

# THE ANTECEDENTS OF CUSTOMER RELATIONSHIP IN E-BANKING INDUSTRY

TSUNG-HSIEN KUO

Testing Center, Securities & Futures Institute, Taipei, Taiwan 10066  
Dept. of Int'l Bus. Admin., School of Cont. Education, Chinese Culture Univ., Taipei, Taiwan 10659

## ABSTRACT

The present study investigates (1) the effect of the bank customer's personal factors (gender, age, educational background) on their perception of their technology readiness (TR), customer relationship management (CRM) of the financial services and relationship quality (RQ) with the bank, and (2) the relationships among TR, CRM, and RQ. This study conducts an empirical study of customers from 12 local banks ( $n = 713$ ) in Taiwan. Results show that personal factors significantly influence TR and CRM. The study also learns that TR has a significant impact on CRM and RQ, and CRM has significant influences on RQ.

**Keywords:** Online banking, Technology readiness, Customer relationship management, Relationship quality

## INTRODUCTION

Along with economic development and social transformation, the financial services industry has moving toward liberalization and globalization. Due to the fact that there has been increasing number of innovative financial services and goods offered in the market, it is important for organizations and individuals to pay more attention to their financial management in order to take full advantages of the globalized financial market. According to the Department of Investment Services, Ministry of Economic Affairs in Taiwan [1], the financial services which supports the lifeblood of a nation's industrial development is a crucial element in the economical growth of a nation. The Taiwan government had taken measures to restrain financial services industry for a lengthy period of time. Thus, the promotion and implementation of financial liberalization and globalization has been taking place for only a limited period. Even though the financial industry has accumulated considerable strength within the short time period, there is still room advancement in the financial services industry to increase international competitiveness. In order to nurture a high-quality financial environment, encourage the development of financial services, and enable the globalizations of Taiwan's financial systems, Taiwan's government has rolled out a series of financial reformation activities. Such reformation process is tremendous and complex, and it is still ongoing.

Even though Taiwan's financial industry has a broader room for development and growth, the competition between the businesses has gradually intensified. In order to improve their service quality and satisfy the needs of their customers, it has become a trend for local banks to invest conservable amount of monetary as well as non-monetary resources on technology integrations [2,3,4]. Based on a report published by the Ministry of Transportation

and Communications [1], the population of people with Internet experiences has exceeded 133 millions in Taiwan. More than half of these people have had experiences using online financial services, such as browsing information for their personal bank accounts, making Web money transfers, inquiring financial goods through the banks' websites, searching bank information and so on. Furthermore, online bank users were estimated to exceed 25 million last year. As a result, the banking industry has converted the traditional operation into a technology-integrated operation, particularly through the implementation of Internet banking or tele-banking, in order to provide their customers with faster, easier, independent, and timely services [5]. Past studies indicate that not only will these technological services improve the quality of services [6,7] they will also improve the satisfaction of customers [8,9].

In addition, in order to provide full services, many local banks have established an independent department within the organisation for providing their customers with personal consultation of financial services and goods, as well as for assisting individuals and businesses for appropriate asset management, such as the accumulation, safeguard, and transfer of wealth. Thus, customers' selection of services is mostly based on their concepts and goals of personal financial management. As a result, financial service providers not only need to possess related professional knowledge (e.g. asset liability management, tax administration planning, investment planning, retirement planning, etc.) to meet the needs of their customers, but also need to learn their customers' characteristics and preferences in order to satisfy the need of these customers and make successful sales.

However, acquiring customers' long-term satisfaction and trust depends on long-term management of customer relationship [10]. Thus, the banking sector has begun to emphasize and apply relationship marketing, which allows them to customize financial products and services, maintain close relationships with their clients and sustain customer loyalty [11]. As Keegan [12] points out, acquiring customer satisfaction is only a process; the key to keep customers is to prolong customer loyalty. Nevertheless, as banks strive for the trust, satisfaction and commitment from their customers with advanced technology-integrated banking systems, the discussion of the customer's technology readiness cannot be neglected. Furthermore, since relationship quality in the banking sector is primarily built upon the interaction between sale representatives and customers, the communication between the two parties becomes critical. Hence, bank service personnel must analyze and react on the customers' reactions for better relationship marketing. As there are existing studies in exploring technology readiness and online behavior [13],

Received: June 21, 2010

Revised: August 8, 2010

Accepted: August 26, 2010

Spring 2011

Journal of Computer Information Systems

57

technology readiness and innovation adaptation [14], current literature lacks direct evidence showing the relationship between customers' readiness toward new technology, their perception of customer relationship management of banks and perceived relationship quality with the bank. Thus, a study which focuses on investigating the relationship between technology readiness and customer relationship management and relationship quality in a banking industry is needed.

The present study aims at exploring (1) the effect of the bank customer's demographic factors on their perception of their technology readiness, perceived customer relationship management of the financial services and relationship quality with the bank, and (2) the relationships among technology readiness, customer relationship management and relationship quality. The study expects to gain insights as how customers' self-perceived technology readiness affects their perceptions of the banks and their relationships with the banks. The findings are of value to the banking sector to improve their service systems as well as to establish more suitable sales strategies.

## LITERATURE REVIEW

### Online Banking Adoption

According to Hernández-Murillo, Llobet, and Fuentes [15], the extent of competition in banking industry is related to the geographic overlap of banks in different markets. In particular, banks adopt online banking services as one of the competing strategy to gain more customers, sales as well market share. The idea of online banking (or called Internet banking, Web home teller, etc.) is considered as the key driver for the changes taking place in the global markets [16], and is still considered a new technological service provided by local banks in Taiwan. Past studies in the literature have explored the use of online banking more from an innovation and diffusion perspective. For instance, Chong, Ooi, Lin and Tan. [17] found that customers' perceived usefulness, trust and government support positively affected the intention to use online banking in Vietnam. Moreover, contrary to the technology acceptance model, they discovered that perceived ease of use was not significant on new technology adoption.

Furthermore, Saleh [18] argued that internet security is assumed to be a major obstacle to the adoption of online banking. Similarly, Zhao, Koenig-Lewis, Hanmer-Lloyd and Ward's [19] study indicated that there was a significant relationship between trust and perceived risk and that both are crucial in explaining the internet banking usage intention. A local study [20] proposed a model to measure both positive and negative driving forces that influence a customer's decision to use online banking services. His findings reveal relative advantage, compatibility, trialability, perceived security, and experience using online banking system had positive impact on the attitude toward online banking services, which consequently influencing the behavioural intention to use online banking services.

