

Contribution of Internet Banking toward Profitability of Banking in India

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Abstract: The adoption of the Internet in the banking industry on the one hand is closely related to a change in the structure of the organization and nature of operations in banking industry itself, and on the other hand, to the emergence of computer as a significant organizational tool. Banks have always been striving to introduce new technologies to reduce operational costs and expand their businesses. This study is an attempt to investigate the contribution of Internet banking on the performance of the banking system in India. Return on Assets (ROA) and Return on Equity (ROE) ratios are used to test this effect. The regression analysis showed that there is a significant effect of Internet banking services on the profitability of banks in terms of ROA and ROE in India.

Keywords: Banking Performance; Internet Banking; Profitability; India

JEL Classification: G2; G21

1. Introduction

The introduction of e-banking in banking business is one of the most important innovations of the 20th century. It provides a large number of opportunities to the bank itself as well as the customers associated with bank that supplies e-banking services. The first benefit for the banks offering e-banking services is better branding and better responsiveness to the market. Those banks that would offer such services would be perceived as leaders in technology implementation. Therefore, they would enjoy a better brand image. The other benefits of e-banking can be named as expand of business, lower operational costs, less human errors, workers efficiency improvement and availability of services anytime and everywhere. The main goal of every company is to maximize profits and e-banking services offer a perfect opportunity for maximizing profits.

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Banks have always been striving to introduce new technologies. Firstly it was the year 1846 when telecommunication was introduced into bank markets that reduced the stock price differential between New York and regional stock markets. The introduction of the trans-Atlantic cable equally enabled greater integration of securities trading in New York and London in 1866. This period is known as early adoption period of IT in the financial sector. During this period, banks' customers entered in the banking system directly through retail banking branches or indirectly through agency representative (such as saving banks, mortgage specialists and even retail outlets). Telephone conversations between bank managers and customers have been recorded in use as early as the 1890s, but, in spite of this, the service remained largely unaffected by technology with unchanged front office relationship and controlled locally through asynchronous analogue systems such as paper-based records and pass-book control. During the late 1930s, the first tabulating machine was purchased to address the growing volume of transactions. The second wave of IT innovation in retail finance begins in the late 1950s and lasted up to the late 1960s. Banks introduced computers to keep up with growth in business volume. The third wave of IT innovations in retail finance emerged hand in hand with advances in telecommunications. During the emergence period, banks became one of the world's dominant customers for computer-based applications, far exceeding other sectors such as capital goods manufacturers or transportation. Between 1968 and 1980 banks emerged as major customers of software and hardware as they involved in applications which delivered significant cost reductions as well as increased business volume and variety. The main difference between this and the specific application period was that the impact of computers was felt throughout the organization rather than in specific departments (Batiz-lazo and Wood, 2001).

There are always two sides to a coin. Similarly Internet banking too has a "bane" side to it. Banks offer e-banking services to expand market share or as a cost saving strategy to reduce paperwork and personnel. The Internet also provides banks with considerable opportunity to expand their customer reach beyond existing boundaries. Therefore electronic delivery channels operate in an uncertain legal and regulatory environment so that all these factors present new challenges for banks in managing security, integrity and availability of services. It is possible to categorize e-banking challenges in different groups such as: business, psychological, problem of security, operational and different kinds of risks associate with electronic delivery and micro economic challenges.

In the early 1990s, the Indian government embarked on the policy of liberalization. The government allowed new private banks to enter in the market. By licensing a small number of private banks, which came to be known as new generation tech-savvy banks, the government introduced greater competition in the Indian banking system. Several initiatives have also been taken by the government as well as the

Reserve Bank of India (RBI) to facilitate the development of these new generation banks. Though ICICI bank initiated the e-banking facilities under the brand name of 'Infinity' as early as 1997 however it got its due respect in the year 2000 when the government of India enacted the IT act 2000 with effect from 17 October 2000. This proactive action has provided legal recognition and security to electronic transaction and other means of electronic commerce for the Indian banking system and paved the way for the emergence and growth of e-banking in India.

On the recommendation of the committee on technology upgrading in banking sector headed by M. R Srinivasan, the RBI has issued a guideline in June 2001 on three major areas of Internet banking, i.e., (i) technology and security issues, (ii) legal issues and (iii) regulatory and supervisory issues. These areas are selected in such a manner that the problems faced by banks and their customers can be minimized to the maximum possible extent. The group recommended certain guidelines for the smooth and proper working of Internet banking. According to this guideline virtual banks that have no offices and function only on line are not permitted to offer e-banking services in India. Only banks that can acquire license under the Banking Regulation Act are those banks that have a physical presence. These banks are then allowed to offer such services. Besides, banks are required to report to the RBI about every breach or failure of security systems and procedures in Internet banking -while the RBI discretion may decide to commission special audit/inspection of such banks (RBI, 2001). This present research work devoted to look into the facts related to the impact of Internet banking on Indian banking system.

