

Internet Banking: A Customer-Centric Perspective

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Abstract

Many financial institutions are actively developing new electronic banking products for their retail customers. These efforts are can succeed only if their managers focus the promotion of the new services toward those customers who are most likely to find them attractive.

The analysis of a 6-branch financial institution presented in this study suggests that institutions are vulnerable to loss of customers to rivals with extensive online services. The likelihood of current customers being tempted to do business online with another institution was shown to increase with the level of customer transaction use on the Internet. Current customer account relationships are found to be predictive of electronic services use in general. And, interest in the use of specific online services is related to differing customer relationships in addition to ordinary demographic and balance information. These findings can be useful in identifying potential users from a customer relationship management perspective.

1. Introduction

Rising numbers of financial institutions are introducing and expanding their offerings of electronic banking products. Banks have augmented their distribution networks with transactional websites, which allow customers to open accounts, apply for loans, check balances, transfer funds, and make and receive payment over the Internet. Some institutions view Internet banking as a way to lower costs or to create new revenue streams by attracting additional customers and selling more services to current customers. Other institutions have begun to offer electronic banking services as a defensive step out of concern that current customers may switch to another financial institution with more advanced electronic banking services. While growth in online trading attests to the popularity of online brokerage services, it is less clear that there exists substantial demand for online commercial banking products.

Current customer usage of electronic banking has been moderate and recent studies have shown that impact has been slight. For example, eMarketer estimates that fewer than 10% of US banking customers use online services (see [4]). But, diffusion and adoption of electronic banking is expected to progress rapidly. Some analysts are predicting that close to one-half of all US households will be banking online by 2005. To date, however, the experience has not been smooth from the customer perspective. A recent study by McKinsey consultants in the US estimated that roughly 9 million customers had signed up for online banking (see [16]). But, roughly one in three of these have given up on it. Of those remaining, the majority was less than completely satisfied with the service

TowerGroup, in a survey conducted in early 2001, finds that only 18 percent of retail customers of banks that offer online banking have used these services. And among the users of online banking services, 85 percent have used a brick and mortar branch within the last month (see [17]). Despite the low adoption rates by consumers, some financial institutions are aggressively pursuing electronic distribution channels. By the third quarter of 1999, 1,364 national banks (or 54 percent of all national banks) had web sites and 541 (21 percent) of these were transactional (see [8], p. 32).¹ By the fourth quarter of 2000, 37 percent of national banks offered transactional internet services. Because the market structure of the US banking system is concentrated, these transactional Internet banks, relative to all national banks, held 90 percent of assets and 85 percent of small deposit accounts (see [1], p 4).

Credit Suisse First Boston has recently studied the online operations of market leaders among large banking systems. These institutions, such as Wells Fargo Bank and

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US commercial banks can operate under a national or a state charter. As of the third quarter of 1999, national banks held 59 percent of all banking system assets (see [8], p 31). At year-end 2000, federally-insured commercial banks held \$6,239 billion in assets and federally-insured savings institutions held \$1,223 billion in assets (see [5]). At year-end 2000, federally-insured credit unions held \$438 billion in assets (see [12]).

FleetBoston Financial have 25% or more of their customers online. Wells Fargo, for example, took four years to reach a total of one million customers. The total was two million one year later and Wells is now adding roughly 100,000 online customers per month. Its 2.5 million online customers now generate roughly 50% more revenue than average, hold 20% higher balances and are higher users of its products and services (see [15]).

While large financial institutions were the leaders in introducing electronic banking services, smaller institutions are now making inroads. Sixty-six percent of community banks have web sites in 2001, up from 42 percent in 1999, and 49 percent of these are transactional sites (see [2]). Credit unions in the US have increasingly taken on the role of the community bank, as the banking system has consolidated. The National Credit Union Administration (NCUA) began collecting data on information systems and technology in 2000 from credit unions. A total of 3,797 credit unions reported having web sites at year-end 2000, 1,441 of which were transactional sites (see [12], p 19). Table 1 shows the percent of 10,316 US federally-insured credit unions offering various services electronically at year-end 2000. These include services delivered via automatic teller machine, kiosk, audio-response telephone systems, home banking (Internet and dial up), and wireless devices.

