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Abstract

This research project investigated the subject of Internet banking activities for a major credit union in California. Community banks have not been the research focus for Internet banking. While large scale banks concentrate on applying information technology to improve their customization, smaller banks have to rely on their mobility, personal touch, and marketing techniques for individual customization. This research identifies the number of Internet banking transactions, the perceived usefulness of Internet banking, and the willingness to use Internet banking as the three aspects of Internet banking phenomenon. A collection of predictor variables including customers' demographics, accessibility to Internet and computer, and characteristics of transactions, applications, and banks are adopted to explain the Internet banking phenomenon. Multiple regression analyses show that customers who are technicians, married, have higher income, public access to Internet, and Internet accounts perform more Internet banking transactions. In addition, they tend to be concerned about the diversified service banks can provide. Customers who have Internet accounts, and access to Internet from home and public places perceive a higher level of usefulness for Internet banking. As for the willingness to use Internet banking in the future, retirees as a customer segment appear to be a huge untapped market. They tend to be concerned about the types of bank transactions online applications can support and what kind of diversified service banks can provide, but not about the continuous improvement of online applications. This research project serves as a starting point for a systematic study about Internet banking activities for community banks.

Keywords: Internet banking, community bank

Introduction

Over the past twenty years, the retail banking industry has experienced many major changes. These changes include increased competition among banks and other financial institutes, evolution of customer preferences, and technological advances that created inexpensive electronic distribution delivery channels like automated teller machines (ATM) and Internet banking. The Internet is inevitably becoming popular and has great impact on our daily lives. The Internet has emerged as a powerful medium of information, communication, and human interaction in a short period of time. Banks have also embraced Internet technology to make banking easier, convenient, and available anywhere and anytime. Internet banking allows customers to perform a wide range of banking transactions electronically via banks' web sites. With Internet banking, transactions are just a click away. Transactions such as balance inquiries, transfers, bill payments, writing electronic checks, statement reviews, etc., can be performed using Internet banking. Today, the Internet is on its way to become a full-fledged delivery and distribution channel. Among the consumer-oriented applications, electronic financial products and services are at the forefront of this evolution (Tan and Teo, 2001). Because Internet transactions cost little, traditional banks are adopting Internet banking to avoid a bloated cost structure. It has been estimated that while it costs an average of $1.07 to conduct a financial transaction through a branch office, it is just a few cents to conduct the same on the Internet (Molly 1999). Internet financial institutes like E*Trade can pay higher rates on deposits, charge less for services, and achieve higher profit margins than traditional brick-and-mortar banks. As different financial institutes have their own customer bases, it is important for them to identify the most significant factors influencing their customers' Internet banking activities before they can realize the full potential of Internet banking.

This research project attempts to identify the various significant factors influencing bank customers' Internet banking activities for community banks. The factors include customers' demographics, proficiency at computing and Internet skills, accessibility to Internet, and characteristics of transactions, applications, and banks. Internet banking activities are measured by the number of Internet banking transactions performed in the past three months, the perceived usefulness of Internet banking, and the desire to use Internet banking in the future. A questionnaire survey was administered to the customers of a major credit union in California. Multiple regression analyses generate several significant models for explaining Internet banking activities.

Literature Review

This section reviews some relevant research findings about Internet banking factors. Liao and Cheung (2001) investigated consumer attitudes toward the usefulness of and the willingness to use Internet banking. The research involved a survey conducted in Singapore whose advanced infrastructure leads to very low telecommunications cost in Internet banking. Their results show that the expectations of accuracy, security, network speed, user friendliness, user involvement, and convenience are the most important quality attributes for perceived usefulness. In addition, willingness to use Internet banking depends significantly on the first five factors as shown above, allowing interdependencies or marginal rates of substitution between the five factors to be estimated. The results draw attention to changes in customers' preferences that may explain the recent slowdown in Internet e-retail banking and may also be useful for marketing and application planning.