2. Internet Banking

Internet banking or cyber banking has changed the way business is conducted. By harnessing the information technology, banks have been providing varied financial services to their customers. The proliferation of the internet has changed the traditional business paradigms and is increasingly playing a significant role in improving the services in the banking industry. Consequently, it offers new possibilities for growth in the banking sector (Krishna and Vidya, 2008).

2.2 Types of Internet Banking

Currently, there are three basic kinds of website facilitating Internet banking in the marketplace:

- 1. Information Websites.** This is the most basic level of Internet banking. The bank has marketing information about its products and services on a stand-alone server. This level of Internet banking service can be provided

by the bank itself or by sourcing it out. Since the server or website may be vulnerable to alteration, appropriate controls must therefore be in place to prevent unauthorized alterations of data in the server or the website (Kumar et al, 2007);

2. **Communication Websites.** This type of Internet banking allows interaction between the bank's systems and the customer. It may be limited to electronic mail, account inquiry, loan applications, or static file updates. The risk is higher with this configuration than with the earlier system and therefore appropriate controls need to be in place to prevent, monitor and alert management of any unauthorized attempt to access bank's internal network and computer systems. Under this system the client makes a request to which the bank subsequently responds. It works on the same principle as the e-mail (Persumal and Shamugam, 2004);
3. **Transactions Websites.** Under this system of Internet banking customers are allowed to execute transactions. Relative to the information and communication types of Internet banking, this system possesses the highest level of risk architecture and must have the strongest controls. Customers' transactions can include accessing accounts, paying bills, transferring funds etc. These possibilities demand very stringent security (Persumal and Shamugam, 2004).

3. Review of Literature

The review of existing literature related to a research problem is the most important part of the academic research. It not only gives an insight into the nature and dimensions of the problem it also gives the information about the relationship among the various parameters and their degree of association. As we know that the studies in social sciences vary with the variation in the circumstances, literature review gives us the variation in results as the area/ region/ economy changes. The present research problem ' impact of Internet banking on banking performance' is also of the same nature where variation in economic infrastructure makes a difference in the result as the success of Internet banking is totally dependent on IT infrastructure and people attitude towards the adoption.

Prasad and Harker (1997), in their paper entitled "Examining the Contribution of Information Technology toward Productivity and Profitability in U.S. Retail Banking ", examined the effect of IT investment on both productivity and profitability in the retail banking sector. Using data collected through a major study of retail banking institutions in the United States, this paper concluded that additional investment in IT capital may have no real benefits and may be more of a strategic necessity to stay with the competition. However, the result indicated that

there are substantially high returns to increase in investment in IT labour, and that retail banks need to shift their emphasis in IT investment from capital to labour.

Merenzi et al. (2000), in their study entitled “Is Internet Banking Profitable? A Study of Digital Insight's Offering”, forecasted profitability for institutions implementing DI's (Digital Insights) Internet banking applications. According to study DI provides an array of applications including home banking with electronic bill payment, check images, authenticated online applications, online statements modules, cash management, account aggregation, e-commerce financial services portal and online lending applications for consumer loans. The results showed that it is not possible to blindly state that Internet banking is always profitable, because very small institutions (with fewer than 15,000 customers) only offer a limited set of Internet banking services are not likely to achieve profit unless they are able to persuade a very substantial portion of their customers to bank online.

Polatoglu and Ekin (2001), conducted a research about Internet banking and its impacts. The results of this research suggest that Internet banking not only reduces operational cost to the bank, but also leads to higher levels of customer satisfaction and retention. Accordingly, it is argued that Internet banking is strategically important to the banking sector in an emerging economy, such as in Turkey.

Eyadat, M (2005), examines the impact of the progress in information technology on the profit and cost efficiency of the U.S. banking sector during the period of 1992-2003. The research shows a positive correlation between the levels of implemented IT and both, asset profitability and cost savings. These results indicate that introduction of the new range of services at a bank, on one hand, generate additional revenues, but, on the other hand, imply new significant cost changes.

