Electron Commer Res
DOI 10.1007/s10660-017-9261-z

# Marketing strategy of internet-banking service based on perceptions of service quality in Vietnam

**Chih-Chin Liang**[1] · **Ngoc Ly Nguyen**[1]



**Abstract** Internet banks can provide a convenient and effective method of managing personal finances because customers can easily access them without constraints of time or place. Following the international trend, Vietnam, an emerging country with a rapidly growing banking industry, is no exception in the provision of Internet-banking services. However, how to provide services that users require is an important consideration for banks that are developing service products. Although service quality is important to users when selecting banking services, the effects of perceived service quality on customer adoption of Internet-banking services have received little attention. This investigation designed a questionnaire to understand the aspects of service quality that influence intention to adopt Internet-banking services for three groups of Vietnamese customers. The descriptive variables used to determine the features of these three consumer groups are verified, and include demographics, customer behaviors, customer satisfaction, and customer loyalty. Finally, marketing strategies for the three clusters are presented to help Vietnamese banks promote Internet-banking services.

**Keywords** Internet-banking services · Clustering analysis · Service quality

✉ Chih-Chin Liang
lgcwow@gmail.com

Ngoc Ly Nguyen
phieu_pk@yahoo.com

[1] Department of Business Administration, National Formosa University, Huwei Township, Taiwan (R.O.C.)

Published online: 10 June 2017

## 1 Introduction

Increases in Internet use have been accompanied by an increased need to make online financial transactions, such as money transfers, payments, and credit card transactions [34, 35]. Based on the technology acceptance model (TAM), demand-side factors including perceived ease-of-use, perceived usefulness, and perceived risk influence customer adoption of new Internet applications [2, 57]. In the Internet era, customers have become used to the widespread adoption of the Internet to access numerous useful service while maintaining the security of their personal data [53]. The Internet enables customers to access services conveniently regardless of service location [38]. Using a well-designed procedure, customers can use online services to obtain expected and useful results that can serve their original purposes [31]. If a company can provide secure online services, customers will be more willing to use those online services based on their perception of low associated risks [4]. Restated, customer demands for virtual and convenient Internet banking services are growing with the growth of Internet usage [47, 51]. To satisfy customer needs, banks thus have begun to use the Internet rather than traditional banking services as a distribution channel for e-services, to gradually provide their customers various financial services. Analysis of these moves reveals competition between local and foreign banks in Vietnam, and that survival requires banks in Vietnam to adopt the Internet as a distribution channel. The banking system in Vietnam involves 85 credit institutions, including six state-owned banks, 36 joint stock banks, four joint venture banks, 34 branch offices of foreign banks, one policy bank, one central credit fund, 13 non-banking credit institutions, and nearly 1000 grassroots people's credit funds [52]. The Bank for Foreign Trade of Vietnam (VCB), Industrial and Commercial Bank (Incombank), Asia Commercial Btank (ACB), Vietnam Export Import Bank (Eximbank), ANZ and Citibank provided home-banking services [52]. Additionally, customers can use Internet banking services from VCB, ACB, Vietnam Technological and Commercial Joint- stock Bank (Techcombank), HSBC, ANZ and Citibank; and can use mobile Internet-banking services from Incombank, ACB and Techcombank. Other banks are content simply with having websites, through which they advertise and provide information about their services to customers. Most local banks and all foreign banks in Vietnam are providing Internet-banking services [52].

Although the increasing need for online financial transactions should provide a good opportunity for banks to deploy Internet-banking services, it is difficult for banks to promote services to customers if those services do not satisfy customer needs [50]. In the service businesses, customer loyalty remains positive only if the provided service is of sufficient quality to satisfy the customer [13, 33–35, 42]. To ensure positive customer perceptions of Internet-banking services, banks must understand user concerns regarding banking service quality [10, 13, 31, 48]. Loyal customers can contribute continuously to a bank.

Additionally, studies have discussed numerous issues related to Internet-banking services, including demographic characteristics of Internet-banking customers and the costs of Internet-banking transactions [29], measurements of Internet bank

service quality [3, 10, 22, 31], customer satisfaction and loyalty [21, 49], marketing segmentation [18, 28, 36], and even consumer behavior.

Although the studies listed above have investigated the influences on Internet-banking customer intentions, few focused on clustering customers in terms of their perceptions of and satisfaction with service quality [1, 10, 16, 17]. To analyze clustered customers, marketing strategies for customer targeting could be developed. Service quality thus could be the variable used to cluster customers and thus identify their true needs [29, 39, 41, 58]. This study thus performed a questionnaire survey to cluster customers based on their perceptions on service quality [20].

Restated, banks can clearly identify clustered customer needs and thus develop effective marketing strategies [11, 27]. Marketing is considered an ongoing process of determining how best to group consumer needs for products and services, corresponding to the strengths and weaknesses of the company with customer demand. Successfully applying marketing strategies to customers allows companies to distribute their products and services more effectively and efficiently than the competition, and to observe changes in customer demand [11, 27]. Accurate clustering analysis enables a company to develop effective marketing strategies based on the specific characteristics identified in grouped customers.

The rest of this paper is structured as follows. Section 2 describes service quality in detail. Section 3 is introduces the research method. Section 4 shows the analytical results. Section 5 discusses the strategies used to market Internet-banking services. Finally, concluding remarks are presented in Sect. 6.