Table 1. Percent of US federally-insured credit unions offering services electronically

Member Application	13.2%
New Loan	18.8%
Account Balance Inquiry	40.6%
Share Draft Order	21.9%
New Share Account	6.0%
Loan Payments	31.3%
View Account History	25.1%
Merchandise Purchase	8.2%
Share Account Transfers	39.6%
Bill Payment	11.4%
Download Account History	15.7%
Electronic Cash	11.0%

Source. NCUA ([12], p. 19)

Additionally, the number of credit unions planning to introduce an informational, interactive, or transactional

website in the future was 1,365, 337, and 341, respectively.²

Our principal focus in this study is on the demand of electronic banking services. (In this study, we use the term "banking services" to refer to services offered by commercial banks, savings banks, savings and loans, and credit unions.) The supply of services has been examined in a number of studies focusing on the institutional characteristics that distinguish institutions that offer electronic banking (see for example [2], [3], and [8]). To better understand the demand side of the market, a number of studies seek to identify the financial and demographic characteristics of customers who use various services.

Our focus is on examining whether measures of customer relationships add information beyond financial and demographic data that helps distinguish the customers who use electronic banking services from those who prefer traditional products and delivery channels. Data based on a survey of customers of a six-branch financial institution is employed.

Understanding the factors associated with customers' likelihood of using specific services is important in an environment that is becoming increasingly competitive. Until the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (Pub. L. 103-328), many financial institutions in the US were geographically isolated. The internet makes physical distance irrelevant for many financial services. Moreover, as noted by Peppard [14], in his recent review of customer relationship management in financial institutions, use of customer relationship management (CRM) allows transition to a more customer centric perspective. Implementation of CRM must be based on e-business technology, channel management and customer information, making it a prime candidate for online banking. US depository institutions are also facing greater competitive pressure from other financial institutions following the passage of the Gramm-Leach-Bliley Act of 1999 (GLB) that eliminated regulatory barriers between commercial banking, investment banking,

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The NCUA provides credit unions with the following definitions of three categories of websites. Informational websites displays general information such as loan/share rates, printable forms, and contact information; interactive websites allow members to complete membership and loan applications, apply for new share accounts, transmit requests for information such as share balances, loan balances, account statements, disclosure statements, etc, in addition to offering informational content; and transactional websites allow members to initiate or perform transactions such as paying bills, making loan payments, and transferring money (between one or more credit union accounts or between the credit union and 3rd parties) in addition to offering interaction content (see [13], p. 6a).

and insurance (Pub. L. 106-102). Further regulatory changes are possible if current oversight processes are determined to discourage the offering of electronic banking services.³

As electronic banking becomes more wide spread, managers of financial institutions need to be able to assess the impact of losing relationships and accounts to aggressive online alternatives. These include traditional banks with electronic offerings, virtual banks and non-banks. An important issue is to determine if customer service indices are helpful in understanding potential demand for electronic banking. Moreover, can an institution collect information other than demographics or account relationships from its customers that may help forecast potential demand? We conclude that managers of financial institutions can more accurately identify which customers to target for electronic banking services by using measures of banking relationships.

The next section reviews some recent empirical studies on the demand for electronic banking services. Section 3 describes the research questions addressed in this study and the empirical approach. Section 4 presents the findings and the section 5 describes some of their implications for managers of financial institutions.

2. Empirical studies on electronic banking services

Kennickell and Kwast [9] examined the determinants of demand for electronic media for financial transactions. Using data from the Board of Governors' 1995 Survey of Consumer Finances, they found that the likelihood of using electronic media to obtain banking services rises with higher levels of financial assets and education. Additionally, younger consumers tend to use computers, ATMs, and debit cards more. However, the use of direct deposit rises with age.

