methods of SSBTs. For respondents in the low and non-user groups, their assessment of perceived ease of use is more adversely affected by perceived risk.

The strong negative perception of risk held by non-users will hinder their assessment of the benefits SSBTs could provide and the ease with which one or more of these methods could be used. While physical risk is mostly associated with the use of ATMs, all SSBTs have varying levels of financial and functional/performance risk. Only through initially decreasing the perception of risk held by this group of mature consumers will they be in a position to more clearly evaluate the benefits and ease of use of these methods, and in turn, gain a more positive attitude and behaviour towards using SSBTs.

Overall, findings suggested that as an external variable, perceived risk influenced mature consumers' perception of SSTs and their attitude and behaviour towards using these technologies.

Individual Differences

The individual differences variables included in the conceptual model comprised of personal contact, technology discomfort and self-efficacy. All three variables were significant determinants of the TAM belief variables, and TAM variables performed a partial mediation role for personal contact and self-efficacy in ETAM.

Personal contact was found to have a consistent negative relationship with perceived usefulness and attitude across both studies. This finding suggested that mature consumers, who prefer to interact more with financial service providers, are less likely to perceive positive benefits from using SSBTs, and have a less favourable attitude and behaviour towards these methods. Respondents in the non-user group were found to hold very strong beliefs about the need for personal contact, while medium-to-high users held more neutral beliefs and perceived SSBT methods to be more useful. This finding is further supported by the low proportion of this latter group using face-to-face banking services. For some mature consumers the desire for personal contact could act as a barrier to trial and adoption of SSBTs.

The relationship between personal contact and perceived usefulness was supported in this study, a previously untested relationship. Findings relating to the negative relationship between personal contact and attitude in this study are supported by Dabkolkar (1992), however Curran and Meuter (2005) found this relationship not significant in their SST study. Overall, prior research findings indicated that non-users of SSTs among mature consumers have a higher desire for personal contact, a finding supported in the context of this study (Rogers, Gilbert & Cabrera 1997; Mattila, Karjaluoto & Pento 2003).

The variable technology discomfort had a consistent negative relationship with perceived ease of use across both studies. This finding suggested that mature consumers who are more uneasy, apprehensive or anxious towards using SSBTs will find these technologies more difficult to use. This relationship indirectly influenced

perceived usefulness, attitude and behaviour towards using SSBTs. As expected, respondents in the medium-to-high user group experienced lower levels of technology discomfort, however there were some respondents in this group who were not completely comfortable with using SSBTs, a finding supported in previous research (Cameron, Marquis & Webster 2001). This finding suggested that they were more able to deal with some level of discomfort when using SSBTs than low and non-users are able to handle.

While a relationship between technology discomfort and perceived usefulness was proposed, findings were inconsistent between the two studies. An indirect negative effect through perceived ease of use as found in the second study, is a relationship supported by the findings from an IT study by Venkatesh (2000).

Overall, technology discomfort acts as an inhibiting factor that can lead to mature consumers avoiding the use of SSTs. Only through reducing the level of discomfort that mature consumers perceive they feel towards using SSTs, will they improve their assessment of ease of use, an important step in influencing their attitude towards using SSTs in the financial service context.

As the final individual difference variable, self-efficacy had a positive impact on perceived ease of use and a direct and indirect effect on perceived usefulness and intention/behaviour, while only an indirect effect on attitude. These findings indicated that mature consumers who perceive they have the capability and confidence to use SSBTs are more likely to perceive these banking technologies as easier to use and more suited to meeting their financial needs. This assessment leads to more positive feeling towards SSBTs, and use of one or more of these banking technologies. As expected, respondents in the non-user group were less confident and had a lower perception of their ability to use these SSBTs. This self-assessment leads to SSBTs as being perceived as more difficult to use and subsequently mature consumers having a less favourable attitude and behaviour towards using these banking technologies.

In summary, perceived risk, personal contact, technology discomfort and self-efficacy have made a significant unique contribution to predicting attitude and

behaviour over and above that contributed by perceived ease of use and perceived usefulness. Further, these four variables have explained a significant portion of the variance in perceived usefulness and perceived ease of use. An understanding of these relationships in the model has been enhanced through an analysis of the responses to the survey based on three SSBT user segments, namely non-users, low users and medium-to-high users. While medium-to-high users actively use SSBTs, potential gains in increasing their level and variety of use would be minimal, as their positive attitude towards using these methods is based on established positive beliefs. However, for non-users and to a lesser degree, low users, change in their usage behaviour of SSBTs will require creating a more favourable attitude towards these banking technologies. To achieve this requires working backwards and improving mature consumers' beliefs about one or more of these SSBTs. Findings suggest that if they are to genuinely believe that SSBTs are easy to use and these banking technologies provide significant benefits over and above their current method(s), than interventions should be directed at altering perceptions of usefulness and ease of use. Enhancing their ability and confidence will have a positive effect on reducing their perception of risk and technology discomfort, decreasing their desire for personal contact and positively enhancing perceived usefulness and ease of use. Based on these findings, implications for practice and policy will be addressed later in the chapter.

7.2.3. MODERATING EFFECTS ON THE MODEL

The discussion in the previous section provided further insight into relationships between beliefs, attitudes and behaviour towards using SSBTs. Findings relating to the moderating effects of gender, age and education on these relationships found that gender did not act as a moderator, while age and education moderated the relationships between attitude and behaviour, and self-efficacy and behaviour in the expected direction and was consistent across the respective groups.

In relation to age, these path relationships were strengthened with an increase in age. These findings suggested that to achieve an improvement in the usage of SSBTs as mature consumers increased in age, they would need to have a more positive attitude towards SSBTs and also have a stronger belief in their confidence and ability to use

SSBTs relative to younger mature consumers. Therefore, any intervention strategies aimed at inducing trial and adoption of SSBTs among the middle and older mature consumers will require additional effort over and above that required for younger mature consumers to achieve stronger positive perceptions towards self-efficacy and attitude.

The moderating effect of education attenuated these path relationships as the level of education increased. For mature consumers with middle to higher levels of education, these results suggested that education had little or no effect on the relationship between self-efficacy and behaviour, while only a moderate effect on the attitude and behaviour relationship. Findings indicated that for consumers in the lower education group these path relationships were much stronger. Based on these results, mature consumers who have attained a lower level of education (primary to junior) require much higher levels of self-efficacy and a more positive attitude towards SSBTs to influence their behaviour to use these banking technologies. These findings have implications for training programs designed to facilitate usage of SSBTs among mature consumers.

These results are exploratory and further research is required to valid the moderating effects of age and education on these paths. While other moderating effects were difficult to interpret among the relationships in the ETAM, future research is required to investigate these effects.

In conclusion, the findings from this research have advanced the state of knowledge relating to mature consumers use of SSTs in the financial services context. Through extending the original TAM, external belief factors were found to significantly contribute to our understanding of mature consumers' attitudes and behaviour towards using SSBTs. The demographic and behavioural profile provided a descriptive account of the diverse usage behaviour of SSBTs among mature consumers. While the moderation effects of age and education provided further insight into the path relationships in ETAM.

7.3. RESEARCH CONTRIBUTIONS

The research was developed, designed and implemented to make several contributions to the literature. These theoretical contributions are discussed in the next section with implications for practice and policy addressed in the final section.

7.3.1. THEORETICAL CONTRIBUTIONS

Although there is extensive empirical support for TAM through numerous studies in the organisational technology context (Davis, Bagozzi & Warshaw 1989; Venkatesh et al. 2003), investigations focusing on extensions to the model outside the IS domain appear very limited. This study extended previous research investigations through incorporating external variables into the theoretical framework of the original TAM and the conceptual model was tested in the consumer SST context. Of the six external variables included, four had a direct effect on the TAM belief variables, while they also partially mediated the effect of three of these external variables on attitude and/or behaviour. The original TAM provided a sound explanation of the data in the consumer context, and formed a good foundation for the ETAM. Extending the original TAM has improved the explanatory power of the model and explicated the paths through which SSBT behaviour is manifested.

This research study focused on understanding factors that facilitated and/or inhibited the use of SSTs. Significant behavioural changes are required for consumers to move from joint production of services to using SSTs. While empirical research investigating consumers' response to SST is growing (Dabholkar & Bagozzi 2002; Meuter et al. 2005), prior empirical research based on the attitudinal-based model in the SST context is limited (Dabholkar & Bagozzi 2002; Curran & Meuter 2005). This study contributed through including behaviour in the model, extending the range of belief variables simultaneously investigated as predictors in the attitudinal-based model, and testing these relationships in a new context, the mature consumer financial services market. The significant relationships among the belief variables provided direction to where interventions should be placed to achieve maximum improvements in consumers' attitudes and behaviour towards using SSBTs.

Through examining consumers' actual degree of use and variety of use of SSTs in the financial services sector, the degree of diffusion of these technologies can be analysed. While prior research mostly focused on non-users and users of one product/service, this research contributed through providing a deeper understanding of consumers' knowledge and patterns of behaviour towards a portfolio of SSTs. Further, a behavioural segmentation approach based on degree of use of SSTs provided a more meaningful profile of each of the three identified segments, thus enhancing our understanding of the behaviour of consumers at stages in the diffusion of SSTs into the financial services market.

While knowledge related to the behaviour of mature consumers is developing in the international market (Trocchia & Janda 2000; Szmigin & Carrigan 2001a; Moschis 2003; Moschis, Bellenger & Folkman Curasi 2003), very little is known about this growing market in the Australian context and more specifically in relation to their use of SSBTs. This study contributed to the mature consumer literature through first developing a comprehensive national demographic and behavioural profile of SST adoption in the financial services context. Second, the application of ETAM has identified significant beliefs relevant to this market that play an influential role in shaping their attitude and behaviour towards SSBTs use. The moderating effects of age and education have further extended our understanding of this market. Finally, this research has contributed empirically to demonstrating that mature consumers are a diverse market in relation to SST use in the financial services sector.

7.3.2. IMPLICATIONS FOR PRACTICE AND POLICY

The contribution of the research findings is not limited to the literature. These research findings have an important role in informing financial industry practice and policy formation by government and independent not-for-profit senior consumer organisations. With over 30% of the Australian population over the age of 50 and increasing, findings from this study indicate that a considerable proportion of mature consumers still rely on face-to-face banking services to meet their financial needs. While findings indicate that some mature consumers will never use SSBTs, providing others with the capability to use and confidence to select desired SSBTs,

empowers them to make choices that more closely align with their productive ageing needs.

For financial institutions to effectively target the mature consumer market to use SSBTs, they need to address and enhance mature consumers' attitudes towards using these banking technologies. This requires financial institutions to assist mature consumers to improve their financial literacy, in particular knowledge and skills related to SSBTs. Both elements are critical, as research findings indicated that improving their confidence and ability to use SSBTs positively improved their perception about how easy these banking technologies are to use, and also influenced their assessment of the usefulness of SSBTs. While mature consumers are aware of the various banking technologies, qualitative research findings would suggest they are not well informed about them, and how they would complement their current banking practices. Communication strategies targeted specifically at the mature consumer market are required to address this knowledge gap. Brochures, seminars, and online information must be developed based on a clear understanding of the current knowledge level of mature consumers, who are currently non-users of SSBTs.

Communicating information about SSBTs to close the knowledge gap is not enough, there is an increasing need for mature consumers to have hands-on training to improve their confidence and demonstrate that they have the ability to use SSBTs (Charness, Park & Sabel 2001). These changes will allow mature consumers to feel less discomfort with banking technologies and thus assist in reducing their need for personal contact. Knowledge about how SSBTs operate can reduce mature consumers' fear of performance and financial risk while physical risk, specifically with ATMs, can be minimised through using EFTPOS technology.

For technology training programs to be successful, either one-on-one or in small groups, these programs must be tailored to meet the changing needs of mature consumers that includes physiological, perceptual, and cognitive changes. Research indicates that these special needs are important, but that they are often neglected when developing technology training courses for mature consumers (Mayhorn et al. 2004). To develop more focused training, Mayhorn et al. (2004) proposed a systems

approach that assesses the person, environment, and technology through a series of sequential stages involving needs assessment, task and person analysis, selection and design of training programs, and evaluation. To enable mature consumers to feel more confident with specific SSBTs, the methodology and approach to development inherent in the systems approach should assist financial institutions to tailor their current approach. This would provide mature consumers with the capacity to use and ability to select desired SSBTs to meet their current financial circumstances.

While in practice more financial services will be delivered through SSTs in the future, findings from this study suggested that to meet the needs of mature consumers, financial institutions must maintain a mix of SSBTs and face-to-face banking services. To ensure mature consumers are not disadvantaged, respective policy makers have an important role to perform.

In the Australian context, financial literacy and productive ageing are important policy areas endorsed by the Australian Government. Findings from this research can inform and assist independent not-for-profit senior consumer organisations such as National Seniors and Australian Council of the Ageing in the development of a policy document for submission to the Government. Critical issues to be addressed in the document relate to ensuring financial institutions are involved in educating mature consumers about SSBTs, training mature consumers in the use of these methods, and that an adequate level of face-to-face banking services at a reasonable price are provided throughout Australia. While other related issues could be included, the focus should be on assisting mature consumers to be financially independent and confident in using SSBTs suited to meet their own personal life situation.

7.4. LIMITATIONS

Several limitations of the overall research study are discussed in this section. Further limitations have already been addressed in relation to Study 1 and testing moderation effects. The first limitation relates to the cross-sectional nature of the data collections. The diffusion of SSBTs into the mature consumer market is constantly changing, yet in this study the data were collected through cross-sectional surveys.

The results should therefore be interpreted with caution. An understanding of how perceptions, attitudes and behaviour towards SSBTs evolve over time would be a preferred approach to data collection. However due to time and cost constraints a longitudinal study was not feasible.

Second, the study focused on the important but narrow area of SSBTs, so caution should be used when generalising findings to other SSTs. Future studies should consider SSTs that are used by mature consumers across a variety of industries such as automated check-in services to provide additional support and increase the generalisability of the findings.

7.5. AREAS FOR FURTHER INVESTIGATION

The mature consumer market is large and growing, yet there is little research that considers their perceptions, attitudes and behaviour towards SSTs. To establish generalisability of the findings, future research could investigate SSTs used in other contexts including internet purchases, automated check-in/check-out services and vending machine ticket purchases. Differences in the role of predictor variables across SSTs could be investigated to determine if there are common predictors or they vary across SSTs.

To further strengthen the measurement scales developed and tested in this study, further modifications to the scales are required. While the method effect resulted in redundancy of twenty items in Study 2, further refinements of some deleted items through rewording is required. Improving the reliability and validity of the measurement scales will contribute to improving the structural measurement model. Retesting the model with modified measurement scales in the same context will contribute to expanding knowledge in the mature consumer market.

While the ETAM was developed and tested in the mature consumer market, could these same relationships be expected to hold for a younger age sample? In retesting the model, a sample that consists of consumers younger than 50 years of age should be included to allow for comparisons across the younger and mature consumer markets.

Further research is required to investigate the moderating effects of gender, age and education on the structural paths of the ETAM. The results achieved from this study were exploratory with some moderating effects being difficult to interpret. Based on findings from this study and a detailed review of the literature, a theoretical foundation should be developed and proposed hypotheses tested in a more rigorous scientific approach.

The explanatory power of the model could be improved through including additional external variables. However, a more meaningful approach is to investigate the moderating effects of additional factors including cognitive age, innovativeness, previous technology experience and habit. Moderating effects would enhance the understanding of established relationships within the core model.

While this study acknowledged that consideration needs to be given to physiological, social and psychological changes experienced due to ageing, research is required to examine the direct affect that these issues have on mature consumers' use of SSTs. Have innovative SSTs assisted in improving services provided to mature consumers? If so, how have they had a positive effect? Focusing on SSBTs in the Australian context, investigations could assess if actual SST improvements have been achieved through innovation to assist mature customers with disabilities in managing their financial requirements.

Due to the vast dispersion of consumers throughout Australia, rural areas are generally the last to receive access to new technologies. This current research agenda could be extended to investigate if the perceptions, attitudes and behaviour towards using SSBTs differ between mature consumers living in urban versus rural areas.

Finally, the research agenda could be extended to consider mature consumers responses to SST experiences including investigating their level of satisfaction with SST services and factors influencing the outcome, approaches to dealing with less than satisfactory SST experiences and associated complaint behaviour, and coping strategies mature consumers engage to manage their use of SSTs.

7.6. CONCLUSION

This research study commenced with the development of a conceptual model that incorporated six external variables into the original TAM. The model provided the conceptual foundation to investigate mature consumers beliefs, attitudes and behaviour towards SSTs in the financial services context. The empirical findings based on two studies found self-efficacy, perceived risk, technology discomfort and personal contact made a significant unique contribution to predicting attitude and behaviour over and above that contributed by perceived usefulness and perceived ease of use. Three user segments coupled with demographic data provided a comprehensive profile of mature consumers' uses of SSBTs. Overall the findings extend our understanding of mature consumers' attitudes and behaviour towards SSTs in the financial services context.

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Appendix A: Summary of mature consumers' use of electronic banking services and internet access

Appendix A.1. Percentage of consumers over the age 45 using electronic banking services

Appendix A.2. Access to any internet site

APPENDIX A

Table A.1. Percentage of consumers over the age 45 using electronic banking services

SSBT: Age	ABS – 1999 % of age group	ABS - 2000 % of age group	ABS - 2001 % of age group	ABS - 2002 % of age group	ABS – 2003 %of age group
EFTPOS: 45-54	61	66	-[2]	-	-
EFTPOS: 55-64	44	49	-	-	-
EFTPOS: 65 or over	23	26	-	-	-
ATM: 45-54	72	75	-	-	-
ATM: 55-64	56	60	-	-	-
ATM: 65 or over	29	32	-	-	-
Phone: 45-54	41	53	-	-	-
Phone: 55-64	33	42	-	-	-
Phone: 65 or over	19	22	-	-	-
Internet Banking: 45-54	3	10	17	24	-
Internet Banking: 55-64	1.0[1]	6	9	14	-
Internet Banking: 65 or over	-	1.0[1]	-	4	7 60 years & over

Source: (Australian Bureau of Statistics 1999, 2000, 2001b, 2002 and 2003)

[1] estimates have a relative standard error between 25% and 50%

[2] data not available

Table A.2. Access to any internet site

Internet Access: Age	ABS – 1999 % of age group	ABS - 2000 % of age group	ABS - 2001 % of age group	ABS - 2002 % of age group	ABS – 2004/5 % of age group
45-54	36	47	55	58	68
55-64	22	26	35	42	49
Over 65	6	9	-	13	17

Source: (Australian Bureau of Statistics 1999, 2000, 2001b, 2002 and 2003, 2004-05)

Appendix B: Summary of ATM, EFTPOS, telephone and internet consumer banking research studies

Table B.1. ATM, EFTPOS and telephone consumer banking research studies

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Murdock & Franz (1983) ATM users and non-users in USA.	To examine why consumers resist using ATMs.	Learning theory – habit Diffusion of innovations characteristics – perceived risk (Rogers 1983).	Resistance, habit and perceived risk – financial, social/psychological & physiological **H1**: strength of resistance & strength of habit positively & significantly correlated; **H2** strength of resistance & strength of perceived risk positively & significantly correlated.	Survey mailed to 1500 consumer panel from Uni of Southern Carolina (responses from 813 panel respondents used); items developed for this study and measured on a five-point Likert type scale; resistance index formed from 5 resistance items; 4 habit items and 5 risk items.	68% are non-users of ATMs; H1 accepted but weak (Tau B range 0.074 to 0.225); H2 accepted & slightly stronger (Tau B range 0.149 to 0.481) – social/psychological risk stronger correlation with resistance; Main reason sighted for not using ATMs – 'old banking system works just fine'; 'no need'; 'safety'.	Limited generalisability of results; construct validity and reliability not tested.
Gilly & Zeithaml (1985) Comparison of elderly (aged +65) and nonelderly consumer acceptance of retailing technologies – EFT, ATMs, grocery scanners in the USA.	To determine differences between elderly and nonelderly in relation to stages of adoption – awareness, decision, adoption, confirmation/ satisfaction.	Stages of adoption (Rogers 1983).		Exploratory/descriptive design. 2 surveys mailed to 2500 aged +65 (20% response); 2500 aged 18-64 (25% response) drawn from 2 USA states – car registration list; questionnaire developed for study to explore stages of adoption of technologies; yes/no responses to statements.	Elderly more likely to hear about ATMs & EFT directly from bank followed by newspapers; a larger % of the elderly compared to nonelderly had use EFT; for ATMs only a small % of the elderly had used; elderly said - EFT 'safe' & 'more convenient'; ATMs 'too impersonal' & 'not as safe'.	Generalisability of results limited; questionnaire design and administration - inability to clarify or probe, lack of control over who completed survey.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Zeithaml & Gilly (1987) Comparison of elderly (aged +65) and non-elderly consumer acceptance of retailing technologies – EFT, ATMs, grocery scanners in the USA.	To determine reasons for use and non-use; profile of elderly awareness, trail & adoption; elderly 'accepters' & 'resisters' identified; difference with non-elderly.	Stages of adoption (Rogers 1983)		Exploratory/descriptive design. 2 surveys mailed to 2500 aged +65 (20% response); 2500 aged 18-64 (25% response) drawn from 2 USA states – car registration list; questionnaire developed for study to explore awareness, trail & adoption of technologies.	**ATM** – 4% elderly adopt, main reason - convenience; non-adopters prefer customary way and enjoy personal interaction, while non-elderly didn't have an ATM card. **EFT** – 45% elderly adopt – main reasons – convenience & safety while non-adopters stated 'don't like' , 'don't need'. *Elderly* – higher education significantly related to awareness, trial & adoption while income related to the awareness & trail of technology; higher income, multiunit dwellings (apartments), and greater exposure to print media discriminated between elderly **accepters & resisters**; Elderly - main sources of information on ATMs & EFT – bank, newspapers; very small % heard about the innovation from a friend or neighbour.	Generalisability limited due to sampling approach; confidence in findings are limited especially ATM-elderly users, very small sample (16 respondents); results of elderly users limited to EFT and scanner use.
Taube (1988) Demographic profile of users and non-users of ATMs, USA.	To determine a demographic profile of non-users, inactive and active users of ATMS.			Survey self-administered to 3967 member of a mail panel; 74% usable response rate; 36% active ATM users.	**Users** are more likely to be younger (18 to 34 years of age), single, average income and at least a college education; ATM users are also users of credit; convenience of location important. **Inactive/non-users** are more likely to be married and less educated, no difference in gender.	Comparisons between the three groups very limited.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Marshall & Heslop (1988) Consumer motivation and use of ATMs in Canada.	To determine the differences between users and non-users of ATMs.	Diffusion of innovations characteristics (Rogers 1983)	**Variables: Dependent**: Use of ATMs; **Independent**: relative advantage – (convenience, social interaction); complexity, compatibility, attitude towards technology, attitude towards ATM technology, familiarity & experience with technology.	Survey – 255 respondents personally interviewed after using an ATM or human teller; every 3rd person selected; respondents compared with city demographics – similar; items to measure variables developed for this study; 73% aged < 45 years; 30% had a uni. Degree.	53% used ATMs in last 3 months; *positively* correlated with ATM use: convenience (0.65), attitude towards ATMs (0.58), technology in general (0.31), familiarity & experience with technology (0.18), level of education (0.31), employment status (0.20); *negative*: social interaction (-0.62), age (-0.33) (all sig); Discriminant analysis results based on users and non-users: convenience, less social interaction, attitude to ATM technology, familiarity with technology, education most useful predictor of use of ATMs(all sig).	Lacking construct validity and reliability; no demographic profile, generalisability limited.
Leblanc (1990) ATM users and non-users in Canada.	To determine the motives for use and non-use of ATMs.		No model; exploratory study.	Survey mailed to 800 credit union respondents; response rate 26% (208); 40 general attitudinal items developed from literature review and personal interviews with Directors of Credit Unions; seven-point Likert scales.	57% of respondents use ATMs in last 3 weeks ; users tended to be more educated; main motives for **use** accessibility at all time, avoid waiting in lines; **non-user** – prefer human teller, complexity, risky; 14 items significantly different between users and non-users that relate to human interaction, ease of use, risk etc.	Data based on general attitude towards ATMs and not specific beliefs about themselves using ATMs; no demographic profile provided; findings lack generalisability.
Kwan (1991) Elderly ATM users and non-users in Perth,	To determine level of use of ATMs and identify differences between users and non-users –			Survey personally administered to 165 individuals 55+ years of age, members of a senior citizen centre; 3	28% respondents used ATMs; a further 7% owned a ATM card but did not use it; use varied from once a week to more than 4 times a week; significant reasons for not using	exploratory study; findings lack generalisability; construct validity