Siam, A Z (2006), examined the impact of e-banking on Jordanian banks and concluded that the majority of the banks are providing services on the Internet through their websites and his findings showed that the attention is more on satisfying and fulfilling customers' needs through e-banking. He also concluded that there should be a well articulated strategy to achieve success and profits in the long run. Results revealed that electronic banking services have a negative effect on banks profitability in the short run due to the capital investment by the banks on infrastructure and training but will be positive in the long run.

Casolaro and Gobbi (2007), have analyzed the effects of investment in information technology (IT) in the financial sector in Italy. The result of the study showed that both cost and profit frontier shifts are strongly correlated with IT capital accumulation. Banks adopting IT capital-intensive technique are more efficient than others.

DeYoung et al. (2007), in their paper “How the Internet Affects Output and Performance at Community Banks” tried to compare two different waves of adoption of Internet banking to find out how the Internet can change the performance of banks. The first wave of US banks to adapt transactional banking web sites in the late-1990s, and compare the change in their 1999–2001. Finding of the study shows that Internet adoption has improved the community bank profitability, chiefly through increased revenues from deposit service charges. Internet adoption was also associated with movements of deposits from checking accounts to money market deposit accounts. This is also responsible for the increased use of brokered deposits, and higher average wage rates for bank employees. The result shows little evidence of changes in the loan portfolio. Findings suggested that the initial click-and-mortar banks (and their customers) used the Internet channel as a complement to, rather than a substitute for, physical branches.

Onay et al. (2008), in their research on Turkish banks entitled “The Impact of Internet-Banking on Bank Profitability- the Case of Turkey”, investigated on the impact of internet banking on bank profitability. Their analysis covered thirteen banks that have adopted online banking in Turkey between 1996 and 2005. Their results showed that Internet banking starts contributing to banks’ ROE with a time lag of two years. According to their study, the Internet has changed the dimensions of competition in the retail banking sector. It has also provided opportunities for emerging countries to build up their financial intermediation infrastructure. According to study Internet banking variable has had a positive effect on the performance of the banking system in Turkey.

Malhotra and Singh (2009), in their paper described the current state of Internet banking in India and discussed its implications for the Indian banking industry. The results showed that nearly 57 percent of the Indian commercial banks are providing transactional Internet banking services. The analysis indicated that Internet banks have better operating efficiency ratios and profitability as compared to non-Internet banks. Internet banks rely more heavily on core deposits for funding than non-Internet banks. Further, the multiple regression results showed that on one hand the profitability and offering of Internet banking does not have any significant association, while on the other hand, Internet banking has a significant and negative association with the risk profile of the banks.

Lin et al. (2011), in their paper “Banking on the Internet: Does Internet Banking Really Improve Bank Performance?” explained that Internet banking represents an important innovation in the banking industry, yet its empirical analysis that how it affects the bank performance remains rare. The Authors found only modest evidence that Internet banking adoption improves bank performance. In fact, the adoption of Internet banking actually results in worse performance for many banks.

The analysis further suggests that younger banks and banks that are earlier adopters are more likely to enjoy the benefits of Internet banking.

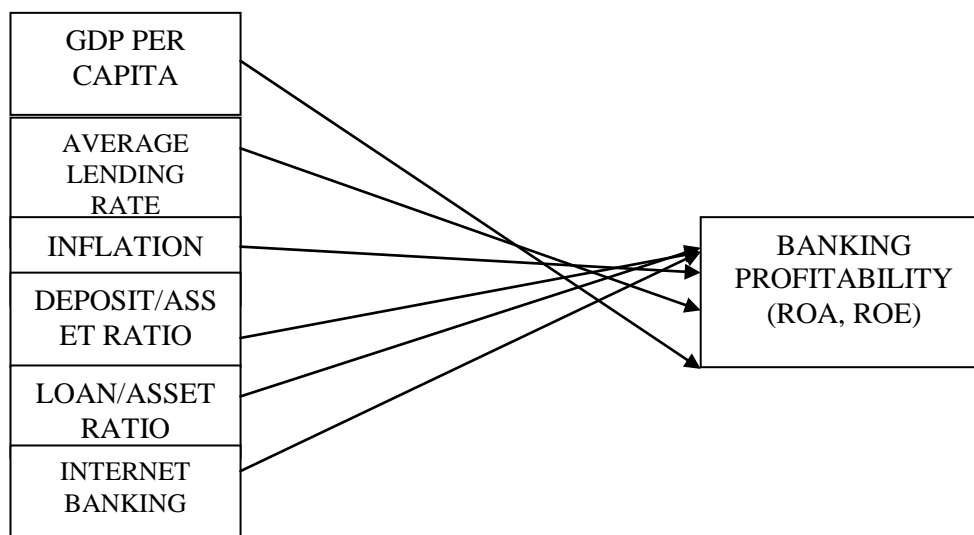
4. Research Methodology, Data and Model Specification

This study is based on secondary data. The required data have been collected from the various annual reports of RBI, Indian bank's association, annual reports of selected banks and RBI bulletins.

