

An Empirical Investigation of Frequency of Internet Banking Usage by Australian Consumers

*Sujana Adapa, Dr. Jennifer Rindfleish, Professor Ray Cooksey and Dr. Fredy Valenzuela
University of New England*

Abstract

The goal of this study was to investigate the dimensions to consumers' frequency of usage of internet banking in Australian context. Quantitative data were collected using a cross-sectional mall intercept survey in Sydney comprising a sample of 372 internet banking users. The survey comprised of closed response rating questions and exploratory factor analysis was performed for factor clarification on the scales employed. Final factors identified were entered in hierarchical logistic regression analyses to test the proposed framework. The major substantive findings emerged from the study reveal that level of education and level of income within the demographic characteristics were significantly and positively associated to consumers' frequency of internet banking usage. Technology (attraction to usability and attraction to trialability), channel (perceived safety) and value dimensions significantly and positively impact consumers' frequency of internet banking usage. Whereas, demographic characteristics such as age, gender, ethnicity, occupation and social dimensions systematically do not relate to the frequency of internet banking usage.

An Empirical Investigation of Frequency of Internet Banking Usage by Australian Consumers

Introduction

Banks delivered their products and services traditionally through a single distribution channel to their prospective customers and it is through physical bank branches. However, technological advancements in the form of advent of internet, technological innovations, financial liberalisation and globalization are increasingly driving many businesses to diversify their traditional modes of operations (Gyptra and Dixson 2002). As a result many businesses are increasingly diversifying their activities in order to gain a competitive advantage over their competitors. Financial services sector became more competitive and the conventional mode to rely on price factors became increasingly difficult. Thus banks started to rely on non-price factors as a means of differentiation and cost reduction (Zhu and Chen 2002). Banks realized distribution as an alternative strategy for differentiation and the result has been the proliferation of service delivery channels such as automated teller machines, telephone, internet and mobile banking through which consumers' can interact with the banks (Dabholkar and Bagozzi 2002). Internet banking has indeed experienced a tremendous growth in many countries and is increasingly managed as an operational activity (Black *et al.*, 2001). Despite the considerable diffusion of internet banking, banks seek further market expansion (Reid and Levy 2008). Over the past two decades researchers in internet banking context studied factors responsible for consumer intention to adopt, adoption and non-adoption of these innovative banking technologies. It is only recently that researchers started to focus on post adoption behaviour of consumers. Therefore, the present study focuses in investigating the relevant factors responsible for consumers' frequency of internet banking usage in Australian context. This study provides important implications for formulation of better channel management strategies. Furthermore, the study is of relevance to service industries associated with the internet banking services for their market expansion.

Literature Synthesis

Existing research asserts that, possible theoretical models that provide a comprehensive understanding of the user acceptance have roots in information systems, psychology and sociology. The present study proposes the application of integrated consumer decision making, technology acceptance and diffusion of innovations models in order to capture factors which might have a significant impact on the continued usage of internet banking by consumers' in Australia. Literature synthesis identifies the possible influence of demographic characteristics, technology, channel, social and value dimensions on frequency of internet banking usage. Positive impact of gender, age, level of education and income, occupation and ethnicity on consumer adoption of internet banking was expressed in some studies (Gan *et al.*, 2006, Foucault and Scheufele 2002, Venkatesh *et al.*, 2000). On the contrary, other studies exhibited no significant influence of the demographics on the consumer adoption of internet banking (Gan *et al.*, 2006, Howcroft *et al.*, 2002).

The role of technology is pivotal in influencing consumers' adoption behaviour and existing studies highlighted the need for inclusion of the additional variables in order to explain variances in behavioural intention and subsequent actual usage, apart from the existing fundamental variables in technology acceptance model (Wang *et al.*, 2003). Diffusion of innovations theory emphasizes that individuals develop certain perceptions towards an innovation and based on these perceptions, an individual makes a decision whether to accept

or reject an innovation (Agarwal and Prasad 1997, Moore and Benbasat 1991). Moore and Benbasat (1996) refined a set of constructs that represents characteristics of innovations that are presented innovation diffusion theory. Therefore technology dimensions encompass sub-dimensions such as relative advantage, compatibility, complexity, trialability and result demonstrability, which are critical for potential adopters' perceptions (Moore and Benbasat 1996). These constructs are widely used to predict individuals' technology acceptance but there exists no reference in the literature whether or not these dimensions impact consumers' frequency of usage of internet banking (Plouffe *et al.*, 2001, Karahanna *et al.*, 1999, Agarwal and Prasad 1998, 1997, Moore and Benbasat 1991).