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Australia.	psychographics and demographics.			focus groups and literature used to inform the development of the questionnaire; Age:55-64 (22%); 65-74 (50%), 75+ (28%).	ATMs (t-test results) 'safety' and 'enjoyment from going to the bank'; users indicated 'convenience' was a key reason; users - younger, white collar professions and better educated ($\chi 2$ test sig).	and reliability limited.
Burgoyne, Lewis, Routh & Webster (1992) ATM users and non-users in the UK.	To gain insight into customers' perceptions and attitudes concerning ATMs.			Qualitative study; semi-structured interviews with 135 building society users in 2 cities, 2 settings, conducted either inside or outside the building society; 56% users of ATM; further 15% possess ATM cards but do not use; 25% of respondents aged 50-75.	**Users:** advantages - convenience, access to accounts 24hrs; speed; less queuing; disadvantages/drawbacks – fail to deliver service (break downs, run out of cash); inclement weather outside, time to clear cheques. **Non-users**: concerned about risk – lack of control, machine malfunction, lack of redress if incorrect money delivered; security – fraud, theft of card, risk of robbery; no need for out-of-hours service; **Non-users** were older, non-professional occupations less formal education.	Findings limited to participants in study and researchers interpretation of output data; interview protocol not informed by previous research findings.
Prendergast (1993); Prendergast & Mar(1994) Self-service (SS) technologies in banking - EPTPOS, ATMs & telephone	To determine current and future usage rate of self-service technologies in banking.			Exploratory study; Survey – 302 respondents drawn randomly from provincial & metropolitan telephone directories; telephone interview.	*67% had used ATMs* – $\chi 2$ test of independence - ATM use is significantly higher among younger age groups, living in metropolitan centre, males white-collar occupation; non-users prefer to deal with humans; *20% had used telephone banking* - no differences; non-users - no need, prefer human teller ; *33% had used EFTPOS* –higher use	Differences in sample and population demographics, limits generalisation of results.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
banking in New Zealand.					among younger age group; non-users prefer cash/cheque Use of SS technologies in bank will grow by 7% (ATMs) ,16% EFTPOS & 26% telephone as indicated by respondents future intended use.	
Marr & Prendergast (1993) Opinion of experts in industries - marketing and information technology experts from banks; technology supplies & influential people.	To determine from industry experts the main factors influencing acceptance and discouraging use of self-service technologies in banking.	Previous research study findings and brainstorming with experts.		Survey to 141 experts; Delphi techniques used with three data collection rounds; final number of replies in round three dropped to 81.	Main variables **encouraging** adoption by 2000 – time and place convenience, simplicity of use; by 2010 the same variable were identified; Main variables to **discourage** acceptance - preference for dealing with humans; habit, fear of banks taking over people lives. By 2010 these all decreased in importance.	Findings only relate to the opinions of the experts involved in the study even though there is considerable consistency.
Bednar, Reeves & Lawrence (1995) ATMs versus human customer service in banks in USA – state of Arkansas.	To determine the importance of technology to different age groups in banking.			Survey mailed to 16,305 banking customers from 41 community banks; response rate 36% (5870); exploratory study; no details on questionnaire development.	47% respondents > 56 years of age; importance rating for ATMs and other automated services decreased with age; all customers prefer to deal with people, but older consumers prefer it more.	Significant differences between groups not tested; previous research findings not used to guide or extend research.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Rugimbana (1995); Rugimbana & Iversen (1994) ATM users and non-users in Australia.	To determine user attributes/perceptions and demographics of non-users.	Diffusion of innovations characteristics including perceived risk and social cost (Rogers 1983).	No model.	Bank/credit union branch intercept survey; bank - 268 completed questionnaires; credit union – 430 completed questionnaires; innovation variables, five-point Likert scale response sought on 14 statements (factor analysed) + demographics; items developed for this study; no demographic profile provided.	Overall 67.5 % used ATMs with the majority of *users* conducting < 50% of their banking using ATMs; used predominately to withdraw cash; *Non-users* prefer human tellers & personal service; based on the Credit Union data perception & demographic model– convenience, ease of use & compatibility most significant predictors of ATM use along with education level (high school certificate); - demographic variables only that predict use - age (younger) and occupation (clerical).	Study is exploratory and findings lack generalisability due to sample design and data collection method; perceptual variables lack construct validity & reliability resulting in items merging across variables to create new factors; inadequate reporting of results from factor analysis & logistic regressions.
Smither & Braun (1994) Older adult use of ATMs, USA.	To determine individual differences and attitudes that influence use of ATMs.		No model or variables identified.	Survey self-administered to 156 respondents (at least 55 years of age) from senior centres in Orlando; past literature informed the development of items to	Mean age 70; range 55-86; 32% ATM users ; 28% (31) non-users had tried using an ATM; principal component analysis resulted in two factors: 'apprehension' & 'assurance'; MANOVA used to determine differences - *non-users*: lower	Convenience sample; complexity of factors reduces understanding of drivers and inhibitors of users and non-

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
				explore convenience, reliability, efficiency, complexity, safety & control of ATMs on 5-point Likert-type scale; *apprehension* – complex, lack trust, lack control, difficult to use, less safe, less reliable; *assurance* – safe, comfortable, convenient, in control.	apprehension and assurance indicating more negative attitude towards ATMs; no difference on education; χ^2 analysis on demographics – difference in dwelling type only; *non-users* divided into tryers & non-tryers – difference non-tryers more apprehensive.	users of ATMs.
Rogers, Cabrera, Walker, Gilbert & Fisk (1996) ATM users and non-users - includes older adults - USA.	Profile users and non-users across 4 ages groupings in terms of demographics, usage rates, difficulties, reasons for non-use; Groups - <35; 35-54; 55-64 (young-old), 65+ (older).			Exploratory/Descriptive design; Survey - mailed to 9000 respondents from 2 major US cities drawn from automobile registration & telephone lists; 17% response rate (1562); 233 (15%) aged 55-64, 445 (28%) aged 65+; items for questionnaire generated specifically for study.	Young-old – 54% used ATMs; old adults - 33% used ATMs; many in the older 2 groups had ATM cards but did not use them; older adults users were younger, better health & better educated than non-users; no difference between young-old adults; all users across all age groups have more experience & feel comfortable with computers; regression results - predictors of use of ATMs were -use technology (20%), age additional (4%) & computer use additional (1%); 9% older adults users never felt comfortable using ATMs; difficulties for older user groups - 'see the screen' & 'wait in line; reasons for non-user, older groups - 'prefer people to machines' , 'safety'	Biased sample – more educated, higher income & over-representation of older adults; Close-ended response categories thus limiting possible other reasons for non-use and difficulties confronting users.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Rogers, Gilbert & Cabrera (1997) ATM older (61 to 81 years of age) adult users and non-users - USA.	To determine 'older adults' use of ATMs and problems confronting users and non-users.			Exploratory design; Telephone interview of 100 older adults followed-up by 24 in-depth interviews.	50% actual used ATMs; Older individuals less likely to use ATMs and less frequently; older males are more aware of & use ATMs than older females; Reasons for not using – 'no need'; 'safety concerns', 'bank during day', 'prefer people' – 62% of non-users are interested in training; **Interview findings** – *Non-users* – 'safety' main issue; *Users* - 2 groups intermediate (use ATM once a month) , frequent user (once a week); not aware of all the functions, still had some 'safety' concerns (mean 6.6 (scale 1 not satisfied – 10 satisfied); other issues 'glare on screen', 'lining up keys with buttons', 'person slow to respond –speed'.	Findings cannot be generalised outside of the study.
Barczak, Scholder Ellen & Pilling (1997) ATM, telephone banking & debit card use in USA.	To identify the motivations behind consumers' use of banking innovations and how these motivations affect usage rates.			Means- end approach – 3 stage; 13 depth interviews with users and non-users; focus groups (32 individuals); survey mailed to 511 respondents that agreed to participate; response rate 65% (331); 17 items intended to measure personal money management	Sample – av. age 45 years; 72% used ATMs; 33 % used telephone banking; 7% used debit card; 4 factors generated from 12 items; using cluster analysis 4 motivational segments - security conscious (n=46), maximisers (122), instant gratification (59), hassle avoiders (97); use of electronic banking methods varied across groups – ATM use - 63% 'security conscious', 80% 'instant gratification';	All individuals are not pure members of one cluster group; respondents from only one bank limiting generalisation.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
				orientation developed from stage 2 and previous AIO inventories.	telephone banking - higher users were 'instant gratification'.	
Lockett & Littler (1997) Direct banking services (human telephone operated banking services) UK.	To determine factors that affect the adoption of direct banking services; differences between users and non-users of direct banking.	Diffusion of innovations characteristics including perceived risk (Rogers 1983) Diffusion of Innovations dimensions (Gatignon & Robertson 1985).	**Variables:** **Innovation attributes** Relative advantage; costs; customer learning requirements; perceived risk, social relevance; **Personal attribute** – socio-economic, attitude & personality, social interaction, product involvement.	Survey mailed to 1000 First Direct bank customers & 500 to general public (random); response rate 40% (413) & 36% (180) = 593; 30 items (5-point Likert scale) developed to test hypotheses based on in-depth interviews, industry expert interviews & previous research.	Differences between users and non-users existed across all innovation attribute items and 10 out 16 personal attribute; results of logistic regression – 11 out of 30 were significant at 5% (Pseudo $R^2 = 0.58$), with innovation attributes (7 items) being better predictors of adoption of direct banking – more available, more secure, less complex, easy to try, less risky, takes less time and also positive attitude towards technology.	Findings specific to the First Direct Bank context; construct validity limited and reliability not reported.
Joseph, McClure & Joseph (1999) Electronic banking in Melbourne, Australia (ATMs, telephone and internet banking).	To determine the position of service quality attributes for electronic banking on an importance-performance grid.			Survey of 440 respondents in a mall intercept; usable response rate 68% (300); items developed from 2 focus groups; five-point scale used to measure importance and performance of items.	Items factor analysed – 5 factors: convenience/accuracy, feedback/complaint management, efficiency, queue management, accessibility, customisation; for electronic banking *convenience /accuracy & efficiency* are the most important factor and performance was above average; *accessibility* (security, non-english and disability service) is important but needs improving.	Limited generalisability due to a convenience sample; detailed reporting of analysis limited.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Montinho & Smith (2000) ATM banking - UK.	To evaluate bank customers' attitudes towards both human tellers and ATMs in mediating the ease of banking/perceived satisfaction, switching and loyalty behaviour.	General consumer behaviour literature, no specific theory.	**Dependent:** perceived satisfaction **Independent**: ease of banking **Mediator**: attitude towards human teller and ATMs **Outcome variables of satisfaction**: switching behaviour & loyalty.	Survey - 250 bank customers from 3 branches of a bank; intercept interview, quota sampling; 31% of respondents 54+ years ; multi-item scales to measure variables developed from 25 semi-structured interviews; item measured on a seven-point scale. Ease of banking - convenience & speed.	Model tested using linear structural modelling -Lisrel; model fit chi-square 8.09, p = 150, GFI = 0.991, RMSR = 0.030; all paths were significant; when testing the model without the mediator, the path between ease of banking and satisfaction was not significant; this would indicate that bank customer attitudes towards banking are important in determining outcomes – satisfaction , behaviour intention etc.	Variables not defined and evolve out of the measurement items -limiting construct validity; generalisability of results limited; R^2 not reported.
Lee & Lee (2000) Acceptance and diffusion of electronic services – ATMs, debit card, direct payment/deposits & smart cards, USA.	To examine the extent to which consumers adopt or avoid electronic financial services and characteristics of adopter and non-adopters.			Data used from 1995 Survey of Consumer Finances commissioned by Federal Reserve Board - USA (4,299 households interviewed).	Key findings - ATM most diffused electronic service (66.6% adopters); logistic regression results for ATM users: adopters more highly educated (college or higher), younger in age (mean 45), from a married household and communicated with a professional information advisor; gender, race and communication with family & friends not significant; findings relating to other electronic services refer to paper.	Analysis based on a data set collected for another purpose resulting in some manipulation of data to suit this study needs; unable to assess sampling and questionnaire design.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Thornton & White (Thornton & White 2000; 2001) Use of ATM, EFTPOS, cheque, credit card, telephone and human teller banking services in Australia.	To investigate whether particular attitudinal orientations affect the usage level of banking services – particularly ATMs.		**Customer orientation variables:** convenience, service, technology, change, knowledge, computer, confidence.	Survey mailed to 3,392 credit union customers in a east coast region of Australia resulted in 24% response rate (801); single item measures developed for each variable; five-point Likert scale.	21% of respondents aged >56; ANOVA results - more convenience oriented, use of ATMs & EFTPOS ↑and human tellers ↓; service oriented – human teller ↑, ATM, EFTPOS & Phone ↓; in general more technology, change, knowledge, computer & confidence oriented , ATM, EFTPOS & Phone ↑ & human teller ↓.	Findings limited to sample respondents and geographical region; complexity of variables not captured with single item measures.
Howcroft, Hamilton & Hewer (2002) Home banking - telephone and internet banking in the UK.	To determine actual and preferred delivery channel used for financial service; factors important in encouraging and discouraging the adoption of telephone & internet banking.		No model; exploratory research; **Variables:** improved service quality – free from error, accessibility, convenience; social interaction – human interface; comparative costs of alternative channels; perceived risk; personal characteristics – demographic, socio-economic.	Survey mailed to 4000 respondents; response rate 7% (286); questionnaire based on variables from literature and focus group discussions; data collected 1998.	15% of respondents over 55 years of age; financial services investigated – current account, insurance , credit & investment; branch network most commonly used to deposit; *ATMs* preferred for cash withdrawals and checking account balance; for current account details *telephone* was the second most used and preferred, but least preferred by older consumers and consumers with lower income; very low interest in using the internet as a delivery channel – older consumers **Factors encouraging adoption** of telephone & internet: lower fees, improved service quality, save time, 24 hr service; least important -	Low response rate (7%); biased sample compared to national averages on a range of factors; results limited to trends, no significance testing; factors measured with one item only.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
					recommend by family & friends **Factors discourage adoption:** security and fear of errors for telephone & internet, also for internet: complicated and access; lack of face-to-face was least important (41%) for younger and less wealth respondents.	
Darch & Caltabiano (2004) ATM banking practices of older adults in regional Australia.	To explore the relationship between ATM usage and demographics, user situational and attitudinal variables.		**Dependent :** ATM use; **Independent**: perceived user comfort over ATM banking, perceived user control over finances using ATMs, technologies used; range of demographic variables.	Survey – 139 volunteers aged 60 years and above; convenience sample from Uni of the Third Age; senior citizens' centres; self-administered questionnaire; item development not reported.	Respondents aged 60 -70 (38%), 71-80 (44%), 80+ (18%); 45% ATM users; 74% limited computer experience; results from stepwise logistic regression, 'perceived control', perceived user comfort' & 'use of technologies' had a significant ($p < 0.05$) effect on ATM use; bivariate analysis, differences - non-users older age, lower level of education, less freq use of computer, lower no. SS banking facilities used.	Findings cannot be generalised; construct validity and reliability limited; measurement procedure not reported.

Table B.2. Internet consumer banking research studies

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Joseph, McClure & Joseph (1999) Electronic banking in Melbourne, Australia (ATMs, telephone and internet banking).	To determine the position of service quality attributes for electronic banking on an importance-performance grid.			Survey of 440 respondents in a mall intercept; usable response rate 68% (300); items developed from 2 focus groups; five-point scale used to measure importance and performance of items.	Items factor analysed – 5 factors: convenience/accuracy, feedback/complaint management, efficiency, queue management, accessibility, customisation; for electronic banking *convenience /accuracy & efficiency* are the most important factor and performance was above average; *accessibility* (security, non-english and disability service) is important but needs improving.	Limited generalisability due to a convenience sample; detailed reporting of analysis limited.
Sathye (1999) Internet banking - Australia.	To quantify the factors affecting the adoption of internet banking (IB).	Adoption process (Rogers 1983).	**Dependent:** adoption of internet banking **Independent:** difficulty in use, security concerns, unreasonable price, resistance to change, no access to internet, benefits of IB not clear.	Survey mailed to 500 consumers & 500 businesses; 53% & 65% response rate; multiple choice type questions used to measure variables.	Consumer Data - 33% aged 41-65, 17% 65+; *Using IB* 8%, 37% indicated security as main concern; *aware of IB non-user* 18% - concerns security & benefits not clear; *Unaware & not use* 44% - resistance to change & security; *Unaware & would use* 30% - benefits not clear, price; overall security & benefits are main issues.	Study lacks rigor in questionnaire design and measurement; generalisability of results are limited.
Mattila, Karjaluoto & Pento (2001) Online banking in	No purpose stated. This resulted in a poorly structured papers with no clear direction	Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975;	**Dependent:** Internet banking usage (intention) **Independent (5)**: prior computer	Survey mailed to 3000 respondents; response rate 39% (1,167) after follow-up; customers of a specific bank in	4 factor solution – prior computer experience, prior technology experience, personal banking experience, reference group influence (security dropped);	Lacking construct validity and reliability; item development not reported; retained

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Finland.		Ajzen & Fishbein 1980); Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989).	experience, prior technological experience; personal banking experience; reference group influence; security. Other items introduced with no justification.	Finland; questionnaire development, content and design not discussed.	*results* of regression analysis – 'prior computer experience' & 'personal banking experience' positive impact on internet banking perceptions, 'reference group' a negative influence $R^2 = 0.78$; 'professional occupation' and 'higher household income' also has a positive impact; factor analysis is conducted on another set of data that consists of non-users of internet banking- 5 factor solution – service dimension, negative word-of-mouth, security concerns, less workload, time consuming to learn.	items in factor analysis with loading as low as 0.3; inadequate reporting of regression results; reporting of results poorly structured and incomplete.
Mattila, Karjaluoto & Pento (2002) Use of all banking methods in Finland – over-the-counter to internet.	To determine consumer banking channel preference and barriers to internet banking adoption.		Exploratory/ descriptive	Survey mailed to 3000 respondents; response rate 39% (1,167) after follow-up; customers of a specific bank in Finland; 30 in-depth interviews with financial customers; questionnaire developed in conjunction with bank staff, academics ; belief items based on previous research.	3 groups formed on basis of internet banking experience – non users (349); new users (344), old users (474); non-users are older, lower income and education level & 50% pensioners*; branch customer* – typically over 65years of age, lower income & education & desire more personal service; *distinct segment in the mature customers* that prefer internet - male, technical/Uni education & higher household income; *main factors affecting channel choice:* non-users- security, ease-of-use; new users –security, speed, ease-of-use; old users –	Sample is older, income higher than the population of Finland therefore limiting the generalisability of findings; findings based on percentages and limited correlation analysis to test for significance.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
					security, free from time & place, speed; *barriers to adoption of Internet banking* – lack personal service, difficult to use, security (less impt than reported in previous studies); no computer/internet.	
Karjaluoto, Mattila & Pento (2002a) Online banking – Finland.	To determine the factors that influence formation of attitude towards online banking and use of online banking services.	Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980); Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989).	**Dependent:** internet banking use **Mediator:** attitude towards internet banking (cheaper, easier, service, faster) **Independent (4**) (proposes a direct and indirect effect): prior computer experience, prior technological experience; personal banking experience; reference group influence.	Survey mailed to 3000 banking customers from a specific bank; response rate 38.9% (1,167) one follow-up; sample equally split between non-users, new users (has password but my not use) & old users 3 years + using); 49% respondent are >50 years of age.	4 factors solution; model tested using LISREL 8, 76% of total variance of attitude explained, with 'personal banking experience' contributing greater than 3 time 'prior computer' & 'technology experience'; reference group *- negatively correlated with attitude and use; use of online banking decreases with age & female. *resulted in poor model fit.	Variables not adequately defined, low construct validity; difficult to assess model due to limited results; discussion of findings limited to correlation analysis results; findings lack generalisability.
Karjaluoto, Mattila & Pento (2002b) Internet banking knowledge & use among non-users; new users & old users in Finland.	To describe the adoption of electronic banking based on beliefs; To study the relationship between perception of technology, demographic variables & internet		No model; variables considered in study drawn from other studies in relation to internet banking, internet.	Survey mailed to 3000 respondents equally split between 3 groups; response rate 39% (1,167) after follow-up; customers of a specific bank in Finland; questionnaire tailored to each group; measures of beliefs based on	50% respondent +50 years of age; **non-users** (30%) internet banking lacks personal service, some security concerns & difficulty in using computer and internet banking facilities; **new users** (30%) (not using internet banking regularly) – saves time, free from time and place, fast, not used to isolate oneself from people**; old**	Descriptive study; one item variables not defined; no relationships between beliefs, attitudes, intention and behaviour; study limited to beliefs and behaviour;