Using data gathered from the September and October 1999 University of Michigan's Survey of Consumers, Kolodinsky, Hogarth, and Shue [10] also found that age and education has an influence on whether consumers use

electronic banking products. However, they conclude that positive attitudes toward e-banking services matter more than demographic factors in determining whether such services are used. That study of 1,000 US households assessed attitudes toward electronic banking. Respondents were asked about ATMs, direct deposit, phone banking, electronic bill payment, electronic funds transfers and PC banking as well as demographic questions. Overall, use of PC banking was low, with only 11 percent of households currently using that service. E-banking users, in general, were found to have higher incomes and education. As part of that study, households were clustered into three groups based on a series of 11 Likert-type statements regarding electronic banking. These items included statements related to perceived use, convenience, relative advantages and risk associated with electronic banking. The resultant clusters were termed "technophobes" (those most resistant to the use of electronic banking technology), "technophiles" (those most accepting) and "in between". In general, technophiles were found to be younger, and to have higher income and education. Analysis showed that use of electronic banking services varied greatly across segments. Usage of PC banking was more than 10 times greater among technophiles than technophobes (31.6 percent vs. 2.7 percent)

Mantel [11] investigated the factors that influence consumers' willingness to use electronic bill payment. Using survey data of 1,300 household primary bill payers, binominal logistic regressions were estimated to explain (1) the likelihood of using direct bill payment and (2) the likelihood of being a "high user" of bill payment technology. Low users are those who pay fewer than 20 percent of their bills electronically; high users pay more than 30 percent of bills with direct bill payment technology.

That study shows that the likelihood of using electronic bill payment is positively associated with age, PC ownership, income, credit card holder, home ownership, desire for control (controlling when bill is paid, option to stop payment, and, desirability of paying bills when out of town are important), and desire for incentives (willingness to use if financial incentive provided). Electronic bill payment use is less likely for consumers who desire receiving a receipt for payment.

The likelihood of being a high user is positively associated with age, income, viewing the ability to pay bills when out of town as important, and an opinion that banks are not opened at convenient times. The likelihood of being a high user is less if the bill payer is a credit-card holder, feels that the ability to control when a bill is paid is

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Section 729 of the GLB Act requires the federal regulators of commercial banks and savings institutions to conduct a study of banking regulations regarding the online delivery of financial services. Furthermore, these agencies are to report their recommendations on adapting existing legislative or regulatory requirements to online banking and lending. For an outline of the issues to be addressed, see [6] and [7].

important, and feels that having a person available to talk to if there's a problem is important. While concerns about privacy or security have some impact on the intensity of bill payment use, the importance bill payers place on saving time has no influence over the use of electronic bill payment.

3. Research question and empirical analysis

3.1. Methodology

A systematic random sampling method was used to select a sample of customers of a 6-branch community financial institution. All customers selected were sent a mail questionnaire as part of a bi-annual customer service evaluation study. As an incentive to participate, the financial institution offered to make a charitable donation to the organization chosen by respondents. In total, 701 useable questionnaires were returned by the cutoff date, a respond rate of roughly 15 percent, which is parallel to the rate achieved by prior studies for the institution. This sample of 701 customers was used as the basis for this study.

The questionnaire listed five electronic banking services: ATM, debit card, online PC banking, electronic bill paying, and direct deposit/payroll deduction. Four online PC banking services were available to customers of this institution: transfer funds, balance inquiry, bill payment, and loan application. To measure Internet use, customers were asked about use of e-mail and were asked if they had used the Internet for any of seven different types of transactions, such as buying a product online. Finally, a series of demographic questions were asked.

3.2 Research approach

Descriptive statistics and analysis-of-variance techniques are employed to gain insights into the extent electronic banking services impact the choice of the primary financial institution, the potential of electronic banking, the potential of Internet banks, and the current level of Internet transactions by customers.