## 2 Service quality variables

Consumers buy goods for functionality as well as quality [36]. For example, customers primarily concerned with security quality may decline to use Internet-banking services with poor security. Restated, if customers can be clustered based on their perceptions on service quality, a bank can promote Internet-banking services to customers in a targeted manner. Customer purchase intention for specific products or services can be identified [26, 36, 46].

To cluster customers based on their perceptions of service quality, variables of customer perceptions of service quality should first be identified. Literature review identified the following measures of service quality as perceived by Internet-banking customers: *tangibility* [9, 23, 55, 59], *reliability* [9, 23, 55, 59–61], *responsiveness* [9, 23, 59, 60], *assurance* [9, 23, 59], *empathy* [23, 55, 59, 60], *convenience* [9, 23, 60, 61] *and security* [9, 23, 55, 60, 61].

However, Internet-banking services cannot be measured using observable characteristics. In fact, Internet-banking services are intangible [45]. Therefore, this study does not consider *tangibility* when clustering customers. This study uses six variables to represent customer perceptions of quality on Internet-banking services: *reliability*, *responsiveness*, *assurance, empathy, convenience and security*.

## 3 Research method

### 3.1 Research design

In this investigation, Internet-banking customers are clustered by customer perceptions of service quality. Verifying differences in variables among clustered customers can help clarify the differences among customer clusters. Therefore, question items for assessing service quality are developed based on literature review and the six integrated variables listed in Table 1. Customers are segmented using six variables of service quality, which are represented by 14 question items used in previous studies of service quality:

Q1. *Data must be transmitted successfully.*
Q2. *Announcements of system fault information and correction of faults must be performed quickly.*
Q3. *Internet bank employees must solve customer problems enthusiastically.*

**Table 1** The measurements of service quality

| Measurement | Variables | Integrated variables |
|---|---|---|
| SERVQUAL [59] | Measures perceptions of service quality based on following variables: tangibility, reliability, responsiveness, assurance, and empathy | Tangibility, reliability, responsiveness, assurance, and empathy |
| E-SERVQUAL [60] | Measures perceptions of website service quality, including: efficiency, reliability, fulfillment, privacy, responsiveness, compensation, and contact | Convenience, reliability, security, responsiveness, and empathy |
| eTailQ [55] | Measures perceptions of online retailer service quality, including: website design, fulfillment/reliability, privacy/security and customized customer service | Tangibility, reliability, security, and empathy |
| E-S-QUAL [61] | Measures perceptions of website core service quality, including: efficiency, fulfillment, system availability and privacy | Convenience, reliability, and security |
| Scale proposed by Jun and Cai [23] | Measures perceptions of service quality, including: reliability, responsiveness, competence, courtesy, credibility, access, communication, comprehension, collaboration, continuous improvement, content, accuracy, ease of use, and security | Tangibility, reliability, responsiveness, assurance, empathy, convenience, and security |
| Scale proposed by Gerrard and Cunningham [9] | Measures perceptions of service quality, including: timeliness, aesthetics, security, product variety, appearance, service issues, and staff quality | Tangibility, reliability, responsiveness, assurance, convenience, and security |

Q4. *Internet-banking transactions must be provided at a discount to the same transactions performed* via *a bricks-and-mortar branch.*
Q5. *Customer privacy must be protected.*
Q6. *Banking services must be provided continuously.*
Q7. *The clerks require professional knowledge of Internet-banking services.*
Q8. *Investment information must be revealed as soon as possible.*
Q9. *All banking services must be provided.*
Q10. *Internet-banking applications must be issued frequently.*
Q11. *Communication between the customer and call center must be convenient.*
Q12. *Customer transaction information must be protected*
Q13. *Customer financial information must be classified and protected.*
Q14. *Internet-banking transactions must be secure.*

A customer satisfaction scale measured user satisfaction with Internet-banking services [20]. Nineteen question items measured customer satisfaction [9, 23, 37, 55, 59–61]:

S1. *Customer data, including deposit and loan data, trading information,* etc., *are consistently accurate.*
S2. *The bank system website has adequate speed.*
S3. *The information is correctly transmitted.*
S4. *Online transactions are completed efficiently.*
S5 *The banking industry has a good overall public image and reputation.*
S6. *The Internet-banking system is stable and effective.*
S7. *System failures are quickly identified and repaired.*
S8. *Website information can be updated at any time.*
S9. *Additional functions are provided on the Internet-banking homepage (e.g.: fast links/search).*
S10. *The web page is attractively designed.*
S11. *Internet-banking services provide service personnel with professional knowledge.*
S12. *The security of customer financial information is maintained.*
S13. *Measures are taken to protect customer privacy.*
S14. *Mechanisms are provided to ensure secure Internet transactions.*
S15. *The Internet-banking service can be accessed at any time or place.*
S16. *Channels are provided for two-way communication (e.g., customer service hotlines,* etc.*).*
S17. *The clerks are enthusiastic about helping customers solve their problems.*
S18. *Internet-banking customer service personnel display good attitudes.*
S19. *Financial information can be managed in a timely and reliable manner.*

The customer loyalty scale measures customer retention. The scale uses the three question items proposed by Gronholdt et al. in 2000 to measure customer loyalty.