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
	banking behaviour.			Fishbein & Ajzen (1975).	**users** (40%) free from time & place, fast, cheaper – hold stronger beliefs when based on actual experience; **non-users** dislike ATM's, computers, internet; strongly like personal service, however **old users** also like personal service ; **Recommend internet banking** – *non-users* - higher education and professional occupation; *new users* - higher income, occupation and professional; overall more positive technology perception more likely to recommend internet banking.	weakness in classification method with some new users having internet banking accounts but no computer or access to the account (acknowledged in (Karjaluoto, Koivumaki & Salo 2003).
Howcroft, Hamilton & Hewer (2002) Home banking - telephone and internet banking in the UK.	To determine actual and preferred delivery channel used for financial service; factors important in encouraging and discouraging the adoption of telephone & internet banking.		No model; exploratory research; **Variables:** improved service quality – free from error, accessibility, convenience; social interaction – human interface; comparative costs of alternative channels; perceived risk; personal characteristics – demographic, socio-economic.	Survey mailed to 4000 respondents; response rate 7% (286); questionnaire based on variables from literature and focus group discussions; data collected 1998.	15% of respondents over 55 years of age; financial services investigated – current account, insurance , credit & investment; branch network most commonly used to deposit; *ATMs* preferred for cash withdrawals and checking account balance; for current account details *telephone* was the second most used and preferred, but least preferred by older consumers and consumers with lower income; very low interest in using the internet as a delivery channel – older consumers **Factors encouraging adoption** of telephone & internet: lower fees,	Low response rate (7%); biased sample compared to national averages on a range of factors; results limited to trends, no significance testing; factors measured with one item only.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
					improved service quality, save time, 24 hr service; least important - recommend by family & friends **Factors discourage adoption:** security and fear of errors for telephone & internet, also for internet: complicated and access; lack of face-to-face was least important (41%) for younger and less wealth respondents.	
Suh & Han (2002) Internet banking in Korea.	To determine the additional contribution that the trust variable will add to explaining actual use of internet banking.	Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989).	**Dependent**: actual use; **Mediators**: behavioural intention, attitude towards using **Independent:** trust, perceived usefulness (PU), perceived ease of use (PEOU).	Web survey; 845 responses over 2 weeks; internet bank users from 5 banks were invited to participate; multi-item measures modified and adapted from previous studies - seven-point scale.	Most respondents aged 20-40; 50% had used internet banking for > 1 year; 40% clerical employee; Structural model tested using LISREL8.12; Cronbach's alpha range .077 – 0.97; good convergent and discriminant validity; all paths significant; trust had a direct effect on attitude (0.352) & direct and indirect on behavioural int (0.152, 0.171); PU strongest effect on attitude & behaviour; attitude R^2 = 0.645; beh int R^2 = 0.745 , actual beh R^2 = 0.03.	Sampling method limited generalisation of results; only 65% of attitude explained; model only test in internet bank setting with personal customers.
Mattila, Karjaluoto & Pento (2003) Internet banking adoption among mature	Reasons for adoption and non-adoption of internet banking; needs of mature Finnish banking customers.	Diffusion of innovation - stages (Rogers 1983).	No model; exploratory study; study based on a range of items identified from other studies that influences mature consumer adoption; no variables	Survey of 220 +65 years of age respondents; data extracted from Karjaluoto et.al (2002) data set; plus 30 in-depth interviews; 76% of sample did not use	Mature consumer 'late adopters' 55%,' majority' 24%, 'early' 22% of internet banking compared to consumers aged < 65 years 'early adopters' 41%; **Barriers** - lack of personal service, difficulties with computer & internet, security; Factor analysis resulted of two	Define mature as aged 65+ other studies as low as 50 years of age; variables not defined; factors based on item context –'internet

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
consumers; Finland.			defined.	internet banking.	factors - problems with use of internet & security/price/service (printed receipt); if a highly positive attitude toward computers than they often use internet banking; users of internet more likely – mature male, married, university degree, higher household income, professional (χ^2 = < 0.05).	banking' than a single variable; findings lack generalisability.
Karjaluoto, Koivumaki & Salo (2003) Banking difference among non-users; low frequency online bankers & high frequency online bankers in Finland.	Examine the relationship of beliefs and perceptions towards banking behaviour and differences in consumer segments - perception of technology.		No model; exploratory study.	Survey mailed to 3000 respondents; response rate 39% (1,167) after follow-up; customers of a specific bank in Finland.	**non-users** (50%) – use branches and telephone; **low frequency** (5%) 1-3 time per month use online banking; **high frequency** (45%) online banking use weekly or even daily. **high users** – younger, more educated, male dominated, wealthy, married; more professional occupation; non-users opposite to high users; **Non-users** have a level of dislike for PCs, e-mail, internet; neutral towards ATM's, debit/credit cards; likes personal service.	Descriptive study; the strength and importance of belief influence on behaviour is not addressed only direction; findings lack generalisability.
Durkin, Howcroft, O'Donnelll & McCartan-Quinn (2003) Face-to-face	To determine the nature and content of the interaction process in remote & personal delivery channels and predictors (motivators and		Model – banking interaction preferences (2x2) customer interaction - personal or remote; banking interaction - personal or remote; 6 hypotheses ; variables	Survey mailed to 11,750 bank retail customers; response rate 19.7% (2,319); variables measured on level of importance, satisfaction & agreement (Likert type	Face-to-face contact (mean 3.46 with 5 most important) was significantly more important than remote banking (2.84) ; positive correlation between importance of remote banking and face-to-face contact (0.146); 3 motivators and 3 deterrents	Single item indicators are used to measure each variable; study lacking construct validity and reliability; profile of respondents in

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
banking and remote banking (telephone and internet) in the UK.	deterrents) of remote banking communication.		- face-to-face contact; remote banking; **motivators** of remote banking : f-to-f restricted hours; slow speed of service, limited access to staff, limited time; **deterrents**: complexity of use, prefer human interaction, level of service; risk.	scale); analysis – paired sample *t* test; correlation and regression analysis.	predicted importance attached to remote banking explaining 14% - no time to visit branch (R^2 = 0.06), face-to-face contact (R^2 = 0.03+), and other factors include - satisfied with availability of staff, service better in branch, inconvenience of branch hours; some financials too important to arrange over internet.	terms of demographic and banking behaviour not provided; regression model explains a very small percentage of remote banking leaving some 86% unexplained.
Gerrard & Cunningham (2003) Internet banking in Singapore.	To determine if adopter and non-adopters on internet banking differ on a range of innovation characteristics and innovativeness.	Diffusion of innovation characteristics (Rogers 1995).	**Variables** – relative advantage, complexity, compatibility, risk, plus innovativeness.	Survey personally administered to 240 adults in downtown Singapore; based on personal interviews with 8 adopters and 8 non-adopters and empirical research, 36 statements developed and measured on a scale (scale type and number of points not mentioned).	46% - adopted internet banking; using factor analysis with varimax rotation, 8 factors (31 statements), Cronbach alpha's >0.69; factors labelled – social desirability, compatibility, convenience, complexity, confidentiality, accessibility, economic benefits, PC proficiency; *significant differences*(t-test) – non-adopters: less convenient & compatible and more complex and higher PC skills required than adopters; *Adopters* more innovative.	Construct validity – variables not defined; development and testing of measures lacking; proposed variables did not hold; non-probability sample, results cannot be generalised.
Wang, Wang, Lin & Tang (2003)	To examine the effect of computer self-efficacy on users' acceptance of	Technology Acceptance Model (TAM) (Davis,	**Dependent**: behavioural intention; **Mediators:** perceived usefulness (PU),	Survey of 123 respondents by telephone that had previously conducted	Structural model tested using LISREL8.3, fit indices were within range, PU, PEOU & PC significant positive effect on Beh Int (R^2 =	Testing of the extended TAM model is limited to one technology and

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Internet banking in Taiwan.	Internet banking through three beliefs- perceived usefulness, perceived ease of use, perceived credibility.	Bagozzi & Warshaw 1989); Social cognitive theory (Bandura 1977).	perceived ease of use (PEOU), perceived credibility (PC) (security & privacy); **Independent**: computer self-efficacy(CSE).	banking transactions; measures of variables drawn from previous studies and modified to fit the specific internet banking study; new items developed to measure 'perceived credibility'; respondents: 87% aged 20-40; high school /college degree.	0.62), PEOU positive effects on PU & PC, CSE positive effects on PU & PEOU and negative effect on PC, total effect of PEOU on Beh Int 0.76, total indirect effect of CSE on Beh Int 0.56.	user group; actual usage is omitted from model; further variables are needed to improve the prediction of Beh Int; level of internet use not reported omitted.
Curran, Meuter & Surprenant (2003) Self-service technologies (SSTs) - ATMs, telephone and online banking in USA.	To determine the influence of specific attitudes on global attitudes and the influence of both on intention to use three banking SSTs.	Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980), Theory of Planned Behaviour (TPB) (Ajzen 1985) and composite attitude-behaviour model (Eagly & Chaiken 1993).	**Dependent (3):** Intention to use - ATMs, telephone, online banking **Mediators:** global attitude towards SSTs; global attitudes towards firms **Independent:** attitude towards staff, attitude towards ATMs; attitudes towards telephone banking, attitude towards online banking; and the direct effect on intention is also hypothesised.	Survey of 2,352 people by telephone with 628 participating, 27% response rate; multi-item attitude measures – attitude towards staff, attitudes towards specific technologies & global attitude measures (towards firm & SSTs) guided by previous research & measured using a seven-point bipolar semantic differential scale; behaviour intention - single item seven-point Likert type scale.	32% aged over 50; range of income and education levels represented; 24% use employees at banks only; 80% ATMS, 27% telephone, 13% online banking; 50% go to bank 75% of time; 50 % of respondents not sure that banks offered telephone or online banking; factor analysis - 4 specific attitudes & 2 general attitudes as planned; 5 models tested using SEM; *regular SST users* (> 25% use) rely on attitudes towards specific SSTs (i.e. ATMs, telephone) to determine intention to use (R^2 - 0.18 to 0.35); *infrequent users* (< 25%) depend on global attitudes and some specific attitudes to determine intentions to use (R^2 – 0.09 to 0.24).	Findings limited to sample respondents and geographical region; model only tested on selected self-service banking technologies; three item measures of each attitudes towards specific SSTs not adequate to capture the multi-dimensional nature of variables in particular the difference between specific and global attitudes.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Pikkarainen, Pikkarainen, Karjaluoto & Pahnila(2004) Online banking – Finland.	To determine the factors that influence online banking acceptance.	Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989).	**Dependent:** online banking use **Independent (6):** perceived usefulness; perceived ease of use; perceived enjoyment; information on online banking; security & privacy; quality of internet connection.	Survey – 427 respondents drawn from university campus, 2 barber shops & retail company; response rate – 63% (268) scales drawn from previous research; analysis techniques: factor analysis (principal axis) regression analysis.	5 factor solution (quality of internet connection dropped); Adjusted R^2 0.093, sig. variables - perceived usefulness, amount of information; perceived enjoyment ($p < 0.10$); not significant in model was perceived ease of use and security & privacy.	Significant variables explain a very small amount of online banking use; modified TAM model - no path between ease of use and usefulness; independent variables selection not justified; sample not representative of population;
Shih & Fang (2004) Internet banking in Taiwan	To compare the 3 theoretical models in the internet banking context and also measure actual use;	Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975); Theory of Planned Behaviour (TPB) (Ajzen 1991); Decomposed theory of Planned Behaviour (Taylor & Todd 1995a)	As per the 3 theoretical models ; **Dependent:** actual use **Mediator:** behavioural intention **Independent:** attitude, subject norms, perceived behavioural control	Survey of 425 banking customers at a Taiwanese bank (personal interview); items adapted from previous studies to internet banking context; decomposed TPB - 3 attitudinal beliefs – relative advantage, complexity & compatibility; seven-point scale	80% respondents aged 20-40; 34% had more than one internet banking experience; Structural model tested using LISREL8.3; Decomposed TBP had better explanatory power; key findings –subjective norms - behaviour intention path was not significant in any model, Decomposed TPB – compatibility – attitude path not significant, self-efficacy only significant determinant of perceived behavioural control actual usage beh R^2 range 0.20-0.24 beh intention R^2 range 0.46-0.66	Evaluation of findings with previous research limited; generalisability limited; variable reliability low for 'relative advantage' Cronbach's alpha 0.66;

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Kolodinsky, Hogarth & Hilgert (2004) Automatic bill payment (ABT) (preauthorised debits), phone banking (P) & PC banking (PC) in USA.	To determine how innovation and personal characteristics influence the adoption (measured on a continuum) of e-banking technologies.	Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989); Diffusion of Innovation (Rogers 1983).	**Dependent:** adoption (of specific technology); **Independent:** relative advantage, trialability, complexity (simplicity), observability, compatibility, risk, technology involvement; socioeconomic and demographic variables.	Survey administered by telephone; data collected for Federal Reserve Bank in 1999 (1000 respondents) & 2003 (1002 respondents); items to measure innovation characteristics adapted from previous research 8 items, five-point Likert scale.	Average age of: users 41 years, will never use 50 years; ordinal probit regression analysis for each technology; significant effect on use; Relative adv* - ABT, P, PC Compatibility - ABT, P, PC Use other tech - ABT, P, PC Money safety – PC Simplicity – PC; Less risk adverse – PC; Observability – P Trialability – not significant; *Most sig. influence Aged 65 & older less likely to adopt (P, PC); higher income & college education more likely to adopt (P, PC).	Innovation variables measured using a single item scale; probit coefficients more difficult to interpret and compare across studies; construct validity and reliability limited; generalisation of findings could be limited.
Curran & Meuter (2005) Self-service technologies (SSTs) - ATMs, telephone and online banking in USA.	To assess the critical variables that contribute to consumer attitude towards and intention to use SSTs.	Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw 1989); Attitude-behaviour (Fishbein & Ajzen 1975).	**Dependent:** Intention to use SST; **Mediator:** Attitude towards SST; **Independent:** perceived ease of use, perceived usefulness, need for interaction, perceived risk.	Survey of 2,352 people by telephone with 628 participating; 27% response rate; 3 version of the survey - ATMs (215 responses), telephone (207), online (206); multi-item scales adapted from previous research; questionnaire pre-tested & scales factors analysed prior to main study; 80% used ATMs, 27% used telephone & 13& used internet banking.	Demographics as per (Curran, Meuter & Surprenant 2003); models tested using SEM; sig. variables in each banking model ATM - usefulness, ease of use, attitude $R^2 = 0.58$; Telephone – usefulness, attitude $R^2 = 0.48$; Online - risk(+), attitude $R^2 = 0.40$; Intention to use ATM $R^2 = 0.42$; telephone 0.32; online 0.19, need for interaction not significant in any model.	Findings limited to sample respondents and geographical region; large amount of unexplained variance in models; role of 'need for interaction' needs further contextualisation to banking context; perceived risk is too narrowly defined; lacking construct validity.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Kaynak & Harcar (2005) Online bank users & non-users in USA.	To profile online bank users/non-users – demographic, usage rates; determine difference between groups on select criteria.			Survey drop-off/pick-up method to 350 respondents, quota sampling; 93% response rate (327); items generated through an iterative process drawn from literature in bank marketing & consumer behaviour.	54% online bank service users – mostly male, high-income, younger, mix of professional & trade related, higher education; higher users of the internet; convenience of ATMs important to both groups; *Reasons for non-use of Online banking* - security concerns; satisfaction with branch service, inability to talk face-to-face, no paper receipts, fees, time to learn are the more important reasons cited.	Sampling method limited generalisation of results; data collected by undergraduate students.
Lee, Kwon & Schumann (2005) Internet banking in USA.	To segment the market into 3 segments: current adopters & non-adopters (prospective adopters & persistent non-adopters) and to examine a range of diffusion factors that affect adoption behaviour.	Diffusion of Innovation (Rogers 1995).	**Dependent**: 3 categories of adoption /non-adoption **Independent:** *relative advantage*– (convenience, quick service, monetary benefits, location); *perceived risk* – (security, size of provider, familiarity); *compatibility* – (existing services (ATM, telephone), internet medium); *experience with computer technology.*	Online survey 1600 respondents; 245 respondents excluded - not meet criteria; usable sample 1349; single item measures for each variable developed for this study.	353 current internet bank adopters; 364 prospect adopters (to adopt in next year); 632 persistent non-adopters (not likely to adopt in next year); approx 15% of sample over the age 50; results of a multinomial logit analysis (full model (sig predictors) - convenience, monetary benefit, security, compatible with existing services (ATM & phone banking), computer use at work; running models with comparisons between categories resulted in more sig. predictor variables with some differences between categories; drivers of non-use category – perceived risk, not compatible; lack experience with computer technology.	Construct validity and reliability limited; single item measures; sampling method limited generalisation of results.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Wan, Luk & Chow (2005) ATM, internet banking, branch banking and telephone banking in Hong Kong.	To obtain insights into factors that can influence adoption of banking channels among Hong Kong banking customers.		Dimensions extracted from previous studies & refined using interviews with bank managers; 11 dimensions proposed to be associated with adoption of a banking channel; demographic factors - gender, age, income, education & occupation.	Survey of 314 respondents – 150 mall intercept, 164 telephone interview.	Sample skewed towards younger, more educated, wealthier, professional when compared to Hong Kong population; highest adoption –ATMs, than internet banking, branch banking & telephone banking; 11 dimensions resulted in 4 factors – convenience, informativeness, user-friendliness & assurance; level of beliefs varied across the 4 banking channels; no relationship between branch banking and 4 beliefs; some demographic relationships found with internet banking & branch.	Limited generalisability; sample not representative of population; limited construct validity
Jih, Wong & Chang (2005) Internet banking in Taiwan.	To explore the impacts of perceived risk, perception of risk-reduction measures, personal involvement, familiarity on willingness to use internet banking and relationships among mediator/ independent variables.	Perceived risk (Jacoby & Kaplan 1972).	**Dependent:** willingness to use internet banking; **Mediator/ Independent:** online banking involvement, familiarity with internet, perceived risk, perception of risk-reduction measures.	Survey of 538 respondents, online survey linked to a banks' homepage and to several bulletin boards; involvement, perceived risk, risk reduction measures & willingness to adopt multi-item measures five-point Likert scale; familiarity – nominal scale; some items developed from literature and adapted for internet banking.	70% male; predominate age 20-39; 90% college degree; professional /semi professional; items factor analyses: Involvement - 2 factors; perceived risk- 5 factors; risk reduction measures- 7 factors; willingness to adopt – 1 factor; *multiple regression* - willingness to adopt predicted by involvement (dependency & concern), risk reduction factors (reduction of non-financial risk & social risk) & functional risk (-) $R^2 = 0.48$; canonical correlations used to test relationships between other variables – see paper.	Sampling method limits generalisability of findings; discriminant and convergent validity not tested for measured variables.

Table B.3. Mature consumer banking studies

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Gilly & Zeithaml (1985) Comparison of elderly (aged +65) and nonelderly consumer acceptance of retailing technologies – EFT, ATMs, grocery scanners in the USA.	To determine differences between elderly and nonelderly in relation to stages of adoption – awareness, decision, adoption, confirmation/ satisfaction.	Stages of adoption (Rogers 1983).		Exploratory/descriptive design. 2 surveys mailed to 2500 aged +65 (20% response); 2500 aged 18-64 (25% response) drawn from 2 USA states – car registration list; questionnaire developed for study to explore stages of adoption of technologies; yes/no responses to statements.	Elderly more likely to hear about ATMs & EFT directly from bank followed by newspapers; a larger % of the elderly compared to nonelderly had use EFT; for ATMs only a small % of the elderly had used; elderly said - EFT 'safe' & 'more convenient'; ATMs 'too impersonal' & 'not as safe'.	Generalisability of results limited; questionnaire design and administration - inability to clarify or probe, lack of control over who completed survey.
Zeithaml & Gilly (1987) Comparison of elderly (aged +65) and non-elderly consumer acceptance of retailing technologies – EFT, ATMs, grocery scanners in the USA.	To determine reasons for use and non-use; profile of elderly awareness, trail & adoption; elderly 'accepters' & 'resisters' identified; difference with non-elderly.	Stages of adoption (Rogers 1983).		Exploratory/descriptive design. 2 surveys mailed to 2500 aged +65 (20% response); 2500 aged 18-64 (25% response) drawn from 2 USA states – car registration list; questionnaire developed for study to explore awareness, trial & adoption of technologies.	**ATM** – 4% elderly adopt, main reason - convenience; non-adopters prefer customary way and enjoy personal interaction, while non-elderly didn't have an ATM card. **EFT** – 45% elderly adopt – main reasons – convenience & safety while non-adopters stated 'don't like' , 'don't need' *Elderly* – higher education significantly relate to awareness, trial & adoption while income related to the awareness & trial of technology; higher income, multiunit dwellings (apartments), and greater exposure to print media discriminated between elderly	Generalisability limited due to sampling approach; confidence in findings are limited especially ATM-elderly users, very small sample (16 respondents); results of elderly users limited to EFT and scanner use.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
					accepters & resisters; Elderly - main sources of information on ATMs & EFT – bank, newspapers; very small % heard about the innovation from a friend or neighbour.	
Kwan (1991) Elderly ATM users and non-users in Perth, Australia.	To determine level of use of ATMs and identify differences between users and non-users – psychographics and demographics.			Survey personally administered to 165 individuals 55+ years of age, members of a senior citizen centre; 3 focus groups and literature used to inform the development of the questionnaire; Age:55-64 (22%); 65-74 (50%), 75+ (28%).	28% respondents used ATMs; a further 7% owned a ATM card but did not use it; use varied from once a week to more than 4 times a week; significant reasons for not using ATMs (t-test results) 'safety' and 'enjoyment from going to the bank'; users indicated 'convenience' was a key reason; users - younger, white collar professions and better educated ($\chi 2$ test sig).	Exploratory study; findings lack generalisability; construct validity and reliability limited.
Bednar, Reeves & Lawrence (1995) ATMs versus human customer service in banks in USA – state of Arkansas.	To determine the importance of technology to different age groups in banking.			Survey mailed to 16,305 banking customers from 41 community banks; response rate 36% (5870); exploratory study; no details on questionnaire development.	47% respondents > 56 years of age; importance rating for ATMs and other automated services decreased with age; all customers prefer to deal with people, but older consumers prefer it more .	Significant differences between groups not tested; previous research findings not used to guide or extend research.
Smither & Braun (1994) Older adult use of ATMs, USA.	To determine individual differences and attitudes that influence use of ATMs.		No model or variables identified.	Survey self-administered to 156 respondents (at least 55 years of age) from senior centres in Orlando; past literature informed the development of items to	Mean age 70; range 55-86; 32% ATM users ; 28% (31) non-users had tried using an ATM; principal component analysis resulted in two factors: 'apprehension' & 'assurance'; MANOVA used to determine	Convenience sample; complexity of factors reduces understanding of drivers and inhibitors of users

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
				explore convenience, reliability, efficiency, complexity, safety & control of ATMs on 5-point Likert-type scale; factor analysis: *apprehension* – complexity, trust, control, difficult to use, less reliable, less safe, prefer human teller; *assurance* – safe, comfortable, convenient, in control.	differences - *non-users*: lower apprehension and assurance indicating more negative attitude towards ATMs; no difference on education; χ^2 analysis on demographics – difference in dwelling type only; *non-users* divided into tryers & non-tryers – difference non-tryers more apprehensive.	and non-users of ATMs.
Rogers, Calrera, Walker, Gilbert & Fisk (1996) ATM users and non-users - includes older adults - USA.	Profile users and non-users across 4 ages groupings in terms of demographics, usage rates, difficulties, reasons for non-use; Groups - <35; 35-54; 55-64 (young-old), 65+ (older).			Exploratory/Descriptive design; Survey - mailed to 9000 respondents from 2 major US cities drawn from automobile registration & telephone lists; 17% response rate (1562); 233 (15%) aged 55-64, 445 (28%) aged 65+; items for questionnaire generated specifically for study.	Young-old – 54% used ATMs; old adults - 33% used ATMs; many in the older 2 groups had ATM cards but did not use them; older adults users were younger, better health & better educated than non-users; no difference between young-old adults; all users across all age groups have more experience & feel comfortable with computers; regression results - predictors of use of ATMs were -use technology (20%), age additional (4%) & computer use additional(1%); 9% older adults users never felt comfortable using ATMs; difficulties for older user groups - 'see the screen' & 'wait in line; reasons for non-user, older groups - 'prefer people to machines' , 'safety'.	Biased sample – more educated, higher income & over-representation of older adults; Close-ended response categories thus limiting possible other reasons for non-use and difficulties confronting users.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Rogers, Gilbert & Cabrera (1997) ATM older (61 to 81 years of age) adult users and non-users - USA.	To determine 'older adults' use of ATMs and problems confronting users and non-users.			Exploratory design; Telephone interview of 100 older adults followed-up by 24 in-depth interviews.	50% actual used ATMs; Older individuals less likely to use ATMs and less frequently; older males are more aware of & use ATMs than older females; Reasons for not using – 'no need'; 'safety concerns', 'bank during day', 'prefer people' – 62% of non-users are interested in training; **Interview findings** – *Non-users* – 'safety' main issue; *Users* - 2 groups intermediate (use ATM once a month) , frequent user (once a week); not aware of all the functions, still had some 'safety' concerns (mean 6.6 (scale 1 not satisfied – 10 satisfied); other issues 'glare on screen', 'lining up keys with buttons', 'person slow to respond –speed'.	Findings cannot be generalised outside of the study.
Mattila, Karjaluoto & Pento (2003) Internet banking adoption among mature consumers; Finland.	Reasons for adoption and non-adoption of internet banking; needs of mature Finnish banking customers.	Diffusion of innovation - stages (Rogers 1983).	No model; exploratory study; study based on a range of items identified from other studies that influences mature consumer adoption; no variables defined.	Survey of 220 +65 years of age respondents; data extracted from Karjaluoto et.al (2002) data set; plus 30 in-depth interviews; 76% of sample did not use internet banking.	Mature consumer 'late adopters' 55%,' majority' 24%, 'early' 22% of internet banking compared to consumers aged < 65 years 'early adopters' 41%; **Barriers** - lack of personal service, difficulties with computer & internet, security; Factor analysis resulted of two factors - problems with use of internet & security/price/service (printed receipt); if a highly positive attitude toward computers than they often use internet banking; users of internet more likely – mature male, married, university degree, higher household income, professional (χ^2 = < 0.05).	Define mature as aged 65+ other studies as low as 50 years of age; variables not defined; factors based on item context –'internet banking' than a single variable; findings lack generalisability.