### Technology Readiness

Ranaweera, Bansal, and McDougall [21] suggest that technology readiness (TR) is one of the most important factors influencing online behaviours. Rapidly technological advancement has forced businesses to better structure their innovation efforts. However, understanding potential customers' TR and their perceptions concerning certain products and services could

provide businesses with a leading-edge position in their domain [22]. Past studies have showed how technology integration impacts its potential users and the external as well as internal factors influencing successful implementation of technology innovations [23,24,25,26]. According to Lam, Chiang, and Parasuraman [27], TR is the key factor affecting the acceptance, adoption, and usage of different Internet-based services.

Matthing, Kristensson, Gustafsson, and Parasuraman [28] perceive TR as an effective tool to understand users' attitudes and behaviours toward technological innovations. Lin et al. [25] examine consumer adoption of e-service systems through the technology readiness and acceptance model. Their study indicates the impact of technology readiness on user intention is completely mediated by both perceptions of usefulness and ease of use. Thus, TR measures help to distinguish users by levels of their TR so that different strategies or assistance can be applied or arranged accordingly.

Parasuraman [29] defines TR as people's tendency to embrace and use new technology to accomplish their goals in their professional as well as personal lives. Parasuraman's four-dimension model includes optimism, innovativeness, discomfort and insecurity. Furthermore, Parasuraman and Colby [30] divide TR into two categories. Based on its positive or negative influences, one category is labelled the enablers of TR (i.e. optimism and innovativeness), while the other is named the inhibitors of TR (i.e. discomfort and insecurity).

### Customer Relationship Management

Customer relationship management (CRM) is a business strategy that involves selecting and managing customer relationship in order to optimize the long-term value of a company [31]. Kalakota and Robinson [32] define CRM as a combination of business processes and technology that allows organisations to better understand different aspects of their customers. As Storr, Forbes, Carraher, and Baird [33] point out, CRM is designed to utilize information technology to develop an ongoing relationship with customers who will maximize the value that an organisation can deliver to them over time. Furthermore, CRM process is likely to enhance the perceived value of the customer thus increase their level of satisfaction to the point where the customer is loyal to the company.

According to many CRM researchers, the main reason companies failed to implement CRM was their inability to develop and effectively implement a strategy for relating to clients [34]. Thus, a key goal of CRM is to develop a view of the client from all angles or areas of the company, which implies continually learning about customers. Additionally, O'Malley and Mitussis [35] argue that the ethos of relationship management is a necessary cultural antecedent to effective CRM. In the absence of corporate-wide buy-in to the ethos, the implementation of suitable information systems can be burdened with political difficulty.

Past researches provide different measures to examine CRM. For example, Wayland and Cole [36] classify CRM at four levels, including customer portfolio management, value proposition design, value-added role and reward and risk sharing. Fletcher [37] proposes CRM must include customer service management, relationship building, and electronic shopping. Furthermore, Berson, Smith, and Thearling [38] divide CRM into three perspectives, namely collaborative CRM, operational CRM, and analytical CRM. Peppard [39] presents a second generation CRM framework, entitled Enterprise CRM. The new framework is based

on incorporating e-business activities, channel management, relationship management and management of total enterprise into a second-generation CRM model.

### Relationship Quality

Relationship quality (RQ) is considered a new concept which originated from relationship marketing. As the demand of the service industry increases, good RQ is expected to reduce service uncertainty, enhance customer reliability and develop long-term customer relationship [40]. According to Singh [41], RQ has been conceptualized as a construct consisting of various distinct but related dimensions. For instance, Smith [42] defines RQ as a macro strength which consists of all the positive relationship results and a satisfied degree of customer needs and expectations. Kotler [43] refers to RQ as the product or service that the manufacturer provides which could satisfy and even exceed the consumer's expectations. Moreover,

Sun [44] argues that RQ, a concept encapsulating the ideas of both trust and satisfaction, is crucial for transferring attributes of e-commerce systems into business benefits.

However, RQ does not yet to have a widely accepted definition and measure. According to Berry and Parasuraman [45], RQ includes two dimensions, namely customer orientation and minimal opportunism. Jap, Manolis, and Weitz [46] state RQ also consists of evaluations of various aspects of relationship, such as attitudinal, process and future expectations. Ural [47] proposes RQ is the sum of three factors, namely situational, emotional, and relational. Crosby et al. [40] perceive RQ as a high level structure and at least should include both trust and satisfaction constructs. Additionally, Storbacka, Strandvik, and Gronroos [48] propose customer satisfaction, relationship strength, relationship longevity and relationship profitability to be included in measuring RQ.

Kumar, Scheer, and Steenkamp [49] suggest RQ reflects the concepts of trust, commitment, conflict, expectation of continuity and willingness to invest.

From past research, some overlapping dimensions can be found

to measure RQ. They are trust, satisfaction, and commitment [50]. Smith [42] integrates various studies and suggests RQ should at least contain three factors: trust, satisfaction, and commitment. Gutierrez [51] later concludes these factors to be the three key variables of measuring long-term relationship.

### METHOD

#### Structure and Hypotheses

This is an exploratory study that performs two sets of analyses (see Figure 1). Firstly, t-test (marked "1") and one-way ANOVA (marked, "2") test how bank customers' demographic factors (i.e. gender, age, educational background) influence the factors within the TR, CRM and RQ. Secondly, Pearson correlation analysis (marked, "3") examines the correlation between paired dimensions; multiple stepwise regression analysis (marked "4") determines how TR affects CRM and RQ as well as how CRM affects RQ. Stepwise regression analysis helps to establish the predictive power of TR on CRM and RQ, and the predictive power of CRM on RQ.

The study tests the following hypotheses:

- H1: Online banking customers' demographic factors are correlated with technology readiness.
- H2: Online banking customers' demographic factors are correlated with customer relationship management.
- H3: Online banking customers' demographic factors are correlated with relationship quality.
- H4: Online banking customers' technology readiness is a predictor of customer relationship management of a bank.
- H5: Online banking customers' technology readiness is a predictor of relationship quality with a bank.
- H6: Online banking customer's self-perceived customer relationship management of a bank is a predictor of relationship quality with a bank.

