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ABSTRACT

This study employed the theory of innovation resistance as a research basis to investigate main factors that influence individuals to resist using mobile banking. Compared to that numerous researches used innovation adoption theories to investigate what affects individuals to adopt mobile banking over the past ten years, this empirical study could advance current knowledge on the non-adoption of mobile banking. Besides, from innovation resistance perspectives to explore the mobile banking adoption and non-adoption, this study could provide banks valuable clues to develop elaborate and differentiated service, marketing, and business strategies in the mobile banking context.

Keywords: Innovation resistance, mobile banking, technology-based services.

INTRODUCTION

After extensively perusal of the literature, this study learned that almost all existing research adopted the positive innovation adoption perspective. Research from the innovation resistance viewpoint investigating what affects individuals to resist the adoption of technology-enabled new services or products is scant. Contrary to academic literature revealing little works in innovation resistance while large works in innovation adoption, market and industry reports have indicated that most of technology-enabled new services and products have suffered failure while only a small fraction of the services and products have been commercially successful [5][6][14][15][16][26][44][47][58]. In reality, the resistance to change is a normal consumer response and the vast majority of consumers have no a prior desire to change [6][15][16][26][36][47][64]. That is why consumer resistance to innovation has long been considered natural [4][14][18][40][46][48][50][52][57]. Particularly in technology-enabled innovative services or products, most consumers express higher resistant response and less enthusiastic response [69][36].

Additionally, some literature [36][57][60][64] further pointed out that the main research stream adopting the innovation adoption perspective might suffer pro-change bias, which assumes that the innovation is good, consumer resistance to an innovation is a temporary response, and consumers will adopt them with the time. Kuisma et al. [29] contended that research adopting the innovation adoption perspective is due to the biased idea that all innovations are improvements and add values for the majority of consumers. Garcia et al. [16] observed that even the innovation may have clear advantages over existing products or services, consumers may resist it when the innovation conflicts with consumer belief structures, requires large learning or changes routine behaviors. Consequently, the pro-change assumption is not always true [36] and even untrue at most of time, because most of innovations have failed in the marketplaces.

Motivated by the above, this research selects mobile banking as a study object to explore why people resist adoption of a technology-enabled innovative service. Two reasons exist for choosing mobile banking as the research subject. First, given that rapid advances in wireless communication, smart phones, and tablet computers as well as the intensive penetration of cell phones have motivated banks to realize that continual and quick advances in wireless communication environments have stimulated and created various commercial opportunities for banks. Therefore, banks have placed large investment on developing mobile banking systems and promoting mobile banking services to their customers during recent years. Meanwhile, mobile banking was still marginally adopted [3], the adoption rate for mobile banking remained substantially lower than the expected [12] [59], and relatively few studies have empirically examined the situation [74].

Second, mobile banking perhaps was the first commercial mobile service [63] and introduced immediately after short messaging service and wireless access protocol [13]. Since mobile banking inherits attributes from both the wireless communication technology and the Internet bank, mobile banking services are frequently deemed as technology-enabled innovative services [61][66][75]. Therefore, the findings obtained from this proposed empirical study would be also useful to other technology-enabled innovation services.

THE THEORY OF INNOVATION RESISTANCE

In contrast to the consumer innovation adoption coming from the innovation diffusion theory (IDT) initially presented by Rogers in 1962 [60], the concept of consumer innovation resistance was first proposed by Sheth in 1981 [14][58][64]. IDT applies a process-oriented viewpoint to explain how an innovation (defined as an idea, practice, product, or service) can be accepted and diffused within a social system [1][22][60]. IDT contends that innovation adoption begins with end-user awareness of the innovation, and diffusion is a process through which an innovation is communicated via certain channels over time among members of a social system [60]. An innovation is defined as an object that is perceived as new by individual, while communication describes the process through which messages are transferred from a source to a receiver, time traces the sequential flow of an innovation through a social system, and social system is an organizational structure through which members communicate innovation adoption decisions.