Study, Year and Context	Purpose of Study	Theory Base	Variables and Model	Research Design	Major Findings	Limitations
Darch & Caltabiano (2004) ATM banking practices of older adults in regional Australia.	To explore the relationship between ATM usage and demographics, user situational and attitudinal variables.		**Dependent :** ATM use; **Independent**: perceived user comfort over ATM banking, perceived user control over finances using ATM, technologies used; range of demographic variables.	Survey – 139 volunteers aged 60 years and above; convenience sample from Uni of the Third Age; senior citizens' centres; self-administered questionnaire; item development not reported.	Respondents aged 60 -70 (38%), 71-80 (44%), 80+ (18%); 45% ATM users; 74% limited computer experience; results from stepwise logistic regression, 'perceived control', perceived user comfort' & 'use of technologies' had a significant ($p < 0.05$) effect on ATM use, age, education, frequency of computer use not significant; bivariate analysis, differences - non-users older age, lower level of education, less freq use of computer, lower no. SS banking facilities used.	Findings cannot be generalised; construct validity and reliability limited; measurement procedure not reported.

Appendix C: Summary of in-depth interview findings

Table C.1. Technology and change

Table C.2. Resistance and change

APPENDIX C

Summary of In-Depth Interview Findings from Mature Consumers

Stage 1 of the qualitative research was undertaken to provide an insight into the banking practices of mature consumers. More specifically, the objective of the in-depth interview stage was to gain an understanding of mature consumers' perceptions, attitude and behaviour towards using self-service banking technologies and face-to-face banking services. As no prior research had been conducted on the banking practices of mature Australian consumers, this was an initial exploratory stage to investigate this market. In-depth interview technique was considered most appropriate at this stage as it provided maximum flexibility in questioning and the ability to seek deeper explanations on issues when required (de Ruyter & Scholl 1998). It was also anticipated that mature participants would discuss banking practices more openly in one-on-one interview basis than in a group. Further, interviews were conducted in the participant's home where they were more comfortable and in a safe environment at a time convenient to them.

As the purpose of this study was to investigate users and non-users of SSBTs, these two categories were used to initially screen participants. To ensure that a range of views and opinions were solicited, participants were selected from across the 50 to 85 age bracket; both genders; range of education levels and occupations including retired. For users, participants were required to use at least one SSBT. Interviews were conducted until no new information was generated, which resulted in ten (10) non-user interviews and six (6) user interviews. A semi-structured interview protocol was developed to guide the interview process. The guidelines provided by Gruca and Schewe (1992) were followed when conducting in-depth interviews with mature consumers participants

Extraction of Key Comments from Interviews with Non-Users of SSBTs

General Technology and Computers

- Have a basic knowledge about computers, but not really interested in using them;
- No experience with computers however thinks technology is good, but not interested in using;

- Feel comfortable using a computer (not my wife), son assisted me to learn the computer and internet;
- Would be very nervous using a computer and feel uncomfortable, technology is all too confusing;
- It is alright to learn technologies to make life easier if you have the education;
- Would like to use a computer but feel incapable of using one;
- Don't feel comfortable with any technology, too late in life to learn.

Face-to-Face Banking

- Like to see my passbook and know what transactions have occurred;
- Convenient, easy, familiar, and personal as I am welcomed by name;
- It is the personal thing with the teller and you get to know the girls, they explain things and advise me on how best to invest my money;
- Current method is simple and I feel comfortable, I try to avoid complex situations;
- It allows me to explain what I want and to ask questions, I can see the person and it is so much easier;
- We always used this method of banking, it is convenient, feel safe, more confident, and like the pleasant social interaction;
- Always visit the same branch and know some of the tellers, don't mind waiting in line;
- Have always done it this way all our lives and would feel uncomfortable going to another branch.

Self-Service Banking Technologies

- Would require effort but cannot be bothered at present;
- Would be stressful learning the processes and take time but I could master it;
- Telephone banking would be more private than ATMs;
- Remembering a pin number would be a problem – you just have to depend on your mind;
- Would find it difficult to listen to instructions on the phone – don't like it;
- Would find telephone banking difficult/complex when transferring account numbers on a piece of paper to the phone key pad;
- If using an ATM people in line would be watching you/looking over your shoulder, could get your pin number, grab your money – it would be very stressful to use an ATM;
- Using an ATM would make me anxious, too may buttons to push, could be knocked over the head;
- Don't want to be embarrassed making mistakes or leaving something behind at the ATM;
- You don't know what is going on behind the wall, very hesitant about ATMs, security concerns;

- With ATMs you are never sure what to do next even though it comes up on the screen;
- With internet banking I am not sure if it is secure, always in the back of my mind however son assures me that it is secure;
- Had a security scare with a credit card, makes me very uneasy with all the banking methods; don't want cards hooked to main account as I am concerned about security.

Other Comments

- Having control over my banking is very important so I can remain independent;
- Too difficult to change and want to stay with my current method; have health to focus on and my overseas trip;
- I don't feel motivated to use these methods right now – it is there to be thought about;
- Need to discuss banking changes with daughter and then would feel more comfortable;
- Would not see learning to use an ATM as difficult if the right attitude and motivated;
- I like to deal with people, not machines;
- Not happy about making changes;
- Cannot see any benefits in using ATMs;
- Due to our major accident we are just coping with things as they are; no energy to try new things.

Extraction of Key Comments from Interviews with Users of SSBTs

General Technology and Computers

- Avid user of technology, fully comfortable using it, internet makes life more interesting as it gives access to support facilities and information; I like changes in technology;
- Experience with technology improves my confidence and willingness to use it;
- Considers that instructions on how to use some pieces of technology are not written for consumers;
- Think that people their age should learn to use technology, but that does not mean they are going too;
- Totally incapable of using a computer, don't have the enthusiasm to learn, prefer to stick to what we know.

Face-to-Face Banking

- Considers that counter service is sometimes almost an insult with bank teller not properly trained, they make mistakes, and use inappropriate language. This annoys me and why I use an ATM;
- In the past used face-to-face service much more and expect to use it more once I retire. Banking hours are not convenient with work;

- It is lovely to have a voice at the end of a phone or personal service from a bank teller, more pleasant, congenial and social;
- Can get passbook updated, actually see transactions and have queries answered.

Self-Service Banking Technologies

- ATMs provide convenience when I want to get money out as they are at the shopping centre and I don't have to wait for a bank to open and queue to be served;
- Using ATMs gives me personal control over how I spend my time;
- Feel confident in using an ATM, however also slightly apprehensive that you couldn't trust it;
- Use ATMs to withdraw money to pay account in cash (the old school) – don't use EFTPOS;
- Problems with seeing ATMs screen with sun shining on it, difficult to see; also changing formats, need to standardise;
- ATMs are a threatening environment for some people, as I get older I feel I am more vulnerable;
- ATMs have a habit of consuming your card for no reason;
- Even though I use an ATM, prefer face-to-face service;
- Telephone banking was very daunting the first time, I had to take notes; good for checking balance;
- With internet banking you see straight away all banking statements, very easy to use and gives me good control;
- Internet banking at home, I may not be able to afford the service provider when I retire;
- Internet banking - security concerns;
- Find you have to work twice as hard to keep track of what's going on with your own money. Passbooks was easier for tracking transactions;
- Sneaking feeling that it is a lot easier to get ripped off than it used to be with a passbook.

Other Comments

- Problems expected in the future with eyesight, brain slowing, may find it hard to remember pin number;
- Prefer larger screen and larger key pad as dexterity of fingers is a problem;
- Trouble looking at an ATM screen due to wearing bifocals;
- Accept that this is a natural evolution to adopt new methods, I use all methods;
- Prefer if there was just one card;
- I believe that carrying cash is dangerous, especially for older people.

Technology and Change

Participants were asked a series of questions about technologies in general and more specifically SSBTs. In general *users* of SSBTs were more likely to use a range of technologies, feel comfortable and confident using them and they believed that they provided more control than dealing with people such as using an ATM. For *non-users*, they acknowledge that technologies have made life easier and that they slightly agree they should learn how to use them, but in most cases they are not interested or willing to adopt them. They feel more in control when dealing with people and it is important that they are fully in control of their banking affairs.

Table C.1. Technology and change

Statements	Mean Users n = 6	Mean Non-users n = 10
1. Technologies such as computers, calculators, cordless phones and other electronic gadgets and services have made life easier.	4.8	4.3
2. Using calculators, computers, and other electronic gadgets is usually too confusing to bother with.	1.6	4.0
3. Older people should learn to use electronic gadgets and services that can make their life easier.	4.2	3.8
4. I feel like I'm more in control when dealing with people than with automated systems i.e. ATM's.	2.2	4.6
5. It is important that I am fully in control of my own banking needs.	5.0	4.9
6. I need face-to-face contact to explain what I want and to answer my questions.	2.2	4.7
7. I feel comfortable with using technology.	4.2	2.9
8. Experience with technology improves my confidence and willingness to use it.	4.8	2.9
9. I am comfortable adapting to new technological innovations.	4.2	2.6
10. Banking technologies are difficult to use.	2.8	3.6

Likert scale: 1 = strongly disagree 5 = strongly agree

Resistance to change

Based on the four questions addressing resistance to change outlined in Table C.2, the findings indicate there is a strong tendency for *non-users* to resist any change to their current banking practices and thus maintain the status quo, while *users* tend to

be slightly less resistant to change. Willingness to adopting a new SSBT method cannot be determined from this information.

Table C.2. Resistance to change

Statements	Mean Users n = 6	Mean Non-users n = 10
1. My preference for using my main banking method would not willingly change.	3.8	4.8
2. It would be difficult to change my beliefs about my main banking method.	2.8	4.4
3. Even if family recommended another method of banking, I would not change my preference for my current main method of banking.	2.6	4.4
4. To change my preference from my current main method of banking would require major rethinking.	3.8	4.3

Likert scale: 1 = strongly disagree 5 = strongly agree

Appendix D: Summary of focus groups findings

APPENDIX D

Summary of Focus Group Findings from Mature Consumers

Based on the findings from stage 1, stage 2 of the qualitative research was undertaken to extend the researchers depth of understanding about technology use and banking practices of mature consumers. Information gained from this stage assisted in the development and design of the questionnaire. The focus group technique was selected at this stage of the research as the group interaction provided quality information and insights that could not be achieved from other methods in an efficient manner (Carson et al. 2001). Selecting a secure and familiar location and one free from background noise also facilitated the process.

With the assistance of two Senior organisations, users and non-users of SSBTs were recruited for two focus groups (one user and one non-user) to be held at each of the respective organisations normal monthly meeting location. Each focus group participant was provided with a letter of introduction that outlined the purpose of the study and why their assistance was being sought, described the nature of a focus group, provided assurance that all information would remain confidential and personal identification would not occur, and details of the location with start and finish time. On arrival morning tea was provided along with refreshments during the focus group session.

An interview protocol was developed to guide the focus group discussion with slight variations in questions for users and non-users of SSBTs. A focus group booklet was provided to each participant to collect information on access and use of technology, financial banking transaction methods, SSBT beliefs and attitudes, and demographic data.

In total 28 mature consumers participated in the four (4) focus groups with slightly more females than males. They ranged in age from 50 to 84 years of age with good distribution of users and non-users across the age groups. Participants lived in a mix of one and two person households. The education level of non-users was mostly primary level education with a couple completing junior, while the education level of users was evenly distributed from primary through to postgraduate degree. Nearly all

participants were retired with previous occupational experience spread across managerial, professional and non-professional categories.

Access and Use of Technology

Noticeable difference in access to technology was evident with users of SSBTs having higher access to personal computers, e-mail and internet. Only one non-user of SSBTs had access to a computer. In terms of computer literacy, users of SSBTs described themselves as poor to average, while non-users of SSBTs said they had little or no computer literacy. Non-users perceived that most technologies such as mobile phone, word processing, e-mail and SSBTs were too difficult or very difficult to use while users of these technologies described them as very easy to fairly easy to use. With half of the users of SSBTs not using e-mail, internet and internet banking, they considered these technologies as being slightly more difficult to use.

Financial Banking Transaction Methods

Face-to-face banking was used weekly by non-users of SSBTs, while users of SSBTs used this method a couple of times a month. Users of SSBTs used EFTPOS and ATMs weekly, while phone and internet banking were used rarely. In-store use of credit cards occurred a few time a month by users, while non-users reported very rare use of credit cards. Rare use of credit cards was reported for phone or internet transactions by users. On average, SSBTs users reported they had been using EFTPOS for 8.5 years; ATMs for 16.4 years; phone banking for 3.1 years and internet banking 0.3 years.

SSBT Beliefs and Attitudes

The following questions in Table D.1 explored mature consumers' resistance to change and reveal similar findings to those in stage 1. Non-users of SSBTs exhibit a stronger resistance to change than the users of SSBTs.

Table D.1. Resistance to change

Statements	Mean Users n = 15	Mean Non-users n = 13
1. My preference for using my main banking method would not willingly change.	3.3	4.5
2. It would be difficult to change my beliefs about my main banking method.	2.7	4.1
3. Even if family recommended another method of banking, I would not change my preference for my current main method of banking.	2.6	4.1
4. To change my preference from my current main method of banking would require major rethinking.	3.0	4.5
5. I would resist changing my current method(s) of banking.	3.0	4.5

Likert scale: 1 = strongly disagree 5 = strongly agree

To examine the level of commitment mature consumers had to electronic banking services, the following dimensions were explored: cognitive (Q1), attitudinal (Q2) behavioural (Q 3,4) and overall (Q5) dimensions. There is a stronger tendency for users of SSBTs to be more committed to electronic banking services than non-users.

Table D.2. Commitment to using banking service methods

Statements	Mean Users n = 15	Mean Non-users n = 13
1. I consider electronic banking services[a] to be my first choice when I need to conduct my banking.	4.1	1.4
2. I really like/would like using electronic services methods when conducting my banking.	3.8	1.4
3. As long as the face-to-face method of banking continues, I doubt that I will use an electronic banking service method.	1.9	4.5
4. The next time I require banking services, I will use an electronic service method.	4.2	1.4
5. Overall I consider myself to be a loyal user of the face-to-face method of banking.	4.8	2.4

Likert scale: 1 = strongly disagree 5 = strongly agree
[a] Electronic banking services refers to EFTPOS, ATMs, phone banking and internet banking.

Extraction of Key Comments from Focus Groups held with Non-Users of SSBTs

General Technology and Computers

- I am scared to use a computer; there seems to be so much to do to just bring something up on the screen;
- If I had to become familiar with using a computer I would have no problems;
- If you use the technology 3-4 times a week you don't fear it anymore; the problem is we don't use it often enough;
- Rely on family to help me to acquire some of the services that are technology based – ATMs, e-tickets;

Face-to-Face Banking

- I like face-to-face because of the friendly face across the counter;
- With face-to-face you can settle any problems that you might have; if you are handed the wrong money or there is a discrepancy or disagreement with your passbook or bank account these things can be settled; you can't argue with an ATM;
- We want to be out doing things and communicating with other people rather than with a machine; this is coming through strongly that we want to talk to the people behind the counter; it is the social interaction and the feeling of well being and the lovely friends you make;
- In the branches (building society) they know you by name and you know them by name;
- …for us it is an outing, you get dressed, get the car out and go to the bank; you maybe talk to someone, meet a friend you know and the time factor doesn't come into it; time factor is irrelevant as far a retirees are concerned;
- By knowing people at my branch and, if I have a query I can ask without being embarrassed;
- It gives you confidence in knowing that your bank account is correct; you have your passbook or pieces of paper;
- I keep using personal service at the bank because it does not add further stress to my life; I feel comfortable;
- Having that control is important with a passbook; the knowledge of knowing what is there; having that comfort zone;

Self-Service Technology Banking

- I have had an EFTPOS card for 2 years but haven't used it – just a bit stubborn;
- I can see an advantage of having EFTPOS where you don't have to carry money around with you;
- The girls at the bank always come out to the ATM with me; I couldn't do it by myself;
- Don't feel confident to use an ATM; need someone with me;
- Have heard that it is safer to get money out at the store than rather use an ATM;
- You draw $1000 to pay bills at an ATM and someone is behind you – you are not going to get too far are you? Banks here don't have security for ATMs;
- I wouldn't be happy depositing my money at an ATM. I wouldn't be able to sleep at night - worry about the money going astray;
- I wouldn't be able to use the ATM due to problems with my eyes – shimmering that occurs on the screen;
- To see the ATM screen I would have to put my glasses on; this is a nuisance; would be hard to focus in with my eyes;
- This is the hardest part isn't it, to remember the PIN;
- Using any of those methods you have no way of checking if it is done; you work against the bank and you know who wins;
- Using the ATM system you have only a receipt and you have to rely on the integrity of the system;
- Receipts for EFTPOS and ATM, we would end up with a cake tin of these things and then trying to add them up and get a balance because the bank only sends a statement every three months – this does not suit me;
- If the card won't work, that is embarrassing, especially if you are standing in a queue;
- I don't use these technologies as I live in the country and want to support our post office or it will close; can do most things there; also a social occasion when visiting;
- Something came up about phone banking, I said I should use it, but I want to keep your business (chemist) going as I need to have the business shop here in my area;
- I left my bank because they were always at me to go and use the ATM.

Training

- If they sat you down and said you do it and I will tell you what to do, I think you would learn quicker; they don't do that at the bank; they give you the card, they hit the buttons and then here is the cash; it scares you as they do it so quickly;
- Literature and brochures from banks are not straightforward, too long, tiny print, lots of grey areas – not clear;

Other Comments

- A lot of things happen too quickly for our generation I think; it is the speed of change; mentally it causes problems; probably why we turn off a bit…;
- You have to realise that at our age we are a pretty conservative generation; if we don't have a use for some of these technologies we are not going to familiarise ourselves with them;
- I think motivation tends to fade out once you turn seventy;

Extraction of Key Comments from Focus Groups held with <u>Users</u> of SSBTs

General Technology and Computers

- I doubt if I will ever use a computer, e-mail or the internet;
- I would love to have access to the internet, but don't think I have the brains to use a computer and cannot afford it;
- I am hopeless with new technology, it's the memory as I cannot remember the instructions;
- I was determined to use the computer, at first frightened to push buttons as I might loose things, now its fine, just familiarity;
- I was on the internet and found it exceedingly expensive; no longer use it.

Face-to-Face Banking

- Girls are the same and they adapt to you. It is a pleasant interchange;
- The chaps and girls have been there for a long time and it is like a family gathering. They ask about your health and the rest, it is just so friendly;
- They advise you if you have too much money in your account and how to get a better return;

Self-Service Technology Banking

- I have used EFTPOS for a couple of years and started using it because I had my bag stolen. I had quite a bit of money in it as I was paying bills;
- The thing that I find irritating with EFTPOS is there is a limit…they say it is for security reasons;
- EFTPOS is a safe way of having access to my money; it is just so easy to get extra money out when paying for the groceries;
- With EFTPOS and credit card I have an audit trail and know exactly where the money has gone; control is important, have limited funds like most people here;
- I would use EFTPOS occasionally but controlled. I take money out of an ATM and I know how much I have. If you run out you know where you are;
- If the ATMs were the same and stayed the same I could learn to use them (visually impaired participant);
- I don't like people standing behind me at an ATM, looking over your shoulder and watching me put in my PIN; they could take your money; not safe;
- Always stand very close to the ATM;
- I use ATMs for convenience and not to have a lot of money in the house;
- I always count my money from the ATM, got short changed on one occasion;
- Very frustrating when you go to an ATM and find it closed;
- Use technology methods as they are convenient and saves time;
- No problem with remembering the PIN, but the day will come;
- Quicker to do phone banking than use the internet – I have done both;
- I don't know if the internet is very easy or very difficult, I have never used it because I don't know how.

Training

- …I think a lot of us need people of our own age group to talk to us about using the technology, and frequently we don't have this.

Other Comments

- I have a hearing problem and I just cannot hack those metallic voices on the phone;
- My eyes are no good and they cause some problems when using the ATM, also the machines are getting smaller and more difficult to see; afternoon sun is also a problem on the screen;

- I don’t use a credit card and I don’t like one. I have a thing about ringing up and giving my details over the phone, so I find I can go and pay all my bills at the post office and you are also employing someone local;
- Yes I am open to change (use other SSBTs) because I think that you have to keep up with the times a little bit even if it is a bit difficult. You have to try to get your best account, your best services or the least amount of charges so you have to be willing to keep an open mind about changing.

Appendix E: Item - variable matching instrument

Assessment of Banking Characteristics

For this exercise, banking methods are grouped under two areas:

1. Face-to-Face Service

This method of banking service requires you to personally go to your financial institution (bank, building society, credit union etc.) or a branch, agency or Australia Post to conduct your financial transactions with a service person at that location.

2. Self-Service Banking Facilities

Self-service banking facilities include the following methods:

- **EFTPOS** – stands for Electronic Funds Transfer at Point of Sale
- **ATM –** stands for Automated Teller Machine
- **Telephone Banking** – automated service available via a touch tone phone
- **Internet Banking –** requires a computer with internet access

Characteristics of self-service banking methods

Perceived ease of use - refers to the degree to which self-service banking is free from effort and easy to understand, learn and use.