From the existing literature the sub-dimensions representing channel dimensions identified include perceived self-efficacy, perceived risk, perceived trust and perceived personalization which might have an impact on frequency of internet banking usage. Perceived self-efficacy sub-dimension is pivotal to social cognitive theory and refers to an individuals' belief in his/her capability to perform a specific task (Hernandez and Mazzon 2007, Chan and Lu 2004). Perceived risk usually arises from the uncertainty that consumers' expect when they cannot foresee the consequences of their purchasing decisions (Gan *et al.*, 2006, Tan and Teo 2000). Users are influenced by only perceptions of risk, whether or not such risk actually exists. Perceived trust is associated with a set of beliefs and often refers to the role of security and privacy aspects in online environment (Herington and Weaven 2007, Ribbink *et al.*, 2004). Perceived personalization relates to consumers' perception as being unique due to performing internet banking transactions. Furthermore, the perceptions of the consumer also pertain to the promotional offers and information that is tailor-made as an internet banking user (Huang and Lin 2005, Srinivasan *et al.*, 2002). In the present study an attempt has been made to identify the relationship between channel dimensions and frequency of usage of internet banking by consumers in Australian context.

Subjective norm and informational influences together constitute the social dimensions for the purpose of this research. Extant studies indicate the possible influence of friends, family, and colleagues/peers on consumers' intention to adopt internet banking (Tan and Teo 2000). Though there exists no basis on which to predict how each of these groups will affect consumers' intention to adopt internet banking, it is however expected that the influence of these groups as a whole will significantly be related to consumers' frequency of usage of internet banking (Chan and Lu 2004, Venkatesh and Davis 2000). Perceived value is identified as the ratio of the consumers' outcome/input to that of the service providers' outcome/input (Oliver and DeSarbo 1988). In other words, the equity concept refers to customers' evaluation of what is fair, right, or deserved for the perceived cost of the offering (Bolton and Lemon 1999). Monetary payments and non-monetary sacrifices such as time consumption, and stress experienced by consumers' together include perceived costs (Yang and Peterson 2004). Whereas, customer perceived value emerges from an evaluation of the relative rewards and sacrifices associated with the offering. Customer value is identified as the fundamental basis for all marketing activity (Holbrook 1994, Zeithaml *et al.*, 2002, Sweeney and Soutar 2001). Thus it could be hypothesised that,

H₁: Frequency of internet banking usage will show no differences on the basis of the demographic characteristics.

H₂: Identified technology dimensions will significantly predict frequency of internet banking usage over and above the influence of the demographic control variables.

H₃: Identified channel dimensions will significantly predict frequency of internet banking usage over and above the influence of the demographic control variables.

H₄: Identified social dimensions will significantly predict frequency of internet banking usage over and above the influence of the demographic control variables.

H₅: Identified value dimensions will significantly predict frequency of internet banking usage over and above the influence of the demographic control variables.

Methodology

Data were obtained from respondents by employing a self-administered questionnaire as a research instrument. 372 usable questionnaires were obtained from internet banking users who were contacted through a cross-sectional mall intercept survey. The questionnaire developed consisted of both quantitative and qualitative components with questions related to respondents' general banking habits, internet usage, demographic characteristics, scale items pertaining to technology, channel, social, value and usage dimensions, and few open-ended items. For the purpose of this paper only quantitative results are presented. All the scale items were labelled on a six-point Likert scale such as strongly agree, agree, neither agree nor disagree, disagree, strongly disagree and unable to rate. Scale items used in this study were mostly derived from intention to adopt and adoption of internet banking studies.

Descriptive statistics were obtained from data by subjecting it for analysis in SPSS 17.0. Data checks were performed for its goodness of fit and normality assumptions. Where ever required data transformations were performed followed by exploratory factor analysis for data reduction and summarization (Cooksey 2007). Factor identified after performing exploratory factor analysis include attraction to usability, attraction to trialability, perceived safety and perceived specialty measures for technology and channel dimensions. Categorical variables such as demographic characteristics before entering into the regression model were dummy coded for meaningful interpretations (Cooksey 2007).