In contrast to Rogers' IDT considering consumer resistance to an innovation as a temporary response and even emotional or illogical response [14], Sheth [64] argued that the vast majority of people have no a prior desire to change to adopt an innovation and only a small minority of individuals seek change to embrace an innovation. Sheth [64] theorized consumer innovation resistance by two psychological constructs: habit toward an existing practice and perceived risks associated with innovation adoption. In the model of innovation resistance [57], habit toward an existing practice includes a series of behavioral stream from being aware of an innovation (such as idea, practice, product, or service), assessing the innovation, and making a decision (for example, selecting, acquiring, and using an existing alternative). As for perceived risks associated with innovation adoption, three major types of risks: (1) aversive physical, social, or economic consequence; (2) performance uncertainty; and (3) perceived side effects associated the innovation are occurred when a person encounters an innovation [57][64].

Contrasting to IDT, consumers' resistance begins with their awareness of the innovation incurring either potential changes from a satisfactory status quo or conflicts with their belief structure [58]. Therefore, consumer innovation resistance is a rejection to an innovation rather than temporary response [64], a choice made by consumers [58], measured as three forms of rejection, postponement, and opposition [68], and considered as four levels ranging from apathy, passive resistance, active resistance, and aggressive resistance [31]. In this respect, Gatignon and Roberston [17] measured consumer rejection and adoption in their research and concluded that adoption and rejection are two different variables (rather than mirror images) in explaining why individuals adopt or resist an innovation. Herbig and Day [21] and Kleijnen et al. [26] supported that consumer resistance cannot be simply deemed as the obverse of adoption. The obverse of adoption is non-adoption instead of resistance [53]. As a result, it is inappropriate to conclude why consumers resist adopting an innovation directly from the conclusions culled from the adoption-based studies [17][26][58].

Even though some literature heeded the above phenomena and suggested the need for paying more attention to consumer innovation resistance instead of innovation adoption [14][26][57][64], innovation adoption literature is dominant in the past two decades and only several empirical studies regarding consumer innovation resistance have been conducted [26][31][34][36][68]. As a result, there is a need to have more researches on investigating consumer resistance behavior from the perspective of innovation resistance.

HYPOTHESIS DEVELOPMENT

Through extensively reviewing the literature, this study discovered that the earliest theory-based research regarding the adoption of mobile banking was conducted in early 2002 in South Africa [8], followed by a study conducted in the summer of 2002 in Finland [67]. The previous theory-based mobile banking studies are briefly summarized as the following table.

Table 1. SUMMARY OF RESEARCH IN MOBILE BANKING ADOPTION

Authors	Theories	Sampling & Countries	Main Findings
Brown et al. [8]	IDT and Decomposed TPB*	162 questionnaires collected from convenience and online sampling in South Africa	Relative advantage, trialability, number of banking services, and risk significantly influence mobile banking adoption.
Suoranta and Mattila [67]	Bass diffusion model and IDT	1253 samples drawn from one major Finnish bank by the postal survey in Finland	Information sources (i.e., interpersonal word-of-mouth), age, and household income significantly influence mobile banking adoption.
Laforet and Li [30]	Attitude. Motivation, and Behavior	300 respondents randomly interviewed in the streets of six major cities in China	Awareness, confidential and security, past experience with computer and new technology are salient factors influencing mobile banking adoption
Luarn and Lin [43]	Extended TAM**	180 respondents surveyed at an e-commerce exposition and symposium in Taiwan	Perceived self-efficacy, financial costs, credibility, easy-of-use, and usefulness had remarked influence on intention to adopt mobile banking
Laukkanen et al. [36]	Innovation Resistance	1525 respondents collected with a large Scandinavian bank customers in Finland	Usage and value are the most intense perceived barriers inhibiting individuals to adopt mobile banking, and aging is related to perceived risks of mobile banking
Laukkanen [33]	Mean-end theory	20 qualitative in-depth interviews conducted with a large Scandinavian bank customers in Finland	Perceived benefits (i.e, location free and efficiency) are main factors encouraging people to adopt mobile banking
Amin et al. [3]	TAM	156 respondents obtained via convenience sampling in Malaysia	Perceived usefulness, easy-of-use, credibility, amount of information, and normative pressure significantly influence the adoption of mobile banking
Laukkanen and Pasanen [35]	Innovation adoption categories	2675 questionnaires completed via the log-out page of a bank in Finland	Demographics such as education, occupation, household income, and size of the household do not influence mobile banking adoption, while age and gender are main differentiating variables.
Yang [73]	Rasch measurement model and Item response theory	178 students selected from a university in South Taiwan	Adoption factors are location-free conveniences, cost effective, and fulfill personal banking needs, while resist factors are concerns on security and basic fees for connecting to mobile banking.
Cruz et al. [12]	TAM and theory of	3585 respondents collected through	The cost barrier and perceived risk are highest rejection