Compatibility – is the degree to which using self-service banking is perceived as being consistent with their existing values, previous skills and experiences and aligned with their current needs.

Perceived usefulness - refers to the extent to which consumers view self-service banking technologies as providing more convenience and flexibility, greater control, security and economic benefits, and an improvement in service over face-to-face service.

Technology discomfort - refers to the tendency of an individual to feel uneasy, apprehensive, fearful, and stressed or have anxious feelings about the current or future use of self-service banking methods.

Perceived risk – refers to the degree of uncertainty about the adverse consequences of using self-service banking methods. Physical risk (personal safety), performance risk (functional), psychological risk and financial risk are the relevant aspects of perceived risk.

Personal contact – is the desire to participate in pleasant interpersonal interactions with a service provider, giving the customer a feeling of greater reassurance and control, being able to query and sight transactions and have relevant banking information explained in person.

Self-efficacy- refers to a belief in one's perceived capability and confidence in being able to successfully use self-service banking methods.

Instructions

To complete this assessment, read the statement on the left side of the table below, and then based on the definitions provided for each self-service banking characteristic, decide which characteristic the statement is most closely aligned with and place a tick or cross in the appropriate box on the right side of the table. If you are unable to decide, place a tick or cross in the don't know box on the far right.

Statements	**Compatibility**	**Perceived ease of use**	**Perceived usefulness**	**Technology discomfort**	**Perceived risk**	**Personal contact**	**Self-efficacy (perceived ability)**	**Don't know**
I believe that internet banking is easy to use.								
I believe that the telephone banking method suits my current banking needs.								
Compared to face-to-face banking, self-service banking methods provide greater control over managing my financial affairs.								
I am afraid to use self-service banking facilities for fear of forgetting my pin number.								
I am concerned that internet banking does **not** provide a secure environment for transacting my financial affairs.								

Statements	**Compatibility**	**Perceived ease of use**	**Perceived usefulness**	**Technology discomfort**	**Perceived risk**	**Personal contact**	**Self-efficacy (perceived ability)**	**Don't know**
I need face-to-face contact to explain what I want and to have my financial questions answered.								
I feel confident in my ability to withdraw cash from my account using an ATM.								
The position of some ATMs makes it difficult to see the screen and operate the machine.								
I think that internet banking complements my style of banking.								
Compared to face-to-face banking, self-service banking methods provide an improvement in service quality.								
I would feel comfortable using EFTPOS.								
I avoid using an ATM for fear of my own safety.								
When using EFTPOS I am concerned that my card may **not** be accepted.								

Statements	Compatibility	Perceived ease of use	Perceived usefulness	Technology discomfort	Perceived risk	Personal contact	Self-efficacy (perceived ability)	Don't know
Interaction with a service person to transact my financial affairs provides me with greater reassurance.								
I am capable of transferring funds between my accounts using telephone banking.								
I feel like I am more in control of my financial affairs when dealing face-to-face with a service person than when using self-service banking facilities.								
I avoid using an ATM for fear of operational difficulties.								
I believe that telephone banking is cumbersome to use.								
I think that the ATM method fits well with the way I like to handle my financial affairs.								
Compared to face-to-face banking, self-service banking methods enhances my ability to handle my banking needs.								
I feel apprehensive about using telephone banking.								

Statements	Compatibility	Perceived ease of use	Perceived usefulness	Technology discomfort	Perceived risk	Personal contact	Self-efficacy (perceived ability)	Don't know
I hesitate to use an ATM for fear that the machine will **not** give me my cash.								
Being able to check the transactions and balance in my passbook after a personal service encounter, reassures me that my financial affairs were handled correctly.								
I consider that I have the ability to pay an account using EFTPOS.								
Using EFTPOS is well within the scope of my abilities.								
I worry that banking over the internet will allow unauthorised people access to my accounts.								
Conducting my financial affairs with a service person is a more pleasant and enjoyable experience than using self-service banking facilities.								
Using EFTPOS would be easy for me.								
Self-service banking methods are **not** compatible with the way I like to bank.								

Statements	Compatibility	Perceived ease of use	Perceived usefulness	Technology discomfort	Perceived risk	Personal contact	Self-efficacy (perceived ability)	Don't know
Compared to face-to-face banking, self-service banking methods makes banking easier for me.								
Using an ATM would be a very stressful experience for me.								
I would feel personally safe using an ATM to withdraw cash.								
I am confident in my ability to remember my pin number when using a self-service banking method.								
I avoid using an ATM for fear of embarrassing myself in front of other users.								
I believe that learning to operate an ATM is difficult.								
Compared to face-to-face banking, self-service banking methods provide greater flexibility in terms of where and when I deal with my financial affairs.								
Overall, I believe that self-service banking methods are difficult to use.								

Statements	Compatibility	Perceived ease of use	Perceived usefulness	Technology discomfort	Perceived risk	Personal contact	Self-efficacy (perceived ability)	Don't know
I hesitate to use most self-service banking facilities for fear of making mistakes I cannot correct.								
EFTPOS is a safer method for me to use than ATMs.								
Overall I believe that using self-service banking facilities provide **less** security and protection for me, and my money, than face-to-face banking.								
I have avoided using most self-service banking facilities because they make me feel overwhelmed.								
My lack of previous technical skills has been a key reason for **not** using self-service banking facilities.								
I am concerned about the consequences of making a mistake with self-service banking methods.								
I feel confident that I have the skills and ability to access and use internet banking facilities.								

Statements	Compatibility	Perceived ease of use	Perceived usefulness	Technology discomfort	Perceived risk	Personal contact	Self-efficacy (perceived ability)	Don't know
During busy periods, I would be very nervous using an ATM if someone was waiting behind me.								
I have avoided using internet banking because it is unfamiliar and somewhat intimidating to me.								
Technical instructions for using self-service banking facilities are confusing to understand.								
Compared to face-to-face banking, self-service banking methods enables me to personally carry less cash.								
I believe that the EFTPOS method fits well with the way I like to handle my financial affairs.								
Having personal contact with a service provider is important to me when making financial transactions.								

Statements	Compatibility	Perceived ease of use	Perceived usefulness	Technology discomfort	Perceived risk	Personal contact	Self-efficacy (perceived ability)	Don't know
I do **not** consider it safe to transact my financial affairs using telephone banking								
Compared to face-to-face banking, self-service banking methods provide a secure and protected environment for conducting my banking affairs.								

Appendix F: Questionnaire for Study 1

18th October 2001

Dear National Seniors member

I am writing to ask for your assistance in a study on the views of older Australians towards personal banking which is being conducted by doctoral student and senior lecturer in marketing at the University of Southern Queensland, Janelle Rose.

Following on from my chairmanship of the Australian Bankers Association's Self Service Banking project, National Seniors Association is sponsoring this study. As a member of NSA, your name was randomly selected and your details remain strictly confidential.

The survey results will provide a better understanding of seniors' banking needs, and assist in identifying programs to help older Australians dealing with self-service banking technologies. NSA will receive a comprehensive report on the study.

The voluntary questionnaire attached should only to be completed by one member, as the questions focus on one person's views and practices towards their current banking methods. The information you provide will remain *confidential* and will be released only as summaries in which no individual's answer can be identified. While you are answering the questions, please enjoy a refreshing cup of tea compliments of the Madura Tea Company.

For further information Janelle may be contacted on (07) 4631 1275 or by e-mail at mcphail@usq.edu.au. If you have any concerns regarding the implementation of this study, you may contact The Secretary, Human Research Ethics Committee USQ on telephone (07) 4631 2956 or Sarah Saunders at my office.

I would like to take this opportunity to express my appreciation for your cooperation in completing and returning this questionnaire in the reply paid envelope by
1 November 2001.

We thank you for your valuable contribution to this research.

Yours faithfully,

David R Deans
Chief Executive

Sponsored by

• Faculty of Business | University of Southern Queensland • National Seniors Association

Banking your way

Personal banking: the views and practices of older Australians

Face-to-face banking

Customers access their account primarily through a **passbook** to conduct manual transactions, such as withdrawals, deposits, transfers etc. Withdrawal and deposit slips are manually completed and along with the passbook handed to the service person to complete the transaction for the customer.

Face-to-face banking is conducted at your financial institution (bank, building society, credit union etc) or a branch, agency of the institution or Australia Post for Commonwealth Bank customers.

▲ TELEPHONE BANKING

Self-service banking

Customers access their account electronically and require a Personal Identification Number (PIN) and card for **EFTPOS** and **ATM**, and a password and account number for **telephone banking** and **Internet banking**.

▲ EFTPOS

▲ ATM

▲ INTERNET BANKING

Instructions: For the purpose of this study banking methods are grouped as face-to-face banking or self-service banking. Your use of and views about these methods are important in understanding your banking needs. Questions that I seek your opinion about begin on the next page. Detailed instructions are provided to guide you through the questionnaire.

Your time and effort in completing this questionnaire are very much appreciated.

SECTION A: Your Banking Practices

In this section questions focus on your use of **face-to-face banking** and/or **self-service banking methods**. Self-service banking methods refer to EFTPOS, ATM, telephone and internet banking. **Telephone banking** allows you to transferring funds, checking an account balance, transactions, interest and use BPAY. It does not refer to paying an account or buying goods with a credit card. **EFTPOS** is used to debit your selected account at point of purchase and operates in a different way from using a credit card.

Please follow the instructions provided when answering the questions in this section.

Q.1 Do you currently use or did you previously use one or more **self-service banking methods**? (*Tick appropriate box)*

Yes ☐$_1$ **(Go to question 2)**

No ☐$_2$ **(Go to question 3)**

Q.2 Please indicate in the first column below approximately how many years you have been using each self-service banking method. *(Write the number in the appropriate box(es). Leave blank if not applicable.)*

If you previously used any of these self-service banking method(s) but have now stopped using the method, indicate in the second column the approximate number of years you had used that method.

	Current Use: No of Years	**Previous Use: No of Years**
1. EFTPOS.....….....		
2. ATM.....….....		
3. Telephone banking...….....		
4. Internet banking.....….....		

Now answer question 3

Q.3 Most people use one or more banking methods when conducting their normal banking transactions, such as withdrawals, deposits, transfers etc. *Indicate the approximate percentage of each method that you use* (ie. 25% face-to-face banking, 40 % EFTPOS and 35 % ATM banking **or** 100% face-to-face banking).

	Percentage Used *(insert number)*
1. Face-to-face banking ……..	_____%
2. EFTPOS.....….....	_____%
3. ATM banking.....….....….....	_____%
4. Telephone banking….....….....	_____%
5. Internet banking.....….....….....	_____%
	Total 100%

Q.4 Compared to using face-to-face banking, how often do you actually use self-service banking methods to address your normal banking affairs i.e. withdrawals, deposits, transfers etc. *(Tick the appropriate box)*

Never	Almost never	Infrequently	Sometimes	Frequently	Almost Always	Always
☐$_1$	☐$_2$	☐$_3$	☐$_4$	☐$_5$	☐$_6$	☐$_7$

Q.5 Based on the scale provided, please indicate how frequently you **used** the following financial banking services in the **past 3 months**. *(Tick the appropriate box to answer each question. If you do not use a method tick the 'never used' box.)*

Banking Methods	**Never use** (1)	**Rarely** (2)	**A few times a month** (3)	**Once a week** (4)	**2 or 3 times a week** (5)	**More than 4 times a week** (6)
1. Face-to-face banking.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
2. EFTPOS.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
3. ATM.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
4. Telephone banking.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
5. Internet banking.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
Credit Card Use						
6. In store.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
7. By telephone.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
8. By internet.....	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...

Q.6 For each financial activity listed on the left side of the table, select the ***main*** banking/payment method used to perform each activity. *(Tick the appropriate banking/methods square for each activity or **leave blank if the financial activity does not apply to you.**)*

Financial Activities	**Banking/Payment Methods**								
	Face-to-face banking (bank, credit union, building society-branch; agency)	Face to face banking (Australia Post Office)	EFTPOS (including Australia Post Office)	ATMs	Telephone banking (including BPAY)	Internet banking (including BPAY)	Cash	Credit Card	Cheque
Withdraw money									
Deposit money									
Check account balance									
Transfer funds between accounts									
Order cheque book									
Order account statement									
Pay for groceries									
Pay for main accounts ie. electricity, gas, rates, telephone.									

SECTION B: Your Views on Banking Methods

The questions in this section enquire about your views towards banking methods. I am particularly interested in your opinion about each banking method even if you have not used one or more of the methods. Questions relating to a specific aspect of banking are grouped together for your convenience. *(Tick the appropriate box to indicate how strongly you agree or disagree with each statement. Please answer all questions in this section.)*

Personal Contact	**Strongly Disagree (1)**	**Somewhat Disagree (2)**	**Neutral (3)**	**Somewhat Agree (4)**	**Strongly Agree (5)**
1. I feel like I am more in control of my financial affairs when dealing face-to-face with a service person than when using self-service banking facilities.	...☐...	...☐...	...☐...	...☐...	...☐...
2. Interaction with a service person to transact my financial affairs provides me with greater reassurance.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I need face-to-face contact to explain what I want and to have my financial questions answered.	...☐...	...☐...	...☐...	...☐...	...☐...
4. Conducting my financial affairs with a service person is a more pleasant and enjoyable experience than using self-service banking facilities.	...☐...	...☐...	...☐...	...☐...	...☐...
5. Being able to check the transaction and balance in my passbook after a personal service encounter, reassures me that my financial affairs were handled correctly.	...☐...	...☐...	...☐...	...☐...	...☐...
6. Having personal contact with a service provider is important to me when making most financial transactions.	...☐...	...☐...	...☐...	...☐...	...☐...

Self-Service Banking Technology	**Strongly Disagree (1)**	**Somewhat Disagree (2)**	**Neutral (3)**	**Somewhat Agree (4)**	**Strongly Agree (5)**
1. Using an ATM would be a very stressful experience for me.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I feel apprehensive about using telephone banking.	...☐...	...☐...	...☐...	...☐...	...☐...
3. When using EFTPOS I am concerned that my card may **not** be accepted.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I avoid using an ATM for fear of embarrassing myself in front of other users.	...☐...	...☐...	...☐...	...☐...	...☐...
5. I am afraid to use self-service banking facilities for fear of forgetting my personal identification number (PIN).	...☐...	...☐...	...☐...	...☐...	...☐...
6. I have avoided using most self-service banking methods because they make me feel overwhelmed.	...☐...	...☐...	...☐...	...☐...	...☐...
7. I have avoided using internet banking because it is unfamiliar and somewhat intimidating to me.	...☐...	...☐...	...☐...	...☐...	...☐...

Perceived Usefulness

Compared to face-to-face banking, self-service banking methods

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. …provide greater control over managing my financial affairs.	...☐...	...☐...	...☐...	...☐...	...☐...
2. …provide greater flexibility and convenience when dealing with my financial affairs.	...☐...	...☐...	...☐...	...☐...	...☐...
3. …enhance my ability to handle my banking needs.	...☐...	...☐...	...☐...	...☐...	...☐...
4. …enable me to personally carry less cash.	...☐...	...☐...	...☐...	...☐...	...☐...
5. …provide an improvement in service offerings.	...☐...	...☐...	...☐...	...☐...	...☐...
6. …provide a secure and protected environment for conducting my banking affairs.	...☐...	...☐...	...☐...	...☐...	...☐...

Ease of Use

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I believe that telephone banking is cumbersome to use.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I believe that EFTPOS is easy to use.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I believe that learning to operate an ATM is **difficult** for me.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I believe that for me internet banking is easy to use.	...☐...	...☐...	...☐...	...☐...	...☐...
5. Technical instructions for using self-service banking facilities are confusing to understand.	...☐...	...☐...	...☐...	...☐...	...☐...
6. I believe that the positioning of some ATMs makes it difficult to see the screen and operate the machine.	...☐...	...☐...	...☐...	...☐...	...☐...
7. Overall, I believe that self-service banking methods are **difficult** for me to use.	...☐...	...☐...	...☐...	...☐...	...☐...

Capability

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I feel confident in my ability to withdraw cash from an account using an ATM.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I consider that I have the ability to pay an account using EFTPOS.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I feel I am capable of transferring funds between my accounts using telephone banking.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I am confident in my ability to remember my pin number when using a self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...
5. I feel confident that I have the skills and ability to access and use internet banking facilities.	...☐...	...☐...	...☐...	...☐...	...☐...
6. Using EFTPOS is well within the scope of my ability.	...☐...	...☐...	...☐...	...☐...	...☐...

Compatibility

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I believe that the EFTPOS method fits well with the way I like to handle my financial affairs.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I believe that the telephone banking method suits my current banking needs.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I think that internet banking complements my style of banking.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I believe that my previous skills and experience are compatible with the requirements to operate self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
5. I think that the ATM method fits well with the way I like to handle my financial affairs.	...☐...	...☐...	...☐...	...☐...	...☐...
6. Self-service banking methods are ***not*** compatible with the way I like to bank.	...☐...	...☐...	...☐...	...☐...	...☐...

Perceived Risk

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I avoid using an ATM for fear for my personal safety.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I think that EFTPOS would be/ is a safer method for me to use than ATMs.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I hesitate to use an ATM for fear that the machine will **not** give me my cash.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I worry that banking over the internet will allow unauthorised people access to my accounts.	...☐...	...☐...	...☐...	...☐...	...☐...
5. I am concerned about the financial risk of making a mistake with self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
6. I consider it safe to transact my financial affairs using telephone banking.	...☐...	...☐...	...☐...	...☐...	...☐...
7. I am concerned that internet banking does **not** provide a secure environment for transacting my financial affairs.	...☐...	...☐...	...☐...	...☐...	...☐...
8. Overall, I believe that using self-service banking facilities provide **less** security and protection for me, and my money, than face-to-face banking.	...☐...	...☐...	...☐...	...☐...	...☐...

SECTION C: Social Influences

The questions in this section enquire about the degree of influence that family, friends and professionals may have on the method(s) of banking that you use. *(Tick the appropriate box to answer each question.)*

Influence of Family, Friends & Professionals	Very Unlikely (1)	Unlikely (2)	Neutral (3)	Likely (4)	Very Likely (5)	Don't Know (6)
1. My family thinks that I should use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
2. My friends think that I should use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
3. The bank teller thinks that I should use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...
4. The financial service advisor at my financial institution thinks that I should use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...	...☐...

Your Desire to Comply with Family, Friends & Professionals	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. Generally speaking, I want to do what my family thinks I should do regarding self-service banking.	...☐...	...☐...	...☐...	...☐...	...☐...
2. Generally speaking, I want to do what my friends think I should do regarding self-service banking.	...☐...	...☐...	...☐...	...☐...	...☐...
3. Generally speaking, I want to do what the bank teller thinks I should do regarding self-service banking.	...☐...	...☐...	...☐...	...☐...	...☐...
4. Generally speaking, I want to do what my financial service advisor from the institution thinks I should do regarding self-service banking.	...☐...	...☐...	...☐...	...☐...	...☐...
Overall Influence					
1. Most people who influence my behaviour think that I should use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...
2. Most people who are important to me think that I should use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...

SECTION D: Attitude Towards Self-Service Banking Methods

The questions in this section relate to your overall assessment of self-service banking methods.
(Tick the appropriate box to answer each question.)

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I like the idea of using self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
2. Using self-service banking methods would be a wise idea for me.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I feel that using self-service banking methods is a good idea for me.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I **dislike** the idea of using self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...

SECTION E: Banking Intentions

The questions in this section relate to the methods of banking you expect to be using in the next month and in the next 6 months. *(Please follow the instructions and tick the appropriate box to answer the questions.)*

Banking Intention

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I intend to use at least one self-service banking method within the next month.	...☐...	...☐...	...☐...	...☐...	...☐...
2. In the next month I firmly believe that I will use at least one self-service banking method.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I plan to use only face-to-face banking during the next month.	...☐...	...☐...	...☐...	...☐...	...☐...

Future Banking Intentions

Q.1 In the next 6 months, how likely are you to use at least one self-service banking method?

Extremely Unlikely ☐1 | Very Unlikely ☐2 | Unlikely ☐3

Go to Question 2 below

Likely ☐4 | Very Likely ☐5 | Extremely Likely ☐6

Go to Question 3 below

Q.2 Future users only of face-to-face banking	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I **do not** intend to change my current method of banking in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...
2. Current self-service banking methods **do not** fit with the way I like to bank.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I intend to search for information on at least one self-service banking method in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I intend to trial/use a self-service banking method in the next 6 months. If you agree or strongly agree, please specify method: _____	...☐...	...☐...	...☐...	...☐...	...☐...

After completing Q2 above, now go to Section F on page 9.

Q.3 Future users of self-service banking	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I expect that my current banking methods will not change in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I intend to decrease my use of face-to-face banking in the next 6 months	...☐...	...☐...	...☐...	...☐...	...☐...
3. I intend to trial/use a self-service banking method that I have not previously used in the next 6 months. If you agree or strongly agree, please specify method: _____	...☐...	...☐...	...☐...	...☐...	...☐...

SECTION F: Your Official And Unofficial Age

Q.1 Most people seem to have other 'ages' besides their official or 'date of birth' age. The following questions have been developed to find out about your 'unofficial' age. *Please tick the box* that best describes which age group you feel you really belong to for *each statement*.

	20s	30s	40s	50s	60s	70s	80s
1. I *feel* as though I am in my……							
2. I *look* as though I am in my……							
3. I *do* most things as if I am in my……....							
4. My *interests* are mostly those of someone in his/her.							

Q.2 **Official Age:** Please indicate in which age group you belong. *(Tick the appropriate box)*

☐	Under 50	☐	60 – 64	☐	75 – 79
☐	50 – 54	☐	65 – 69	☐	80 – 84
☐	55 – 59	☐	70 – 74	☐	Over 85

SECTION G: Demographics

So that we may categorise your responses with other participants, would you please answer the following questions. Once again, your responses will remain confidential. *(Please tick the most appropriate box)*

Q.1 Please indicate your gender: ☐ Male ☐ Female

Q.2 Please indicate your marital status.

☐	Never Married	☐	Married (or de facto)	☐	Widowed
☐	Divorced	☐	Separated but not divorced		

Q.3 Please indicate the number of people living in the household.

☐ One person ☐ Two persons ☐ Three persons ☐ Four or more persons

Q.4 What is your annual gross household income (before tax)?

☐	Under $ 9,000	☐	$ 30,000 - $ 39,999	☐	$ 60,000 - $ 69,000
☐	$ 10,000 - $ 19,999	☐	$ 40,000 - $ 49,999	☐	$ 70,000 and above
☐	$ 20,000 - $ 29,999	☐	$ 50,000 - $ 59,999		

Q.5 Please indicate your highest level of education

☐	Primary school	☐	Associate diploma / diploma
☐	Some secondary but did not complete	☐	Bachelor degree
☐	Completed junior (grade 10)	☐	Post-graduate diploma/degree
☐	Completed senior (grade 12)	☐	Other (please specify)
☐	Skilled vocational, inc trade qualification		_____

Q.6 Please indicate your current employment status.

☐	Employed full time	☐	Unemployed	☐	Home duties
☐	Employed part time / casual	☐	Retired	☐	Other

Q.7 Please indicate your current or previous occupation.

