

## **Modelling Choice of Mobile Technology for M-Banking**

**Saifullah M. Dewan**

**School of Information Systems Technology and Management  
The University of New South Wales  
Sydney, Australia**

**Ahsanullah M. Dewan**

**Graduate School of Business  
Curtin University of Technology  
Perth, Australia**

### **Abstract**

Research in the adoption of mobile services has not offered a comprehensive explanation of low demand for the service. This paper proposes a more comprehensive framework to account for the explanations of consumer choice in the context of m-banking. The model underlies the cognitive processes of reasoning, referencing and contextualizing, as postulated in the behavioral decision making. The proposed theoretical framework is based on a review of literature from marketing, behavioral economics and information systems.

### **Keywords**

M-Banking, Choice, Reasoning, Referencing, Context

### **1. Introduction**

Over the last two decades, we have witnessed the growth of two new communication technologies – mobile networks and the Internet. A number of applied and theoretical research has taken place in an effort to combine these two successful technologies, but so far the mobile services has not become as popular as expected except in few countries. The success of mobile services in general depends on consumer choice and technological improvements. Technological development opens up new possibilities but finally it is the consumer who decides whether to choose a service or not. Banks have traditionally delivered services through face-to-face interactions with consumers at branch offices [1]. Traditional channels are being challenged and complemented by new electronic channels [2-3]. The most recent addition is mobile banking (m-banking), an application of mobile commerce (m-commerce), which is now offered by many banks in many countries. M-banking is defined as provision and availment of banking services with the help of mobile telecommunication devices such as mobile phones [4-5] (see Figure 1 for an example of m-banking application).

There is wide agreement that wireless channel has the potential to transform banking and telecom sectors [6-8]. Rapid proliferation of mobile phones, rising proliferation of advanced mobile phones (e.g. iPhone, iPod Touch) and advancement in wireless technology can potentially drive m-banking - the “next-generation” of electronic banking (e-banking). However, since late 1990s, many attempted m-commerce applications, including m-banking, have failed to attract consumers [9]. It is mainly because m-commerce applications followed a technology-driven model of design [10], and the potential of m-commerce was not yet recognised at the consumer side [11-12]. As technology has become an indispensable element of banking service delivery, managerial interest to improve understanding of consumer choice has also increased in an increasingly competitive market [13-14]. Hence, there have been calls for more research to understand consumer choice of m-banking like mobile services [8, 15-20].

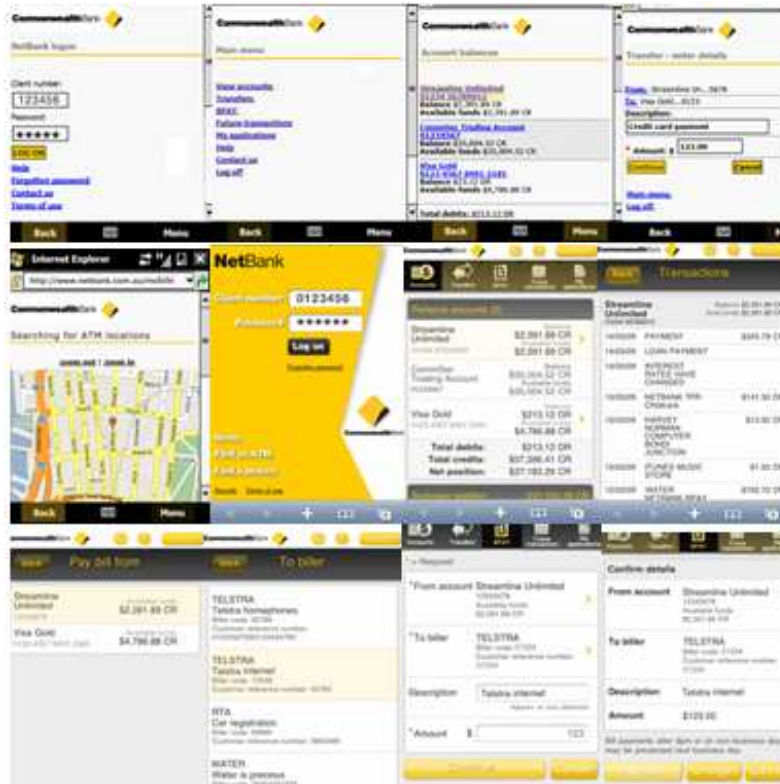


Figure 1: Mobile Banking (Courtesy: Commonwealth Bank of Australia)

## 2. Theoretical Development

A number of theories have been considered to anchor the theoretical development. These are explained below followed by components of the proposed model (see Figure 3 for the proposed model). Table 1 provides the definition of constructs from literature.