Tan and Teo (2001) studied influential factors for Internet banking based on the theory of planned behavior and diffusion of innovation theory. The study tried to identify the attitudinal, social, and perceived behavioral factors that may influence the adoption of Internet banking. The results reveal that attitudinal and perceived behavioral factors, rather than social influence, play a significant role in influencing the intention to adopt Internet banking. In particular, perceptions of relative advantage, compatibility, verifiability, and risk were found to significantly influence the intention to use Internet banking services.

The Internet offers a new channel for distribution of financial services. While technology offers new opportunities to banks, it also brings new challenges such as the integration of financial and marketing functions into online services (Altinkemer 2001). The competition among banks has intensified because of the increased accessibility and transparency of online services. Indeed, the physical distribution is becoming less important comparing with the supremacy of online distribution systems (Beynold and Lederer, 2001). This trend is leading to an "economy of stars" in which two categories of banks survive; a few gigantic banks that enjoy the scale of economy, and many smaller banks that serve niche markets. Medium-sized banks will have difficulty in competing against the technology-enhanced customization capabilities offered by giant banks as well as the personal touch of smaller niche players (Holland and Westwood, 2001).

Customization is one way of attracting branch customers to use online banking. A personalized Web page may impress customers and draw them to online banking. As the financial world is becoming personal, the practice of a small town banker knowing every customer who walked through the branch door is being recreated and improved on a large scale in the virtual world (Fuhrman, 2002). How many traditional bankers will handle your deposits at 2 a.m. or instantly approve a loan application? Customized Web sites are a great leap forward in both efficiency and customer service. Financial service is just one of the many industries experiencing this trend of customization, which combines operations, marketing, and customer relationship via Web site interface. The emergence of computer-managed, flexible manufacturing techniques has narrowed the gap between customization and efficient production. Both mass customization and individual customization are the attempts to provide products and service that match the needs of customers (Wind, 2001). Mass and individual customizations are the two sides of the same coin. Both sides are information technology (IT) intensive. However, mass customization is IT-intensive on the production side, whereas individual customization is IT intensive on the marketing side. Moreover, customization is inherently dependent on Internet-related technologies, particularly the Web as a vehicle for economically implementing this concept (Dewan and Seidmann, 2001; Johnston, 1997; Machauer and Morgner, 2001).

Research conducted by the Gartner Group (Alt, 2000; Molly, 1999) shows that 27 percent of consumers who switched banks did so because their new banks offered online banking while their old banks did not. By the year 2005, nearly two of five U.S. households will bank online, and one in five will pay bills electronically. Although there are independent companies which offer electronic bill payment service, banks that incorporate e-bill payment with their online presence will capture most of the market share. More than 27 million adults are doing some types of online banking activities such as viewing their account balances and transferring funds between accounts. Online bank customers are typically in their early 40s, with an average of annual household income of $70,900. Almost one-quarter of all consumers who engage in Internet banking also pay their bills online. Though gender is not a significant factor differentiating a branch and Internet customer, a man is more likely to pay bills online than a

woman, and an online bill payer has an average annual household income of $80,100, which is higher than a general online customer. In addition, three quarters of online bill payers have cellular phones. In summary, online banking is projected to have significant impacts on various elements of the banking system as follows (Aladwani, 2001):

- What is the effect of customer-oriented and market-oriented forces on online banking strategies?
- What is the effect of organizational characteristics on online banking strategies?
- What leads to customers' trust in online banking?
- What are the attributes of online banking site design that contribute to customers' satisfaction?
- What are the effective measures to secure and audit online banking systems and transactions?
- What are the appropriate laws supporting online banking operations?

The above questions have more or less been answered by some research findings in the literature. However, the authors cannot identify any findings focusing on the smaller players in the banking industry such as community banks or credit unions. As community banks are operating in niche markets, their influential factors for Internet banking activities may be different from others in the industry. It is the purpose of this research project to discover the significant factors affecting customers' Internet banking activities in smaller banks. The results can provide information to community banks for target marketing at customers who are likely to be converted from branch goers to Internet surfers, as well as to satisfy and retain existing online customers by tailoring to their needs and concerns (Stramoulis et. al, 2002).