- ☐ Manager or administrator
- ☐ Professional
- ☐ Associate professional (technical & admin support)
- ☐ Advanced clerical and service person
- ☐ Clerical, sales and service person
- ☐ Tradesperson or related work
- ☐ Plant/machinery operator or transport driver
- ☐ Labourer or related work
- ☐ Home duties
- ☐ Other or not sure (please specify)

_____

Q.8 Please indicate your current living location by providing the postal code in the space below.

☐☐☐☐

We would like to hear your views on any aspect of banking. Please provide these in the space below.

I would be grateful if you checked all sections of the questionnaire to ensure they have been completed to your satisfaction.

Your contribution to this research is greatly appreciated.
Thank you

Appendix G: Measurement scale items, factor loadings and item means: Study 1

Table G.1. Measurement scale items, factor loadings (direct oblimin) and item means

Table G.2. Measurement scale items and item means

Table G.1. Measurement scale items, factor loadings (direct oblimin) and item means

Item No.	Personal Contact Items	Item Mean [1]	Factor Loadings
1	I feel like I am more in control of my financial affairs when dealing face-to-face with a service person than when using self-service banking facilities.	3.94	.830
2	Interaction with a service person to transact my financial affairs provides me with greater reassurance.	3.99	.902
3	I need face-to-face contact to explain what I want and to have my financial questions answered.	3.94	.760
4	Conducting my financial affairs with a service person is a more pleasant and enjoyable experience than using self-service banking facilities.	4.04	.843
5	Being able to check the transaction and balance in my passbook after a personal service encounter, reassures me that my financial affairs were handled correctly.	3.78	.716
6	Having personal contact with a service provider is important to me when making most financial transactions.	3.64	.758
	Technology Discomfort Items		
1	Using an ATM would be a very stressful experience for me.	2.34	.620
2	I feel apprehensive about using telephone banking.	3.11	.442
3	When using EFTPOS I am concerned that my card may **not** be accepted.	2.59	.754
4	I avoid using an ATM for fear of embarrassing myself in front of other users.	2.13	.846
5	I am afraid to use self-service banking facilities for fear of forgetting my personal identification number (PIN).	2.23	.789
6	I have avoided using most self-service banking methods because they make me feel overwhelmed.	2.35	.862
7	I have avoided using internet banking because it is unfamiliar and somewhat intimidating to me.	3.40	.527
	Perceived Usefulness Items		
	Compared to face-to-face banking, self-service banking methods		
1	…provide greater control over managing my financial affairs.	2.78	.853
2	…provide greater flexibility and convenience when dealing with my financial affairs.	3.10	.811
3	…enhance my ability to handle my banking needs.	3.01	.907
4	…enable me to personally carry less cash.	3.67	.468
5	…provide an improvement in service offerings.	2.87	.670
6	…provide a secure and protected environment for conducting my banking affairs.	2.73	.831

Table G.1. Measurement scale items, factor loadings (direct oblimin) and item means

Item No.	Subjective Norm – Overall Influence Items	Item Mean [1]	Factor Loadings
1	Most people who influence my behaviour think that I should use at least one self-service banking method.	2.50	.935
2	Most people who are important to me think that I should use at least one self-service banking method.	2.59	.989
	Attitude Towards Self-Service Banking Items		
1	I like the idea of using self-service banking methods.	3.17	.741
2	Using self-service banking methods would be a wise idea for me.	3.21	.803
3	I feel that using self-service banking methods is a good idea for me.	3.22	.850
4	I **dislike** the idea of using self-service banking methods. (r)	3.13	.651
	Banking Intention Items		
1	I intend to use at least one self-service banking method within the next month.	3.95	.933
2	In the next month I firmly believe that I will use at least one self-service banking method.	3.90	.988
3	I plan to use only face-to-face banking during the next month. (r)	3.70	.828

[1] 5-point Likert scale (1) strongly disagree, (5) strongly agree
r = reverse coded item

Kaiser-Meyer-Olkin measure of sampling adequacy: .927
Bartlett's test of sphericity: Chi-square 6159.86, *df* 378, Sig 0.000
Extraction method: Principal axis factoring
Rotation method: Direct oblimin
% of variance explained: 80%

Table G.2. Measurement scale items and item means

Item No.	Perceived Ease of Use Items	Item Mean[1]
1	I believe that telephone banking is cumbersome to use. (r)	2.92
2	I believe that EFTPOS is easy to use.	3.96
3	I believe that learning to operate an ATM is **difficult** for me. (r)	3.95
4	I believe that for me internet banking is easy to use.	2.55
5	Technical instructions for using self-service banking facilities are confusing to understand. (r)	2.96
6	I believe that the positioning of some ATMs makes it difficult to see the screen and operate the machine. (r)	2.26
7	Overall, I believe that self-service banking methods are **difficult** for me to use. (r)	3.30
	Perceived Risk Items	
1	I avoid using an ATM for fear for my personal safety.	2.79
2	I think that EFTPOS would be/ is a safer method for me to use than ATMs.	3.39
3	I hesitate to use an ATM for fear that the machine will **not** give me my cash.	2.55
4	I worry that banking over the internet will allow unauthorised people access to my accounts.	3.85
5	I am concerned about the financial risk of making a mistake with self-service banking methods.	3.14
6	I consider it safe to transact my financial affairs using telephone banking. (r)	3.16
7	I am concerned that internet banking does **not** provide a secure environment for transacting my financial affairs.	3.64
8	Overall, I believe that using self-service banking facilities provide **less** security and protection for me, and my money, than face-to-face banking.	3.52
	Self-Efficacy Items	
1	I feel confident in my ability to withdraw cash from an account using an ATM.	4.08
2	I consider that I have the ability to pay an account using EFTPOS.	4.08
3	I feel I am capable of transferring funds between my accounts using telephone banking.	3.35
4	I am confident in my ability to remember my pin number when using a self-service banking method.	4.09
5	I feel confident that I have the skills and ability to access and use internet banking facilities.	2.80
6	Using EFTPOS is well within the scope of my ability.	4.20

Table G.2. Measurement scale items and item means

Item No.	Compatibility Items	Item Mean[1]
1	I believe that the EFTPOS method fits well with the way I like to handle my financial affairs.	3.19
2	I believe that the telephone banking method suits my current banking needs.	2.72
3	I think that internet banking complements my style of banking.	2.23
4	I believe that my previous skills and experience are compatible with the requirements to operate self-service banking methods.	3.65
5	I think that the ATM method fits well with the way I like to handle my financial affairs.	3.26
6	Self-service banking methods are ***not*** compatible with the way I like to bank. (r)	2.90

[1] 5-point Likert scale (1) strongly disagree, (5) strongly agree
r = reverse coded item

Appendix H: Parameter estimates and standardised direct and indirect effects for respecified model: Study 1

Table H.1. Parameter estimates for respecified model – Study 1

Table H.2. Standardised total, direct and indirect effects – Study 1

Table H.1. Parameter estimates for respecified model – Study 1

Regression weights:

			Estimate	S.E.	C.R.	P
PEOU	<---	SE	.212	.051	4.140	***
PEOU	<---	TD	-.189	.051	-3.674	***
PEOU	<---	PR	-.221	.057	-3.902	***
PU	<---	SE	.377	.099	3.806	***
PU	<---	PC	-.368	.085	-4.332	***
PEOU	<---	PC	-.101	.044	-2.307	.021
PU	<---	PR	-.228	.110	-2.072	.038
PU	<---	TD	.283	.100	2.843	.004
A	<---	PU	.333	.058	5.740	***
A	<---	PEOU	.401	.101	3.959	***
A	<---	PC	-.373	.076	-4.933	***
A	<---	PR	-.278	.095	-2.912	.004
BI	<---	A	.583	.062	9.358	***
BI	<---	SE	.326	.089	3.673	***
B	<---	BI	1.104	.032	34.730	***
B	<---	PEOU	.171	.058	2.962	.003

Covariances:

			Estimate	S.E.	C.R.	P
SE	<-->	TD	-.833	.098	-8.503	***
TD	<-->	PC	.847	.109	7.759	***
SE	<-->	PR	-.569	.078	-7.323	***
PC	<-->	PR	.797	.095	8.349	***
TD	<-->	PR	.772	.094	8.231	***
SE	<-->	PC	-.596	.090	-6.630	***

Variances:

	Estimate	S.E.	C.R.	P
Self-efficacy	.988	.097	10.173	***
Technology discomfort	1.308	.129	10.173	***
Personal contact	1.336	.131	10.173	***
Perceived risk	.936	.092	10.173	***
e2	.904	.089	10.173	***
e1	.241	.024	10.173	***
e3	.674	.066	10.173	***
e4	1.139	.112	10.173	***
e5	.341	.034	10.173	***

Table H.2. Standardised total, direct and indirect effects – Study 1

Standardised total effects

	PR	PC	TD	SE	PEOU	PU	A	BI
PEOU	-.262	-.143	-.264	.257	.000	.000	.000	.000
PU	-.192	-.370	.281	.326	.000	.000	.000	.000
A	-.302	-.437	.015	.148	.232	.270	.000	.000
BI	-.168	-.243	.008	.300	.129	.150	.555	.000
B	-.172	-.231	-.013	.291	.194	.136	.502	.905

Standardised direct effects

	PR	PC	TD	SE	PEOU	PU	A	BI
PEOU	-.262	-.143	-.264	.257	.000	.000	.000	.000
PU	-.192	-.370	.281	.326	.000	.000	.000	.000
A	-.190	-.304	.000	.000	.232	.270	.000	.000
BI	.000	.000	.000	.218	.000	.000	.555	.000
B	.000	.000	.000	.000	.077	.000	.000	.905

Standardised indirect effects

	PR	PC	TD	SE	PEOU	PU	A	BI
PEOU	.000	.000	.000	.000	.000	.000	.000	.000
PU	.000	.000	.000	.000	.000	.000	.000	.000
A	-.112	-.133	.015	.148	.000	.000	.000	.000
BI	-.168	-.243	.008	.082	.129	.150	.000	.000
B	-.172	-.231	-.013	.291	.116	.136	.502	.000

Appendix I: Questionnaire for Study 2

9 January 2004

Dear National Seniors member

I am writing to ask for your assistance in a study on the views of senior Australians towards personal banking which is being conducted by doctoral student and Senior Lecturer in Marketing at The University of Southern Queensland (USQ), Janelle Rose, and supervised by Professor Fogarty.

Following on from my chairmanship of the Australian Bankers Association's Self Service Banking project, National Seniors is sponsoring this study. As a member of National Seniors, your name was randomly selected and your details remain strictly confidential.

The survey results will provide a better understanding of seniors' banking needs, and assist in identifying programs to help senior Australians dealing with self-service banking technologies. National Seniors will receive a comprehensive report on the study.

The voluntary questionnaire attached should be completed by one family member only, as the questions focus on one person's views and practices regarding current banking methods. The information you provide will remain *confidential.* A report summarising the findings will be prepared, however this report will not deal with information at the individual level. While you are answering the questions, sit back and enjoy a cup of tea, compliments of the Madura Tea Company.

For further information, Janelle may be contacted on (07) 4631 1275 or by e-mail at <mcphail@usq.edu.au>. If you have any concerns regarding this study, you may contact The Secretary, Human Research Ethics Committee, USQ on telephone (07) 4631 2956.

I would like to take this opportunity to express my appreciation for your cooperation in completing and returning this questionnaire in the reply paid envelope by **6 February 2004.**

We thank you for your valuable contribution to this research.

Yours faithfully,

David R Deans
Chief Executive

Ms Janelle Rose
PhD Candidate
Marketing Department
University of Southern Queensland

Professor Gerard Fogarty
PhD Supervisor
Psychology Department
University of Southern Queensland

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Face-to-face banking

Customers access their account primarily through a **passbook** to conduct manual transactions, such as withdrawals, deposits, transfers etc. Withdrawal and deposit slips are manually completed and along with the passbook handed to the service person to complete the transaction for the customer.

Face-to-face banking is conducted at your financial institution (bank, building society, credit union etc) or a branch, agency of the institution or Australia Post for Commonwealth Bank customers.

Banking your way

Personal banking: the views and practices of older Australians

▲ TELEPHONE BANKING

▲ EFTPOS

▲ ATM

Self-service banking

Customers access their account electronically and require a Personal Identification Number (PIN) and card for **EFTPOS** and **ATM**, and a password and account number for **telephone banking** and **Internet banking**.

▲ INTERNET BANKING

Instructions: For the purpose of this study banking methods are grouped as face-to-face banking or self-service banking. Your use of and views about these methods are important in understanding your banking needs. Questions that I seek your opinion about begin on the next page. Detailed instructions are provided to guide you through the questionnaire.

Your time and effort in completing this questionnaire are very much appreciated.

SECTION A: Your Banking Practices

In this section questions focus on your use of **face-to-face banking** and/or **self-service banking methods**. Self-service banking methods refer to EFTPOS, ATM, telephone and internet banking. **Telephone banking** allows you to transfer funds, check account details and use BPAY. **EFTPOS** is used to debit your selected account at point of purchase and operates in a different way to using a credit card.

Q.1 Do you currently use or did you previously use one or more **self-service banking methods**? (*Tick appropriate box)*

No ☐1 **(Go to Q.3)**

Yes ☐2

Q.2.a How long have you been using self-service banking methods? *(Tick the box most appropriate for each method)*

	Have not used (1)	**Less than 2 years (2)**	**3 – 8 years (3)**	**9 – 15 years (4)**	**More than 16 years (5)**
EFTPOS……	☐	☐	☐	☐	☐
ATM banking……..	☐	☐	☐	☐	☐
Telephone banking...	☐	☐	☐	☐	
Internet banking……	☐	☐	☐		

Q.2.b Have you previously used any self-service bank method(s) and now no longer use the method(s)?

Yes ☐1 Which method(s) _____No. of years used _____

No ☐2

Q.3 Most people use one or more banking methods when conducting their normal banking transactions, such as withdrawals, deposits, transfers, etc. *Indicate the approximate percentage of each method that you use* (i.e. 25% face-to-face banking, 40 % EFTPOS and 35 % ATM banking **or** 100% face-to-face banking).

	Percentage Used *(insert number)*
6. Face-to-face banking …….……..	_____%
7. EFTPOS.....….....	_____%
8. ATM banking.....….....…....	_____%
9. Telephone banking….....…....	_____%
10. Internet banking.....….....….....	_____%
	Total 100%

Q.4 Compared to using face-to-face banking, how often do you actually use self-service banking methods to address your normal banking affairs, i.e. withdrawals, deposits, transfers etc. *(Tick the appropriate box)*

Never	Almost never	Infrequently	Sometimes	Frequently	Almost always	Always
☐1	☐2	☐3	☐4	☐5	☐6	☐7

Q.5 Based on the scale provided, please indicate how frequently you **used** the following financial banking services in the **past 3 months**. *(Tick the appropriate box to answer each question. If you do not use a method, tick the 'never used' box.)*

Banking Methods	**Never used** (1)	**Once or twice** (2)	**A few times a month** (3)	**Once a week** (4)	**2 or 3 times a week** (5)	**More than 4 times a week** (6)
9. Face-to-face banking	☐	☐	☐	☐	☐	☐
10. EFTPOS	☐	☐	☐	☐	☐	☐
11. ATM	☐	☐	☐	☐	☐	☐
12. Telephone banking	☐	☐	☐	☐	☐	☐
13. Internet banking	☐	☐	☐	☐	☐	☐
Credit Card Use						
14. In store	☐	☐	☐	☐	☐	☐
15. By mail	☐	☐	☐	☐	☐	☐
16. By telephone	☐	☐	☐	☐	☐	☐
17. By internet	☐	☐	☐	☐	☐	☐

Q.6 For each financial activity listed on the left side of the table, select the ***main*** banking/payment method used to perform each activity. *(Tick the appropriate banking/method square for each financial activity or* ***leave blank if the financial activity does not apply to you****.)*

Financial Activities	**Banking/Payment Methods**									
	Face-to-face banking (bank, credit union, building society branch or agency) **(1)**	Face-to-face banking (Australia Post Office) **(2)**	EFTPOS (including Australia Post Office) **(3)**	ATMs **(4)**	Telephone banking (including BPAY) **(5)**	Internet banking (including BPAY) **(6)**	Cash **(7)**	Credit Card **(8)**	Cheque **(9)**	Telephone Financial Institution **(10)**
Withdraw money										
Deposit money										
Check account balance										
Transfer funds between accounts										
Enquire about financial services										
Pay for groceries										
Pay for **main** accounts, i.e. electricity, gas, rates, telephone.										

SECTION B: Your Views on Banking Methods

The questions in this section enquire about your views towards banking methods – **face-to-face and self-service banking methods.** I am particularly interested in your opinion about various banking methods even if you have not used one or more of these methods. Questions relating to a specific aspect of banking are grouped together for your convenience. *(Tick the appropriate box to indicate how strongly you agree or disagree with each statement. Please answer all questions in this section.)*

Personal Contact	**Strongly Disagree (1)**	**Somewhat Disagree (2)**	**Neutral (3)**	**Somewhat Agree (4)**	**Strongly Agree (5)**
1. I feel like I am more in control of my financial affairs when dealing face-to-face with a service person than when using self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
2. Interaction with a service person to transact my banking affairs provides me with greater reassurance.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I need face-to-face contact to explain what I want and to have my banking questions answered.	...☐...	...☐...	...☐...	...☐...	...☐...
4. Conducting my banking affairs with a service person is a more pleasant and enjoyable experience than using self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
5. Having personal contact with a service provider allows me to check my transactions.	...☐...	...☐...	...☐...	...☐...	...☐...
6. Having personal contact with a service provider is important to me when making most financial transactions.	...☐...	...☐...	...☐...	...☐...	...☐...

Self-Service Banking Technology	**Strongly Disagree (1)**	**Somewhat Disagree (2)**	**Neutral (3)**	**Somewhat Agree (4)**	**Strongly Agree (5)**
1. I would find using most self-service banking methods to be a very **stressful** experience.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I feel **apprehensive** about the use of most self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I hesitate to use self-service banking methods for **fear of making mistakes**.	...☐...	...☐...	...☐...	...☐...	...☐...
4. I hesitate to use an ATM for fear of **embarrassing** myself in front of other users.	...☐...	...☐...	...☐...	...☐...	...☐...
5. I am afraid to use self-service banking methods for **fear of forgetting** my personal identification number (PIN).	...☐...	...☐...	...☐...	...☐...	...☐...
6. I hesitate to use most self-service banking methods because they make me **feel overwhelmed**.	...☐...	...☐...	...☐...	...☐...	...☐...

Perceived Usefulness

Compared to face-to-face banking, self-service banking methods

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. …give me more control over my financial affairs.	☐	☐	☐	☐	☐
2. …provide greater flexibility and convenience when dealing with my financial affairs.	☐	☐	☐	☐	☐
3. …enhance my ability to handle my banking needs.	☐	☐	☐	☐	☐
4. …provide more convenient access to my account funds when making a purchase.	☐	☐	☐	☐	☐
5. …provide more services to meet my current banking needs.	☐	☐	☐	☐	☐
6. …provide a more secure and protected environment for conducting my banking affairs.	☐	☐	☐	☐	☐
7. …provide lower cost withdrawal and transfer fees.	☐	☐	☐	☐	☐

Ease of Use

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I believe that it is easy to operate most self-service banking methods.	☐	☐	☐	☐	☐
2. Learning to use most self-service banking methods would be easy for me.	☐	☐	☐	☐	☐
3. It would be easy for me to gain the skills to use self-service banking methods.	☐	☐	☐	☐	☐
4. Instructions for using self-service banking methods are easy to follow.	☐	☐	☐	☐	☐
5. Overall, I believe that self-service banking methods require little effort to use.	☐	☐	☐	☐	☐

Capability

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I feel confident that I have the ability to withdraw cash from an account using an ATM.	☐	☐	☐	☐	☐
2. I consider that I have the ability to pay an account using self-service banking methods.	☐	☐	☐	☐	☐
3. I am fully capable of using self-service banking methods.	☐	☐	☐	☐	☐
4. I am confident in my ability to remember my PIN number when using a self-service banking method.	☐	☐	☐	☐	☐
5. I feel confident that I have the ability to access and use internet banking.	☐	☐	☐	☐	☐
6. Using EFTPOS is well within the scope of my ability.	☐	☐	☐	☐	☐
7. Overall, I feel that using most self-service banking methods are well within the scope of my abilities.	☐	☐	☐	☐	☐

Perceived Risk	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I feel personally unsafe using some self-service banking methods, i.e. ATM.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I find most self-service banking methods are personally safer than using cash.	...☐...	...☐...	...☐...	...☐...	...☐...
3. I am concerned that self-service banking equipment/cards will not function properly.	...☐...	...☐...	...☐...	...☐...	...☐...
4. The reliable performance of self-service banking equipment/cards influences my use of these methods.	...☐...	...☐...	...☐...	...☐...	...☐...
5. I fear that by using self-service banking methods unauthorised people may gain access to my accounts.	...☐...	...☐...	...☐...	...☐...	...☐...
6. I am concerned about the financial risk of making a mistake with self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
7. I am concerned that self-service banking methods do **not** provide a financially secure environment.	...☐...	...☐...	...☐...	...☐...	...☐...
8. Overall, I believe that using self-service banking methods are riskier than face-to-face banking.	...☐...	...☐...	...☐...	...☐...	...☐...

SECTION C: Attitude Towards Self-Service Banking Methods

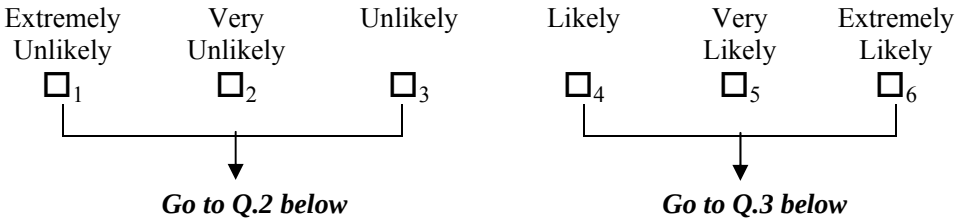
The questions in this section relate to your overall assessment of self-service banking methods. *(Tick the appropriate box to answer each question.)*

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I like the idea of using self-service banking methods.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I feel that using self-service banking methods is a good idea for me.	...☐...	...☐...	...☐...	...☐...	...☐...

SECTION D: Banking Behaviour

The questions in this section relate to the methods of banking you might expect to be using in the next 6 months. *(Please follow the instructions and tick the appropriate box to answer the questions.)*

Q.1 In the next 6 months, how likely are you to use at least one self-service banking method?



Q.2 Future users only of face-to-face banking

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I intend to search for information on at least one self-service banking method in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I intend to trial/use a self-service banking method in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...

If you agree or strongly agree, please specify method: _____

After completing Q.2 above, now go to Section F at the bottom of this page

Q.3 Future users of self-service banking

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
1. I expect that my current banking methods will not change in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...
2. I intend to trial/use a self-service banking method that I have not previously used in the next 6 months.	...☐...	...☐...	...☐...	...☐...	...☐...

If you agree or strongly agree, please specify method: _____

SECTION E: Your Official and Unofficial Age

Q.1 Most people seem to have other 'ages' besides their official or 'date of birth' age. The following questions have been developed to find out about your 'unofficial' age. *Please tick the box* that best describes which age group you feel you really belong to for *each statement*.