	resistance to innovation	an online survey in Brazil	motives, following are unsuitable device, complexity, and lack of information.
Riquelme and Rios [59]	TAM, TPB, and IDT	681 samples drawn from the population of Singapore	Usefulness, social norms, risk influences the intention to adopt mobile banking
Puschel et al. [56]	IDT and Decomposed TPB	666 respondents surveyed on a online questionnaire in Brazil	Relative advantages, visibility, compatibility, and perceived easy-of-use significantly affects attitude, and attitudes, subjective norm, and perceived behavioral control significantly affects intention.
Natarjan et al. [49]	Analytical Hierarchy Process	40 data obtained from a bank in India	Purpose, perceived risk, benefits, and requirements are main criteria to influence people to choose banking channels.
Koenig-Lewis et al. [27]	TAM and IDT	155 consumers aged 18-35 collected via online survey in Germany	perceived usefulness, compatibility, and risk are significant factors, while perceived costs, easy-of-use, credibility, and trust are not salient factors
Sripalawat et al. [66]	TAM and TPB	195 questionnaires collected via online survey in Thailand	Subjective norm is the most influential factor, and the following is perceived usefulness and self-efficacy.
Dasgupta et al. [13]	TAM	325 usable questionnaires gathered from MBA students in India	Perceived usefulness, easy-of-use, image, value, self-efficacy, and credibility significantly affect intentions toward mobile banking usage.
Khraim et al. [24]	TAM	301 mobile banking users collected from three banks in Amman City, capital of Jordan, via convenient sampling	Self efficacy, trailability, compatibility, complexity, risk, and relative advantage significantly influence the adoption of mobile banking services
Lin [41]	Innovation Attributes	368 usable respondents from students and customers of one public and three private banks in Taiwan	Perceived relative advantage, ease of use, compatibility, perceived competence and integrity are significant factors, while perceived benevolence is insignificant factor.
Yu [74]	UTAUT	441 respondents were sampled by the shopping mall intercept method in Taiwan.	Intention to adopt mobile banking was significantly influenced by social influence, perceived financial cost, performance expectancy, and perceived credibility. The actual behavior was considerably affected by individual intention and facilitating conditions.

*TPB stands for theory of planned behavior, **TAM stands for technology acceptance model, and UTAUT stands for unified theory of acceptance and use of technology.

In contrast to abundant literature based on innovation adoption viewpoints, this study extensively reviewed literature and then found only two works based on the perspective of consumer innovation resistance to investigate the mobile banking. Drawing from the theory of innovation resistance proposed by Ram and Sheth [58], Laukkanen et al. [36] summarized 18 factors into five barriers, namely Usage, Value, Risk, Tradition, and Image barriers. The theory of innovation resistance, proposed by Ram and Sheth [58] and adapted from the psychology and the IDT of Rogers, aims to explain why customers resist innovations even though these innovations were considered necessary and desirable. Through investigating 1525 usable respondents from a large Scandinavian bank, Laukkanen et al. [36] identified that the value and usage barriers were the most intense factors influencing consumers to resist mobile banking, while tradition barriers (such as preferring to chat with the teller and patronizing the banking office) were not significant factors to incur consumers to resist mobile banking.

Considering prior research indicated that consumers not use Internet banking due to not receiving enough information from the bank and lacking of knowledge and training concerning the innovation, Laukkanen and Kiviniemi [34] presented five hypotheses to test whether information offered by the bank has a negative effect on the usage barrier, value barrier, risk barrier, tradition barrier, and image barrier. After collecting 1551 valid responses, Laukkanen and Kiviniemi [34] examined the hypotheses using structural equation modeling and found all hypotheses were supported except for Hypothesis 4. That is, information offered by the bank significantly lowers the usage, value, risk and image barriers but not the tradition barrier.