L1. *The customer would continue using Internet-banking services.*
L2. *The customer would recommend the bank network to friends and family.*
L3. *The customer would buy/use other online goods/services offered by the bank.*

Kotler [26] found shared customer behaviors can be used to develop marketing strategies. Understanding consumer behaviors can help researchers forecast customer purchase intentions. This study discusses time spent using Internet-banking services, knowledge of Internet-banking services, attitudes toward Internet-banking services, and reactions to the use of Internet-banking services [8]. Other studies confirmed that consumer behavior was the determinant factor in characterizing clusters [32, 56]. A six-question survey is conducted on consumer behavior in terms of Internet use, and specifically on Internet-banking activity [8]:

a. *How many days a week do you surf the Internet?*
b. *How many hours per day do you spend online?*
c. *What are your main reasons for using the Internet?*
d. *When do you usually use Internet-banking services?*
e. *What Internet-banking service do you use most often?*
f. *What is your main motivation for using Internet-banking services?*

Kotler [26] also stated that demographic variables are important for developing marketing strategies, because customer behaviors relate closely to demographic variables [54]. The analysis in this study considers demographic variables including age, gender, marital status, occupation, race, income and education. Demographic variables have been commonly used to describe segmented markets. For example, studies identified differences between Facebook users and non-users based on education, occupation, gender, and age [19]. User profiles are generated based on six demographic variables: gender, age, occupation, education level, marital status, and average monthly income [26]. The abovementioned question items of service quality, satisfaction, and loyalty are measured using a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = no comment, 4 = agree, and 5 = strongly agree). After gathering survey results for service quality, satisfaction, and loyalty, reliability analysis is performed to confirm the questionnaire accuracy and validity. To identify customer groups, cluster analysis of service quality identifies homogeneous groups of target customers. Two-stage clustering is used to identify an appropriate number of clusters, and discriminant analysis is used to test the stability of the clustering results. To ensure minimal variance of the analytical results of customer clusters within a cluster given large sampling size (>200), the number of customer clusters and their centers are identified through hierarchical clustering. Non-hierarchical clustering of group samples is then performed based on the distance between the sampling results and the individual cluster centers. This K-means method served as the non-hierarchical clustering method. Using the posterior comparisons proposed by Scheffe to analyze variables revealed the significance of the differences between clusters [33]. The application of factor analyses to the perceptions of service quality, satisfaction, and loyalty found fewer factors, namely, fewer unobserved variables of service quality. Additionally, factors derived from factor analysis can be used to describe customer clusters. Each cluster can also be profiled using the descriptive statistical data obtained from the Chi Square tests of consumer behavior and demographics. Finally, effective marketing

strategies for increasing the number of loyal customers in each cluster were identified by analyzing the differences among measuring variables: service quality, satisfaction, loyalty, demographics, and consumer behaviors.

### 3.2 Sampling

Reliability measurements of each question item in terms of Cronbach α (where an α exceeding 0.7 indicates high reliability, an α between 0.5 and 0.7 indicates acceptable reliability, and an α below 0.5 indicates low reliability) revealed high reliability for all proposed scales (Table 2) [33, 43].

Rule-based sampling was developed to survey user Internet-banking behavior. All respondents had to be at least 20 years old, since only those aged 20 years or older can use Internet-banking services in Vietnam [33, 42]. Snowball sampling, which was used because privacy laws in Vietnam complicate surveys of personal financial behavior, confirmed that all users had experience of using Internet-banking services. Additionally, to increase the independence of each respondent through snowball sampling, this study used dice and geographic segmentation for sample selection. Each seed of snowball sampling must be selected from a phonebook based on dicing to randomly select a geographical area. The selected seeds help identify individuals with previous experience of using Internet-banking services. All the above question items were included in a user survey performed from January 1 to February 28, 2012. This study obtained a valid sample of 536.

Before analyzing the survey results, reliability tests must be performed to confirm the consistency and accuracy of the sampling results. After calculating the Cronbach α values [43], Item-Total Correlations are calculated to increase the correctness of the Cronbach α values for each scale by deleting question items in which correlation with a total below 0.5 [5]. Table 4 lists the reliability of the test results. Factor analysis must also be performed customer segmentation. The Kaiser–Meyer–Olkin (KMO) and Bartlett (Table 3) tests are generally used to determine the suitability of the study scales for factor analysis [25]. A variable is qualified for factor analysis if its KMO value exceeds 0.5 and its Bartlett test score reaches statistical significance. If a $p$ value below 0.05 is rejected at the 5% level, the Bartlett test score is significant, which confirms that the variables (here, perceptions of service quality, customer satisfaction, and customer loyalty) are qualified.

**Table 2** Cronbach α

| Scales | Cronbach α |
|---|---|
| The scale of service quality | 0.917 |
| The scale of customer satisfaction | 0.950 |
| The scale of customer loyalty | 0.710 |

The Cronbach α for each scale is the high reliability values that Nunnally [43] recommended, because α is larger than 0.7

**Table 3** KMO and Bartlett's test

| Scales | KMO test | Bartlett test (*p*-value) |
|---|---|---|
| The scale of service quality | 0.763 | 0.000 |
| The scale of customer satisfaction | 0.675 | 0.000 |
| The scale of customer loyalty | 0.654 | 0.000 |

The KMO test for each scale is higher than 0.5; the Bartlett's test (*p*-value) for each scale is significant

## 4 Data analysis

Internet-banking customers were then classified based on their perceptions of service quality. The question item of customer perceptions of service quality was selected to describe factors if the factor loading of a question item exceeded 0.5 (Table 4) [44]. Table 6 lists the factors, selected question items, factor loadings, eigenvalues, and variance extracted values. The factors within a construct are extracted using the following rules: The factor must comprise at least three qualified question items [24, 44], where an item is qualified if it has an eigenvalue exceeding 1 and factor loading of each question item exceeding 0.5 [24], and if the Item-Total Correlation and Cronbach α validate the results of factor analysis. Factor analysis of