	20s	30s	40s	50s	60s	70s	80s
1. I *feel* as though I am in my…….							
2. I *look* as though I am in my…….							
3. I *do* most things as if I am in my……...							
4. My *interests* are mostly those of someone in his/her.							

Q.2 Official Age: Please indicate in which age group you belong. *(Tick the appropriate box)*

☐1	Under 50	☐4	60—64	☐7	75—79
☐2	50—54	☐5	65—69	☐8	80—84
☐3	55—59	☐6	70—74	☐9	Over 85

SECTION F: Demographics

So that we may categorise your responses with other participants, would you please answer the following questions. Once again, your responses will remain confidential. *(Please tick the most appropriate box)*

Q.1 Please indicate your gender: ☐1 Male ☐2 Female

Q.2 Please indicate your marital status.

☐1 Never married ☐2 Married (or de facto) ☐3 Widowed
☐4 Divorced ☐5 Separated, but not divorced

Q.3 Please indicate the number of people living in the household including yourself.

☐1 One person ☐2 Two persons ☐3 Three persons ☐4 Four or more persons

Q.4 What is your annual gross household income (before tax)?

☐1 Under $9 000
☐2 $10 000—$19 999
☐3 $20 000—$29 999
☐4 $30 000—$39 999
☐5 $40 000—$49 999
☐6 $50 000—$59 999
☐7 $60 000—$69 999
☐8 $70 000 and above

Q.5 Please indicate your highest level of education

☐1 Primary school
☐2 Some secondary, but did not complete
☐3 Completed junior (grade 10)
☐4 Completed senior (grade 12)
☐5 Skilled vocational, inc. trade qualification
☐6 Associate diploma/diploma
☐7 Bachelor degree
☐8 Post-graduate diploma/degree
☐9 Other (please specify)
_____

Q.6 Please indicate your current employment status.

☐1 Employed full time ☐2 Unemployed ☐3 Home duties
☐4 Employed part time/casual ☐5 Retired ☐6 Other (please specify)
_____

Q.7 Please indicate your current or previous occupation.

☐1 Manager or administrator
☐2 Professional
☐3 Associate professional (technical & admin support)
☐4 Advanced clerical and service person
☐5 Clerical, sales and service person
☐6 Tradesperson or related work
☐7 Plant/machinery operator or transport driver
☐8 Labourer or related work
☐9 Home duties
☐10 Other or not sure (please specify)
_____

Q.8 Please indicate your current living location by providing the postal code in the space below.

☐☐☐☐

We would like to hear your views on any aspect of banking.
Please provide these in the space provided below.

I would be grateful if you checked all sections of the questionnaire to ensure they have been completed to your satisfaction.

Your contribution to this research is greatly appreciated.
Thank you

Please return the questionnaire in the reply paid envelope provided.

Appendix J: Full demographic profile of respondents for Study 2

Table J.1. Full demographic profile of mature consumer respondents – Study 2

Table J.1. Full demographic profile of mature consumer respondents – Study 2

Demographic Variables	*N* = 2,253		Non-Users of SSBT: *n* = 319 (used 0%)		Low Users of SSBT: *n* = 327 (used <56%)		Med - High Users of SSBT: *n* = 1,607 (used ≥ 55%)	
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
Official Age:								
50 - 54	471	(20.9)	21	(6.6)	47	(14.4)	403	(25.1)
55 - 59	430	(19.1)	24	(7.5)	68	(20.8)	338	(21.0)
60 - 64	379	(16.8)	37	(11.6)	57	(17.4)	285	(17.7)
65 - 69	294	(13.0)	39	(12.2)	43	(13.1)	212	(13.2)
70 - 74	274	(12.2)	58	(18.2)	36	(11.0)	180	(11.2)
75 - 79	213	(9.5)	57	(17.9)	38	(11.6)	118	(7.3)
80 - 84	123	(5.5)	54	(16.9)	26	(8.0)	43	(2.7)
>85	45	(2.0)	23	(7.2)	6	(1.8)	16	(1.0)
Not stated	24	(1.1)	6	(1.9)	6	(1.8)	12	(0.7)
Cognitive Age	56		64		58		55	
Gender:								
Male	978	(43.4)	146	(45.8)	136	(41.6)	696	(43.3)
Female	1236	(54.9)	164	(51.4)	182	(55.7)	890	(55.4)
Not stated	39	(1.7)	9	(2.8)	9	(2.8)	21	(1.3)
Marital Status:								
Never married	73	(3.2)	20	(6.3)	9	(2.8)	44	(2.7)
Married/de facto	1702	(75.5)	194	(60.8)	248	(75.8)	1260	(78.4)
Widowed	240	(10.7)	71	(22.3)	38	(11.6)	131	(8.2)
Divorced	144	(6.4)	16	(5.0)	15	(4.6)	113	(7.0)
Separated	52	(2.3)	10	(3.1)	6	(1.8)	36	(2.2)
Not stated	42	(1.9)	8	(2.5)	11	(3.4)	23	(1.4)
Household:								
One person	416	(18.5)	97	(30.4)	71	(21.7)	248	(15.4)
Two persons	1395	(61.9)	180	(56.4)	197	(60.2)	1018	(63.4)
Three persons	252	(11.2)	19	(6.0)	29	(8.9)	204	(12.7)
Four or more persons	141	(6.3)	11	(3.4)	19	(5.8)	111	(6.9)
Not Stated	49	(2.2)	12	(3.8)	11	(3.4)	26	(1.6)
Income: Australian $								
< 9,999	79	(3.5)	21	(6.6)	16	(4.9)	42	(2.6)
10,000 – 19,999	303	(13.4)	75	(23.5)	51	(15.6)	177	(11.0)
20,000 – 29,999	324	(14.4)	44	(13.8)	59	(18.0)	221	(13.8)
30,000 – 39,999	344	(15.3)	46	(14.4)	52	(15.9)	246	(15.3)
40,000 – 49,999	245	(10.9)	19	(6.0)	28	(8.6)	198	(12.3)
50,000 – 59,999	198	(8.8)	21	(6.6)	18	(5.5)	159	(9.9)
60,000 – 69,999	154	(6.8)	13	(4.1)	13	(4.0)	128	(8.0)
70,000 and above	380	(16.9)	26	(8.2)	42	(12.9)	312	(19.4)
Not stated	226	(10.0)	54	(16.9)	48	(14.7)	124	(7.7)

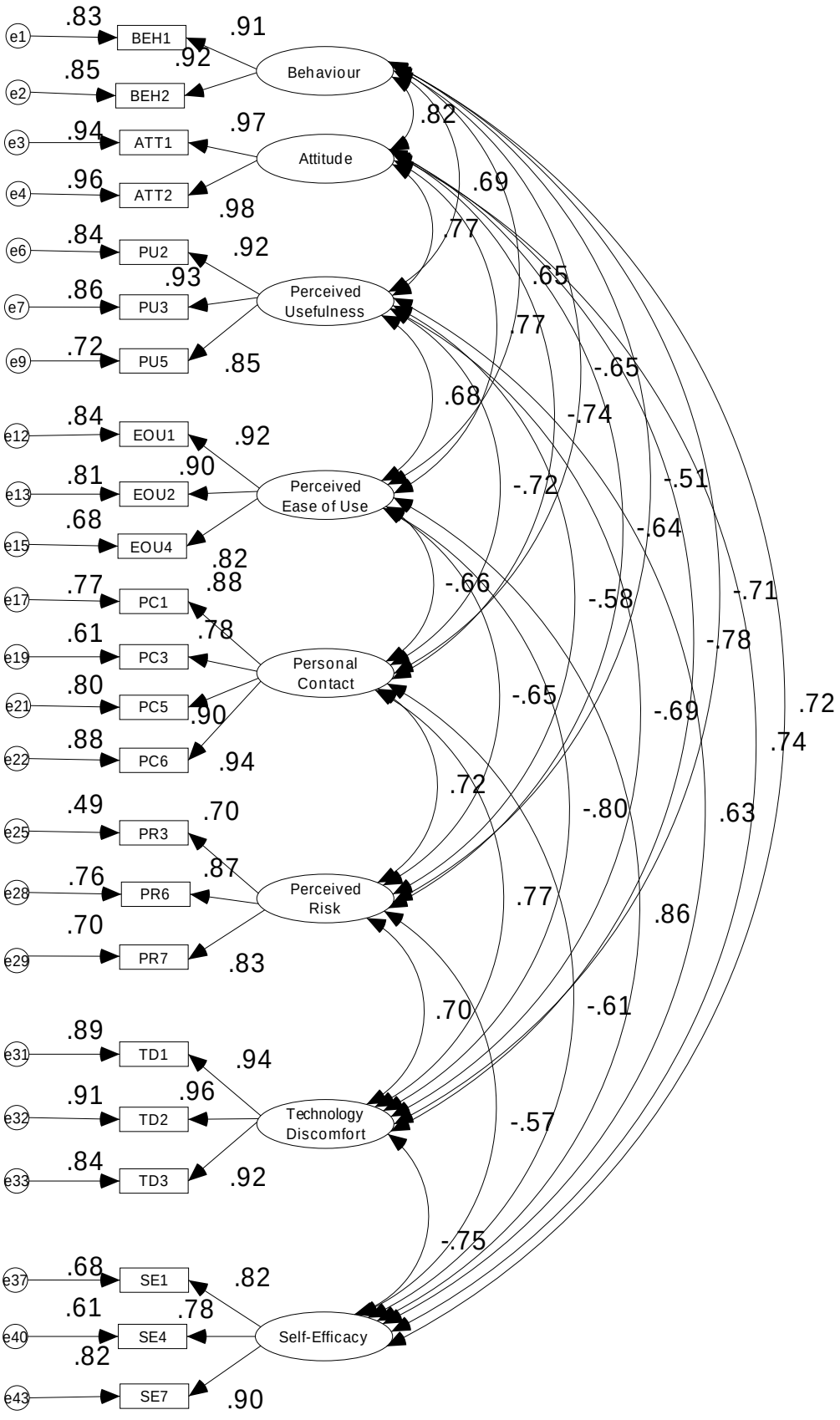
Table J.1. Full demographic profile of mature consumer respondents – Study 2 (cont)

Demographic Variables	*N* = 2,253		Non-Users of SSBT: *n* = 319 (used 0%)		Low Users of SSBT: *n* = 327 (used <56%)		Med - High Users of SSBT: *n* = 1,607 (used ≥ 55%)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Education:								
Primary school	69	(3.1)	34	(10.7)	11	(3.4)	24	(1.5)
Some secondary	270	(12.0)	51	(16.0)	52	(15.9)	167	(10.4)
Completed junior	367	(16.3)	49	(15.4)	49	(15.0)	269	(16.7)
Completed senior	258	(11.5)	42	(13.2)	43	(13.1)	173	(10.8)
Skill vocational	376	(16.7)	58	(18.2)	53	(16.2)	265	(16.5)
Ass diploma/diploma	394	(17.5)	35	(11.0)	53	(16.2)	306	(19.0)
Bachelor degree	210	(9.3)	22	(6.9)	28	(8.6)	160	(10.0)
Postgraduate degree	251	(11.1)	16	(5.0)	21	(6.4)	214	(13.3)
Other	7	(0.3)	0		3	(0.9)	4	(0.2)
Not stated	51	(2.3)	12	(3.8)	14	(4.3)	25	(1.6)
Employment:								
Employed full-time	515	(22.9)	34	(10.7)	60	(18.3)	421	(26.6)
Employed part-time/casual	345	(15.3)	28	(8.8)	39	(11.9)	278	(17.3)
Unemployed	32	(1.4)	3	(0.9)	5	(1.5)	24	(1.5)
Retired	1114	(49.4)	206	(64.6)	174	(53.2)	734	(45.7)
Home duties	147	(6.5)	32	(10.0)	22	(6.7)	93	(5.8)
Other	62	(2.8)	8	(2.5)	17	(5.2)	37	(2.3)
Not stated	38	(1.7)	8	(2.5)	10	(3.1)	20	(1.2)
Occupation:								
Manager or administrator	520	(23.1)	65	(20.4)	69	(21.2)	386	(24.0)
Professional	603	(26.8)	60	(18.8)	79	(24.2)	464	(28.9)
Associate professional	144	(6.4)	19	(6.0)	14	(4.3)	111	(6.9)
Advanced clerical & service	252	(11.2)	31	(9.7)	38	(11.6)	183	(11.4)
Clerical, sales& service	277	(12.3)	30	(9.4)	45	(13.8)	202	(12.6)
Tradesperson	149	(6.6)	38	(11.9)	23	(7.0)	88	(5.5)
Plant/machinery operator or transport driver	42	(1.9)	9	(2.8)	6	(1.8)	27	(1.7)
Labourer or related work	36	(1.6)	8	(2.5)	8	(2.4)	20	(1.2)
Home duties	125	(5.5)	36	(11.3)	20	(6.1)	69	(4.3)
Other	53	(2.4)	8	(2.5)	15	(4.6)	30	(1.9)
Not stated	52	(2.3)	15	(4.7)	10	(3.1)	27	(1.7)
Postcode – State:								
NSW	661	(29.3)	90	(28.0)	103	(31.6)	468	(29.2)
VIC	538	(23.9)	71	(22.0)	69	(21.2)	398	(24.8)
QLD	444	(19.7)	61	(18.9)	68	(20.9)	315	(19.6)
SA	211	(9.4)	45	(14.0)	31	(9.5)	135	(8.4)
WA	205	(9.1)	24	(7.5)	27	(8.3)	154	(9.6)
TAS	63	(2.8)	7	(2.2)	11	(3.4)	45	(2.8)
ACT	44	(2.0)	10	(3.1)	1	(0.3)	33	(2.1)
NT	15	(0.7)	1	(0.3)	2	(0.6)	12	(0.7)
Not stated	72	(3.2)	13	(4.0)	14	(4.3)	45	(2.8)

Appendix K: Measurement model– SEM output from AMOS: Study 2

Figure K.1. Measurement model - SEM output for Study 2

Figure K.1. Measurement model - SEM output for Study 2



Appendix L: Composition of measurement scales: Study 2

Measurement items retained and deleted for each variable: Study 2

Behaviour (n = 2, α = 0.90, AVE = 0.83)

BEH1	Compared to using face-to-face banking, how often do you actually use self-service banking methods to address your normal banking affairs, i.e. withdrawals, deposits, transfers etc?
BEH2	In the next 6 months, how likely are you to use at least one self-service banking method?

Attitude (n = 2, α = 0.97, AVE = 0.95)

ATT1	I like the idea of using self-service banking methods.
ATT2	I feel that using self-service banking methods is a good idea for me.

Perceived usefulness (n = 3, α = 0.92, AVE = 0.79)

Compared to face-to-face banking, self-service banking methods

PU2	…provide greater flexibility and convenience when dealing with my financial affairs.
PU3	…enhance my ability to handle my banking needs.
PU5	…provide more services to meet my current banking needs.

Items deleted from the perceived usefulness scale

PU1	…give me control over my financial affairs.
PU4	…provide more convenient access to my account funds when making a purchase
PU6	…provide a more secure and protected environment for conducting my banking affairs.
PU7	…provide lower cost withdrawal and transfer fees.

Perceived ease of use (n = 3, α = 0.89, AVE = 0.72)

EOU1	I believe that it is easy to operate most self-service banking methods.
EOU2	Learning to use most self-service banking methods would be easy for me.
EOU4	Instructions for using self-service banking methods are easy to follow.

Items deleted from the perceived ease of use scale

EOU3	It would be easy for me to gain the skills to use self-service banking methods.
EOU5	Overall, I believe that self-service banking methods require little effort to use.

Personal contact (n = 4, α = 0.92, AVE = 0.76)

PC1	I feel like I am more in control of my financial affairs when dealing face-to-face with a service person than when using self-service banking methods.
PC3	I need face-to-face contact to explain what I want and to have my banking questions answered.
PC5	Having personal contact with a service provider allows me to check my transactions.
PC6	Having personal contact with a service provider is important to me when making most financial transactions.

Items deleted from the personal contact scale

PC2	Interaction with a service person to transact my banking affairs provides me with greater reassurance.
PC4	Conducting my banking affairs with a person is a more pleasant and enjoyable experience than using self-service banking methods.

Perceived risk (n = 3, α = 0.84, AVE = 0.65)

PR3	I am concerned that self-service banking equipment/cards will not function properly.
PR6	I am concerned about the financial risk of making a mistake with self-service banking methods.
PR7	I am concerned that self-service banking methods do not provide a financially secure environment.

Items deleted from the perceived risk scale

PR1	I feel personally unsafe using some self-service banking methods, i.e. ATM.
PR2	I find most self-service banking methods are personally safer than using cash.
PR4	The reliable performance of self-service banking equipment/cards influences my use of these methods.
PR5	I fear that by using self-service banking methods unauthorised people may gain access to my account.
PR8	Overall, I believe that using self-service banking methods are riskier than face-to-face banking.

Technology discomfort (n = 3, α = 0.88, AVE = 0.75)

TD1	I would find using most self-service banking methods to be a very stressful experience.
TD2	I feel apprehensive about the use of most self-service banking methods.
TD3	I hesitate to use self-service banking methods for fear of making mistakes.

Items deleted from the technology discomfort scale

TD4	I hesitate to use an ATM for fear of embarrassing myself in front of other users.
TD5	I am afraid to use self-service banking methods for fear of forgetting my personal identification number (PIN).
TD6	I hesitate to use most self-service banking methods because they make me feel overwhelmed.

Self-efficacy (n = 3, α = 0.84, AVE = 0.65)

SE1	I feel confident that I have the ability to withdraw cash from an account using an ATM.
SE4	I am confident in my ability to remember my PIN number when using a self-service banking method.
SE7	Overall, I feel that using most self-service banking methods are well within the scope of my ability.

Items deleted from the self-efficacy scale

SE2	I consider that I have the ability to pay an account using self-service banking methods.
SE3	I am fully capable of using self-service banking methods.
SE5	I feel confident that I have the ability to access and use internet banking.
SE6	Using EFTPOS is well within the scope of my ability.

α: composite reliability
AVE: average variance extracted estimates

Appendix M: Correlation matrix including means and standard deviation measures for each variable item: Study 2

Table M.1. Correlations, means and standard deviations for each variable item

Table M.1. Correlations, means and standard deviations for each variable item

	BEH1	BEH2	ATT1	ATT2	PU1	PU2	PU3	PU4	PU5	PU6
BEH1	1.00									
BEH2	0.83	1.00								
ATT1	0.69	0.69	1.00							
ATT2	0.70	0.70	0.94	1.00						
PU1	0.45	0.50	0.61	0.62	1.00					
PU2	0.55	0.55	0.66	0.67	0.77	1.00				
PU3	0.53	0.55	0.67	0.67	0.80	0.85	1.00			
PU4	0.60	0.58	0.63	0.63	0.62	0.72	0.72	1.00		
PU5	0.51	0.52	0.63	0.64	0.69	0.74	0.78	0.73	1.00	
PU6	0.39	0.43	0.57	0.57	0.71	0.63	0.69	0.55	0.68	1.00
PU7	0.43	0.43	0.50	0.51	0.53	0.56	0.57	0.55	0.57	0.53
PEOU1	0.50	0.53	0.66	0.67	0.51	0.54	0.56	0.51	0.53	0.48
PEOU2	0.44	0.44	0.59	0.60	0.45	0.48	0.51	0.48	0.47	0.42
PEOU3	0.43	0.44	0.57	0.59	0.45	0.48	0.51	0.47	0.46	0.41
PEOU4	0.40	0.41	0.57	0.57	0.42	0.45	0.47	0.43	0.45	0.40
PEOU5	0.43	0.45	0.62	0.62	0.47	0.50	0.53	0.48	0.51	0.44
PC1	-0.48	-0.52	-0.62	-0.64	-0.57	-0.58	-0.58	-0.49	-0.53	-0.50
PC2	-0.43	-0.50	-0.59	-0.61	-0.54	-0.55	-0.55	-0.46	-0.50	-0.47
PC3	-0.38	-0.43	-0.51	-0.53	-0.46	-0.48	-0.48	-0.39	-0.44	-0.41
PC4	-0.42	-0.48	-0.56	-0.58	-0.51	-0.51	-0.52	-0.45	-0.48	-0.45
PC5	-0.50	-0.54	-0.61	-0.63	-0.52	-0.55	-0.55	-0.48	-0.50	-0.43
PC6	-0.53	-0.56	-0.64	-0.67	-0.54	-0.60	-0.59	-0.52	-0.54	-0.46
PR1	-0.30	-0.30	-0.37	-0.36	-0.27	-0.28	-0.29	-0.25	-0.26	-0.31
PR2	0.42	0.44	0.52	0.51	0.39	0.39	0.41	0.41	0.40	0.38
PR3	-0.30	-0.30	-0.40	-0.39	-0.32	-0.30	-0.33	-0.26	-0.30	-0.32
PR4	0.15	0.17	0.21	0.21	0.17	0.19	0.20	0.19	0.19	0.16
PR5	-0.29	-0.30	-0.41	-0.42	-0.35	-0.33	-0.34	-0.29	-0.31	-0.37
PR6	-0.36	-0.36	-0.48	-0.49	-0.38	-0.40	-0.41	-0.35	-0.36	-0.36
PR7	-0.37	-0.40	-0.53	-0.54	-0.45	-0.44	-0.46	-0.38	-0.44	-0.48
PR8	-0.40	-0.44	-0.56	-0.58	-0.49	-0.46	-0.48	-0.40	-0.45	-0.51
TD1	-0.56	-0.57	-0.67	-0.69	-0.52	-0.57	-0.57	-0.53	-0.53	-0.47
TD2	-0.55	-0.58	-0.68	-0.70	-0.53	-0.57	-0.58	-0.53	-0.53	-0.48
TD3	-0.53	-0.56	-0.63	-0.65	-0.48	-0.52	-0.53	-0.50	-0.49	-0.44
TD4	-0.51	-0.50	-0.53	-0.55	-0.36	-0.44	-0.43	-0.45	-0.40	-0.32
TD5	-0.51	-0.50	-0.54	-0.55	-0.36	-0.43	-0.43	-0.43	-0.40	-0.33
TD6	-0.53	-0.52	-0.59	-0.61	-0.41	-0.49	-0.49	-0.47	-0.44	-0.39
SE1	0.57	0.52	0.52	0.52	0.34	0.41	0.40	0.45	0.37	0.29
SE2	0.49	0.47	0.50	0.51	0.35	0.40	0.40	0.46	0.40	0.32
SE3	0.37	0.36	0.46	0.47	0.36	0.40	0.40	0.36	0.38	0.31
SE4	0.48	0.46	0.48	0.50	0.32	0.36	0.36	0.38	0.36	0.31
SE5	0.33	0.35	0.48	0.48	0.40	0.41	0.42	0.35	0.38	0.33
SE6	0.49	0.47	0.49	0.50	0.34	0.39	0.39	0.44	0.38	0.29
SE7	0.49	0.47	0.60	0.62	0.43	0.49	0.49	0.47	0.45	0.39
Mean	5.04	4.78	3.50	3.48	2.91	3.40	3.26	3.67	3.24	2.73
SD	1.63	1.86	1.35	1.39	1.31	1.36	1.33	1.30	1.29	1.30