More specifically, hypotheses tested in this study concern whether:

- the potential for doing business with a virtual Internet bank is related to the customer's current use of the Internet,
- the perceived usefulness of various online banking services (funds transfer, balance inquiry, bill payment

and stock trading) is related to the customer's current level of performing transactions on the Internet,

- the potential for current customers to doing business with a virtual Internet bank is related to the customer's current level of performing transactions on the Internet,
- the choice of customers' primary financial institution is related to the availability of electronic banking services, and
- measures of banking relationships are related to perceived usefulness of services offered online by a financial institution

To investigate more fully the factors that drive demand for electronic banking services, analysis is also presented on customer characteristics that are associated with the use of electronic banking services. The focus in this analysis is on determining what types of information bank managers might use to identify the customers most likely to purchase electronic banking services. Other studies have shown that demographic, financial, and technology factors are useful in understanding the demand for electronic banking services. Our chief focus is on whether measures of banking relationships for current customers offer additional information beyond demographic and financial data.

One model is developed to investigate the characteristics of customers who indicated that the availability of electronic banking services was a "principal reason" in selecting their primary financial institution. A second model is used to examine the characteristics that distinguish customers who view specific electronic banking services as useful versus those who do not? Binary probit models are used to examine these issues. The first model attempts to explain the likelihood that the availability of electronic banking services will be a factor in customers choosing their primary financial institution. The second model attempts to explain the likelihood that a customer will view certain electronic banking services as useful.

In the probit model which estimates the likelihood that the availability of electronic banking services is a primary factor in a customer's choice of primary financial institution, the dependent variable, EMIMPORT, takes on the value of 1 if the survey respondent checks the response: "has the electronic banking services I need," and is assigned a value of 0 otherwise. We use a total of 26 explanatory variables falling into four general categories: banking relationships, demographic, financial, and technology. A complete list of the explanatory variables are provided in the appendix. Measures of banking relationships cover whether the customer has deposit and investment accounts (e.g., checking, savings, CDs, IRA)

and credit accounts (e.g., mortgage, auto loan, lines of credit, credit card) at the institution, and the complexity of the relationship (e.g., number of accounts owned by a household). Demographic characteristics cover age and education while financial characteristics cover household income level and home ownership. The technology variables cover whether the customer is connected to the Internet, uses e-mail, and conducts online non-banking transactions. To access the importance of the four categories of factors, joint significance tests of the variables within the categories were alternately conducted.

A similar approach is employed to examine what customer characteristics determine if specific electronic banking services are viewed as useful. Four types of services are considered: transfer funds, balance inquiry, bill payment, and loan application. Customers were asked to rate, from not very useful to very useful, each of the services. Four separate probit models are estimated to predict the likelihood that a customer believes that the service is useful or very useful. To conduct the estimation, the dependent variable is defined as 1 if the customer rated the service as useful or very useful, and 0 otherwise. A total of 30 explanatory variables, listed in the appendix, are used in these probit models.

4. Empirical results

4.1 General findings

Respondents were asked to indicate reasons for the choice of their primary financial institution, given 11 different reasons from which to choose. As shown in Table 2, the prime reasons were the checking account and direct deposit relationships, proximity to branches, customer service and offering a comprehensive set of financial services. Electronic banking services was ranked sixth, with 30.2 percent of respondents checking this factor.

Table 2. Primary reasons for choice of financial institution

Factor	Percent checked	Rank
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Have checking account(s) there	81.0	1
Use direct deposit there	59.8	2
Branches located close to home	48.2	3
Better customer service there	42.5	4
Has the financial services I need	30.5	5
Has the electronic banking services I need	30.2	6
Branches located close to work or school	25.2	7
Better rates on loans	23.3	8
Attractive rates on savings	14.9	9
Have mortgage loan there	8.0	10
Too much trouble to transfer accounts	5.9	11

To determine potential for various electronic banking models, the study first determined overall Internet usage by respondents. As seen in Table 3, 71.5 percent of all customers were connected to the Internet at home or work (compared to roughly 50 percent in the market overall) and nearly all of these were users of e-mail.