**Table 4** The factor load of question items of the perceptions to service quality

| Factors and components | Standardized factor loading | Eigenvalues | Variance (%) | Average variance extracted (AVE) | Cronbach's α |
|---|---|---|---|---|---|
| Factor 1: network quality | | | | | |
| *Q1* | 0.745 | 8.943 | 21.941 | 0.504 | 0.837 |
| *Q2* | 0.711 | | | | |
| *Q3* | 0.703 | | | | |
| Factor 2: customer rights | | | | | |
| *Q4* | 0.811 | 2.055 | 17.338 | 0.506 | 0.792 |
| *Q5* | 0.743 | | | | |
| *Q6* | 0.708 | | | | |
| *Q7* | 0.698 | | | | |
| *Q8* | 0.653 | | | | |
| *Q9* | 0.642 | | | | |
| Factor 3: internet convenience | | | | | |
| *Q10* | 0.802 | 1.392 | 4.972 | 0.559 | 0.661 |
| *Q11* | 0.689 | | | | |
| Factor 4: internet security | | | | | |
| *Q12* | 0.821 | 5.267 | 31.840 | 0.609 | 0.770 |
| *Q13* | 0.768 | | | | |
| *Q14* | 0.751 | | | | |

the characteristics of selected qualified question items revealed five factors that improve perceptions of service quality: "Internet Security (Factor 1)," "Customer Rights (Factor 2)," "Internet Convenience (Factor 3)," and "Internet Security (Factor 4)." The presence of Factor 1 (Internet Security) shows that the security of banking services is a central customer concern. Three customer characteristics, assurance, convenience, and empathy, can be grouped together since Factor 2 is "Customer Rights." This study denoted Factor 3 as "Internet Convenience" because it is characterized by eagerness to receive positive responses to on-line inquiries. Factor 4 reveals the security requirements. The factors had a cumulative variance of 76.091%, meaning they could describe 76.091% of customer perceived service quality. The reliability test shows that eliminating one of the selected question items of the factors of the perceptions of service quality results in a smaller Cronbach $\alpha$ value. Therefore, all selected question items are retained.

The factor analysis must be followed by the test of common method bias. This study adopted the Herman one factor test to verify the common method bias. Principal components factor analysis shows that four factors have eigenvalues exceeding one. The test result shows that no high factor is explained, and the highest non-rotated factor explained 31.941% of the variance among all reflective measures. Consequently, common method bias is not a major concern.

Strategies for dealing with target customers are identified by clustering [14] using the hierarchical method developed by Ward. This study found that, whenever the number of clusters decreased from two to one, the rate of change in the condensation coefficient increased (the largest increase was 50%). When the rate of change in the condensation coefficient peaks this indicates the number of clusters that are correct [30]. After determining the cluster number, sample segmentation is performed using the K-means method, a non-hierarchical method of segmenting large samples. Additionally, this study uses discriminant analysis to verify the accuracy of the clustering analysis [40]. After classifying the samples into training and testing samples, discriminant analysis is performed to verify the results of clustering analysis. Here, 10% of the samples are used for training, while 90% are used for testing. Discriminant analysis reveals accuracies of 99.5 and 98.1% in the grouping results for the training and testing samples, respectively. Based on analytical results, two consumer clusters are identified: *Customer Rights* and *Network Quality and Security* (Table 5). Cluster 1 is named *Customer Rights* because respondents in this cluster care more about customer rights than those in cluster 2. Cluster 2 is named *Network Quality and Security* because respondents in this cluster care most about network quality and security.

Besides analyzing the clustering results, this study also analyzes the influences on customer satisfaction and loyalty. Table 6 illustrates the factor load of question items of customer satisfaction and the results of factor analysis, respectively. The question item of customer satisfaction can describe clusters if the factor loading of a question item exceeds 0.5. The factors have a cumulative variance of 58.936%, meaning the identified factors can describe 58.936% of the variance in customer satisfaction. Reliability testing shows that all selected question items should be retained.

**Table 5** The clusters based on perceptions of quality

| Factors | Cluster 1 (355 samples) | Cluster 2 (181 samples) | F-value | *p*-value (*significance) |
|---|---|---|---|---|
| Factor 1: network quality | −0.14958 | 0.29338 | 24.557 | 0.000** |
| Factor 2: customer rights | 0.17414 | −0.34155 | 33.836 | 0.000** |
| Factor 3: internet convenience | −0.03329 | 0.06529 | 1.165 | 0.281 |
| Factor 4: internet security | −0.51693 | 1.01386 | 590.378 | 0.000** |
| Names of clusters | *Customer rights* | *Network quality and security* | | |

**Table 6** The factor load of question items of consumer satisfaction

| Factors and components | Standardized factor loading | Eigen-values | Variance (%) | Average variance extracted (AVE) | Cronbach's α |
|---|---|---|---|---|---|
| Factor 1: accuracy | | | | | |
| *S1* | 0.854 | 12.135 | 43.338 | 0.535 | 0.898 |
| *S2* | 0.801 | | | | |
| *S3* | 0.745 | | | | |
| *S4* | 0.717 | | | | |
| *S5* | 0.703 | | | | |
| *S6* | 0.651 | | | | |
| *S7* | 0.624 | | | | |
| Factor 2: convenience | | | | | |
| *S8* | 0.738 | 1.875 | 6.696 | 0.509 | 0.822 |
| *S9* | 0.718 | | | | |
| *S10* | 0.702 | | | | |
| *S11* | 0.694 | | | | |
| Factor 3: privacy | | | | | |
| *S12* | 0.814 | 1.420 | 5.070 | 0.567 | 0.847 |
| *S13* | 0.785 | | | | |
| *S14* | 0.710 | | | | |
| *S15* | 0.697 | | | | |
| Factor 4: customer service | | | | | |
| *S16* | 0.739 | 1.073 | 3.832 | 0.4899 | 0.840 |
| *S17* | 0.714 | | | | |
| *S18* | 0.701 | | | | |
| *S19* | 0.642 | | | | |

Table 7 shows the factor load of the question items related to customer loyalty and the results of factor analysis. The question item of customer loyalty could be selected for factor description if the question item factor loading exceeds 0.5. Based on the characteristics of selected qualified question items, "Loyalty" is the only factor identified using the characteristics of selected qualified question items.