### 2.1 Choice

Choice Theory [21-22] is used to structure the effects of reasoning and referencing factors on choice behaviour (see [23-26] for more about choice). The choice process is viewed as being based on four hierarchical choice sets: the universal set, the awareness set, the consideration set, and the final choice outcome [27] (see Figure 2). The universal set consists of all possible alternatives. The awareness set consists of alternatives a consumer is aware of [26]. The consideration set consists of alternatives that a consumer is prepared to consider carefully to pay for and use. From the consideration set, consumer selects the best alternative(s). In this study, we focus on choice which is defined as the decision to adopt a technology after active evaluation of the alternatives in a consideration set.

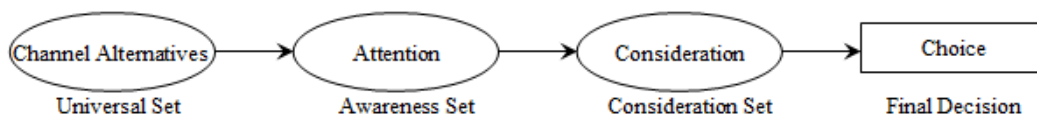


Figure 2: Choice making stages (Adapted from Ho et al., 2008 [27])

Consideration set size and choice are context dependent [27] (see Figure 3 for contextual factors). The decision to adopt m-banking service is based on two cognitive processes of reasoning and referencing [28-29]. Consumer's choice has been the research focus of both scholars and practitioners in the field of behavioral decision theory [e.g. 30] and marketing [e.g. 31]. Research extending over twenty years in behavioral decision theory has led to the

development of two important research streams – reason-based choice (reasoning) [32] and mental accounting (referencing) [33].

### 2.2 Reasoning

Reason-based choice was introduced by Shafir et al. (1993) [32]. In reasoning process, evaluations based on the prominent reason, conflict resolution between options, dealing with trade-off contrast and assessing unneeded features of the option take place [18]. Consumers tend to call for reasons to justify their choice [28]. Reasons are built from the characteristics of the product or service [32]. Consumer invokes a salient and simple reason to facilitate or motivate the choice [28]. By linking a salient reason to a particular service attribute, consumer avoids the cognitively demanding evaluations and focuses on the service attribute that is easy to justify the choice [29].

If reasoning evoke intrapersonal conflict, that might be resolved with the aid of referencing and vice versa [28], especially if the service is viewed as luxury (or, already a cheaper alternative exists to satisfy the need) [28]. Unless there is a compelling reason to choose new option, consumer chooses to maintain “status quo” [32]. Hence, factors, such as mobility, fit, risk, complexity, relative advantage, compatibility, service availability and social influence are reasoning factors in the model.

### 2.3 Referencing

Mental accounting theory was introduced by Thaler [34]. It involves a referencing process when consumer assesses a potential service, develops a cognitive account and compares the subjective value in relation to the reference point [33]. The current service available to consumer form the reference point in the decision process [18]. Consumer will move from the reference point (the equilibrium) and will opt for the new service if there is a positive subjective value [33]. Hence, price is a referencing factor in the model.