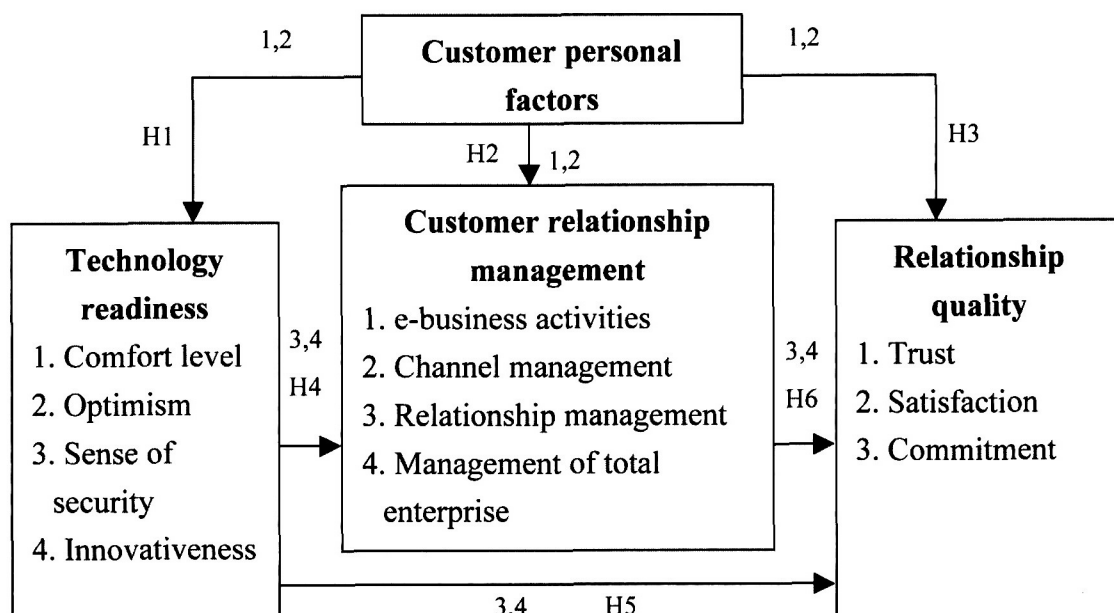


FIGURE 1 — Research structure



## Questionnaire Design

The questionnaire includes four parts: technology readiness, customer relationship management, relationship quality and customers' demographic factors, including gender, age, and education background. The questionnaire utilizes a five-point Likert scale. Details of the dimensions are described as follows.

### I. Technology readiness.

This study adapts Rarasuraman's [29] four-dimension TR model to measure bank customers' readiness to adopt new technology (i.e. online banking). The model consists of four factors, including optimism, innovations, comfort level, and sense of security. While optimism refers to the positive view of technology and the belief that it offers more control to people, innovations refer to the tendency of the customers to be a technology pioneer who has an open mind to accept or try new things or ideas. Comfort level is defined as the perceived control over technology, which means the customers are not overwhelmed by the use of new technology. Finally, the sense of security refers to the trust of technology about its ability to work properly or as expected.

### II. Customer relationship management

This study adopts Peppard's [39] Enterprise CRM. The factors included are e-business activities, channel management, relationship management and management of total enterprise. E-business refers to the extent to which financial services capitalize on marketplace opportunities through the use of technology to reengineer business process for internal operations as well as to enhance communications with business partners for external interactions. Channel management refers to the extent to which financial services understand customer usage of product/service delivery channels and meet customer's preferences. Relationship management refers to the extent to which financial services collect and analyze customer information, and try to understand the value and need of its customers. Last, management of total enterprise refers to the extent to which financial services offer products (e.g. insurance, entertainment, travel, etc) that are provided by third parties.

### III. Relationship quality

Based on Smith [42] and Gutierrez's [51] proposals, the three factors used to measure relationship quality are trust, satisfaction and commitment. While trust refers to the integrity, reliability, and confidence on the financial services, satisfaction refers to the extent to which customers' expectations on financial, behavioural and other issues are met by financial services. Finally, commitment refers to the extent of the customer's instrumental, attitudinal and temporal commitment.

Table 1 illustrates the description statistics for the three dimensions.

## Research Sample

The data are questionnaire responses from customers at top twelve local banks (including branches) located in Taipei, Taiwan. The study targets particularly the customers who have had online bank accounts. A random sampling method was used. One hundred potential research participants were selected randomly by each participating bank. Survey questionnaires then were e-mailed to their chosen customers. Therefore, a total of 1200 survey forms were distributed, and 798 were returned. 713 were valid for analysis (a valid return rate of 59.42%). The result from non-response analysis ensures the absence of non-response biases. The results show that no difference exists between respondents and non-respondents. Table 2 presents the demographic statistics of the participants.

## Reliability and Validity Tests

Reliability and validity tests are conducted for each of the constructs with multivariate measures. Cronbach  $\alpha$  reliability estimates are used to measure the internal consistency of these multivariate scales [52]. In this study, the Cronbach  $\alpha$  of each factor is greater than 0.7089, which indicates a strong reliability for our survey instrument [53]. In addition, since item-to-total correlations are larger than 0.6232 (see Table 3), it is considered to have high criterion validity [54].

Meanwhile, to ensure that the instrument has reasonable construct, this study employs validity exploratory factor analyses. The exploratory factor analysis applies the following rules: (1) eigenvalue > 1, (2) applying Varimax rotation and extracting factor

TABLE 1 — Survey structure and description statistics for each dimension

Dimension	Number of items per dimension	Mean	Std. Dev.	Order
Technology readiness (TR)	16	3.4400	0.6317	3
Customer relationship management (CRM)	15	3.5232	0.4084	1
Relationship quality (RQ)	11	3.5159	0.4169	2

TABLE 2 — Demographic statistics

Construct	Classification	Number	Percentage (%)
Gender	Male	372	52.0
	Female	341	47.7
Age	< 30	335	47.0
	31-40	191	26.8
	41-50	115	16.1
	> 50	72	10.1
Education	College graduates	196	27.5
	Undergraduate school graduates	346	48.5
	Graduate school graduates	110	15.4
	Other (including junior high and senior high school graduates)	61	8.6

**TABLE 3 — Internal consistency values for the questionnaire**

Dimensions	Factors	Item-to-Total Correlations	Cronbach's $\alpha$
TR	Comfort level	0.6232	0.8029
	Optimism	0.6542	0.7896
	Sense of security	0.6704	0.7824
	Innovations	0.6915	0.7724
CRM	e-business activities	0.6500	0.8105
	Channel management	0.6636	0.8047
	Relationship management	0.7435	0.7688
	management of total enterprise	0.6468	0.8119
RQ	Trust	0.6362	0.7537
	Satisfaction	0.6780	0.7089
	Commitment	0.6471	0.7413

with loading > .6 (3) compared factor loading variance > .3 (4) item-to-total correlation value > 0.6. The results of exploratory factor analysis are presented in Table 4.