Table 3. Use of electronic services

	Number YES	Percent of sample
Connected to the Internet at home or work	487	71.5
Use e-mail	477	95.6*

* percent of those connected to the Internet

It was hypothesized that interest in e-banking would be related to overall familiarity or use of the Internet for transactions. All respondents were asked whether, in the pass year, they had conducted one or more types of transactions, ranging from product purchase to airline reservations. As seen in Table 4, 41.1 percent of all customers had made a product purchase online, but that figure increased dramatically for those with Internet connections at home or work (60.4 percent). This was followed by online reservations, stock trading and mutual fund trading.

Table 4. Forms of current Internet transactions

Within the past year, have you:	Numb	Pct of all customers	Pct of Internet customers
Purchased a product online	288	41.1	60.4
Made airline reservations	191	27.2	41.6
Make rental car reservation	89	12.7	70.1
Made hotel reservation	135	19.3	30.1
Applied for a loan	35	5.0	8.2
Purchased extended warranty/insurance	3	0.4	0.7
Bought / traded stock	71	10.1	16.2
Bought / traded mutual funds	50	7.1	11.5

A particular interest of this study was to evaluate the potential loss of customers if an online bank could offer a rate incentive as a means to build its customer base. To evaluate this in the extreme, we asked if the customer would consider doing business with "an Internet bank - a financial institution with no retail branches, operating only on the Internet", if it offered better rates. A total of 32.9 percent of all customers (as shown in Table 5) would be tempted by such an offer. This figure increased significantly to 40.5 percent of the Internet customers ($\chi^2 = 45.98, 3df, sig = < 0.00$).

Table 5. Potential use of pure Internet bank

Would you consider doing business with an Internet bank if it offered better rates?	Numb	Pct of all customers	Pct of Internet customers
Definitely YES	40	5.7	6.5
Probably YES	191	27.2	34.0
Probably NO	234	33.4	36.9
Definitely NO	198	<u>28.2</u>	<u>22.7</u>
		100.0	100.0

Internet banks were defined as financial institutions with no retail branches that operate only on the Internet.

$\chi^2 = 45.98, 3df, sig = < 0.00$

To better understand the relationship between Internet

transactions and e-banking potential, an index of Internet transactions variable was created (IIT), which summed the possible transaction modes in Table 4 for each respondent. This is shown in Table 6. Usage ranged from zero to seven of the eight items. For the Internet users, this was collapsed into four categories: no transaction users (N) - 32.8 percent, low transaction users - only one of the 8 items possible (L) - 24.2 percent, moderate transaction users - used 2 or 3 of the 8 items possible (M) - 24.2%, and high transaction users - used 4 or more of the 8 items possible (H) - 18.8 percent.

Table 6. Index of Internet transaction use

Use of different transaction modes*	Numb	Pct of all customers	Pct of Internet customers
Non-Internet users	280	39.9	-
Zero transactions	138	19.7	32.8
One	102	14.6	24.2
Two	61	8.7	14.5
Three	41	5.8	9.7
Four	51	7.3	12.1
Five	22	3.1	5.2
Six	5	0.7	1.2
Seven	<u>1</u>	<u>0.1</u>	<u>0.2</u>
	701	100.0	100.00

* Sum of different transaction modes utilized

The questionnaire asked for a rating of five current and proposed e-banking services: funds transfer, balance inquiry, bill payment, stock trading and online loan application. These results are shown in Table 7. For the total sample, the services perceived as most useful were balance inquiry (56.4 percent - very useful) and funds transfer (54.8 percent), followed by bill payment (26.9 percent), loan application (20 percent) and stock trading (13.5 percent). As hypothesized, the ratings differed significantly for funds transfer and balance inquiry as a function of IIT level, but not for the other three services.