To analyse the effects of Internet banking on bank performance with GLS method, we have collected panel data from 8 top commercial banks in India (State Bank of India (SBI), Bank of India (BOI), Central Bank of India (CBI), Punjab National Bank (PNB), and Union Bank of India (UBI), ICICI Bank, HDFC Bank and Axis Bank.) that have adopted Internet banking sometime between 1997 and 2010. We follow an empirical model based on previous works (Berger (1995); Demirguc-Kunt and Huizinga (1999); by Quispe-Agnoli and Whisler (2006); and Oney et al (2007) where we defended a bank's performance, Y_{it} (measured by the ratio of bank's pre-tax profits to total assets ROA) or to its equity (ROE) for bank i in year t . This relationship is as follows:

$$Y_{it} = \alpha_0 + \theta_t MACRO_t + \beta_i X_{it} + \gamma_t BANKCRI_t + \delta_{it} INTERNET_{it}^j + \varepsilon_{it}$$

Where α_0 is a bank fixed effect term that captures time-invariant influences specific to bank i , $MACRO_t$ is a matrix of macroeconomic variables in India in year t that include percentage change in real GDP per capita, inflation and the average lending rate charged by banks in year t . X_{it} is a matrix of bank-specific control variables: Total deposits in bank i as a ratio of total assets in year t , total loans of bank i as a ratio of total assets in year t . We employ a matrix of dummy variables, $INTERNET$, that are defined based on the time of adoption of a transactional website by the bank. Thus, $INTERNET$ is a dummy variable that equals 1 if the bank introduces a transactional website in year t . Model diagram of the study according to both dependent and independent variables are presented as below:



5. Data Analysis

In this section we will test the impact of Internet banking services on the profitability of banks. The unit root test has been applied in order to find the reliability and accuracy of data. Therefore, we begin our empirical analysis by testing for unit roots of variables with the help of Fischer - Dickey Fuller test.

5.1. Unit Root Test

Table 1 shows the results of Fischer - Dickey Fuller test.

Table 1. Stationary Test of Variables

Variable	Intercept and no trend	Intercept and trend	Optimal lag
ROA	14.22 (0.94)	32.48 (0.00)	-
ROE	29.39 (0.02)	25.24 (0.06)	-
DA(Deposit/Asset)	37.92 (0.00)	24.47 (0.06)	-
LA(Loan/Asset)	9.95 (0.86)	24.19 (0.08)	-
INF(Inflation)	12.97 (0.67)	20.78 (0.18)	1
GDP	14.29 (0.08)	47.59 (0.00)	-
LR(Lending Rate)	66.39 (0.00)	-	-

As can be seen from the table, all variables are stationary except inflation. When this series is converted into first difference, this variable became stationary as its value is 1 in the fourth column. Therefore, we use this variable with one year lag in our model to estimate the impact of Internet Banking on profitability of banks.

5.2 Tests of Fixed Effects, Random Effects and Pooled OLS model

Panel data can be divided into the three types of model, the Pooled OLS, fixed effects and random effects models. Pooled OLS model has constant coefficients; referring to both intercepts and slopes therefore we could pool all of the data and run an ordinary least squares regression model. The fixed effects regression models allow the unobserved explanatory variables (either cross-section fixed effects or time fixed effects) to be correlated with the observed explanatory variables. If the unobserved explanatory variables are strictly uncorrelated with the observed explanatory variables, then it might be appropriate to treat the regression model as a random effect model, where cross-section specific constant terms (a different constant term for each cross-section unit) are randomly distributed across cross sectional units. In Modern Econometrics “Random Effect” is considered synonymous with zero correlation between the observed explanatory variables and unobserved explanatory variables.

In terms of regression analysis, as panel data is adopted in this study, corresponded regression model should be selected from fixed effect and Pooled OLS model. In this context we have applied F-test. The results obtained from F-tests (for fixed Effects) are presented below. These results indicate that the null hypotheses that we have to use Pooled OLS methods are rejected for these groups of banks at % 5 significance level. Therefore, as it is shown by the results, we cannot estimate the model by using Pooled Ordinary Least Squares method.

The general accepted way of choosing between fixed and random effects is running a Hausman test. Statistically, fixed effects are always a reasonable thing to do with panel data (they always give consistent results) but they may not be the most efficient model to run. Random effects will give better P-values as they are a more efficient estimator.

