

Factors Affecting E-Banking Usage in India: an Empirical Analysis

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Abstract

This study aims at identifying the factors affecting the customers demand for E-Banking services, by analyzing a sample of 450 consumers' responses who have been interviewed personally through structured questionnaire in 3 districts of Uttar Pradesh, India, namely Lucknow, Kanpur & Varanasi. The factor analysis using principal component extraction method with Varimax rotation has extracted 4 factors which explained the 62.84 percent of the variance. All the four factors - ambiance & infrastructures, technology & innovation, services & security, and consumer support & timings - represent different banking attributes important to customers. This provides a basis for the banks in order to modify and offer demanding services to the banks.

Key words: *Factor Analysis, Correlation Matrix, online banking, ATM services , Internet Banking*

JEL Classification: *G21, O33*

Introduction

Innovations in the field of banking, information and telecommunication technologies have drastically changed the structure of the overall financial system and particularly of the banking system by lowering the transaction costs and reducing asymmetric information (Katri et.al 2002).

At the same time, both financial consolidation and new innovations require the usage of new methods to preserve the safety and soundness of the financial system through the supervision and regulation of financial intermediary's activities.

Kaynak and Harcar (2005) observed that in recent years, commercial banks of all types and sizes have intensified the use of online banking in their operations. First offered in mid-1990s, online banking is becoming the latest breakthrough development in the ever-growing world financial services marketing.

The Automated Teller Machine (ATM) is a machine which performs various jobs, such as dispensing cash, accepting deposits of cash and cheques (only in special envelopes and not note pieces or cheque leaves), throughout the day (Srivatava 2000).

According to Y.V. Reddy former deputy governor, RBI, there are some banks that are not strong and some banks that are strong, but the critical issue is to really improve the overall

efficiency of the banking system. Banks are banks and they have to compete. They have to be efficient and regulated properly irrespective of their being public- or private-owned.

If a bank already has a reputation for technical innovation, its customers are likely to feel comfortable with more technology. But if a large share of its profits or growth comes from older customers who prefer personal service, it could be unwise to push ATMs too hard. Bank marketing managers need to continuously assess the customer's decision-making process as well as the formation of attitudes, preferences and satisfaction of automated services. It is of little use for an organization to attempt to position an offering by emphasizing particular attributes that do not constitute significant choice criteria in the target market (Devlin, 2002).

Moutinho and Smith (2000) studied the bank customer satisfaction through mediation of attitudes towards human and automated banking. Their findings suggest that the drive towards 'ease of banking' and convenience is favored by customers and therefore banks should find alternative strategic routes designed to improve service delivery, either human based or technology based. The study also suggests that Bank customer's attitudes towards the human provisions of services and subsequent level of satisfaction will impact on banks switching more than when the same delivery is made through automation.

Finally, turning to the literature dealing directly with influences on consumer adoption of internet banking services, we discovered a fragmented and inconclusive theoretical base:

- Demographics may be relevant. In the uptake of electronic banking – which includes ATMs, phone banking, internet banking and other electronic banking forms – Kolodinsky, Hogarth and Shue (2000) found that the likelihood of adoption rose with higher levels of financial assets and education, but that individual consumer attitudes and beliefs were stronger influences than demographics. In addition, recent studies confirm earlier reports of difficulties attracting the 65+ age group to internet banking (Ilett, 2005; Perumal and Shanmugam, 2004). Gender issues may also be relevant. Shergill and Li's (2005) study of internet banking consumers found that women regarded privacy protection and ethical standards more seriously than men did. Nevertheless, in some countries such as the UK, women now equal men in numbers using internet banking (Ilett, 2005) raising new questions about the nature of gender differences found in internet banking adoption.
- Convenience has been identified by a number of studies as an important adoption factor (ACNielsen, 2005; Pew, 2003; Ramsay and Smith, 1999; Thornton and White, 2001). A US survey found convenience to be the main motivator for internet banking in terms of 24/7 access and time savings (Pew, 2003). Interestingly, Chung and Paynter (2002) found that many people who did not use internet banking believed they did not need high levels of convenience. Accessibility, which may be related to convenience, has also been found important (Ramsay and Smith, 1999). High levels of workplace internet use have also been associated with the uptake of internet banking (Durkin, 2004).
- The relevance of internet banking as an innovation has been found significant. Tan and Teo's (2000) survey of (mostly male) internet users employed Ajzen's (1985) theory of planned behaviour and Rogers' theory of innovation diffusion, and identified the main influences as: perceptions of relative advantage, compatibility, trialability and risk. All but risk are known constructs in Rogers' theory of innovations diffusion. Also supporting the importance of trialability, Chung and Paynter (2002) found that lack of prior use of internet banking inhibited consumer adoption. Their survey further found that consumers who did not use the internet channel did not feel a need to do so, suggesting the importance of relative advantage. In a related finding, Sathye's (1999) study highlighted that many consumers were simply unaware of internet banking and its unique benefits.
- Adaptability, technical self-efficacy and knowledge of the internet banking application have been found influential, suggesting that individual characteristics affect the adoption decision