**DATA ANALYSIS AND RESULTS**

In the first section of the analysis, customers' demographic factors are analyzed against factors within the TR, CRM, and RQ using t-Test and one-way ANOVA. In the second section, correlations are calculated for each of the dimension pairings, namely TR to CRM and RQ as well as CRM to RQ.

**The Effect of Demographic Factors on Three Dimensions**

The results show that the customer's demographic factors significantly influences their technology readiness, and to some point, influences their perception of customer relationship management of the financial services as well (see Table 5 for a summary of the effect of the customer's demographic factors on the factors in the three dimensions).

The study discovers that customer's demographic background results in statistically significant differences in (1) comfort level, optimism, and sense of security factor of the TR dimension; and (2) e-business activities factor of the CRM dimension ( $p < .01$ ). In particular, the customers who are male, age of 50 or less, or at have at least a college degree appear to have higher TR. The study also finds male tend to response to the e-business activities provided by the banks more than female ( $p < .01$ ). However, the customer's demographic factors do not significantly influence their perceptions of other factors in the CRM dimension nor the factors in the RQ dimension. Hence,  $H_1$  and  $H_2$  are supported but  $H_3$  is rejected.

**TABLE 4 — Factor analysis for the questionnaire**

Dimensions	KMO value	Cumulative %
TR	0.903	78.260
CRM	0.920	79.806
RQ	0.903	78.244

**TABLE 5 — A summary of the effect of the bank customers' personal factors**

Dimension	Factors	Gender	Age	Education
TR	Comfort level	M>F***	a,b,c>d **	C,U,G>O **
	Optimism	M>F**	N.S.	C,U,G>O **
	Sense of security	N.S.	a>c,d ***	N.S.
	Innovations	N.S.	N.S.	N.S.
CRM	e-business activities	M>F**	N.S.	N.S.
	Channel management	N.S.	N.S.	N.S.
	Relationship management	N.S.	N.S.	N.S.
	management of total enterprise	N.S.	N.S.	N.S.
RQ	Trust	N.S.	N.S.	N.S.
	Satisfaction	N.S.	N.S.	N.S.
	Commitment	N.S.	N.S.	N.S.

Note: M = males, F = females a: < 30; b: 31-40; c: 41-50; d: > 50  
 C: college graduates; U: undergraduate school graduates; G: graduate school graduates;  
 O: others N.S. = Not statistically significant \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

### Correlations between Three Dimensions

The Pearson analysis is able to identify a statistically significant correlation between TR and CRM, TR and RQ, and CRM and RQ ( $r = .310$ -. $0.639$ ,  $p < .01$  two-tailed). Next, multiple regression analysis was used to test the hypothesis  $H_4$ ,  $H_5$  and  $H_6$ . First, the CRM was used as the dependent variables (i.e.  $Y_1$ ,  $Y_2$ ,  $Y_3$  and  $Y_4$  denoting “e-business activities”, “channel management”, “relationship management” and “management of total enterprise”, respectively) and factors of TR (i.e. denoting by  $X_1$ ,  $X_2$ ,  $X_3$ , and  $X_4$ ) as the independent variables in the linear regressions. The resulting linear regression and their corresponding adjusted  $R^2$  with standardization  $\beta$  are shown in Table 6.

In the “e-business activities” factor of CRM, only three factors of TR are significant in the regression model: “sense of security” ( $X_3$ ), “innovations” ( $X_4$ ) and “comfort level” ( $X_1$ ), the latter being least significant ( $R^2 = 0.159$ ) and the former more significant ( $R^2 = 0.206$ ). This implies that “sense of security” is one with the greatest impact on “e-business activities” among four indicators of TR. For the “channel management” and “relationship

management” of CRM, the same three factors of TR are significant in regression: “comfort level” ( $X_1$ ), “sense of security” ( $X_3$ ), and “innovations” ( $X_4$ ). The most significant factor for “channel management” is “comfort level” with a  $R^2 = 0.228$ , and “sense of security” with a  $R^2 = 0.294$  for “relationship management”. Finally, in the “management of total enterprise” of CRM, there are four regressions that include “comfort level”, “optimism” ( $X_2$ ,  $R^2 = 0.276$ ), “sense of security” ( $X_3$ ), and “innovations” ( $X_4$ ). The resulting regression equations for these four factors of CRM are given by Equation (1), (2), (3) and (4) in Table 6.

Applying multiple stepwise regression analysis, we explored the effects of TR (the independent variables) for each type of RQ (the dependent variables). The resulting regression equations for these three types of RQ are given by Equation (5), (6), and (7); and the corresponding adjusted —  $R^2$  with standardized  $\beta$  are shown in Table 7. Table 7 shows that “optimism” ( $X_2$ ) is the most influential factor on “trust” ( $Y_1$ ), and “commitment” ( $Y_3$ ). For the “satisfaction” factor ( $Y_2$ ), “sense of security” ( $X_3$ ) has the greatest impact.