We hypothesized that customers most likely to consider doing business with an Internet bank would also be higher users of Internet transactions (i.e., have a higher IIT level). Table 8 shows these results. The proportion of those indicating definitely or probably yes increases significantly ($\chi^2 = 33.08, 9df, sig = < 0.00$) with nearly 60 percent of those in the High transactions status category indicating that they may do so.

Table 7. Ratings of usefulness of Internet banking services as a function of Internet transaction use

	N	L	M	H	Total
Transfer Funds (Percent of Transaction Use group)					
1 = not very useful	30.5	9.3	14.5	6.3	15.7
2	5.1	0.0	1.4	2.1	2.2
3	10.2	11.1	8.7	4.2	8.7
4	11.9	22.2	20.3	20.8	18.7
5 = very useful	42.4	57.4	55.1	66.7	54.8
$\chi^2 = 22.79, 12df, sig = < 0.03$					
Balance Inquiry (Percent of Transaction Use group)					
1 = not very useful	25.0	7.1	14.7	3.6	13.2
2	4.7	1.8	2.9	1.8	2.9
3	10.9	5.4	7.4	5.5	7.4
4	18.8	23.2	14.7	25.5	20.2
5 = very useful	40.6	62.5	60.3	63.6	56.4
$\chi^2 = 21.10, 12df, sig = < 0.05$					
Bill Payment (Percent of Transaction Use group)					
1 = not very useful	42.2	24.4	25.5	12.2	26.4
2	8.9	9.8	12.7	9.8	10.4
3	17.8	22.0	23.6	24.4	22.0
4	11.1	22.0	9.1	17.1	14.3
5 = very useful	20.0	22.0	29.1	36.6	26.9
$\chi^2 = 14.41, 12df, sig = < 0.28$					
Stock Trading (Percent of Transaction Use group)					
1 = not very useful	47.1	46.4	50.0	31.8	45.2
2	11.8	10.7	4.8	9.1	8.7
3	20.6	21.4	23.8	27.3	23.0
4	2.9	14.3	9.5	13.6	9.5
5 = very useful	17.6	7.1	11.9	18.2	13.5
$\chi^2 = 6.98, 12df, sig = < 0.86$					
Loan Application (Percent of Transaction Use group)					
1 = not very useful	39.5	32.4	20.8	16.7	27.5
2	7.0	2.9	11.3	3.3	6.9
3	20.9	20.6	28.3	36.7	26.3
4	11.6	32.4	17.0	20.0	19.4
5 = very useful	20.9	11.8	22.6	23.3	20.0
$\chi^2 = 15.73, 12df, sig = < 0.20$					
N = No transaction users, L = low transaction users, M = moderate transaction users, and H = high transaction users.					

Table 8. Possible use of Internet banking as a function of Internet transaction use

	N	L	M	H
Would you consider doing business with an Internet bank?				
Definitely YES	4.4	4.0	6.9	11.4
Probably YES	26.7	32.7	37.3	48.1
Probably NO	31.9	42.6	38.2	30.4
Definitely NO	37.0	20.8	17.6	10.1
$\chi^2 = 33.08, 9df, sig = < 0.00$				

4.2. Probit Models

Results for the model of the likelihood that the availability of electronic banking services will be a factor in customers' selection of primary financial institution is shown in Table 9. The equation is statistically significant ($F = 3.28, sig = < 0.00$). Surprisingly, the hypotheses that the coefficients of the variables in the demographic category and the financial category are jointly zero can not be rejected. However, the variables in the technology and banking relationship categories are significant in distinguishing between customers for whom electronic banking services affect their choice of primary financial institution and those customers for whom these services do not affect their selection. Further analysis (not presented in the table) indicates that a credit relationship (i.e., whether the customer has a mortgage, vehicle loan, or line of credit) appears to be the critical dimension of the relationship ($F = 9.37, sig = < 0.00$). This model was re-estimated using only those customers who used at least one electronic banking product. The results are similar to those based on the entire sample.