Notably, the above literature review on mobile banking adoption and resistance clearly indicates that studies regarding the mobile banking have majorly focused on adoption and employed the perspective of innovation adoption while only two articles studying consumer innovation resistance in the mobile banking context. Considering this situation and mobile banking can be deemed the extension of online banking, this study expanded literature review into literature that employed the perspective of consumer innovation resistance to investigate what influence people resist adopting online banking. As expected, compared to numerous studies on online banking adoption, literature regarding resistance to online banking is also rare and only three another works were found and discussed as follows.

By in-depth interviewing 30 customers of a large Scandinavian bank, Kusima et al. [29] used the means-end approach to identify two functional barriers (usage and value barriers) and three psychological barriers (risk, tradition, and image barriers) which cause consumer resistance to banking online. After analyzing these barriers and interviews, Kusima et al. [29] contended that some barriers are connected to Internet banking and some are connected to Internet channel. Besides, resistance to change seems to be a personal characteristic of a respondent generating resistance to online banking as well as both consumer characteristics and communication characteristics may generate barriers.

Through collecting 390 valid samples from a large bank in Finland, Laukkanen et al. [32] found that those who resist online banking think internet banking would hardly enhance the ability to deal with financial matters, attach negative image to the new service in general, and like to going to the bank in person. By grouping resisters into postponers, opponents, and rejectors, Laukkanen et al. [32] further discovered that usage, value, tradition, and image barriers were significantly different among

three groups, the resistance of the rejectors is much more intense and diverse than that of the opponents, and the postponers show only slightly resistance.

To investigate how customers experience and perceive different kinds of resistance to Internet banking, Laukkanen et al. [37] performed a postal survey and collected 302 Finish bank customers who have not adopted Internet banking services in November-December 2006. Laukkanen et al. [37] separated 251 valid respondents into four groups: non-resistors, functional resistors, psychological resistors, and dual resistors. Through statistical analysis, Laukkanen et al. [37] discovered that functional resistors resist online banking mainly due to the functional characteristics of the service, psychological resistors resist adoption primarily due to that Internet banking causes consumer changes in their banking traditions and routines. Their study reported resistors preferred face-to-face services and enjoyed visiting the bank in person. Through hypothesis examination, Laukkanen et al. [37] noticed that four groups have different perceptions and resistance levels on online banking.

Building in the above and relying on theory of innovation resistance proposed by Ram and Sheth [58], this study put two core resistance constructs (functional and psychological barriers) into the research structure. Under the psychological construct, there are two barriers of tradition barrier and image barrier. Meanwhile, the functional construct contains usage barrier, value barrier, and risk barrier. Accordingly, the following hypotheses are posited:

H_1: Psychological barriers significantly affect individual intention to resist using mobile banking;

H_{1a}: Tradition barrier significantly affects individual intention to resist using mobile banking;

H_{1b}: Image barrier significantly affects individual intention to resist using mobile banking;

H_2: Functional barriers significantly affect individual intention to resist using mobile banking;

H_{2a}: Usage barrier significantly affects individual intention to resist using mobile banking;

H_{2b}: Value barrier significantly affects individual intention to resist using mobile banking;

H_{2c}: Risk barrier significantly affects individual intention to resist using mobile banking;

QUESTIONNAIRE DEVELOPMENT AND DATA COLLECTION

Following previous literature, this study developed survey questionnaire through the following three steps: (1) items to measure each corresponding construct were culled from the earlier empirical research and reworded to fit the mobile banking resistance; (2) the focus-group interview and panel discussion involving mobile banking executives and scholars were executed to verify and, if necessary, revise the research structure and constructs (Taking this step is heavily because the pertinent literature on the mobile banking resistance is rare and considered insufficient to provide a highly validated research foundation for this work); and (3) a pretest were conducted by inviting several academics and practitioners who are familiar with mobile banking in order to refine the survey questions and check the wording.