(Thornton and White, 2001). The desire for control of service delivery was found important by Ramsay and Smith (1999) while habit may also play a role (Wan et al., 2005). The information provided on the banking web site may help provide needed knowledge and thus help to motivate adoption (Waite and Harrison, 2004).

- Security, privacy, trust and risk concerns may impact on consumer internet banking choices. It was found that 80% of global phishing attacks in the first quarter of 2005 targeted the financial services sector (IDC, 2005). One survey by Chung and Paynter (2002) identified consumer fears regarding transaction security as an inhibitor to the adoption of internet banking. Security has also been identified as a key consumer concern in other internet banking adoption studies (e.g. Black et al., 2002; Siu and Mou, 2005). In Australia, Sathye's (1999) study highlighted consumer security fears while Ramsay and Smith (1999) found privacy to be a key consumer concern. Hain et al (2003) observed that non-internet banking consumers were more concerned about security and privacy issues than internet banking consumers. The security concern has also been recently associated more with female than male non-users (ACNielsen, 2005). Trust in the internet gained through long-term internet usage has been found an important factor in the adoption decision (Gartner, 2003b). In the context of consumer attitudes toward internet banking systems, trust may be related to consumer judgement on security and privacy issues (Wang et al., 2003). Suh and Han (2002) found trust an important factor in consumer adoption of internet banking using a Web-based survey, while Rexha et al (2003) obtained similar results in Singapore.
- Some researchers have organised internet banking adoption factors into categories (e.g. consumer, product, organisation and channel, Black et al., 2002).

Objectives and Hypothesis

The main objective of the present paper is to seek and measure the level of customer satisfaction and the online services rendered in banking industry on the basis of various dimensions i.e. ambiance, service quality technological use, security, use of computers, customers support, and attitude of employees.

Data and Methodology

Survey data

This study is based on a survey carried out through a structured questionnaire. The primary data required for the study has been collected from three cities of Uttar Pradesh (India) across different regions so as to make it representative of entire population. The cities involved in the survey have been Lucknow, Kanpur & Varanasi. The sample size of 450 has been taken from among the urban population of over 18 years of age, using banking services. Questions related to use of ATM Services, Mobile Banking, Phone banking, internet banking, (NEFT/RTGS) were asked in a dichotomous form were asked, and then questions in a Likert scale. Similarly, the questions related to socio-demographic information of the respondents such as gender, education level, occupation and household income were also included.

Instruments

The factor analysis with rotated method was employed to extract the important variables from a list 17 continuous variables which are given in the table below Table: 1.1 and Eigen value of less than one was used to extract the variables. All the statements other than the statements relating to general information were based on 5 point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree) with an option of NK (not known). The schedule has 8 items of

general information. After having identified the variables, we have designed the correlation matrix and have extracted the factors by means of the Principal Component Analysis and the rotation method Varimax with Kaiser Normalization.

Table 1. Variables used for Factor analysis

1	Ambiance & Interiors
2	Transparency of services
3	Better return on deposits
4	Seating, Parking & Cafeterias
5	Information & Communication
6	Use of computers and internet
7	Behaviours of employee/staff
8	Innovative services
9	Promptness & Accuracy
10	Number of services
11	Minimum cost of services
12	Risk minimization & Security
13	Ease in availability of services
14	Accessible location
15	ATM facility
16	Grievances Redress
17	Banking hours

Source: made by author

Primary Data

To find out the customers' perceptions about online banking, the primary data were collected from 450 randomly selected customers from Lucknow, Kanpur, Varanasi, U.P. India.