Table 2. Results of Hausman Test (ROA and ROE)

Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
0.000000	7	1.0000

Result of Hausman test in table 2 shows that fixed effects model is more appropriate as compared to random effects model for this study. Results of F-test also are presented as below for both dependent variables:

$$F = \frac{(0.89 - 0.79)/7}{(1 - 0.89)/97} = 12.6 \quad (1)$$

$$F = \frac{(0.64 - 0.52)/7}{(1 - 0.64)/97} = 4.6 \quad (2)$$

As can be seen, the calculated F statistic for ROA model (1) is equal to 12.6 and critical value of this statistic is equal to 2.83. The calculated value of F is greater than the table value ($12.6 > 2.83$). Consequently, estimated model by using Pooled data model is invalid and the best model for our study is fixed effects.

The calculated F statistic for ROE model (2) as can be seen is equal to 4.6 and critical value of this statistic is equal to 2.83 ($F_{0.01}(7,97) = 2.83$). As the calculated value of F is greater than the table value ($4.6 > 2.83$), panel model with fixed effects is then selected as an appropriate model versus pooled data model.

Table 3. Estimation of Model of Study with Fixed Effects Model (ROA)

Variable	Coefficient	t-Statistic	Prob.
C	0.637883	2.790923	0.0063
GDP	-0.026349	-0.819485	0.4145
INF(-1)	0.053178	1.882288	0.0628
DA	0.131985	3.504815	0.0007
LA	0.262625	5.273482	0.0000
LR	-0.051911	-0.816120	0.4164
INTERNET	0.046134	2.180300	0.0317
R-square= 0.899847, Adjusted-R square=0.885392, F=62.25133, DW=2.156695			

Table 3 shows the results of the model. R square value in the above table indicates that 89 per cent of the variance in dependent variable (ROA) is explained by the model. All independent variables of the study are logarithmic. As can be seen from the table, GDP has a negative impact on dependent variable ROA. Nevertheless, it is not significant. This means that any improvement in production and economic growth will shift surplus capital into investment and production instead of banks' accounts. We can infer from this the conclusion that the reduction in banks' deposits would be followed by a fall in their profitability. The negative coefficient of GDP can be explained that countries with higher GDP are assumed to have a banking system that operates in a mature environment resulting in more competitive interest and profit margins.

Inflation (INF) variable with one year lag has a positive impact on ROA but it is insignificant. This may suggest that due to the inability of banks to accurately

predict the levels of inflation, the banks lose the opportunity to benefit from inflationary environment to increase profits.

As can be seen from the table both total deposits of banks as the ratio of total assets (DA) and total loans of banks as the ratio of total assets (LA) have a positive impact on profitability of banks and both ratios are significant. Deposits and loans are the most important indicators in the bank financial statements because they reflect the banks' primary functions. Provided that other variables remain constant the higher the rate of transforming deposits into loans the higher would be the profitability of banks in India. The lending rate variable is negative but is insignificant. This result shows a decrease of interest rates in India has had a negative impact on profitability of banks.

It is also clear from the table that the dummy variable of INTERNET has positive impact on the profitability of banks at 3 per cent level of significance. This result indicates that adoption of Internet banking as a delivery channel would improve convincingly their performance and profitability. Table 4 clearly demonstrates that the dummy variable of Internet banking has also a positive impact on dependent variable ROE and is significant. This result corroborates positive affect of Internet banking on profitability of banks in India.

Table 4. Estimation of Model of Study with Fixed Effects Model (ROE)

Variable	Coefficient	t-Statistic	Prob.
C	1.258591	2.417792	0.0175
GDP	-0.075008	-2.149195	0.4341
IINF(-1)	0.033251	0.619486	0.5370
DA	0.176240	2.847277	0.0054
LA	-0.033258	-0.600563	0.0495
LR	0.086223	0.727652	0.4686
INTERNET	0.224260	3.755754	0.0003
R-square= 0.648028, Adjusted-R square=0.597228, F=12.75646, DW=2.090003			

6. Conclusion

The methodology of carrying out this research was based on the objectives of the study and the availability of relevant information. The results of the models show both internal and external factors have a significant impact on the performance of banks in India. The findings of the study indicate that both total deposits of banks as ratio of total assets (DA) and total loans of banks as ratio of total assets (LA) have a positive impact on profitability of banks and are significant. Results of econometric models also show despite of a small share of Internet banking services in profitability of the banking system as compared to the traditional activities of banks this service has a positive impact and enhanced productivity and profitability of the banking system in India.

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