Following respondent feedback, the questionnaire was slightly reedited to strengthen clarity and completeness. As a result, the formal questionnaire was organized into two sections, comprised of 28 questions. The first section contained 20 questions used to evaluate six constructs of f tradition barrier, image barrier, usage barrier, value barrier, risk barrier, and intention to resist mobile banking. All questions in the first section were measured using a five-point Likert scale, ranging from “strongly disagree” to “strongly agree”. Of the seven questions in the second section, the first five questions were used to collect respondent demographic variables of gender, age, occupation, education level, and income level. The sixth question was to ask respondents whether they had used mobile banking or not. If the respondents answered “Yes”, they were deemed as mobile banking users. The seventh question was to ask respondents whether they had used smart phones or not.

After ensuring that the questionnaire is clearly verified and effectively reflect the research purpose as well as each construct is concretized by the corresponding items, this study performed online sampling to collect data. Advantages of online surveys over paper-based mail survey have been discussed in many online studies [11][62], but a common problem in questionnaire survey is the response rate and non-response bias [11][23][62]. Based on past experience, offering monetary incentives is an effective approach for increasing response rate, while the uniformity of the responses in relation to date of receipt will be examined for non-response, the IP addresses of respondents will be examined for double submissions, and unanswered questions in incomplete questionnaire will be examined for item non-response bias.

After one-month survey in 2013, 238 valid samples were collected based on a structured questionnaire. The basic data of respondents is summarized in Table 2.

Table 2. PROFILE OF RESPONDENTS

Category		Number of Respondents	Percentage
Gender	Male	159	66.8%
	Female	79	33.2%
Age	Less than 20-year-old	17	7.1%
	20-30 years old	121	50.8%
	30-40 years old	51	21.4%
	40-50 years old	34	14.3%
	above 50 years old	15	6.3%
Occupation	ICT-related Sector	21	8.8%
	Banking/Financial/Insurance	9	3.8%

	Sector		
	Education/Culture Sector	3	1.3%
	Medical/Hospital/Bio-Tech Sector	1	0.4%
	Retail/Distribution Sector	3	1.3%
	Restate/Construction Sector	6	2.5%
	Media/Publishing Sector	9	3.8%
	Military/Police Sector	8	3.4%
	Student	69	29.0%
	Government/Non-Profit Sector	20	8.4%
	House Keeping/SOHO	19	8.0%
	Other Manufacturing Sector	21	8.8%
	Other Service Sector	34	14.3%
	Others	3	1.3%
Education	Senior High Diploma or Below	33	13.9%
	Associate Bachelor Degree	42	17.6%
	Bachelor Degree	107	45.0%
	Master Degree	53	22.3%
	Ph.D. Degree	3	1.3%
Annual Income	Less than NT$ 250,000	81	34.3%
	NT$ 250,001 – 500,000	68	28.6%
	NT$ 500,001 – 1,000,000	49	20.8%
	NT$ 1,000,001 – 1,500,000	25	10.5%
	Over NT$ 1,500,000	15	6.3%
Have you used mobile banking	Yes	101	37.6%
	No	157	62.4%
Have you used smart phone	Yes	214	82.9%
	No	44	17.1%

DATA ANALYSIS AND DISCUSSION

The partial least squares (PLS) path analysis (also known PLS path modeling), a prediction-oriented structural equation modeling (SEM) technique, is selected to examine the hypothesized model. As a SEM technique, the PLS approach allows researchers to assess model parameters and structural path coefficients simultaneously. Different from covariance-based SEM, PLS is variance-based SEM and focuses on maximizing the variance of the dependent variables explained by the independent ones in place of reproducing the empirical covariance matrix (Haenlein and Kaplan, 2004). Another advantage is that PLS makes minimal demands in terms of sample size to validate a model compared to other SEM (i.e., LISREL and AMOS). The sample size of PLS requires ten times the largest number of independent variables impacting a dependent variable or the largest number of formative indicators [10][42]. Therefore, this study modeled all latent constructs as reflective indicators. Consistent with recommendations [10], bootstrapping was also performed to determine the statistical significance of each path coefficient using t-tests.

After running the PLS, the generated figures reveal that all factors in the measurement model had adequate reliability and convergent validity because all factor loading were greater than 0.7, the composite reliabilities exceeded acceptable criteria of 0.6, and the average variance extracted were greater than the threshold value of 0.5 in all cases. Since each construct is culled from literature and assessed using a multi-item five-point Likert scale, the content validity for each construct was also supported. The cross-correlation analysis (i.e., whether the square root of the average variance extracted for each construct exceeds the squared correlation between any pair of distinct constructs) was checked to verify the discriminant validity. As Fig. 1 displays, the generated $R^2_{adjusted}$ was 0.365 accounted for the variances explained in Resist to Mobile Banking. In Fig. 1, * represents p-value < 0.05, ** represents p-value < 0.01, and *** represents p-value < 0.001.