Similarly, by multiple stepwise regression analysis we

TABLE 6 — Regression analysis for “CRM” with respect to “TR”

TR	Dependent variables: CRM							
	e-business activities ( $Y_1$ )		Channel management ( $Y_2$ )		Relationship management ( $Y_3$ )		Management of total enterprise ( $Y_4$ )	
	Adjusted $R^2$	Standardized Regression Coefficient $\beta$	Adjusted $R^2$	Standardized Regression Coefficient $\beta$	Adjusted $R^2$	Standardized Regression Coefficient $\beta$	Adjusted $R^2$	Standardized Regression Coefficient $\beta$
Comfort level ( $X_1$ )	0.159	0.231***	0.228	0.154***	0.270	0.218***	0.202	0.229***
Optimism ( $X_2$ )							0.276	0.108*
Sense of security ( $X_3$ )	0.206	0.146***	0.181	0.242***	0.294	0.205***	0.271	0.142**
Innovations ( $X_4$ )	0.194	0.167***	0.215	0.175***	0.216	0.226***	0.254	0.168***

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; “/”: variables were removed from the model due to insignificant  $\beta$

$$Y_1 = 2.036 + 0.192 X_1 + 0.133 X_4 + 0.113 X_3 \quad \text{----- (1)}$$

$$Y_2 = 1.996 + 0.187 X_3 + 0.139 X_4 + 0.127 X_1 \quad \text{----- (2)}$$

$$Y_3 = 1.682 + 0.185 X_4 + 0.187 X_1 + 0.163 X_3 \quad \text{----- (3)}$$

$$Y_4 = 1.730 + 0.191 X_1 + 0.135 X_4 + 0.110 X_3 + 0.090 X_2 \quad \text{----- (4)}$$

TABLE 7 — Regression analysis for “RQ” with respect to “TR”

TR	Dependent variables: RQ					
	Trust ( $Y_1$ )		Satisfaction ( $Y_2$ )		Commitment ( $Y_3$ )	
	Adjusted $R^2$	Standardized Regression Coefficient $\beta$	Adjusted $R^2$	Standardized Regression Coefficient $\beta$	Adjusted $R^2$	Standardized Regression Coefficient $\beta$
Comfort level ( $X_1$ )	0.226	0.268***	0.386	0.257***	0.268	0.133***
Optimism ( $X_2$ )	0.292	0.109**			0.271	0.091*
Sense of security ( $X_3$ )	0.286	0.119**	0.412	0.209***	0.255	0.154***
Innovations ( $X_4$ )	0.274	0.165***	0.315	0.298***	0.222	0.255***

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; “/”: variables were removed from the model due to insignificant  $\beta$

$$Y_1 = 1.659 + 0.232 X_1 + 0.137 X_4 + 0.095 X_3 + 0.094 X_2 \quad \text{----- (5)}$$

$$Y_2 = 1.367 + 0.237 X_4 + 0.214 X_1 + 0.162 X_3 \quad \text{----- (6)}$$

$$Y_3 = 1.861 + 0.199 X_4 + 0.117 X_3 + 0.109 X_1 + 0.078 X_2 \quad \text{----- (7)}$$



explored the effects of CRM (the independent variables) on each RQ factor (the dependent variables). The resulting equations for these three factors of RQ are given by Equations (8), (9), and (10); and the corresponding adjusted- R<sup>2</sup> with standardized  $\beta$  are shown in Table 8. Regression analysis shows that the most influential factors within the CRM dimension for the three factors (Y<sub>1</sub>, Y<sub>2</sub>, Y<sub>3</sub>) of RQ are “e-business activities” (X<sub>1</sub>), “channel management” (X<sub>2</sub>) and “relationship management” (X<sub>3</sub>), respectively. Based on the statistical results, H<sub>4</sub>, H<sub>5</sub> and H<sub>6</sub> are supported.

## DISCUSSION

The results show that gender, age and educational background have significant and positive effect on TR. Past researches have various dissimilar results on this matter. For example, Kleijnen, Wetzels and de Ruyter [55] target M-commerce customers and find that age, computer skills, mobile technology readiness and social influence are significant interrelated, which is in line with the finding of this study. Similar results can be found in Smith [56]. However, Jaafar, Ramayah, Abdul-Aziz, and Saad [57] discover that there are no significant differences in terms of TR across various demographic variables (e.g. gender, age, etc.), except for educational level, which is partially supportive of the findings in this research. Moreover, existing literature demonstrate diverse evidence of the effect of demographic factors on CRM. For example, Zhang [58] concludes that demographic factors (e.g. tenure, marital status, gender, channel usage) do not significantly affect customer retention. Eisingerich and Bell [59] propose that customer education to be the strongest determinant of client loyalty in multi-product financial institutions. Finally, from RQ’s perspective, existing literature presents evidence showing significant relationships between demographic factors and RQ [60,61,62]. However, the present study finds that demographic factors do not affect RQ. Therefore, based on past researches and the finding of the present study, a cohesive statement for the effect of the bank customer’s demographic factors is premature to make.

From the results of correlation analysis between paired dimensions, this study finds that TR significantly affects CRM and RQ in a banking context, which implies technology readiness of an individual can affect an individual’s perceived CRM of online banking system and his/her RQ with online banking. In his study, Tsikriktsis [63] learns that technophobia has a negative

effect on technological products. In other hands, the user’s technological positivism has positive impact on technology innovations. Yousafzai [64] asserts that technology readiness is useful in explaining internet banking acceptance. Ranaweera et al. [21] suggest that risk aversion, trust disposition, and technology readiness are fundamental to online consumer behaviour literature. Yen [65] analyzes satisfaction of online customers and concludes that technology readiness is both an enabler as well as an inhibitor of online customer satisfaction. In addition, numerous studies confirm the relationship between CRM and RQ [48,66,67]. There are studies investigating the relationship between CRM and RQ in the financial industry, such as Ndubisi, Wah, and Ndubisi [68]. These are all in line with the present study.

## CONCLUSION

The present study conducts an empirical study of these customers who have had online banking experience from 10 local banks (n = 713) in Taiwan. The study explores the condition of the online banking customer’s TR, CRM implementation of online banking, and their effect on RQ, proposing a theoretical model which is analyzed using t-test, one-way ANOVA, Pearson correlation analysis and multiples stepwise regression method. Similar models have been largely unexplored by prior researchers.