**Table 7** The result of factor analysis of consumer loyalty

| Factors and components | Standardized factor loading | Eigenvalues | Variance (%) | Average variance extracted (AVE) | Cronbach's α |
|---|---|---|---|---|---|
| Factor 1: Loyalty | | | | | |
| *L1* | 0.835 | 1.829 | 60.964 | 0.650 | 0.680 |
| *L2* | 0.794 | | | | |
| *L3* | 0.788 | | | | |

"Loyalty" thus is used to represent the customer loyalty variable in factor analysis [30]. The cumulative variance of this factor is 60.964%, meaning the factor identified in this study can describe 60.964% of the variance in customer loyalty. Reliability testing demonstrates that all the selected question items should be retained.

Analysis also shows that other consumer behaviors related to Internet-banking, such as time spent using banking services each week, heavy/light network usage, and motivation to use Internet-banking, did not differ significantly between clusters, whereas daily time spent using the Internet and Internet-banking services remained constant (Table 8). Motivations in using Internet-banking services differ considerably between clusters, but further analysis demonstrates that the main motivation (Convenience) does not differ significantly. Demographic variables show no significant differences between clusters (Table 9). Table 10 lists the differences in service quality, customer satisfaction, and loyalty between clusters. Analysis of customer satisfaction reveals significant differences between clusters for Accuracy, Convenience, and Customer Service. Loyalty also differs significantly between clusters. Finally, Tables 11 and 12 summarize the profiles (characteristics) of clusters described by analyzing the differences among demographics, consumer behavior, service quality, customer satisfaction, and customer loyalty.

## 5 Marketing strategy

Marketing strategies can be proposed based on analysis of the cluster profiles in Sect. 4. Marketing strategies are proposed based on segment profiles. To identify strategies, 4P is considered [12, 53], being the method marketing researchers use to

**Table 8** Differences of consumer behaviors between clusters

| H1: Consumer behavior are different significant between benefit segments | *p*-value (*significance) |
|---|---|
| How many days a week do you surf the Internet? | 0.555 |
| How many hours per day do you spend online? | 0.149 |
| What are your main reasons for using the Internet? | 0.686 |
| When do you usually use Internet-banking services? | 0.366 |
| What Internet-banking service do you use most often? | 0.231 |
| What is your main motivation for using Internet-banking services? | 0.034** |

**Table 9** Differences of demographics between clusters

| H2: Demographic are different significant between benefit segments | *p*-value (*significance) |
|---|---|
| Gender | 0.238 |
| Age | 0.089 |
| Occupation | 0.126 |
| Education | 0.741 |
| Marital status | 0.299 |
| Average monthly income | 0.458 |

**Table 10** Differences of service quality, customer satisfaction, and customer loyalty between clusters

| Service quality | Customer rights | Network quality and security | F-value | *P*-value (*significance) |
|---|---|---|---|---|
| Internet quality | −0.14958 | 0.29338 | 24.557 | 0.000** |
| Customer rights | 0.17414 | −0.34155 | 33.836 | 0.000** |
| Internet convenience | −0.03329 | 0.06529 | 1.165 | 0.281 |
| Internet security | −0.51693 | 1.01386 | 590.378 | 0.000** |
| *Customer satisfaction* | | | | |
| Accuracy | 0.82341 | −0.70374 | 739.094 | 0.000** |
| Convenience | −0.22196 | 0.18970 | 23.518 | 0.000** |
| Privacy | 0.03915 | −0.03346 | 0.702 | 0.403 |
| Customer service | 0.21742 | −0.18582 | 22.527 | 0.000** |
| *Customer loyalty* | | | | |
| Loyalty | −2.44669 | 0.21881 | 617.752 | 0.000** |

explore market demands from four product-oriented businesses. Consequently, this investigation proposes the following marketing strategies:

## 5.1 Product

In this investigation, for customers interested in customer rights, the strongest influence is to maximize personal benefits, or customer rights. In relation to Internet-banking, banks thus should enable customers to focus on their online business by offering a system that will allow them to exert less effort and save costs in implementing manual.

The *Network quality and security* (Table 10) group includes customers who pay attention to the network quality and security. Companies interested in this group thus should offer customer-support services to ensure network access problems are promptly solved. Thus, banks should offer after-sales services, including security support and other marketing efforts.