All correlations significant at the 0.01 level (2-tailed); * Not significant ($p > 0.05$)

BEH – Behaviour
ATT - Attitude
PU - Perceived usefulness
PEOU - Perceived ease of use
PC - Personal contact
PR - Perceived risk
TD - Technology discomfort
SE - Self-efficacy
SD - Standard Deviation

Table M.1. Correlations, means and standard deviations for each variable item (cont)

	PU7	PEOU1	PEOU2	PEOU3	PEOU4	PEOU5	PC1	PC2	PC3	PC4
BEH1										
BEH2										
ATT1										
ATT2										
PU1										
PU2										
PU3										
PU4										
PU5										
PU6										
PU7	1.00									
PEOU1	0.42	1.00								
PEOU2	0.38	0.79	1.00							
PEOU3	0.38	0.74	0.88	1.00						
PEOU4	0.39	0.72	0.74	0.75	1.00					
PEOU5	0.41	0.76	0.75	0.74	0.80	1.00				
PC1	-0.44	-0.53	-0.48	-0.49	-0.46	-0.51	1.00			
PC2	-0.42	-0.52	-0.49	-0.49	-0.46	-0.51	0.87	1.00		
PC3	-0.36	-0.45	-0.45	-0.46	-0.43	-0.46	0.69	0.74	1.00	
PC4	-0.39	-0.48	-0.43	-0.44	-0.42	-0.46	0.72	0.76	0.66	1.00
PC5	-0.43	-0.52	-0.48	-0.49	-0.45	-0.49	0.76	0.77	0.68	0.74
PC6	-0.43	-0.55	-0.52	-0.52	-0.49	-0.52	0.78	0.79	0.71	0.74
PR1	-0.24	-0.36	-0.31	-0.31	-0.30	-0.32	0.36	0.37	0.33	0.31
PR2	0.33	0.41	0.37	0.36	0.36	0.40	-0.38	-0.35	-0.29	-0.34
PR3	-0.25	-0.38	-0.35	-0.34	-0.35	-0.36	0.41	0.42	0.38	0.36
PR4	0.13	0.17	0.15	0.14	0.15	0.18	-0.13	-0.12	-0.11	-0.12
PR5	-0.28	-0.41	-0.36	-0.35	-0.37	-0.38	0.47	0.46	0.39	0.38
PR6	-0.30	-0.50	-0.49	-0.48	-0.48	-0.47	0.51	0.53	0.49	0.46
PR7	-0.36	-0.49	-0.45	-0.44	-0.44	-0.48	0.55	0.55	0.49	0.48
PR8	-0.36	-0.51	-0.47	-0.46	-0.47	-0.50	0.60	0.60	0.51	0.53
TD1	-0.42	-0.66	-0.62	-0.61	-0.58	-0.61	0.61	0.62	0.56	0.58
TD2	-0.43	-0.67	-0.63	-0.63	-0.58	-0.61	0.63	0.63	0.56	0.57
TD3	-0.40	-0.65	-0.63	-0.61	-0.58	-0.61	0.58	0.59	0.52	0.53
TD4	-0.34	-0.55	-0.53	-0.51	-0.47	-0.50	0.46	0.46	0.41	0.42
TD5	-0.35	-0.56	-0.54	-0.51	-0.49	-0.52	0.45	0.45	0.41	0.43
TD6	-0.37	-0.63	-0.62	-0.60	-0.54	-0.57	0.51	0.51	0.46	0.48
SE1	0.32	0.57	0.55	0.53	0.48	0.50	-0.38	-0.37	-0.34	-0.35
SE2	0.31	0.52	0.53	0.53	0.46	0.48	-0.38	-0.36	-0.32	-0.32
SE3	0.28	0.54	0.57	0.58	0.54	0.52	-0.40	-0.41	-0.39	-0.36
SE4	0.30	0.52	0.51	0.51	0.47	0.48	-0.34	-0.34	-0.33	-0.34
SE5	0.29	0.53	0.55	0.56	0.47	0.50	-0.48	-0.48	-0.43	-0.41
SE6	0.31	0.51	0.53	0.53	0.46	0.48	-0.36	-0.35	-0.31	-0.33
SE7	0.37	0.68	0.70	0.71	0.64	0.67	-0.48	-0.47	-0.43	-0.42
Mean	3.28	3.62	3.64	3.72	3.45	3.51	3.56	3.57	3.61	3.66
SD	1.30	1.22	1.16	1.13	1.18	1.22	1.34	1.32	1.36	1.31

All correlations significant at the 0.01 level (2-tailed); * Not significant ($p > 0.05$)

BEH - Behaviour
ATT - Attitude
PU - Perceived usefulness
PEOU - Perceived ease of use
PC - Personal contact
PR - Perceived risk
TD - Technology discomfort
SE - Self-efficacy
SD - Standard Deviation

Table M.1. Correlations, means and standard deviations for each variable item (cont)

	PC5	PC6	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8
BEH1										
BEH2										
ATT1										
ATT2										
PU1										
PU2										
PU3										
PU4										
PU5										
PU6										
PU7										
PEOU1										
PEOU2										
PEOU3										
PEOU4										
PEOU5										
PC1										
PC2										
PC3										
PC4										
PC5	1.00									
PC6	0.84	1.00								
PR1	0.35	0.37	1.00							
PR2	-0.35	-0.37	-0.17	1.00						
PR3	0.40	0.42	0.47	-0.20	1.00					
PR4	-0.12	-0.13	-0.01*	0.26	0.06	1.00				
PR5	0.43	0.45	0.48	-0.25	0.52	0.01*	1.00			
PR6	0.52	0.54	0.46	-0.25	0.57	-0.01*	0.63	1.00		
PR7	0.53	0.55	0.52	-0.35	0.57	-0.07	0.68	0.68	1.00	
PR8	0.57	0.59	0.49	-0.37	0.53	-0.11	0.65	0.63	0.80	1.00
TD1	0.62	0.66	0.38	-0.42	0.42	-0.15	0.42	0.54	0.52	0.54
TD2	0.63	0.68	0.39	-0.43	0.43	-0.15	0.46	0.55	0.55	0.57
TD3	0.59	0.62	0.37	-0.39	0.41	-0.14	0.42	0.56	0.51	0.53
TD4	0.49	0.51	0.38	-0.32	0.36	-0.11	0.34	0.47	0.42	0.42
TD5	0.48	0.51	0.35	-0.35	0.37	-0.10	0.35	0.47	0.42	0.41
TD6	0.53	0.57	0.37	-0.38	0.38	-0.12	0.40	0.52	0.48	0.48
SE1	-0.41	-0.43	-0.33	0.32	-0.28	0.13	-0.29	-0.38	-0.36	-0.35
SE2	-0.36	-0.38	-0.22	0.36	-0.25	0.11	-0.25	-0.35	-0.33	-0.35
SE3	-0.41	-0.43	-0.23	0.31	-0.28	0.10	-0.27	-0.37	-0.34	-0.37
SE4	-0.36	-0.38	-0.26	0.34	-0.28	0.11	-0.29	-0.37	-0.34	-0.33
SE5	-0.49	-0.47	-0.27	0.28	-0.28	0.11	-0.30	-0.39	-0.37	-0.40
SE6	-0.37	-0.38	-0.22	0.36	-0.25	0.09	-0.26	-0.36	-0.34	-0.35
SE7	-0.47	-0.49	-0.29	0.38	-0.31	0.16	-0.35	-0.45	-0.42	-0.44
Mean	3.31	3.23	3.28	2.57	3.19	3.42	3.52	3.11	3.35	3.42
SD	1.40	1.42	1.32	1.22	1.17	1.12	1.22	1.26	1.28	1.33

All correlations significant at the 0.01 level (2-tailed); *** Not significant ($p > 0.05$)**

BEH - Behaviour
ATT - Attitude
PU - Perceived usefulness
PEOU - Perceived ease of use
PC - Personal contact
PR - Perceived risk
TD - Technology discomfort
SE - Self-efficacy
SD - Standard Deviation

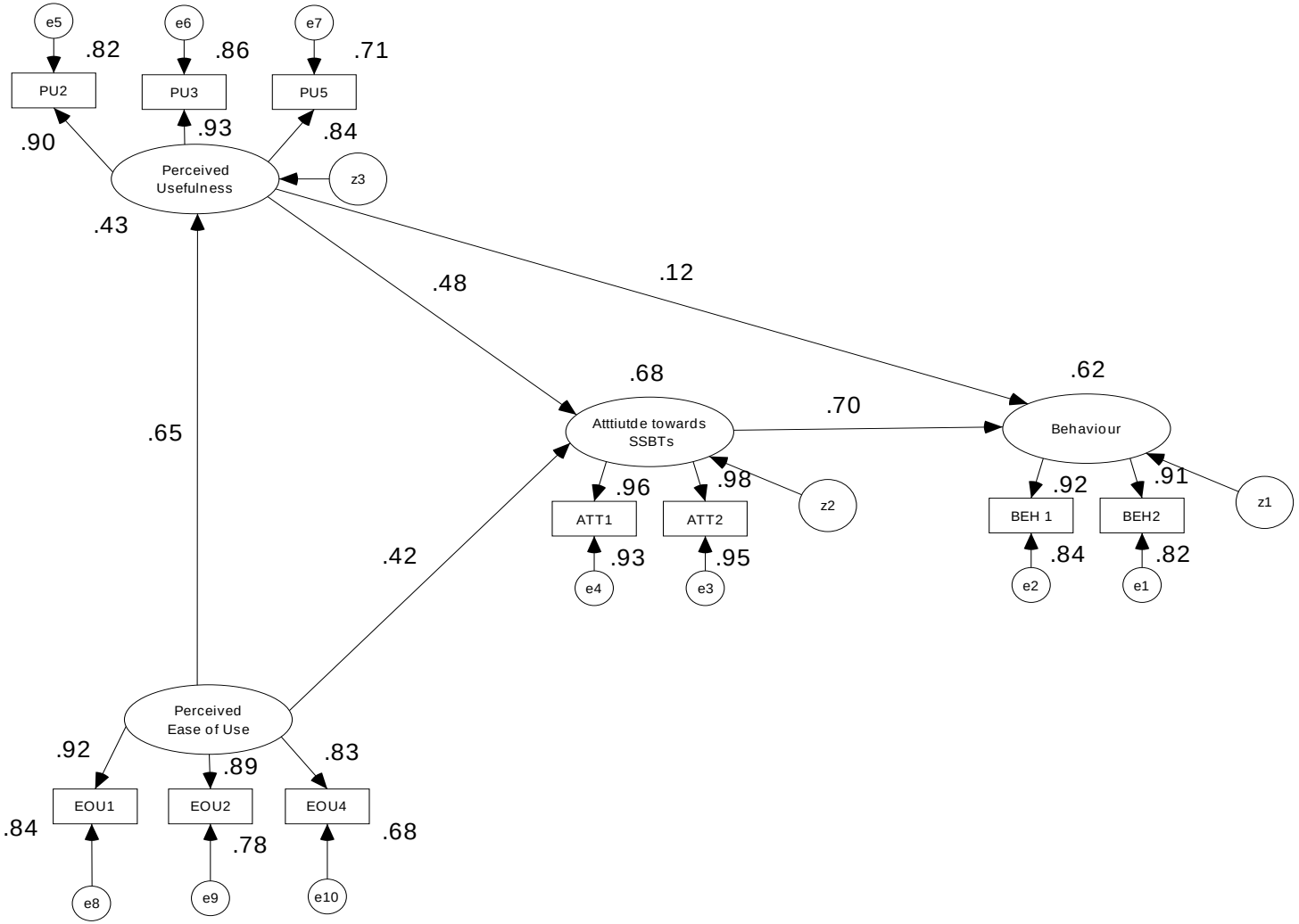
Table M.1. Correlations, means and standard deviations for each variable item (cont)

	TD1	TD2	TD3	TD4	TD5	TD6	SE1	SE2	SE3	SE4	SE5	SE6	SE7
BEH1													
BEH2													
ATT1													
ATT2													
PU1													
PU2													
PU3													
PU4													
PU5													
PU6													
PU7													
PEOU1													
PEOU2													
PEOU3													
PEOU4													
PEOU5													
PC1													
PC2													
PC3													
PC4													
PC5													
PC6													
PR1													
PR2													
PR3													
PR4													
PR5													
PR6													
PR7													
PR8													
TD1	1.00												
TD2	0.88	1.00											
TD3	0.82	0.84	1.00										
TD4	0.68	0.68	0.74	1.00									
TD5	0.65	0.66	0.71	0.78	1.00								
TD6	0.75	0.76	0.79	0.78	0.78	1.00							
SE1	-0.52	-0.52	-0.53	-0.64	-0.57	-0.57	1.00						
SE2	-0.47	-0.46	-0.45	-0.43	-0.46	-0.47	0.61	1.00					
SE3	-0.50	-0.50	-0.51	-0.41	-0.41	-0.50	0.45	0.51	1.00				
SE4	-0.47	-0.46	-0.49	-0.49	-0.65	-0.53	0.63	0.55	0.44	1.00			
SE5	-0.50	-0.50	-0.48	-0.40	-0.41	-0.50	0.40	0.43	0.55	0.38	1.00		
SE6	-0.47	-0.46	-0.45	-0.43	-0.47	-0.47	0.56	0.81	0.50	0.60	0.47	1.00	
SE7	-0.61	-0.60	-0.60	-0.52	-0.55	-0.62	0.61	0.64	0.67	0.62	0.62	0.71	1.00
Mean	2.50	2.62	2.49	2.05	2.12	2.17	4.33	4.16	3.78	4.22	3.07	4.20	4.03
SD	1.37	1.44	1.42	1.32	1.33	1.34	1.11	1.18	1.36	1.15	1.54	1.12	1.16

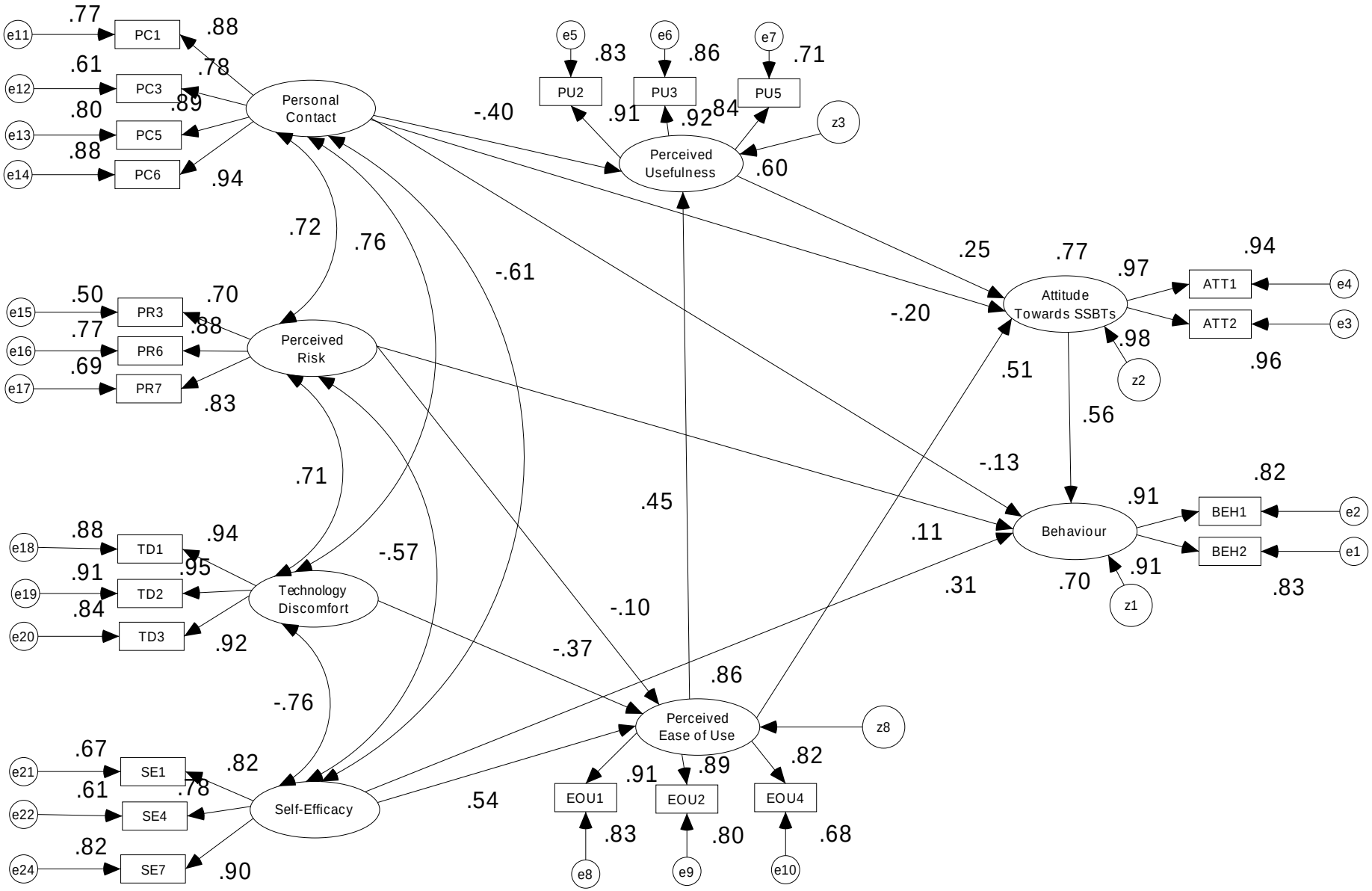
All correlations significant at the 0.01 level (2-tailed); *** Not significant ($p > 0.05$)**

BEH - Behaviour
ATT - Attitude
PU - Perceived usefulness
PEOU - Perceived ease of use
PC - Personal contact
PR - Perceived risk
TD - Technology discomfort
SE - Self-efficacy
SD - Standard Deviation

Appendix N: Technology acceptance model – SEM output from AMOS: Study 2


e5
e6
e7
.82
.86
.71
PU2
PU3
PU5
.90
.93
.84
Perceived Usefulness
z3
.43
.48
.12
.68
.62
.70
Atttiutde towards SSBTs
Behaviour
.65
.96
.98
.92
.91
ATT1
ATT2
z2
BEH 1
BEH2
z1
.93
.95
.84
.82
e4
e3
e2
e1
.42
Perceived Ease of Use
.92
.89
.83
EOU1
EOU2
EOU4
.84
.78
.68
e8
e9
e10

Appendix O: Extended technology acceptance model – SEM output from AMOS: Study 2


Personal Contact
Perceived Risk
Technology Discomfort
Self-Efficacy
Perceived Usefulness
Perceived Ease of Use
Attitude Towards SSBTs
Behaviour
PC1
PC3
PC5
PC6
PR3
PR6
PR7
TD1
TD2
TD3
SE1
SE4
SE7
PU2
PU3
PU5
EOU1
EOU2
EOU4
ATT1
ATT2
BEH1
BEH2
z1
z2
z3
z8
e1
e2
e3
e4
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.80
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.83
.86
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-.20

Appendix P: Standardised direct and indirect effects for respecified model: Study 2

Table P.1. Standardised total, direct and indirect effects - Study 2

Table P.1. Standardised total, direct and indirect effects - Study 2

Standardised total effects

	PC	PR	TD	SE	PEOU	PU	A
PEOU	.000	-.105	-.370	.537	.000	.000	.000
PU	-.398	-.047	-.165	.239	.446	.000	.000
A	-.304	-.065	-.231	.335	.624	.251	.000
B	-.295	-.071	-.129	.495	.347	.140	.556

Standardised direct effects

	PC	PR	TD	SE	PEOU	PU	A
PEOU	.000	-.105	-.370	.538	.000	.000	.000
PU	-.398	.000	.000	.000	.446	.000	.000
A	-.204	.000	.000	.000	.512	.251	.000
B	-.126	.107	.000	.309	.000	.000	.556

Standardised indirect effects

	PC	PR	TD	SE	PEOU	PU	A
PEOU	.000	.000	.000	.000	.000	.000	.000
PU	.000	-.047	-.165	.239	.000	.000	.000
A	-.100	-.065	-.231	.335	.112	.000	.000
B	-.169	-.036	-.128	.186	.347	.140	.000

Appendix Q: Hierarchical regression tests for original TAM: Study 2

Table Q.1. Hierarchical regression tests for original TAM

Table Q.1. Hierarchical regression tests for original TAM

Dependent Variable	R^2	Independent Variables	R^2 Change	*b*	S.E. (*b*)	β	*t*-statistic	Significance Level
Behaviour	0.55	Constant		1.50	0.08		17.90	0.000
		Attitude	0.54	0.77	0.03	0.62	27.49	0.000
		PU	0.01	0.20	0.03	0.15	7.26	0.000
		PEOU		0.01	0.03	0.01	0.44	0.657
Attitude	0.62	Constant		-0.01	0.06		-0.17	0.867
		PU	0.52	0.54	0.02	0.49	30.37	0.000
		PEOU	0.10	0.49	0.02	0.39	24.22	0.000

PU – perceived usefulness; PEOU – perceived ease of use

Appendix R: Hierarchical regression test for ETAM: Study 2

Table R.1. Hierarchical regression tests for ETAM

Table R.1. Hierarchical regression tests for ETAM

Dependent Variable	R^2	Independent Variables	R^2 Change	*b*	S.E. (*b*)	β	*t*-statistic	Significance Level
Behaviour	0.60	Constant		1.72	0.24		7.14	0.000
		Attitude	0.54	0.61	0.03	0.50	20.84	0.000
		PU	0.11	0.15	0.03	0.12	5.69	0.000
		PEOU		-0.29	0.04	-0.19	-8.32	0.000
		PC	0.05	-0.10	0.03	-0.07	-3.30	0.001
		PR		0.10	0.03	0.06	3.52	0.000
		TD		-0.18	0.03	-0.14	-5.86	0.000
		SE		0.48	0.04	0.28	13.79	0.000
Attitude	0.69	Constant		2.164	0.17		12.89	0.000
		PU	0.62	0.36	0.02	0.33	19.60	0.000
		PEOU		0.14	0.03	0.12	5.76	0.000
		PC	0.07	-0.18	0.02	-0.17	-8.81	0.000
		PR		-0.06	0.02	-0.05	-2.97	0.000
		TD		-0.19	0.02	-0.18	-8.77	0.000
		SE		0.22	0.03	0.16	8.91	0.000
Perceived usefulness	0.49	Constant		3.75	0.18		21.06	0.000
		PEOU	0.34	0.21	0.03	0.19	7.44	0.000
		PC	0.15	-0.37	0.02	-0.37	-16.13	0.000
		PR		-0.01	0.02	-0.01	-0.17	0.865
		TD		-0.15	0.02	-0.16	-6.26	0.000
		SE		0.11	0.03	0.08	3.75	0.000
Perceived ease of use		Constant		2.90	0.12		24.91	0.000
	0.64	PC	0.64	-0.06	0.02	-0.07	-3.44	0.001
		PR		-0.11	0.02	-0.11	-6.47	0.000
		TD		-0.28	0.02	-0.34	-16.54	0.000
		SE		0.46	0.02	0.41	24.58	0.000

PU – perceived usefulness; PEOU – perceived ease of use; PC – personal contact; PR – perceived risk; TD – technology discomfort; SE – self-efficacy