## Practical and Theoretical Implications

The findings implies that the bank customer’s TR may impact their perception of bank’s CRM through their “comfort”, “optimism”, “sense of security” and “innovation” levels of using technological products and services provide by the banks. In particularly, “sense of security” appears to be the most influential indicator of TR which contributes to the bank’s e-business activities and relationship management. Such finding implies the customer’s technological skills do impact their online behaviours as suggested by Yousafzai [55]. Specifically, the customer’s sense of security is the most crucial element as the customer experiment online banking activities. Such experience may also influence their perception of how the banks try to manage the relationship with their customers. There is also evidence in related literature showing that risk aversion, trust disposition, and technology readiness are fundamental to online consumer behaviour

TABLE 8 — Regression analysis for “RQ” with respect to “CRM”

CRM	Dependent variables: RQ					
	Trust (Y <sub>1</sub> )		Satisfaction (Y <sub>2</sub> )		Commitment (Y <sub>3</sub> )	
	Adjusted R <sup>2</sup>	Standardized Regression Coefficient $\beta$	Adjusted R <sup>2</sup>	Standardized Regression Coefficient $\beta$	Adjusted R <sup>2</sup>	Standardized Regression Coefficient $\beta$
e-business activities (X <sub>1</sub> )	0.335	0.114**	0.369	0.217***	0.269	0.275***
Channel management (X <sub>2</sub> )	0.250	0.243***	0.403	0.131**	0.322	0.167***
Relationship management (X <sub>3</sub> )	0.328	0.144**	0.315	0.237***	0.350	0.122**
Management of total enterprise (X <sub>4</sub> )	0.312	0.203***	0.394	0.184***	0.344	0.156***

Note: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; “/”: variables were removed from the model due to insignificant  $\beta$

$$Y_1 = 0.989 + 0.254 X_2 + 0.210 X_4 + 0.145 X_3 + 0.118 X_1 \quad \text{----- (5)}$$

$$Y_2 = 0.769 + 0.230 X_3 + 0.216 X_1 + 0.183 X_4 + 0.131 X_2 \quad \text{----- (6)}$$

$$Y_3 = 1.090 + 0.269 X_1 + 0.164 X_2 + 0.152 X_4 + 0.116 X_3 \quad \text{----- (7)}$$

literature. Thus, as banks invest conservable amount of resources on technology innovations, it is essential to understand and train their potential customers with necessary computing skills so that they feel comfortable and secured to use, and continue to use, online financial services.

The findings also implies that the bank's CRM significantly affects RQ, which are parallel with a number of prior researches [66,67,68]. More specifically, the present study discovers that while "e-business activities" is the most influencing element on the customer's trust; "channel management" is the key component to the customer's satisfaction. In addition, the bank's "relationship management" strategy plays critical role on the customer's commitment toward a bank. These identifications can also find supporting evidence in existing studies [69,70,71]. The findings imply that the most effective way to enhance a bank's relationship quality with its customers is through providing appropriate e-business activities, trustworthy channels, and effective relationship management strategies.

Finally, the present study discovers that the customer's demographic factors positively affect TR and their perception of e-business activities within CRM dimension. Although past studies show diverse finding in regard to the effect of demographic factor on TR, CRM and RQ, it is apparent that customers with different personal attributes differ in their expectations and perceptions of the quality of technological innovations provided by any type of organization in some aspects [72]. No direct evidence shows the effect of demographic factor on RQ. Nevertheless, the finding on the effect of the customer's demographic factors in an online banking sector adds values to the current practice as well as to the literature.

#### Limitations and Suggestions

Even though the empirical results of this study largely support the proposed research model, at least five limitations should be carefully considered. First, this study expects to gain insights as to how customers' self-perceived technology readiness affects their perceptions of customer relationship management of the banks and the quality of relationships with the banks. However, most CRM is planned by the banks and the customers might not be fully familiar with how CRM is being applied. Second, this study recruited participants only those who have had online banking experience, and non-technology users (i.e. people who have no prior experience using online banking systems) were not included in this study. Thus, no evidence showing how these non-technology users may respond to the condition of the online banking customer's TR, CRM implementation of online banking, and their effect on RQ.

Furthermore, since individual informants provide the empirical data, possible biases or preferences (e.g., computing skills, values, shopping habits, social preferences, etc.) may exist due to different personal experiences, family or educational backgrounds. Forth, since the data collection takes place in Taiwan, the characteristics of the online financial services provided by these local banks may be quite different from those in other areas or countries. Hence, do not assume the present results to represent the general case. However, the results for this report may provide a fundamental reference for the banks in other industries or countries whose environments are similar to those in Taiwan. Finally, even though the analytical methods used in the present study were selected to test the proposed hypotheses, the findings of the present study are constrained by the statistical methods used

to analyze data (i.e. t-test, one-way ANOVA, Pearson correlation analysis, and stepwise regression analysis). For future studies, it is recommended that a structural equation modelling method (SEM) can be applied as it allows the researchers to study the whole model.

#### REFERENCES

- [1] Ministry of Transportation and Communications. *An investigation report for the status of Internet usage in Taiwan* (in Chinese), Ministry of Transportation and Communications, Taipei, Taiwan, 2008.
- [2] Ho, L.-A., Kuo, T.-H., Lin, C., Lin, B. "The mediate effect of trust at knowledge sharing: An empirical study," *International Journal of Information Technology & Decision Making* (9:4), 2010, 1-20.
- [3] Lin, C.-Y., Kuo, T.-H., Kuo, Y.-K., Ho, L.-A., & Kuo, Y.-L.. "The KM chain - Empirical study of the vital knowledge sourcing links," *The Journal of Computer Information Systems* (48:2), 2007, 91-99.
- [4] Liu, H.-Y. "Development of a framework for customer relationship management (CRM) in the banking industry," *International Journal of Management* (24:1), 2007, 15-32.
- [5] González, M., Mueller, R., & Mack, R. "An alternative approach in service quality: An e-banking case study," *The Quality Management Journal* (15:1), 2008, 41-58.
- [6] Ayanso, A., Lertwachara, K., & Thongpapanl, N. "Technolgy-enabled retail services and online sales performance," *The Journal of Computer Information Systems* (50:3), 2010, 102-111.
- [7] Tan, W., Cater-Steel, A., & Toleman, M. "Implementing IT service management: A case study focusing on critical success factors," *The Journal of Computer Information Systems* (50:2), 2009, 1-12.
- [8] Chukumba, C., Oyewole, S. A., & Parbhakar, M. "Influence of engineering and technology on banking and capital markets in developing countries," *The Business Review, Cambridge* (7:1), 2007, 193-199.
- [9] Dardan, S., Stylianou, A., & Kumar, R. "The impact of customer-related IT investments on customer satisfaction and shareholder returns," *The Journal of Computer Information Systems* (47:2), 2006, 100-111.
- [10] Chang, S., & Jang, Y. "Assessing customer satisfaction in a V-commerce environment," *Journal of Organizational Computing and Electronic Commerce* (19:1), 2009, 30-49.
- [11] Heffernan, T., O'Neill, G., Travaglione, T., & Droulers, M. "Relationship marketing: The impact of emotional intelligence and trust on bank performance," *The International Journal of Bank Marketing* (26:3), 2008, 183-199.
- [12] Keegan, W. *Global marketing management*. (7<sup>th</sup> Ed.), Prentice Hall, Englewood Cliffs, NJ, 2002.
- [13] Lin, C. "In search of e-service value: technology-exploitation vs. certainty-seeking online behaviours," *The Service Industries Journal* (30:8), 2010, 1377-1400.
- [14] Chiu, Y.-T. H., Fang, S.-C. & Tseng, C.-C. "Early versus potential adopters :Exploring the antecedents of use intention in the context of retail service innovations," *International Journal of Retail & Distribution Management* (38:6), 2010, 443-459.
- [15] Hernández-Murillo, R., Llobet, G., & Fuentes, R. "Strategic online banking adoption," *Journal of Banking & Finance* (34:7), 2010, 1650-1663.