Consumers' profile analysis

Table 2 presents the socio-demographic features of the banks' consumer respondents. The socio-demographic profile of the overall sample is shown in Table 1. The sample comprises 81 percent male and 19 percent female respondents. The educational profile of the sample shows that about 89 percent respondents are graduate and above; 11 percent hold education degrees up to secondary and higher secondary levels. About 55 percent of the respondents have an annual income of Rupees 300,000 & above, and 45 percent have an annual income lower than Rupees 300,000. The 87 percent of the respondents had a saving account and 13 percent had a current account. 74 percent of the respondents had an account in a public sector bank, 22 percent of the respondents had a private sector bank account, and 4 percent had an account in a foreign bank.

Table 2. Sample Demographic Characteristics

	N	%		N	%
Gender			Annual Income		
Male	364	80.9	less than 1,00,000	54	12.0
Female	86	19.1	1,00,001 To 2,00,000	36	8.0
Occupation			2,00,001 To 3,00,000	114	25.3
Government service	103	22.9	3,00,001 To 4,00,000	114	25.3
Private service	65	14.4	More than 4,00,001	132	29.3
Business	177	39.3	Types of Accounts		
others	105	23.3	Saving	393	87.3

Table 1 (cont.)

Education			Current	57	12.7
High School	13	2.9	Category of Banks		
Intermediate	37	8.2	Private Bank	98	21.8
Graduation	248	55.1	Public Bank	335	74.4
Post Graduation	152	33.8	Foreign Bank	17	3.8

Source: Made by author

Analysis and Results

It can be observed that the correlation matrix Table 3 is fit for factor analysis. Therefore, we proceed to the factor analysis.

Table 3. Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1	.917 ^{**}	.843 ^{**}	.842 ^{**}	.807 ^{**}	.111 [*]	0.05	0	.113 [*]	.141 [*]	0.03	-0	-0	0.01	0.06	-.186 [*]	-.137 [*]
2	.917 ^{**}	1	.787 ^{**}	.800 ^{**}	.824 ^{**}	.098 [*]	0.07	0.04	.158 [*]	.182 [*]	0.01	-0	0.02	0.06	0.07	-.232 [*]	-.147 [*]
3	.843 ^{**}	.787 ^{**}	1	.841 ^{**}	.805 ^{**}	-0	-.093 [*]	-0	0.06	0.06	0.02	-0	-0	0.05	.102 [*]	-.107 [*]	-.120 [*]
4	.842 ^{**}	.800 ^{**}	.841 ^{**}	1	.751 ^{**}	0.02	-0.1	0.02	0.06	.135 [*]	0.03	0	0.01	0.03	.122 [*]	-0.1	-.113 [*]
5	.807 ^{**}	.824 ^{**}	.805 ^{**}	.751 ^{**}	1	-0	-0.1	-0	0.03	.153 [*]	0.03	.099 [*]	0	0.04	.120 [*]	-.218 [*]	-.133 [*]
6	.111 [*]	.098 [*]	-0	0.02	-0	1	.604 ^{**}	.679 ^{**}	.598 ^{**}	-.114 [*]	-.183 [*]	-0	0.02	.147 [*]	-0.1	-.103 [*]	-.155 [*]
7	0.05	0.07	-.093 [*]	-0.1	-0.1	.604 ^{**}	1	.656 ^{**}	.516 ^{**}	-.105 [*]	-.185 [*]	-0	-0	.151 [*]	-0.1	-.156 [*]	-.108 [*]
8	0	0.04	-0	0.02	-0	.679 ^{**}	.656 ^{**}	1	.544 ^{**}	-.110 [*]	-.159 [*]	-0.1	0.03	.097 [*]	-0.1	-0	-0.1
9	.113 [*]	.158 [*]	0.06	0.06	0.03	.598 ^{**}	.516 ^{**}	.544 ^{**}	1	-.120 [*]	-.130 [*]	-0	-0	-0	0.01	-.156 [*]	-0.1
10	.141 [*]	.182 [*]	0.06	.135 [*]	.153 [*]	-.114 [*]	-.105 [*]	-.110 [*]	-.120 [*]	1	.382 ^{**}	.316 [*]	.229 [*]	.238 [*]	.116 [*]	-0.1	0.08
11	0.03	0.01	0.02	0.03	0.03	.183 [*]	.185 [*]	.159 [*]	.130 [*]	.382 ^{**}	1	.195 [*]	.292 [*]	.205 [*]	.150 [*]	-0	0.09
12	-0	-0	-0	0	-.099 [*]	-0	-0	-0.1	-0	.316 [*]	.195 [*]	1	.248 [*]	.265 [*]	.131 [*]	0.05	.108 [*]
13	-0	0.02	-0	0.01	0	0.02	-0	0.03	-0	.229 [*]	.292 [*]	.248 [*]	1	.104 [*]	.217 [*]	-.123 [*]	-0.1
14	0.01	0.06	0.05	0.03	0.04	.147 [*]	.151 [*]	.097 [*]	-0	.238 [*]	.205 [*]	.265 [*]	.104 [*]	1	.220 [*]	0.05	0.02
15	0.06	0.07	.102 [*]	.122 [*]	.120 [*]	-0.1	-0.1	-0.1	0.01	.116 [*]	.150 [*]	.131 [*]	.217 [*]	.220 [*]	1	-.124 [*]	0.06
16	-.186 [*]	-.232 [*]	-.107 [*]	-0.1	-.218 [*]	-.103 [*]	-.156 [*]	-0	-.156 [*]	-0.1	-0	0.05	.123 [*]	0.05	.124 [*]	1	.346 ^{**}
17	.137 [*]	.147 [*]	.120 [*]	.113 [*]	.133 [*]	.155 [*]	.108 [*]	-0.1	-0.1	0.08	0.09	.108 [*]	-0.1	0.02	0.06	.346 ^{**}	1