Research Methodology

The research procedure is divided into four stages. The first stage is to collect information about significant factors for community bank customers from bank officials working in a community bank. The investigators collected information from bank officials using a semi-open-ended questionnaire, email communications, and personal interviews. The second stage is to synthesize the information from bank officials and literature review. A questionnaire was designed based on the synthesized knowledge. The preliminary questionnaire was pre-tested with 24 customers, whose feedback on the content and presentation of the questionnaire was used to improve the questionnaire. The final questionnaire has six categories of independent variables including customer demographics, accessibility to Internet, proficiency at using computer and Internet, characteristics of transactions, online applications, and banks. Dependent variables consist of the number of Internet banking transactions performed in the past three months (IBTRANS), the perceived usefulness of Internet banking (USEFUL), and the willingness to use Internet banking in the future (FUTURE), which are used to measure the Internet banking activities. Table 1 presents the labels and descriptions of the variables. Other than for categorical variables such as gender, we used a seven-point Likert scale to measure the independent and dependent variables. For example, respondents were requested to evaluate whether a certain application characteristic such as "fun/entertainment" is "not important at all", "slightly important", "slightly to medium important", "medium important", "medium to highly important", "highly important", or "extremely important" to Internet banking. To check the reliability of responses, we have two variables, "access convenience" and "availability" measuring about the same value in the category of application characteristics; as well as "assurance from the bank" and "credibility" measuring about the same value in the category of bank characteristics.

The third stage of the research is to conduct the survey to community bank customers. The research subject in this project is a major credit union in California. In order to have a diversified group of bank customers to participate in the survey, we adopted a stratified sampling procedure in a metropolitan area. Different bank branches for the credit union serving different income levels were selected as the target survey sites. The sample includes 2 branches for low income level, 1 branch for students, 1 branch for state employees and business people at downtown, 2 branches for middle to high income level, and 2 branches for affluent suburb. During a specific time frame, the survey was administered at bank branches. When a customer walked in a branch, the teller asked the customer whether he or she was willing to participate in the survey. A bank souvenir was presented to each participant as a motivation gift. If the customer agreed to participate in the survey, a questionnaire was given to the customer after he or she was done with bank business. Survey administrators were available to answer customers' questions when they were filling out the questionnaire. Most customers took about 10 minutes to finish the questionnaire. A total of 636 customers were contacted at branches and 159 filled out the questionnaire.

The final stage of the research project is to run data analyses. Before we ran regression models, we performed the following data pre-processing procedure. First, all cases without information for dependent variables were deleted. Second, non-critical missing values were replaced by averages of the same variables. Third, cases with more than two-point difference for the variables for reliability test were deleted. The above pre-processing procedure gave us a total of 101 usable surveys. Multiple regression analyses were performed to identify significant predictors for Internet banking activities. The first set of regression models ran