Results and Discussion

In the present study, consumers using internet banking are faced with a binary choice situation with regard to their frequency of using internet banking such as, performing internet banking more frequently (more than once a week) and performing internet banking less frequently (less than or equal to once a week). The decision to perform internet banking frequently was hypothesized to be a function of technology, channel, social and value dimensions apart from demographic characteristics. Demographic characteristics include gender, age, level of education, level of income, ethnicity and occupation. The variables are proposed to be entered into the logistic regression hierarchically based on the theoretical and contextual description. The proposed empirical model takes the form,

$$\text{Frequency of using internet banking} = f(\text{Gender, Age, Education, Income, Ethnicity, Occupation, Technology Determinants, Channel Determinants, Social Determinants, Value Determinants, } \varepsilon)$$

The discrete dependent variable frequency of using internet banking measures whether an individual is a more frequent or less frequent user of the internet banking. The probabilities of the Wald statistic and their Exp (B) representing the change in the odds of the modelled event would predict the frequency of using the internet banking by Australian consumers. Logistic regression is used to predict a dependent variable on the basis of continuous and/or categorical independents and to determine the percent of variance in the dependent variable explained by the independents, to rank the relative importance of independents, to assess interaction effects and to understand the impact of covariates as control variables (Hosmer and Lemeshow 2000). Hierarchical method of logistic regression was followed in which control variables were entered in the analysis before the predictors whose effects were of a

primary concern. The variable frequency of using internet banking on an average per week was dummy coded and the value of 0 was assigned to 'Less than or equal to once a week' and a value of 1 was assigned to 'More than once a week'. Performing internet banking less than or equal to once a week was identified as the reference category. The dummy coded variable of frequency of using internet banking was further entered into the hierarchical logistic regression analysis.

The output for logistic regression begins with no independent variables as Block 0: Beginning Block, reports the initial -2 log likelihood, as a measure of the error associated trying to predict the dependent variable without using any information from the independent variables (O'Connell 2005). The difference between ending and beginning -2 log likelihood is the model chi-square that was used in the test of overall statistical significance. Model chi-square determined was 39.660 and was statistically significant at $p < 0.001$. Logistic regression computes correlation measures to estimate the strength of the relationship (pseudo R^2 measures such as Nagelkerke R^2). The Nagelkerke measure adapts Cox-Snell measure so that it varies from 0 to 1 (Pampel 2000). Model summary of the logistic regression relates to the Nagelkerke R^2 value of 0.136. However, the abovementioned correlation measures do not actually depict much about the accuracy of errors associated with the model.

More useful measure to assess the utility of a logistic regression associates to classification accuracy. It compares predicted group membership based on the logistic model to the actual (McKelvy and Zavoina 1994). The chance accuracy reported was 65.1%. Omnibus tests of model coefficients support the existence of a relationship between the independent and dependent variables. The test of significance for the relationship between an individual independent variable and the dependent variable is determined by the significance test of Wald statistic. The individual coefficients represent change in the probability of being a member of the modelled category. The Exp (B) represents the change in the odds of the modelled event associated with a one unit change in the independent variable. Odds ratio of less than 1 correspond to decreases and odds ratio of more than 1 corresponds to increases in odds.

Demographic characteristics were entered into the model initially in model 1 followed by technology, channel, social and value dimensions in subsequent models. The probabilities of the Wald statistic of the significant variables and their Exp (B) are presented in TABLE 1.0. The probability of the Wald statistic for the variable education was $p = 0.031$. The value of Exp (B) was 1.869 which implies an increase in the odds of 0.87%. Survey respondents with higher education were more prone to use internet banking frequently. Among the demographic variables entered into the hierarchical logistic regression, the variable income also associated significantly ($p = 0.048$) with the frequency of internet banking usage. The Exp (B) was 1.595 which implies survey respondents with higher levels of income were more prone to use internet banking frequently with an increase in the odds of 0.60%.

Technology dimensions entered into the model after demographics and the probability of the Wald statistic was significant for attraction to usability ($p = 0.000$) and attraction to trialability ($p = 0.001$). Every unit increase in attraction to usability and attraction to trialability is associated with increase in the frequency of internet banking usage as high numeric values were associated with respondents who strongly disagree. With regard to the channel dimensions, the sub-dimension perceived safety was significant ($p = 0.000$) implying respondents likeliness to increase frequency of internet banking usage.