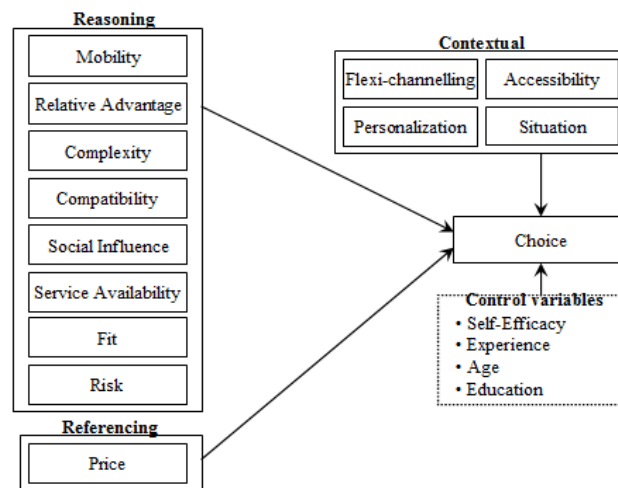


Figure 3: Mobile technology choice model

### 2.4 Technology Adoption

Technology adoption and acceptance research has developed several competing theories each with a different set of acceptance determinants. The most prominent theories are Innovation Diffusion Theory (IDT) [35], Theory of Reasoned Action (TRA) [36], Theory of Planned Behaviour (TPB) [37], Technology Acceptance Model (TAM) [38], Unified Theory of Acceptance and Use of Technology (UTAUT) [39], Model of Adoption of Technology in Households (MATH) [40] and Task-Technology Fit (TTF) model [41]. The behaviour investigated is typically the attitude, intention or actual usage of a technology, and factors influencing usage behaviour are assessed as to their impact [39]. Existing adoption studies focus on single application usage in which no alternative is observed [39, 42]. Even recent research on mobile and Internet technology [e.g. 8, 43, 44-45] paid no attention to the choice of consumers in light of the multitude of sources available to fulfil a service need [19]. Researchers have long recognized that the accuracy of predicting behaviour with the presence of alternatives is higher than without them [46-47].

Table 1: Definition of Constructs

	Constructs	Definitions
<i>Dependent</i>	Choice	Choice is the decision to adopt a technology after active evaluation of the alternatives in a consideration set. Consideration set consists of different technologies to fill a similar consumer need [18, 48].
	Risk	The perceived sense of risk concerning disclosure of personal and financial information (loss of privacy) [49] and the “risk of monetary loss” [50].
<i>Reasoning</i>	Mobility	“refers to movement of technologies, people, settings, etc” (implies portability) [51]. “Compared with traditional e-commerce, mobile computing provides access to information, communication, and services independent of time” (implies temporality) and “place” (implies spatiality) [51].
	Fit	Depicts “the match between requirements of a task and the capabilities of the technology to support task accomplishment” [41, 52].
	Complexity	the degree to which an innovation is perceived as relatively difficult to understand and use [53].
	Relative Advantage	“The degree to which an innovation is perceived as being better than its precursor” [54, p. 195].
	Compatibility	“the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters” [54].
	Service Availability	“the extent to which an information appliance is perceived as being able to provide pervasive and timely connections” [44].
	Social Influence	“the degree to which individuals believed that others thought they should use advanced mobile services” [45].
<i>Referencing</i>	Price	The extent to which the price of the new service is too high [40, 55].
<i>Contextual</i>	Accessibility	Encompasses “physical access to the terminal and information system” [56].
	Flexi-channelling	refers to the choice of different channels based on strengths and weaknesses of each channel [57].
	Situation	“any information that can be used to characterize the situation of entities (i.e., whether a person, place, or object) that are considered relevant to the interaction between a user and an application, including the user and the application themselves” [58].
	Personalization	Perceived personalization is a consumer’s perception of a service’s or service personnel’s personalization - implies the extent to which a service or service personnel understands, represents and serves his or her personal needs [59].

### 3. Conclusion and Future Research

In this research paper, we have proposed a model for consumer choice of m-banking underlying the concepts of behavioral decision making. The contribution of this research is twofold. First, it contributes to a more comprehensive theory development integrating adoption research and behavioral decision theory to understand choice. The model focuses on individual consumer’s cognitive processes influencing choice of m-banking. The model incorporates the concepts of choice, mobility, flexi-channelling and situation. Second, it may provide a practical tool, which can generate useful insights for the marketing strategies of the banks and may enable them to increase their market share in a highly competitive consumer banking environment. It will help banking and financial services practitioners and managers to better understand consumer behavior and invest in “suitable” m-banking and avoid drowning into so-called “technological chasm”. We intend to validate this model in two phases. In the exploratory phase, a preliminary validation of the model will be attempted using a survey of 30,000 respondents conducted in US and Europe on mobile phone use. It will follow interviewing tech-savvy consumers who are likely to choose m-banking on their advanced mobile phones. To better determine the structural fit of the proposed model and improve its generalizability a second quantitative study using questionnaire will follow the interviews.

