Internet-enabled e-Banking Systems and Customer Responses

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Abstract

This paper presents an empirical study of Internetenabled e-banking systems and customer responses on the basis of structural equation modeling. The results suggest that perceived usefulness, ease of use, system security, quality services and convenience represent the major avenues affecting customer interactions with e-banking services. The findings provide commercial banks with meaningful information for developing commercially sustainable Internet-enabled e-banking systems.

1. Introduction

Many commercial banks implement Internet-enabled e-banking systems with an aim to provide an effective channel for the delivery of innovative banking services [17]. However, it seems very challenging to extend market penetration and achieve the expected value of Internet banking in competitive marketplace. As far as this is concerned, this paper explores various factors associated with Internet-enabled banking systems from the customer point of view. In particular, it empirically elucidates customer response in light of their experience from using the existing Internet banking services. The influences of individual variables are tested using confirmatory factor analysis and structural equation modeling. The empirical results are discussed in an analytical manner to examine the impacts of different variables on the issue concerned.

2. Research Model

Technology Acceptance Model (TAM) enables the explanation of user behavior across a broad range of end-user computing technologies and the acceptance of computer-based information systems [10]. It asserts that the influence of external variables upon user behavior is mediated through user beliefs and attitudes. Actually, TAM adapts the Theory of Reasoned Action (TRA), which is specifically tailored for modeling user acceptance of information systems [9]. Attitudes are related to individual affective feelings about performing a behavior. Both perceived usefulness and perceived ease of use are belief constructs. Perceived usefulness refers to the prospective user's subjective probability that using a specific system might enhance job performance within an organizational context [10]. It captures the extent to which a potential adopter views the innovation as offering value over alternative ways of performing a similar task [2]. On the Wing-Keung Wong Department of Economics National University of Singapore Ken Ridge, Singapore e-mail: ecswwk@nus.edu.sg

other hand, perceived ease of use refers to the degree to which the prospective user expects the use of a system to be free of effort [10]. A number of previous empirical studies have proved that both perceived usefulness and perceived ease of use affect the acceptance of information systems implemented within an organization [1] [3] [14].

In terms of technology-based self services, customers usually apply a compensatory process to evaluate multiple attributes and gradually form their expectations based on experience [11] [15]. The quality of services can be assessed using consumption-based perceptions [8]. The evaluation that individuals can rationally provide in such situations would be derived from their expectations. For instance, the expectations assigned to speed of delivery, ease of use, and reliability determine expected service quality, which might in turn affect the individual's intention to consume [12]. Internet-enabled e-banking is an innovative alternative of banking services. However, it is not an unfamiliar phenomenon at this stage because it has been implemented for several years. Therefore, it is meaningful to examine customer responses in terms of the actual use of the services beyond individual attitudes and intention to use. The evaluation of online banking systems should involve multiple considerations in addition to perceived usefulness and perceived ease of use. In this paper, a research model is developed to examine such constructs as perceived usefulness, perceived ease of use, systems security, service quality and convenience.

3. Research Methods

This project involves a survey of individual assessments of e-banking services provided by commercial banks. In terms of the design of a questionnaire for our survey, a complex construct should be rich in meaning and multi-dimensional. Multiple measures were employed to evaluate the constructs mentioned in the previous section. Respondents are requested to give their opinions regarding the perceived importance of each variable, on the basis of a seven-point Likert-scale, with which 1 represents "Not important at all" or "Strongly disagree," while 7 represents "Extremely important" or "Strongly agree." Our questionnaire was circulated to individuals in a random manner. Respondents were requested to access various attributes with respect to Internet banking currently provided by banks. They were also requested to tell to what extent they have actually used Internet banking services within a particular period of time. As a result, we

received the feedback from three hundred individuals who possess experience on Internet banking services. On the basis of the assumed causal relationships of different variables and their potential impacts on customer responses to e-banking services, we validate each set of measures in an egalitarian way through reliability test, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

4. Results

The results show that factor loadings are greater than the cutoff value of 0.4 [13]. Hence, all items seem relevant to those major factors being examined. Firstly, the factor loadings of those items associated with "Usefulness" are 0.9302, 0.8788, and 0.6047, respectively, which are positively significant. These three items together explain 65.45% of the variance. Secondly, the factor loadings of five items in relation to "Ease of Use" are 0.8346, 0.8464, 0.8321, 0.8759 and 0.8424, respectively, explaining 70.52% of the variance. Thirdly, the factor loadings of four items in relation to "System Security" are 0.8803, 0.8807, 0.5057, and 0.7888, respectively, explaining 60.55% of the total variance. Moreover, the factor loadings of the two items associated with "Quality Services" are 0.8989 and 0.8989, explaining 80.42% of the total variance. These factor loadings considerably support the convergent validity and discriminant validity of factors. The values of Cronbach alpha resulted from reliability analysis prove the internal consistency of the sample data. The values of Cronbach alpha are 0.7606 (Usefulness), 0.8987 (Ease of Use), 0.8327 (System Security), and 0.7238 (Quality Services), respectively, further indicating that the items associated with each factor mentioned above are relatively consistent [13] [19].