Table 1. Labels and Descriptions of Variables

Category	Label: Variable Description	
Demographic Information	Age	
	Male, Female	
	Student, Clerical, Tech: Technician, Manager, Prof: Professional, Exec: Executive, Retiree, Wife: House wife, Self: Self employed, Ocothers: Other occupations	
	Single, Married, Divorced, Widowed, Msothers: Other marital status	
	Children: Number of children living with the respondent	
	House: Is the respondent a house owner?	
	Income: Annual income of the respondent	
	Primary, High: High School, Junior, Bachelor: Bachelor degree, Masters: Masters degree, Doctoral: Doctoral degree, Edothers: Other education qualification	
	G1acct: Does the respondent have an Internet bank account at the subject institute?	
	Oiacct: Does the respondent have an Internet bank account at other institutes?	
Accessibility and Proficiency	Conpro1: Internet access convenience from home	
	Conpro2: Internet access convenience from work	
	Conpro3: Internet access convenience from public places	
	Conpro4: Proficiency in using computers	
	Conpro5: Proficiency in using Internet	
Transaction Characteristics	Tran1: Degree of importance of transaction amount	
	Tran2: Degree of importance of transaction type	
	Tran3: Degree of importance of transaction cost	
Application Characteristics	App1: Ease of application	App7: Availability
	App2: Access convenience	App8: Screen design/Content
	App3: Speed of execution	App9: Navigation
	App4: Efficiency	App10: Continuous improvement
	App5: Accuracy	App11: Fun/Entertainment
	App6: Reliability/Consistency	App12: Security
Bank Characteristics	Bank1: Assurance from the bank	Bank6: Responsiveness
	Bank2: Bank image	Bank7: Competence
	Bank3: Branch locations	Bank8: Compliance with regulation/disclosure
	Bank4: Diversified service	Bank9: Advertisement
	Bank5: Credibility	Bank10: Customer service and care
Dependent Variables	IBTRANS: Number of Internet banking transactions performed in the past three months	
	USEFUL: Perceived usefulness of Internet banking	
	FUTURE: Willingness to use Internet banking in the future	

all independent variables in all categories against each of the three dependent variables. The second set of regression models adopted the backward stepwise analysis method so as to allow significant predictors to be selected one by one into the model. The backward stepwise method can also address the multicollinearity problem if it is present in the data sets. The last set of regression models used the results from the first set of models as input. Then, a list of insignificant variables ($p > 1$) was created, which was based on the descending order of the p-values of the predictor variables. Those predictor variables in the above list were deleted from the input model one by one starting from the top, until all the predictor variables in the input model generated a p-value that is less than or equal to 1. The next section presents the regression results and discusses our findings.

Research Findings and Discussions

Table 2 describes the summary statistics from the regression models 1.1 – 1.3 with model 1.1 for the dependent variable IBTRANS (the number of Internet banking transactions performed in the past three months), model 1.2 for the dependent variable USEFUL (the perceived usefulness of Internet banking), and model 1.3 for the dependent variable FUTURE (the willingness to use Internet banking in the future), with all the independent variables included in the models. All the three models in Table 2 are significant at the alpha level of less than 0.05. The adjusted R-square for models 1.1, 1.2, and 1.3 are 26.83%, 36.29%, and 29.01% respectively. Table 2 also lists all the significant predictor variables ($p <= 0.1$) and their coefficients. Table 3 shows the summary statistics for models derived from backward stepwise regression analyses. Models 2.1 (IBTRANS), 2.2 (USEFUL), and 2.3 (FUTURE) are highly significant at the alpha level of 0.0. The adjusted R-square for models 2.1, 2.2, and 2.3 are 39.23%, 44.19%, and 45.65% respectively. The last group of results are presented in Table 4, which started with all predictor variables, and the variable with the highest p-value was deleted from the models one by one until all predictors are significant at $p <= 0.1$. The manual selection procedure derived models 3.1 – 3.3, which are also highly significant at the alpha level of 0.0. The adjusted R-square for models 3.1, 3.2, and 3.3 are 29.91%, 44.19%, and 47.32% respectively. The remaining discussion focuses on the results from backward regression analysis (Table 3) as it generates the best overall results.