To enhance relationships, an Internet bank should provide a telephone number for customers to use. The bank can use this number to communicate with customers

**Table 11** The profiles of group: *Customer rights* (Cluster 1)

| *Cluster 1*: The users who care nothing about benefits (samples of *cluster 1* = 355) | |
|---|---|
| Demographics | Age: 21–25 and 25–30 years |
| | Marital status: the number of single is the highest between two clusters |
| | Monthly income: between US dollar $101–300 |
| Consumer behavior to internet-banking | Accessing Internet: every day |
| | Usages: exchange rate/price check |
| | Motivation: Convenience (flexible time and place) |
| The perceptions of using internet-banking services | Service quality: care about "Customer Rights" |
| | Customer satisfaction: focus on the "Accuracy", "Privacy" and "Customer Service" |
| | Customer loyalty: low intention to reuse Internet-banking services |

**Table 12** The profiles of group: *network quality and security* (cluster 2)

| *Cluster 2*: the users who pay attention to quality (samples of *cluster 2* = 181) | |
|---|---|
| Demographics | Age: 21–25 and 25–30 years |
| | Marital status: the number of singles is larger than married ones |
| | Monthly income: between US dollar $101–300 |
| Consumer behavior to internet-banking | Accessing Internet: every day |
| | Heavy users: 25.5% |
| | Usages: exchange rate/price check |
| | Motivation: Convenience (Flexible time and place) |
| The perceptions of using internet-bank services | Service quality: care about "Network Quality", and "Internet Security" |
| | Customer satisfaction: focus on "Convenience" |
| | Customer loyalty: high intention to reuse Internet-banking services |

who encounter problems. For customers in the group interested in *Network Quality and Security*, enhancing information quality such as visual appeal or availability of help, reducing the response time of an Internet-banking system, or increasing accessibility of information, should help increase customer satisfaction. For customers in this group, improving protection of Internet-banking transactions, securing customer privacy, or ensuring credit-card services are fully-secured, can satisfy customers. Furthermore, Internet banks should establish an alliance to accelerate banking transactions and provide alliance-supported security services to boost customer confidence in using Internet-banking.

### 5.2 Price

Price is defined as the value assigned to the product being exchanged and is represented in the calculation of customer rights [6]. Customers interested in *Customer Rights* heavily emphasize service price. The less money such customers pay, the more satisfaction they get. Furthermore, for customers in the group *Network Quality and Security*, the service price may not influence their intentions to use Internet-banking services most strongly, because they understand that quality and security can be ensured when services are provided at a higher cost. Restated, customers are willing to pay more for secure and high-quality services.

### 5.3 Place

The Internet opened up borderless opportunities to sell products and services over the Internet, and so eliminated most common barriers to market entry [7]. The analytical results show that most customers in both clusters use the Internet daily, and most spend 2–3 h a day using the Internet (Tables 11, 12). Hence, Internet banks must generate customer trust online, to encourage customers to use Internet-banking. Therefore, Internet-banking channels must be improved, such as through well-designed webpages that help customers find required services. Websites should enable customers to complete their transactions rapidly through being functional and easy to use.

### 5.4 Promotion

The application of the Internet undoubtedly enables sales departments to connect interactively with customer [15]. In this study, since customers interested in *Customer Rights* are concerned by promotional activities, Internet banks should adopt promotional strategies such as free in-house money transfers, free registration, or zero annual fees. For customers that prioritize *Network Quality and Security*, "Network Quality", "Convenience" and "Internet Security" are very important. Banks should use different promotional approaches to increase customer trust in their Internet-banking services. Companies can promote their services by granting quality certifications, and can demonstrate the safety of Internet transactions by providing security evaluation records from International organizations.

## 6 Conclusion

Online financial transactions must develop in tandem with the growth of electronic commerce. Offering services that match user needs is essential to maintain high customer satisfaction. Satisfied users perceive good service quality. Therefore, banks must measure banking service quality in a way that represents customer perceptions of good service.

This investigation analyzed Internet-banking users in Vietnam based on customer perceptions of service quality. The analytical results show that Internet-banking

customers comprise two clusters: those concerned with "*Customer Rights*," and those concerned with "*Network Quality and Security*." These two clusters are described in terms of demographics, consumer behaviors, and perceptions of service quality, customer satisfaction, and customer loyalty. Regarding the variable service quality, this investigation identified four factors that can describe each cluster: "Internet Security," "Internet Convenience," "Network Quality," and "Customer Rights." For the customer satisfaction variable, this study found that each cluster can be described using four factors: "Accuracy," "Convenience," "Privacy," and "Customer Service." For the customer loyalty variable, one factor can describe the "Loyalty" cluster. Finally, this investigation proposed strategies to promote Internet-banking services based on product, price, place, and promotion.

Finally, although this study has not analyzed *tangibility*, the literature review suggests that tangibility deserves study [58]. An intuitive Internet banking website helps users to more easily navigate webpages. Further work is required to survey customer feelings regarding *tangibility* using well-designed question items, because this study focuses on customers of Internet-banking services in Vietnam.

**Acknowledgements** The author would like to thank the Ministry of Science and Technology of the Republic of China, Taiwan, for financially supporting this research under Contract No. 103-2410-H-150-004-.