The models of electronic banking services ratings are shown in Table 10 and are all statistically significant. Each of the four categories of factors are significant in at least one equation. Demographic characteristics are jointly significant in the equations for balance inquiry, bill payment, and loan application but not in the equation for transfer funds. Financial characteristics are significant in the equation for bill payment only. However, the group of technology variables and banking relationship variables are significant in each of the four equations. Thus, measures of banking relationships are useful in distinguishing between customers that find certain electronic banking services useful and those that do not view these services as useful. For the transfer funds service, the presence of credit accounts ($F = 2.17, sig = < 0.09$) and level of funds maintained in accounts ($F = 2.49, sig = < 0.06$) are the important dimensions of customers' banking relationships. For the balance inquiry service, lending

($F = 3.59$, $\text{sig} = < 0.01$) is the important dimension. For the bill payment service, the presence of deposit accounts ($F = 5.07$, $\text{sig} = < 0.00$) and credit accounts (2.24 , $\text{sig} = < 0.08$) are the important dimensions. Finally, for the loan application service, the presence of deposit accounts ($F = 2.32$, $\text{sig} = < 0.07$) and credit accounts ($F = 4.69$, $\text{sig} = < 0.00$) are the important dimensions.

Table 9. Importance of electronic banking services in selecting customers' primary financial institution

Variable group	F-statistic (significance)
All explanatory variables	3.28 (0.00)
Banking relationship	3.91 (0.00)
Demographic characteristics	0.96 (0.45)
Financial characteristics	1.66 (0.17)
Use of technology	6.77 (0.00)
Obs with EBIMPORT = 0	395
Obs with EBIMPORT = 1	<u>192</u> 587
McFadden R-sq	0.11

The explanatory variables for the variable groups are listed in the appendix. Each F-statistics applies to a test of the hypothesis that the coefficients of all the variables in the group jointly equal zero.

Table 10. Rating of electronic banking services

	F-statistic (significance)			
	Transf Funds	Bal Inquiry	Bill Paymt	Loan Applc
All explanatory variables	14.18 (0.00)	15.93 (0.00)	4.59 (0.00)	3.00 (0.00)
Banking relationship	3.97 (0.00)	3.44 (0.00)	2.46 (0.00)	2.67 (0.00)
Demographic characteristics	1.08 (0.37)	2.65 (0.02)	2.05 (0.06)	1.83 (0.09)
Financial characteristics	0.00 (1.00)	1.29 (0.28)	3.68 (0.01)	1.34 (0.26)
Use of technology	40.76 (0.00)	43.97 (0.00)	12.23 (0.00)	6.64 (0.00)
Obs: dep var = 0	412	399	511	523
Obs: dep var = 1	<u>175</u> 587	<u>188</u> 587	<u>76</u> 587	<u>64</u> 587
McFadden R-sq	0.39	0.41	0.24	0.19

5. Summary and conclusions

For a variety of reasons, financial institutions are developing new electronic banking products for their retail customers. The probability that these efforts will succeed can be enhanced if managers at these institutions focus the promotion of the new services toward those customers who are most likely to find them attractive. Research elsewhere has demonstrated an association between customers' demographic and financial characteristics and their demand for electronic banking services. This study analyzed whether measures of banking relationships provide information beyond demographic and financial data that might be employed to distinguish between customers who demand electronic banking products from those who prefer traditional services and delivery channels.

The analysis of a 6-branch financial institution presented in this study found that many of its retail customers are already using electronic banking services. This is especially true for customers that are comfortable with technology, proxied by whether the customer has an Internet connection and patterns of non-banking online transactions. Of special concern to bankers is the risk that they will lose customers to Internet banks. A total of 32.9 percent of all customers would be tempted to switch to a competitive Internet bank if rate incentives were offered. And, this figure increased significantly to 40.5 percent of the customers with Internet connections. Of a group of customers that had conducted the widest range of non-banking online transactions, nearly 60 percent indicated that they would consider doing business with an Internet bank. These findings suggest that the potential loss of customers to institutions with aggressive Internet offerings (perhaps even "virtual" banks) is substantial. However, since the few Internet banks in operation today are struggling, the loss of customers is a long-run rather than a short-run threat. The threat is probably higher that customer loss may be to aggressive institutions using the Web as a distribution alternative, actively practicing e-CRM methodology and using it for market segmentation purposes.