Table 2. Summary Statistics for Regression Models Using all Independent Variables

Dependent Variable	Model F-Significance	R-Square (Adj.)	Significant Variables with P <= 0.1		
			Variable	Coefficient	P-Value
Model 1.1 IBTRANS	0.0451	26.8308	Age	-0.5157	0.0481
			Retiree	6.4540	0.0294
			Conpro5	-0.5461	0.0881
			Tran2	0.4137	0.0340
			App9	0.6890	0.0456
			App10	-0.5793	0.0155
			Bank4	0.5599	0.0555
Model 1.2: USEFUL	0.0095	36.2902	Wife	-3.3705	0.0846
			G1acct	1.7153	0.0172
			Conpro3	0.2683	0.0398
Model 1.3: FUTURE	0.0328	29.0104	Conpro3	0.2169	0.0522
			Tran2	0.3964	0.0352

Number of Internet Banking Transactions

For model 2.1 in Table 3, we find that Age, Male, Children (number of children living with the respondent), App10 (continuous improvement of application), and Bank8 (compliance with regulation/disclosure) have a negative impact on the number of transactions performed by a respondent. In other words, a customer who is older, male, have more children, and who cares about the continuous improvement of application, and the bank's law abiding behavior tends to perform fewer Internet banking transactions. The predictors with a positive impact on the number of Internet banking transactions include Tech (technicians as the occupation), Income, Married, G1acct (having an Internet account), Bank4 (diversified service), and Conpro3 (Internet access convenience from public places). Respondents who have technicians as occupation, higher income, married, Internet accounts, access to Internet from public places, and care about a bank's diversified service tend to perform more Internet banking transactions. In terms of coefficient magnitude, other than G1acct (having an Internet account), which is obviously a decisive factor, Male, Married, Tech, and Children have high coefficients determining the number of Internet banking transactions community bank customers perform.

Table 3. Summary Statistics for Backward Stepwise Regression Model

Dependent Variable	Model F-Significance	R-Square (Adj.)	Significant Variables with P <= 0.1		
			Variable	**Coefficient**	**P-Value**
Model 2.1: IBTRANS	0.0	39.2353	Age	-0.3710	0.0079
			Male	-1.2102	0.0009
			Tech	0.9862	0.0377
			Children	-0.8324	0.0005
			Income	0.2311	0.0423
			G1acct	2.0088	0.0000
			App10	-0.3080	0.0154
			Bank4	0.3965	0.0370
			Bank8	-0.4446	0.0202
			Married	0.8062	0.0484
			Conpro3	0.1630	0.0339
Model 2.2: USEFUL	0.0	44.1977	Children	-0.6290	0.0060
			G1acct	2.4321	0.0000
			Conpro1	0.2733	0.0002
			Conpro3	0.2045	0.0160
Model 2.3: FUTURE	0.0	45.6539	Retiree	4.0919	0.0096
			Conpro1	0.2218	0.0002
			Conpro3	0.1996	0.0048
			Tran2	0.4144	0.0000
			App10	-0.3310	0.0046
			Bank2	-0.3550	0.0060
			Bank4	0.4386	0.0031

Perceived Usefulness of Internet Banking

For model 2.2 in Table 3, G1acct (having an Internet account), Conpro1 (Internet access convenience from home), and Conrpo3 (Internet access convenience from public places) have a positive impact on USEFUL (perceived usefulness of Internet banking transactions) whereas Children (number of children) has a negative impact. In other words, a customer with fewer children, having an Internet account, and access to Internet from home or public places tends to perceive Internet banking to be useful. G1acct (having an Internet account) is still the variable that affects the perceived usefulness of Internet banking the most. Interestingly, none of the application, transaction, or bank characteristics appears in the significant predictor list for USEFUL.

Willingness to Use Internet Banking in the Future

For model 2.3 in Table 3, Retiree, Conpro1 (Internet access convenience from home), Conpro3 (Internet access convenience from public places), Tran2 (degree of importance of transaction type), and Bank4 (diversified service) have a positive impact on FUTURE (willingness to use Internet banking in the future) whereas App10 (continuous improvement) and Bank2 (bank image) have a negative impact. In other words, a customer who has retired, access to Internet from home and public places, performs only certain type of bank transactions over Internet, cares about a bank's diversified service, but does not care much about continuous improvement of applications and a bank's image tend to perceive Internet banking to be useful in the future. A comparison between the significant predictors for FUTURE and those for IBTRANS and USEFUL reveals several insights. First, G1acct (having an Internet account) does not appear in the significant predictor list for FUTURE. That should be a very encouraging finding to community banks because the perceived potential of Internet banking is not dependent on the current access to it. Even though a customer may not have an Internet account now, as long as he or she perceives it to be useful in the