- [16] Safeena, R., Abdullah, , & Date, H. "Customer perspectives on e-business value: Case study on internet banking," *Journal of Internet Banking and Commerce* (15:1), 2010, 1-13.
- [17] Chong, A. Y.-L., Ooi, K.-B., Lin, B. & Tan, B.-I. "Online banking adoption: an empirical analysis," *The International Journal of Bank Marketing*, (28:4), 2010, 267-287.
- [18] Saleh, Z. "Improving security of online banking using RFID," *Allied Academies International Conference. Academy of Banking Studies, Proceedings* (10:1), 2010, 3-4.
- [19] Zhao, A. L., Koenig-Lewis, N., Hanmer-Lloyd, S., & Ward, P. "Adoption of internet banking services in China: is it all about trust?" *The International Journal of Bank Marketing* (28:1), 2010, 7-26.
- [20] Wang, W. "Diffusions of innovation, perceived security and experience: The case of online banking service adoption in Taiwan," *The Business Review, Cambridge* (15:2), 2010, 247-252.
- [21] Ranaweera, C., Bansal, H., McDougall, G. "Web site satisfaction and purchase intentions: Impact of personality characteristics during initial web site visit," *Managing Service Quality* (18:4), 2008, 329-348.
- [22] Demirci, A., & Ersoy, N. "Technology readiness for innovative high-tech products: How consumers perceive and adopt new technologies," *The Business Review, Cambridge* (11:1), 2008, 302-308.
- [23] Ho, L.-A., Kuo, T.-H., & Lin, B. "Influence of online learning skills in cyberspace," *Internet Research* (20:1), 2010, 55-71.
- [24] Ho, L.-A. & Kuo, T.-H. "How can one amplify the effect of e-learning? An examination of high-tech employees' computer attitude and flow experience," *Computers in Human Behavior* (26:1), 2010, 23-31.
- [25] Lin, C.-H., Shih, H.-Y., & Sher, P. J. "Integrating technology readiness into technology acceptance: The TRAM model," *Psychology & Marketing* (24:7), 2007, 641-657.
- [26] Walczuch, R., Lemmink, J., & Streukens, S. "The effect of service employees' technology readiness on technology acceptance," *Information & Management* (44:2), 2007, 206-215.
- [27] Lam, S., Chiang, J., & Parasuraman, A. "The effects of the dimensions of technology readiness on technology acceptance: An empirical analysis," *Journal of Interactive Marketing*, (22:4), 2008, 19-39.
- [28] Matthing, J., Kristensson, P., Gustafsson, A., & Parasuraman, A. "Developing successful technology-based services: The issue of identifying and involving innovative users," *The Journal of Services Marketing* (20:5), 2006, 288-297.
- [29] Parasuraman, A. "Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies," *Journal of Service Research* (2:4), 2000, 307-321.
- [30] Parasuraman, A., & Colby, C. L. *Techno-ready marketing*, The Free Press, New York, NY, 2001.
- [31] Petouhoff, N., & Johnson, B. "Raising the bar on CRM standards: Driving toward a customer-centric call center and CRM financial strategy," *Customer Interaction Solutions* (26:6), 2007, 22-25.
- [32] Kalakota, R. & Robinson, M. *e-Business: Roadmap for success*. (1<sup>st</sup> Ed.), Addison-Wesley, Boston, MA, 1999.
- [33] Storr, T., Forbes, D., Carraher, S., & Baird, T. "Customer relationship management in RBC Royal Bank of Canada (BAHAMAS): An analysis of the present and a pathway to future success," *Allied Academies International Conference. Academy of Marketing Studies. Proceedings* (14:1), 2009, 45-48.
- [34] Lassar, W. M., Lassar, S. S., & Rauseo, N. A. "Developing a CRM strategy in your firm," *Journal of Accountancy* (206:2), 2008, 68-73.
- [35] O'Malley, L., & Mitussis, D. "Relationships and technology: The strategic implications," *Journal of Strategic Marketing* (10), 2002, 225-38.
- [36] Wayland, R. E., & Cole P. M. *Customer connections: New strategies for growth*, Harvard Business School Press, Boston, MA, 1997.
- [37] Fletcher, K. "Consumer power and privacy: The changing nature of CRM," *International Journal of Advertising* (22:2), 2003, 249-263.
- [38] Berson, A., Smith, S., & Thearling, K. *Building data mining applications for CRM*. McGraw-Hill, New York, NY, 1999, pp.43-46.
- [39] Peppard, J. "Customer relationship management (CRM) in financial services," *European Management Journal* (18:3), 2000, 312-327.
- [40] Crosby, L. A., Evans, K. A. & Cowles, D. "Relationship quality in services selling: An interpersonal influence perspective," *Journal of Marketing* (54:3), 1990, 68-81.
- [41] Singh, R. "Relational embeddedness, tertius iungens orientation and relationship quality in emerging markets," *Asia Pacific Journal of Marketing and Logistics* (20:4), 2008, 479-492.
- [42] Smith, J. R. "Buyer-seller relationships: Similarity, relationship management, and quality," *Psychology and Marketing* (15:1), 1998, 3-21.
- [43] Kotler, P. *Marketing management*, Prentice Hall, Englewood Cliffs, NJ, 2000.
- [44] Sun, H. "Transferring attributes of e-commerce systems into business benefits: A relationship quality perspective," *Journal of Electronic Commerce Research* (11:2), 2010, 92-109.
- [45] Berry, L. L., & Parasuraman, A. *Marketing services: Competing through quality*. Free Press, New York, NY, 1991.
- [46] Jap, S. D., Manolis, C. & Weitz, B. "Relationship quality and buyer-seller interactions in channels of distribution," *Journal of Business Research* (46), 1999, 303-313.
- [47] Ural, T. "The antecedents and consequences of relationship quality according to stages of the relationship between exporters and importers," *Problems and Perspectives in Management* (5:3), 2007, 111-130.
- [48] Storbacka, K., Strandvik, T., & Gronroos, C. "Managing customer relationships for profit: The dynamics of," *International Journal of Service Industry Management* (5:5), 1994, 21-38.
- [49] Kumar, N., Scheer, L. K., & Steenkamp, J. B. E. M. "The effects of perceived interdependence on dealer attitudes," *Journal of Marketing Research*, (32), 1995, 348-356.
- [50] Roberts, K., Varki, S., & Brodie, R. "Measuring the quality of relationships in consumer services: An empirical study," *European Journal of Marketing* (37:1), 2003, 169-196.
- [51] Gutierrez, S. S. M. "Consumer-retailer relationships from a multi-level perspective," *Journal of International Consumer Marketing* (17:2/3), 2005, 93-115.
- [52] Nunnally, J. C. *Psychometric theory*, McGraw, New York, NY, 1978.
- [53] Cuieford, J. P. *Fundamental statistics in psychology and education* (4<sup>th</sup> ed), McGraw Hill, New York, NY, 1965.