## References

1. Angelakopoulos, G., & Mihiotis, A. (2011). E-banking: Challenges and opportunities in the Greek banking sector. *Electronic Commerce Research, 11*(3), 297–319.
2. Alsajjan, B., & Dennis, C. (2010). Internet banking acceptance model: Cross-market examination. *Journal of Business Research, 63*(9), 957–963.
3. Bauer, H. H., Hammerschmidt, M., & Falk, T. (2005). Measuring the quality of Internet-banking portals. *International Journal of Bank Marketing., 23*(2), 153–175.
4. Cunningham, L. F., Gerlach, J., & Harper, M. D. (2005). Perceived risk and e-banking services: An analysis from the perspective of the consumer. *Journal of Financial Services Marketing, 10*(2), 165–178.
5. Churchill, G. A. (1995). *Marketing research: Methodological foundations* (6th ed.). New York: The Dryden Press.
6. Dibb, S., & Simkin, L. (2001). Market segmentation: Diagnosing and treating the barriers. *Industrial Marketing Management, 30*(8), 609–625.
7. Eid, R., & Trueman, M. (2002). The Internet: New international marketing issues. *Management Research News, 25*(12), 54–67.
8. Engel, J. F., Blackwell, R. D., & Miniard, P. W. (1995). *Consumer behavior* (8th ed.). New York: Dryden Press.
9. Gerrard, P., & Cunningham, J. B. (2005). The service quality of e-banks: An exploratory study. *International Journal of Financial Services Management, 1*(1), 102–117.
10. Gilmore, J. H., & Pine, B. J. (2007). *Authenticity: what consumers really want?*. Boston: Harvard Business School Press.
11. Goel, L., & Prokopec, S. (2009). If you build it will they come?-An empirical investigation of consumer perceptions and strategy in virtual worlds. *Electronic Commerce Research, 9*(1–2), 115–134.
12. Grönroos, C. (1995). Relationship marketing: the strategy continuum. *Journal of the Academy of Marketing Science, 23*(4), 252–254.
13. Guh, Y. Y., & Po, J. W. (2007). *Operations management in service industries-competing in service area*. Taipei: Hwa-Tai Publishing Co.

14. Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, New Jersey: Prentice Hall Inc.
15. Hamill, J. (1997). The Internet and international marketing. *International Marketing Review, 14*(5), 300–323.
16. Harris, L. C., & Goode, M. M. H. (2004). The four levels of loyalty and the pivotal role of trust: A study of online service dynamics. *Journal of Retailing, 80*(2), 139–158.
17. Hanafizadeh, P., & Khedmatgozar, H. R. (2012). The mediating role of the dimensions of the perceived risk in the effect of customers' awareness on the adoption of Internet banking in Iran. *Electronic Commerce Research, 12*(2), 151–175.
18. Heaney, J. G. (2007). Generations X and Y's internet banking usage in Australia. *Journal of Financial Service Marketing, 11*(3), 196–210.
19. Hoadley, C. M., Xu, H., Lee, J. J., & Rosson, M. B. (2010). Privacy as information access and illusory control: The case of the Facebook News Feed privacy outcry. *Electronic Commerce Research and Applications, 9*(1), 50–60.
20. Hurley, R. F., & Estelami, H. (1998). Alternative indexes for monitoring customer perceptions of service quality: A comparative evaluation in a retail context. *Journal of the Academy of Marketing Science, 26*(3), 209–221.
21. Hwang, H. G., Chen, R. F., & Lee, J. M. (2007). Measuring customer satisfaction with internet banking: An exploratory. *International Journal of Electronic Finance, 1*(3), 321–335.
22. Jayawardhena, C. (2004). Measurement of service quality in internet banking: the development of an instrument. *Journal of Marketing Management, 20*(1&2), 185–207.
23. Jun, M., & Cai, S. (2001). The key determinants of internet banking service quality: A content analysis. *International Journal of Bank Marketing, 19*(7), 276–291.
24. Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141–151.
25. Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31–36.
26. Kotler, P. (1998). *Marketing management: Analysis, planning, implementation and control* (9th ed.). New Jersey: Prentice-Hall Inc.
27. Kotler, P. (2000). *Marketing management* (10th ed.). New Jersey: Prentice-Hall Inc.
28. Laforet, S., & Li, X. (2005). Consumers' attitudes towards online and mobile banking in China. *International Journal of Bank Marketing, 23*(5), 362–380.
29. Lassar, W. M., Manolis, C., & Lassar, S. S. (2005). The relationship between consumer innovativeness, personal characteristics, and online banking adoption. *International Journal of Bank Marketing, 23*(2), 176–199.
30. Lederer, A. L., & Sethi, V. (2007). Critical dimensions of strategic information systems planning. *Decision Science, 22*(1), 104–119.
31. Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications, 8*(3), 130–141.
32. Lee, T. K., LaBrie, R. A., Grant, J. E., Kim, S. W., & Shaffer, H. J. (2008). The Structure of pathological gambling among Korean gamblers: A cluster and factor analysis of clinical and demographic characteristics. *International Journal of Mental Health and Addiction, 6*(4), 551–563.
33. Liang, C. C., & Pei-Ching, W. (2015). Internet-banking customer analysis based on perceptions of service quality in Taiwan. *Total Quality Management & Business Excellence, 26*(5–6), 550–568.
34. Liao, C., Liu, C. C., & Chen, K. (2011). Examining the impact of privacy, trust and risk perceptions beyond monetary transactions: An integrated model. *Electronic Commerce Research and Applications, 10*(6), 702–715.
35. Liao, S. H., Chang, W. J., Wu, C. C., & Katrichis, J. M. (2011). A survey of marketing orientation research (1995–2008). *Industrial Marketing Management, 40*(2), 301–310.
36. Lim, A. S. (2008). Inter-consortia battles in mobile payments standardization. *Electronic Commerce Research and Applications, 7*(2), 202–213.
37. Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2002). *WebQual: A measure of web site quality. Marketing theory and applications* (13th ed.). Chicago: American Marketing Association.
38. Luarn, P., & Lin, H. H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior, 21*(6), 873–891.
39. Ming, X. G., Yan, J. Q., Lu, W. F., & Ma, D. Z. (2005). Technology solutions for collaborative product lifecycle management—Status review and future trend. *Concurrent Engineering: Research and Application, 13*(4), 311–319.