Binary probit models are estimated to examine the factors that distinguish customers that use electronic banking services from those who prefer traditional services and delivery channels. In addition to measures of demographic, financial, and technology characteristics, we find that measures of banking relationships are useful in predicting the likelihood that a customer views the availability of electronic banking services as a principal factor when selecting a primary financial institution. Additionally, measures of banking relationships are useful in predicting whether a customer views funds transfer, balance inquiry, bill payment, and loan application services as useful. The implication of this finding is that managers of financial institutions may find this type of information

valuable when choosing which customers to target for new electronic banking services.

Overall, this study demonstrates that institutions are highly vulnerable to loss of customer relationships and deposits to banks with extensive online services, virtual banks and non-banks. As online banking becomes more widely accepted by consumers, smaller or less innovative institutions may be most at risk. The likelihood of current customers being tempted to do business online with another institution was shown to increase with the level of customer transaction use on the Internet. This can be estimated by an institution through the use of customer survey research as a means of monitoring Internet use by customer segments. Although most prior studies have focused on the role of demographics in explaining online banking use, this study shows that current customer account and service relationships are predictive of electronic use in general. Moreover, interest in use of specific online services is related to differing customer relationships. This finding can be useful in helping to identify potential users from a CRM perspective in addition to the use of ordinary demographic and balance information.

6. References

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Appendix. Variables used in probit models

Dependent Variables

- Has the electronic banking services I need
- Rates transfer funds service at Subject FI as 'useful' or 'very useful'
- Rates balance inquiry service at Subject FI as 'useful' or 'very useful'
- Rates bill payment service at Subject FI as 'useful' or 'very useful'
- Rates loan application service at Subject FI as 'useful' or 'very useful'

Banking relationship variables

Values – 0: no, 1: yes

- Has 1 account or service at primary financial institution (FI)
- Has 2 or 3 accounts or services at primary FI
- Has 4 or more accounts or services at primary FI
- Has checking or money-market account at primary FI.
- Has regular savings account at primary FI
- Has CD at primary FI.
- Has IRA at primary FI.
- Has first or second mortgage with primary FI.

- Has auto/RV loan or auto lease with primary FI .
- Has home equity and/or personal line of credit at primary FI.
- Has credit card services at primary FI.

- Sum household maintained in all deposit accounts: \$2,500 or less
- Sum household maintained in all deposit accounts: \$2,501 - \$10,000
- Sum household maintained in all deposit accounts: \$10,001 - \$50,000
- Sum household maintained in all deposit accounts: \$50,001 or more

- Subject FI is customer's primary FI*

Demographic characteristics of customers

Values – 0: no, 1: yes

- Age: under 34
- Age: 35-44
- Age 45-54
- Age: 55 or over

- Some high school or has high school degree
- Some college
- College degree
- Graduate work or degree

Financial characteristics of customers

Values – 0: no, 1: yes

- Household total gross income: \$40,000 or less
- Household total gross income: \$40,001 - \$75,000
- Household total gross income: \$75,001 or more
- Home owner

Customers use of technology

Values – 0: no, 1: yes

- Connected to the Internet at home or work
- Uses E-mail
- Completed 1 or 2 non-banking transactions on the Internet within the past year
- Completed 3 or more non-banking transactions on the Internet within the past year

- Has ATM or debt card service at primary FI*
- Uses online banking services at primary FI*
- Uses electronic bill paying services at primary FI*
- Uses direct deposit services at primary FI*

* Variable used only in the models of rating of electronic banking service presented in Table 10.