The empirical results show that H_1 is fully supported and H_2 is partially supported. Fig. 1 displays that all factors in psychology side hold very significant influence (p-value < 0.01), while not all factors in function side hold statistical significance (p-value < 0.05). However, the most important barrier is risk barriers which hold extremely significant influence (p-value < 0.001). In the order of influencing strength, risk barriers, traditional barriers, and image barriers are salient factors impacting people resistance to use mobile banking. Given that mobile banking operates in an impersonal and technology-enabled environment which let customers may feel more uncertainties and unseen risks in mobile banking context than physical banking office, this study empirically discovered that risk is a crucial factor when people deciding to use or not use mobile banking (which is also verified in vast literature based on innovation adoption perspectives).

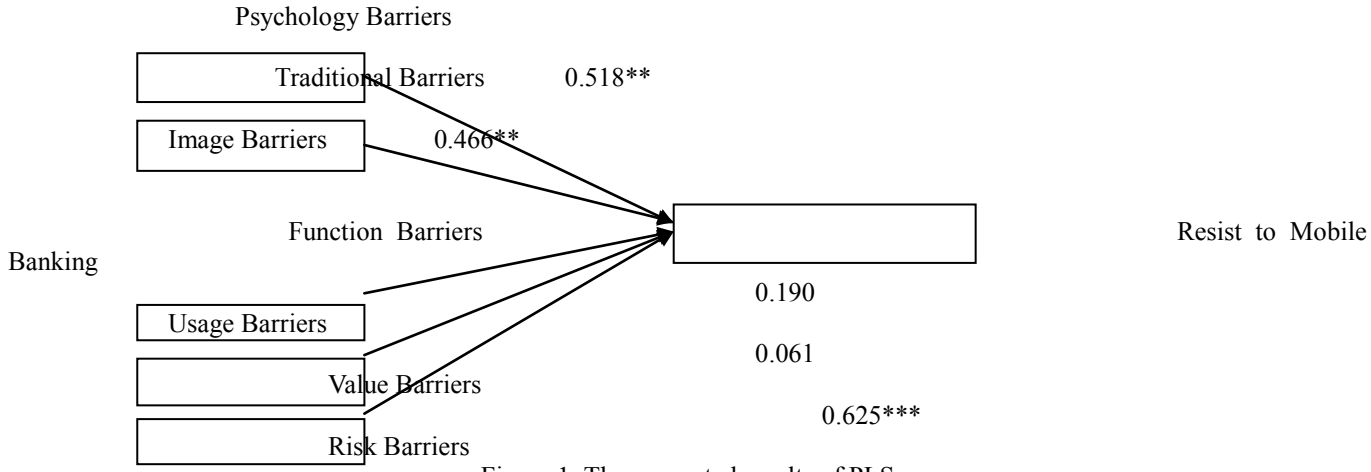

Figure 1: The computed results of PLS

Additionally, this study empirically discovered that psychological barriers play an important role. This reveals that offering consumers opportunities using mobile banking is an effective strategy. Once they have experience using mobile banking, their habits and cognition may be changed and adapted to use mobile banking. Regarding the image barriers, the results indicate that peers and the public opinions still affect people willingness in the context of mobile banking. Therefore, executing testimony strategy could reduce individual resistance to mobile banking. Given that consumer resistance and adoption are two sides of whether a new technology-enabled product and service could be successfully commercialized, investigating the factors about consumers resist adopting an innovative technology-enabled product/service is as important as understanding why consumers are willing to adopt a new technology-enabled product/service. Thus, compared with tremendous studies in the past decades have explored the potential influences on individuals to decide whether or not to adopt a new technology-enabled service or product, this study could help banks more in-depth understanding consumer resistance to mobile banking. In line of this thinking, since most studies have focused on innovation diffusion, this research on consumer innovation resistance to mobile banking could advance current knowledge about what influences people discourage using mobile banking services.

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