## References

1. Lee, J., 2002, "A key to marketing financial services: the right mix of products, services, channels and customers", *Journal of Services Marketing*, 16(3), 238-258.
2. Meuter, M.L., A.L. Ostrom, R.I. Roundtree, and M.J. Bitner, 2000, "Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters", *Journal of Marketing*, 64(3), 50-64.
3. Morrison, P.D. and J.H. Roberts, 1998, "Matching Electronic Distribution Channels to Product Characteristics: Role of Congruence in Consideration Set", *Journal of Business Research*, 41(3), 223-229.
4. Mallat, N., M. Rossi, and V.K. Tuunainen, 2004, "Mobile banking services", *Communications of the ACM*, 47(5), 42-46.
5. Dewan, S., G. Low, L. Land, and A. Dewan, 2009, "Consumer Choice Model of Mobile Banking", 20th Australasian Conference on Information Systems. Melbourne.
6. Daniel, E., 1999, "Provision of electronic banking in the UK and the Republic of Ireland", *Marketing*, 72, 82.
7. GSMA. "GSMA". 2009.
8. Kim, G., B.S. Shin, and H.G. Lee, 2009, "Understanding dynamics between initial trust and usage intentions of mobile banking", *Information Systems Journal*, 19(3), 283-311.
9. Liang, T.P. and C.P. Wei, 2004, "Introduction to the special issue: Mobile commerce applications", *International Journal of Electronic Commerce*, 8(3), 7-17.
10. Mattila, M. and T. Pentto, 2002, "Development of Electronic Distribution Channels in Finland—M-banking Usage and Customer Profiles", *Banking and Information Technology BIT*, 41.
11. Kleijnen, M., M. Wetzels, and K. De Ruyter, 2004, "Consumer acceptance of wireless finance", *Journal of Financial Services Marketing*, 8(3), 206-217.
12. Wang, Y.-S., L. Hsin-Hui, and L. Pin, 2006, "Predicting consumer intention to use mobile service", *Information Systems Journal*, 16(2), 157-179.
13. Lyytinen, K. and Y. Youngjin, 2002, "Research Commentary: The Next Wave of Nomadic Computing", *Information Systems Research*, 13(4), 377-388.
14. Constantiou, I.D., J. Damsgaard, and L. Knutsen, 2007, "The four incremental steps toward advanced mobile service adoption", *Communications of the Acm*, 50(6), 51-55.
15. Sarker, S. and J.D. Wells, 2003, "Understanding mobile handheld device use and adoption", *Communications of the Acm*, 46(12), 35-40.
16. Nickerson, R., 2008, "Whither Wireless? Future Directions in Mobility", *CACM*.
17. Blechar, J., I.D. Constantiou, and J. Damsgaard, 2006, "Exploring the influence of reference situations and reference pricing on mobile service user behaviour", *European Journal of Information Systems*, 15(3), 285-291.
18. Constantiou, I.D., 2008, "Consumer behaviour and Advanced Mobile Data Services: opening the 'black box' of the individual's choice process", *Int. J. Social and Humanistic Computing*, 1(1), 67.
19. Venkatesh, V., 2006, "Where To Go From Here? Thoughts on Future Directions for Research on Individual-Level Technology Adoption with a Focus on Decision Making", *Decision Sciences*, 37(4), 497-518.
20. Choudhury, V. and E. Karahanna, 2008, "The relative advantage of electronic channels: a multidimensional view", *MIS Quarterly*, 32(1), 179-200.
21. Howard, J.A. and J.N. Sheth, "The theory of buyer behavior". 1969: Wiley New York.
22. Sheth, J.N., B. Mittal, and B.I. Newman, "Customer behavior: consumer behavior and beyond". 1999: Dryden Press.
23. Gensch, D.H., 1987, "A two-stage disaggregate attribute choice model", *Marketing Science*, 6(3), 223-239.
24. Gensch, D.H. and W.W. Recker, 1979, "The Multinomial, Multiattribute Logit Choice Model", *Journal of Marketing Research*, 16(1), 124-132.
25. Louviere, J.J. and R.J. Meyer, 2007, "Formal Choice Models of Informal Choices: What Choice Modeling Research Can (and Can't) Learn from Behavioral Theory", *Review of Marketing Research*, 4, 3-32.
26. Robertson, T.S. and H.H. Kassirjian, "Handbook of consumer behavior". 1991: Prentice-Hall.
27. Ho, S., M. Davern, and K. Tam, 2008, "Personalization and choice behavior: the role of personality traits", *The DATA BASE for Advances in Information Systems*.
28. Kivetz, R., 1999, "Advances in research on mental accounting and reason-based choice", *Marketing Letters*, 10(3), 249-266.
29. Constantiou, I.D., 2009, "Consumer behaviour in the mobile telecommunications' market: The individual's adoption decision of innovative services", *Telematics and Informatics*, 26(3), 270-281.
30. Kahneman, D. and A. Tversky, 1979, "Prospect theory: an analysis of decision under risk", *Econometrica*, 47(2), 263-291.