However, perceived specialty did not show any relationship with the frequency of internet banking usage. Social dimensions entered in model 4, did not show any statistical significance with the frequency of internet banking usage. The probability of the Wald

statistic of the value dimensions entered in model 5 was statistically significant ($p = 0.000$) relating to respondents likeliness to increase frequency of internet banking usage.

TABLE 1.0: Hierarchical Logistic Regression

Step	Variable sets and variables	B	S.E.	Wald	df	Sig.	Exp (B)
1	Demographic Characteristics						
	Education	0.625	0.289	4.665	1	0.031*	1.869
	Income	0.520	0.263	3.905	1	0.048*	1.595
2	Technology Determinants						
	Attraction to Usability	-5.297	1.305	16.470	1	0.000*	0.005
	Attraction to Trialability	-3.582	0.180	10.428	1	0.001*	0.559
3	Channel Determinants						
	Perceived Safety	-1.008	0.054	2.020	1	0.000*	0.352
	Perceived Specialty	-0.007	0.004	3.085	1	0.079	0.993
4	Social Determinants						
	Social	-0.531	0.869	0.373	1	0.542	0.588
5	Value Determinants						
	Value	-2.438	0.153	8.973	1	0.000*	0.533

Conclusion

Results obtained indicate that level of education and level of income significantly influence consumers' frequency of internet banking usage. Technology (attraction to usability and attraction to trialability), channel (perceived safety) and value dimensions significantly and positively impact frequency of internet banking usage. Perceived specialty component of channel dimensions, social dimensions and other demographic characteristics such as gender, age, ethnicity and occupation systematically do not relate to the consumers' frequency of internet banking usage. To increase productivity of any business, not only the adoption of a particular product or service, but also frequency of usage is critical. Respondents emphasize more on safety issues related to privacy, security and trust components of internet banking. Respondents do not feel internet banking as special that could be related to their frequency of usage. Therefore banks should concentrate on providing unique benefits to consumers which might enhance their frequency of usage. Banks should concentrate to enhance the value aspect and increase the site preference by consumers.

References

- Agarwal, R. & Prasad, J. 1997, The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences*, 28 (93), 557-582.
- Agarwal, R. & Prasad, J. 1998, A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, 9 (2), 204-215.
- Black, N. J., Lockett, A., Winklhofer, H. & Ennew, C. 2001, The adoption of internet financial services: A qualitative study. *International Journal of Retail and Distribution Management*, 20 (8), 390-398.
- Bolton, R. N. & Lemon, K. N. 1999, A dynamic model of customers' usage of services: Usage as an antecedent and consequence of satisfaction. *Journal of Marketing Research*, 36, 171-186.
- Chan, S. & Lu, M. 2004, "Understanding internet banking adoption and use behaviour: A Hong Kong Perspective", *Journal of Global Information Management*, 12 (3), 21-43.
- Cooksey, R. W. 2007, *Illustrating Statistical Procedures: For Business, Behavioral & Social Science Research* (1st Ed.). Tilde University Press, Australia.
- Dabholkar, P. & Bagozzi, R. 2002, An attitudinal model of technology-based self-service: Moderation effects of consumers traits and situational factors. *Journal of Academy of Marketing Sciences*, 30 (3), 184-201.
- Foucault, B. E. & Scheufele, D. A. 2002, Web vs campus store? Why students buy textbooks online? *Journal of Consumer Marketing*, 19 (5), 409-423.
- Frambach, R. T., Roest, H. C. A. & Krishnan, T. V. 2007, The impact of consumer internet experience on channel preferences and usage intentions across the different stages of the buying process. *Journal of Interactive Marketing*, 21 (2), 26-41.
- Gan, C., Clemes, M., Limsombunchai, V. & Weng, A. 2006, "A logit analysis of electronic banking in New Zealand", *International Journal of Bank Marketing*, 24 (6), 360-383.
- Gyptre, P. & Dixon, P. 2002, Future of Banking-Expectation. *Global Change*, Retrieved 10th June 2008. Available from www.globalchange.com/futurebank.htm
- Herington, C. & Weaven, S. 2007, "Can banks improve customer relationships with high quality online services?", *Managing Service Quality*, 17 (4), 404-427.
- Hernandez, J. M. C. & Mazzon, J. A. 2007, "Adoption of internet banking: Proposition and implementation of an integrated methodology approach", *International Journal of Bank Marketing*, 25 (2), 72-88.
- Holbrook, M. B. 1994, The nature of customer's value: An axiology of service in consumption experiment. In R. T. Rust & R. L. Oliver (Eds.), *Service Quality: New Directions in Theory and Practice* (pp. 21-71), Thousand Oaks, CA: Sage Publications.
- Hosmer, D. & Lemeshow, S. 2000, *Applied Logistic Regression* (2nd Ed.). Wiley and Sons, New York.
- Howcroft, B., Hamilton, R. & Hewer, P. 2002, Consumer attitude and the usage and adoption of home-based banking in the United Kingdom. *International Journal of Bank Marketing*, 20 (3), 111-121.
- Huang, E. Y. & Lin, C. Y. 2005, "Customer-oriented financial service personalization", *Industrial Management and Data Systems*, 105 (1), 26-44.
- Karahanna, E., Straub, D. W. & Chervany, N. L. 1999, Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly*, 23 (2), 183-213.
- McKelvey, R. & Zavoina, W. 1994, A statistical model for the analysis of ordinal level dependent variables. *Journal of Mathematical Sociology*, 4, 103-120.