**Table 4. Summary Statistics for Regression Models Using Manual Selection
for Variables with P <= 0.1**

Dependent Variable	Model F-Significance	R-Square (Adj.)	Significant Variables with P <= 0.1		
			Variable	Coefficient	P-Value
Model 3.1 IBTRANS	0.0	29.918	Age	-0.3153	0.0335
			Male	-1.0107	0.0059
			Wife	-1.9340	0.0604
			Income	0.1874	0.0584
			G1acct	1.7380	0.0000
			Conpro3	0.1899	0.0180
			App10	-0.2442	0.0421
Model 3.2 USEFUL	0.0	44.1977	Children	-0.6290	0.0060
			G1acct	2.4320	0.0000
			Conpro1	0.2733	0.0002
			Conpro3	0.2045	0.0160
Model 3.3 FUTURE	0.0	47.3222	Retiree	3.4821	0.0274
			G1acct	0.6198	0.0509
			Conpro1	0.2156	0.0003
			Conpro3	0.1978	0.0045
			Tran2	0.3730	0.0000
			App10	-0.2789	0.0175
			Bank2	-0.2939	0.0240
			Bank4	0.3685	0.0137

future, and the bank makes it simple and easy enough to get one, then the possibility of converting a branch goer to an Internet surfer is definitely high. Second, the coefficient for the predictor variable Retiree is 4.09, which is about 9 times higher than the second largest coefficient 0.4386 of Bank4. This shows that the retiree population can be the target group for Internet banking promotion. Community banks should start to develop marketing strategies to penetrate and capture the retiree group, which may have greater potential than other customer groups for the Internet banking markets. Third, the predictor Tran2 (degrees of importance of different transaction types such as deposits, withdrawals, transfers) has the third largest coefficient. Online application developers have to make sure that Internet banking applications must provide the types of transactions perceived to be safe via Internet in their Internet banking applications.

Overall, models 2.1 – 2.3 indicate that there are specific customer demographics that can be useful in differentiating customer segments for Internet banking promotion. In terms of application characteristics, customers do not pay much attention to continuous improvement of online applications. That may be explained by the "here and now" attitude. Providing customers with what they need now is more important than a promise to improve in the future. Regarding accessibility to Internet, being able to access Internet from home and public places are the important factors for customers. As for bank characteristics, customers have a lot of interest in diversified service provided by a bank, but not the bank image and its compliance with regulations. Customers may be pragmatic about what products and service they can get from a bank but not the fancy advertisement and disclosure statements.

Conclusion

This research project carried out a survey to the customers of a major credit union in California. The purpose of the survey is to identify significant predictor variables for Internet banking activities including the number of Internet banking transactions, perceived usefulness of Internet banking, and willingness to use Internet banking in the future. Multiple regression analyses have identified several significant models, which provide several important messages to community banks for Internet banking. For

the number of Internet banking transactions, customers who are technicians, have higher income, Internet accounts, married, access to Internet from public places, and cares about a bank's diversified service perform more Internet banking transactions. For the perceived usefulness of Internet banking, having an Internet account, access to Internet from home or public places will increase the perceived usefulness of Internet banking. The regression model for the willingness to use Internet banking in the future reveals retirees as a customer group that should receive more attention and promotion for Internet banking activities.

One major limitation of this research project is the sample being not random but convenient in nature. The results in this report can serve as a starting point for a systematic investigation for Internet banking activities for community banks. In order to survive, community banks have to rely on their personal touch and customization of products and service. Identifying the customer segments that are ignored by the larger players in the market may be a viable strategy for community banks. Hopefully, this research project has provided some useful insight to community banks for advancing their Internet endeavors.

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