31. Bettman, J.R., M.F. Luce, and J.W. Payne, 1998, "Constructive consumer choice processes", *Journal of Consumer Research*, 25(3), 187-217.
32. Shafir, E., I. Simonson, and A. Tversky, 1993, "Reason-based choice", *Cognition*, 49(1-2), 11-36.
33. Thaler, R., 1985, "Mental accounting and consumer choice", *Marketing science*, 199-214.
34. Thaler, R.H., 1980, "Towards a Positive Theory of Choice", *Journal of Economic Behavior and Organization*, 4(3), 199-214.
35. Rogers, E.M., "Diffusion of Innovations". 1962, Free Press: New York.
36. Fishbein, M. and I. Ajzen, "Belief, attitude, intention, and behavior: an introduction to theory and research". 1975.
37. Ajzen, I., 1991, "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
38. Davis, F.D., 1989, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology", *MIS Quarterly*, 13(3), 319-340.
39. Venkatesh, V., M.G. Morris, G.B. Davis, and F.D. Davis, 2003, "User Acceptance of Information Technology: Toward a Unified View", *MIS Quarterly*, 27(3), 425-478.
40. Venkatesh, V. and S.A. Brown, 2001, "A longitudinal investigation of personal computers in homes: adoption determinants and emerging challenges ", *MIS Quarterly*, 25(1), 71-102.
41. Goodhue, D.L. and R.L. Thompson, 1995, "Task-Technology Fit and Individual Performance", *MIS Quarterly*, 19(2), 213-236.
42. Mathieson, K., 1991, "Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior", *Information Systems Research*, 2(3), 173-191.
43. Pavlou, P. and M. Fygenson, 2006, "Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior", *Management Information Systems Quarterly*, 30(1), 44.
44. Hong, S.J. and K.Y. Tam, 2006, "Understanding the Adoption of Multipurpose Information Appliances: The Case of Mobile Data Services", *Information Systems Research*, 17(2), 162-179.
45. López-Nicolás, C., F.J. Molina-Castillo, and H. Bouwman, 2008, "An assessment of advanced mobile services acceptance: Contributions from TAM and diffusion theory", *Information & Management*, 45(6), 359-364.
46. Sheppard, B.H., J. Hartwick, and P.R. Warshaw, 1988, "The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research", *Journal of Consumer Research*, 15(3), 325.
47. Szajna, B., 1994, "Software Evaluation and Choice: Predictive Validation of the Technology Acceptance Instrument", *MIS Quarterly*, 18(3), 319-324.
48. Ho, S., M. Davern, and K. Tam, 2008, "Personalization and choice behavior: the role of personality traits", *Data base for Advances in IS*.
49. Fang, X., S. Chan, J. Brzezinski, and S. Xu, 2006, "Moderating Effects of Task Type on Wireless Technology Acceptance", *Journal of Management Information Systems*, 22(3), 123-157.
50. Pavlou, P.A., 2003, "Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model", *International Journal of Electronic Commerce*, 7(3), 101-134.
51. Mallat, N., M. Rossi, V.K. Tuunainen, and A. Öörni, 2009, "The impact of use context on mobile services acceptance: The case of mobile ticketing", *Information & Management*, 46(3), 190-195.
52. Fuller, R.M. and A.R. Dennis, 2009, "Does Fit Matter? The Impact of Task-Technology Fit and Appropriation on Team Performance in Repeated Tasks", *Information Systems Research*, 20(1), 2-17.
53. Thompson, R.L., C.A. Higgins, and J.M. Howell, 1991, "Personal Computing: Toward a Conceptual Model of Utilization", *MIS Quarterly*, 15(1), 125-143.
54. Moore, G.C. and I. Benbasat, 1991, "Development of an instrument to measure the perceived characteristics of adopting an information technology innovation", *Information Systems Research*, 2(3), 192-222.
55. Brown, S.A., V. Venkatesh, and H. Bala, 2006, "Household technology use: Integrating household life cycle and the model of adoption of technology in households", *The Information Society*, 22(4), 205-218.
56. Karahanna, E. and D.W. Straub, 1999, "The psychological origins of perceived usefulness and ease-of-use", *Information & Management*, 35(4), 237-250.
57. Millard, J., 2006, "eGovernment for an inclusive society: flexi-channelling and social intermediaries", Danish Technological Institute.
58. Dey, A.K., G.D. Abowd, and D. Salber, 2001, "A conceptual framework and a toolkit for supporting the rapid prototyping of context-aware applications", *Human-Computer Interaction*, 16(2), 97-166.

59. Komiak, S.Y.X. and I. Benbasat, 2006, "The effects of personalization and familiarity on trust and adoption of recommendation agents", *Management Information Systems Quarterly*, 30(4), 941.