40. Morrison, D. G. (2011). *Discriminant analysis and predictive classification*. Chicago: Marketing Classics Press.
41. Narayanasamy, K., Rasiah, D., & Tan, T. M. (2011). The adoption and concerns of e-finance in Malaysia. *Electronic Commerce Research, 12*(2), 383–400.
42. Nguyen, L. V. (2012). The marketing strategy to Vietnam internet banking customers. Unpublished Master thesis, National Formosa University.
43. Nunnally, J. C. (1967). *Psychometric theory*. New York: McGraw-Hill.
44. Overall, J. E., & Klett, C. J. (1972). *Applied multivariate analysis*. New York: McGraw-Hill.
45. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing, 49*(4), 41–50.
46. Park, H., Lim, C. M., Bhardwaj, V., & Kim, Y. K. (2011). Benefit segmentation of TV home shoppers. *International Journal of Retail and Distribution Management, 39*(1), 7–24.
47. Peterson, R. A., Balasubramanian, S., & Bronnenberg, B. J. (1997). Exploring the implications of the Internet for consumer marketing. *Journal of the Academy of Marketing Science, 25*(4), 329–346.
48. Piccoli, G., Brohman, M. K., Watson, R. T., & Parasuraman, A. (2009). Process completeness: Strategies for aligning service systems with customers' service needs. *Business Horizons, 52*(4), 367–376.
49. Pikkarainen, K., Pikkarainen, T., Karjaluoto, H., & Pahnila, S. (2006). The measurement of end-user computing satisfaction of online banking services: Empirical evidence from Finland. *Journal of Bank Marketing, 24*(3), 158–172.
50. Rivera, R. (2009). The otaku in transition. *Journal of Kyoto Seika University, 35*, Retrieved April 17, 2011, from http://www.kyoto-seika.ac.jp/event/kiyo/pdf-data/no35/renato_rivera.pdf.
51. Rowley, J. (2006). An analysis of the e-service literature: Towards a research agenda. *Internet Research, 16*(3), 339–359.
52. The State Bank of Vietnam (2012). http://www.sbv.gov.vn.
53. Walker, O. C., Mullins, J. W., & Larreche, J. C. (2006). *Marketing strategy: A decision-focused approach*. New York: McGraw-Hill Irvin.
54. Wheeler, S. C., & Berger, J. (2007). When the same prime leads to different effects. *Journal of Consumer Research, 34*(1), 357–368.
55. Wolfinbarger, M., & Gilly, M. C. (2003). eTailQ: Dimensionalizing, measuring and predicting etail quality. *Journal of Retailing, 79*(3), 183–198.
56. Wu, S. I. (2002). Internet marketing involvement and consumer behavior. *Asia Pacific Journal of Marketing and Logistics, 14*(4), 36–53.
57. Yaghoubi, N. M. (2010). Factors affecting the adoption of online banking—An integration of technology acceptance model and theory of planned behavior. *International Journal of Business and Management, 5*(9), P159.
58. Yen, C. H., & Lu, H. P. (2008). Effects of e-service quality on loyalty intention: an empirical study in online auction. *Managing Service Quality, 18*(2), 127–146.
59. Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1988). Communication and control processes in the delivery of service quality. *Journal of Marketing, 52*(2), 46.
60. Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: A critical review of extant knowledge. *Journal of the Academy of Marketing Science, 30*(4), 362–375.
61. Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2005). ES-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research, 7*(3), 213–233.

**Chih-Chin Liang** has served as an associate professor in the Department of Business Administration at National Formosa University in HuWei Township, Taiwan since Feb. 2014. He was previously assistant professor in the Department of Business Administration at National Formosa University and also in the Department of Accounting and Information at Shieh-Chien University, between 2007-2014. He received his M.S. from the Department of Industrial and Information Management at National Cheng Kung University, Tainan, Taiwan in 1998 and his Ph.D. from the Department of Business Administration, National Central University, Chung-Li, Taiwan in 2007. After graduation but prior to completing his Ph.D he worked as a researcher in ChungHwa Telecom (CHT), where he had a special interest in queuing behaviors, brainwave analysis, IoT, industrial management, content delivery, network communications, e-marketing, software quality, multimedia, and electronic business. While working at CHT, Chih-Chin

Liang participated in largescale software engineering tasks, such as: Ordering System, File Delivery System, Finance System, and ERP System. He is also a certified engineer of Microsoft products (MCSE, MCSA, MCDBA, and MCP), and an associate editor of the International Journal of Technology and Human Interaction. His papers have been published or accepted in Time & Society, Industry and Management Forum, Journal of the Chinese Institute of Transportation, Industrial Management & Data Systems, Journal of Consumer Marketing, Electronic Commerce Research, Marketing Reviews, Journal of Computer Standards & Interfaces, Total Quality Management and Business Excellence, Journal of Advances in Information Sciences and Service Sciences, Journal of the Chinese Institute of Engineers, Advanced Science Letters, Computers and Operations Research, Journal of Telecommunication Management, Journal of Software Engineering and Applications, International Journal of Electronic Commerce Studies, Journal of Chinese Marketing, International Journal of Computer Science and Network Security, Lecture Notes in Computer Science, Lecture Notes in Artificial Intelligence, Expert Systems with Applications, Journal of Software Engineering and Applications, and the TL Technology Journal.

**Ngoc Ly Nguyen** has been studied in the master program in the Department of Businss Administration of National Formosa University in Huwei Township, Taiwan.