The *t* values (estimated factor loadings divided by their standard errors) for the factor loadings of manifest variables are all above two (for example, 17.7048, 24.7869 and 21.3946 for the three items associated with "Usefulness"), supporting the statistical significance of the parameter estimations and indicate the unidimensionality of each exogenous latent variable and the convergent validity of our model. In addition, the relatively large squared multiple correlations (R^2) for each exogenous latent variable (minimum value of R^2 is 0.5250 in the present case) not only supports the assertion that items are reasonable measures of the constructs [6] [13], but also indicates that the items are well represented the exogenous variables.

The estimates of the path coefficients from β_1 to β_5 are calculated using Latent Variable Equation [6]. The results indicate that the path coefficients in the CFA model for perceived usefulness, perceived ease of use, system security, service quality and perceived convenience are 0.2939 (p < 0.01), 0.2747 (p < 0.01), 0.1219 (p < 0.05), 0.1372 (p < 0.05), and 0.0757 (p < 0.1), respectively.

Our analysis shows that the Goodness of Fit Index (GFI) [5] is 0.9125 and the GFI Adjusted for Degrees of Freedom (AGFI) is 0.8469. AGFI values higher than 0.80 suggest a good fit of the hypothesize model [4]. The Root Mean Square Residual (RMR) is 0.0521. The RMR value less than 0.1 is considered a good fit and a value less than 0.05 is considered a very good fit of the data to the research model. It also suggests that the model fits well. GFI is a measure of the relative amount of variances and covariances jointly accounted for the model [18], while RMR is a measure of the average of the residual variances and covariances [16]. Bentler and Bonett's Non-normed Index is 0.9149, Bollen Non-normed Index is 0.9438 and Bentler's Comparative Fit Index is 0.9433. The Chi-square statistic is 211.47 with d.f. = 52 which is a statistically significant validity of constructs within the model [7]. Finally, the test Statistics (e.g. GFI, AGFI, and RMR) suggest a good fit of the hypothesized model, which shows that 36.81% of the variation of the endogenous variable can be explained by the exogenous variables.

5. Discussion

This empirical investigation elucidates critical factors of Internet-enabled e-banking services from the customer point of view. In particular, the reliability analysis and exploratory factor analysis show that the individual items are relevant. The convergent validity of these items is strongly supported by the resulted factor loadings. Our hypothesized model is supported by the results presented in the previous section. The constructs within the model have also been validated, because the estimates of path coefficients indicate that perceived usefulness, ease of use, system security, service quality and convenience considerably influence individual customer responses to Internet-enabled e-banking.

In general, the use of e-banking services varies from looking for information to conducting transactions. Banks should pay attention to customer concerns because the e-banking platform ultimately is built for individuals. The improvement of Internet banking systems should focus on functionalities, user friendliness, system security and service quality. An Internet-enabled banking website should improve the usefulness of Internet banking services by allowing customers to interactively search the latest banking information, conduct real-time transactions, and make investment plans. Therefore, the design of Internet banking systems should focus on navigation, content and interactivity. Most online customers seek a sophisticated service. A desirable platform for e-banking should be aesthetically appealing and user-friendly. It should also possess practical functionalities to meet the need of individual customers. In addition, customers are usually concerned about such uncertainties as authorized access, confidentiality, transaction restrictions, and serious security procedure implemented. It is necessary to continuously enhance the security level of online banking systems by implementing the latest security systems and

instruments. Additional resources must be allocated in this direction even though the investment might be significant.

Convenience would be a great advantage of Internet banking, because it enables individuals to easily access accounts and execute transactions through e-banking systems anywhere. Customers are no longer constrained by physical access and opening hours of branches. Many appreciate the convenience of e-banking, because they do not have to queue up for routine banking services in brick-and-mortar branches. Today, quality service is a must in the competitive environments. Similar to face-to-face services at a bank branch, customers are also expected quality services with e-banking systems. It is practically difficult to effectively provide assistance to customers and ensure consistent service performance in the virtual environment. However, it would be desirable if banks could respond to service request and process transactions in a reliable manner. Therefore, it is necessary for commercial banks to continuously reengineer their business processes and implement the best practices in the industry.

6. Conclusion

This paper has contributed to the development of knowledge because the theoretical approach of TAM for evaluating the acceptance of information systems has been extended to assess Internet-enabled banking systems. In addition to perceived usefulness and ease of use, systems security and quality services should be emphasized, because these aspects also considerably explain individual interactions with the present Internet-enabled banking services. Finally, our findings based on customer feedback have practical implications, because commercial banks are provided with useful information to enhance e-banking systems and services. By continuously improving critical features and sophisticated functions, Internet-enabled e-banking is likely to achieve greater customer acceptance and market penetration.

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