- Moore, G. C. & Benbasat, I. 1991, Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2 (3), 192-222.
- Moore, G. C. & Benbasat, I. 1996, Integrating diffusion of innovations and theory of reasoned action models to predict utilization of information technology by end-users. In K. Kautz & J. Prier-Hege (Eds.), *Diffusion and Adoption of Information Technology*, (pp. 132-146). Chapman & Hall, London.
- O'Connell, A. A. 2005, *Logistic Regression Models for Ordinal Response Variables*. Sage Publications, Thousand Oaks, CA.
- Oliver, R. L & DeSarbo, W. S. 1988, Response determinants in satisfaction judgments. *Journal of Consumer Research*, 14, 495-508.
- Pampel, F. C. 2000, *Logistic Regression: A Primer*. Sage Publications, Thousand Oaks, CA.
- Plouffe, C. R., Hulland, J. S. & Vandenbosch, M. 2001, Richness versus parsimony in modelling technology adoption decisions- understanding merchant adoption of a smart card-based payment system. *Information Systems Research*, 12 (2), 208-222.
- Reid, M. & Levy, Y. 2008, Integrating trust and computer self-efficacy with TAM: An empirical assessment of customers' acceptance of banking information systems (BIS) in Jamaica. *Journal of Internet Banking and Commerce*, 13 (3), 1-18.
- Ribbink, D., Riel, A., Liljander, V. & Streukens, S. 2004, "Comfort your online customer: Quality, trust, and loyalty on the internet", *Managing Service Quality*, 14 (6), 446-456.
- Srinivasan, S. S., Anderson, R. & Ponnnavolu, K. 2002, "Customer loyalty in e-commerce: An exploration of its antecedents and consequences", *Journal of Retailing*, 78 (1), 41-50.
- Sweeney, J. C. & Soutar, G. 2001, "Consumer perceived value: The development of multiple item scale", *Journal of Retailing*, 77 (2), 203-220.
- Tan, M. & Teo, T. S. H. 2000, "Factors influencing the adoption of internet banking", *Journal of the Association for Information Systems*, 1 (5), 22-38.
- Venkatesh, V. & Davis, F. D. 2000, "A theoretical extension of the technology acceptance model: Four longitudinal studies", *Management Science*, 46 (2), 186-204.
- Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. 2003, User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27 (3), 425-478.
- Wang, Y., Wang, Y., Lin, H. & Tang, T. 2003, Determinants of user acceptance of internet banking: An empirical study. *International Journal of Service Industry Management*, 14 (5), 501-519.
- Yang, Z. & Peterson, R. T. 2004, Customer perceived value, satisfaction, and loyalty: The role of switching costs. *Psychology and Marketing*, 21 (10), 799-822.
- Zeithaml, V. A., Parasuraman, A. & Malhotra, A. 2002, "Service quality delivery through web sites: A critical review of extant knowledge", *Journal of Academy of Marketing Science*, 30 (4), 362-375.
- Zhu, F. & Chen, I. 2002, IT-based services and service quality in consumer banking. *International Journal of Service Industry Management*, 13 (1), 69-90.