- [54] Kerlinger, F. N. *Foundations of behavioral research* (4th ed.), Harcourt Brace College Publishers, Forth Worth, TX, 1999.
- [55] Kleijnen, M., Wetzels, M., & de Ruyter, K. "Consumer acceptance of wireless finance," *Journal of Financial Services Marketing* (8:3), 2004, 206-217.
- [56] Smith, A. D. "Barriers to accepting e-processing in the USA," *International Journal of Health Care Quality Assurance* (19:2), 2006, 158-180.
- [57] Jaafar, M., Ramayah, T., Abdul-Aziz, A.-R. & Saad, B. "Technology readiness among managers of Malaysian construction firms," *Engineering, Construction and Architectural Management* (14:2), 2007, 180-191.
- [58] Zhang, H. *Customer retention in the financial industry: An application of survival analysis*, Doctoral dissertation, Purdue University, United States, 2009.
- [59] Eisingerich, A. B., & Bell, S. J. "Relationship marketing in the financial services industry: The importance of customer education, participation and problem management for customer loyalty," *Journal of Financial Services Marketing* (10:4), 2006, 86-97.
- [60] Wolfinger, N. H., & Wilcox, W. B., "Happily ever after? Religion, marital status, gender and relationship quality in urban families," *Social Forces* (86:3), 2008, 1311-1337.
- [61] Lin, C.-P., & Ding, C. G. "Evaluating group differences in gender during the formation of relationship quality and loyalty in ISP service," *Journal of Organizational and End User Computing* (18:2), 2006, 38-62.
- [62] Palmer, A., & Bejou, D. "The effects of gender on the development of relationships between clients and financial advisers," *The International Journal of Bank Marketing* (13:3), 1995, 18-27.
- [63] Tsikriktsis, N. "A technology readiness-based taxonomy of customers: A replication and extension," *Journal of Service Research* (7:2), 2004, 42-52.
- [64] Yousafzai, S. Y. K., *Internet banking in the United Kingdom: A customer behaviour perspective*, Doctoral dissertation, Cardiff University, United Kingdom, 2005.
- [65] Yen, H. R. "An attribute-based model of quality satisfaction for Internet self-service technology," *The Service Industries Journal* (25:5), 2005, 641-659.
- [66] Chang, H., & Ku, P. "Implementation of relationship quality for CRM performance: Acquisition of BPR and organisational learning," *Total Quality Management & Business Excellence* (20:3), 2009, 327-348.
- [67] Wu, W., Shih, H., & Chan, H. "A study of customer relationship management activities and marketing tactics for hypermarkets on membership behavior," *The Business Review, Cambridge* (10:1), 2008, 89-95.
- [68] Ndubisi, N. O., Wah, C. K., & Ndubisi, G. C. "Supplier-customer relationship management and customer loyalty: The banking industry perspective," *Journal of Enterprise Information Management* (20:2), 2007, 222-236.
- [69] Tomiuk, D., & Pinsonneault, A. "Applying relationship theories to web site design: development and validation of a site-communality scale," *Information Systems Journal* (19:4), 2009, 413-435.
- [70] Lévy Mangin, J., de Pablo Valenciano, J., & Kopylay, T. "Modeling distribution channel dynamics of north American cars in the Spanish automobile industry," *International Advances in Economic Research* (15:2), 2009, 186-206.
- [71] Sheu, J., & Hu, T. "Channel power, commitment and performance toward sustainable channel relationship," *Industrial Marketing Management* (38:1), 2009, 17-31.
- [72] Shen, H., Wei, J., & Zheng, L. "An empirical study on the influential factors of travel agency websites quality based on the users' perception," *International Journal of Services Technology and Management* (12:2), 2009, 216-230.

**APPENDIX SURVEY — structure and sample survey items (translated from Chinese)**

Dimensions	Factors	Number of items per factor	Sample survey item
TR	Comfort level	4	I am able to adapt myself to the new online banking systems.
	Optimism	4	I believe the online banking systems provide me with effective and efficient services.
	Sense of security	4	I trust the online banking system to keep all my personal account information confidential.
	Innovations	4	I often keep an open mind toward new technologies.
CRM	e-business activities	4	I chose to be a customer of the bank-in-question because it provides alternative means (i.e. online system) to accommodate my needs.
	Channel management	4	The bank-in-question keeps records of my online actions.
	Relationship management	4	The bank-in-question offers means (e.g. online form) for collecting my feedback.
	Management of total enterprise	3	The bank-in-question provides incentive (such as restaurant discounts) for using its online banking system.
RQ	Trust	4	I believe that all information I exchanged or transactions I made via the online banking system are on a secured line so that all information will not be stolen by others.
	Satisfaction	4	I am satisfied services provided by the online banking system.
	Commitment	3	I am going to continue to use the online banking system.