Source: made by author

Notes: ** - Correlation is significant at the 0.01 level (2-tailed); * - Correlation is significant at the 0.05 level (2-tailed).

Factor Analysis

The data so collected was analysed with the help of 15.0 version of SPSS. Factors analysis was used for the data reduction and purification, resulting into the deletion of some insignificant items with factor loading less than 0.5 and the Eigen Values less than 1. The factor analysis using principal component extraction method with Varimax rotation has extracted 4 factors which explained 63.23 percent of the variance (Table 4).

Findings

Using the factor loadings, the banking attributes were grouped into their respective factors and were named according to their collective representation. The findings of the study have been summarised as follows:

FACTOR 1

First factor consists of five items, namely: Ambiance & Interiors (4.49), Transparency of services (4.52), Better return on deposits (4.48), Seating, Parking & Cafeterias (4.46), Information & Communication (4.47). The total variance explained by factor 1 is 25.41 percent which primarily comprises ambiance & interiors, parking & seating, and enquiry & information facilities and can be termed 'Ambiance and Infrastructures'.

FACTOR 2

This factor includes four variables, namely: Use of computers and internet (4.33), Innovative services (4.27), Behaviours of employee/staff (4.35), Promptness & Accuracy (4.31). The total variance explained by factor 1 is 16.75 percent. This is termed as 'Technology and Innovation' and is basically related to application of computer in innovative banking services and its accuracy.

FACTOR 3

This factor comprises six variables, as follows: Number of services (1.95), Risk minimization & Security (1.73), Minimum cost of services (1.47), Ease in availability of services (1.61), Accessible location (1.62), and ATM facility (1.34). Similarly, factor 3 can be called 'Services and Security' which explains 12.70 percent variance and represents count, cost and convenience of banking services apart from risk minimization and security.

FACTOR 4

This factor consists of two variables: Grievances Redressal (2.75) and Banking hours (2.70). This last factor can be named 'Consumer Support & Timings' which explains 8.38 percent variance and loads high on Grievances Redress and Banking Hours.

Table 4. Factor Analysis

Rotated Component Matrix ^a	Component				
	Mean	1	2	3	4
		Ambiance & Infrastructures	Technology & Innovation	Services & Security	Consumer Support & Timings
Ambiance & Interiors	4.49	0.947	0.071	0.034	-0.075
Transparency of services	4.52	0.925	0.101	0.076	-0.108
Better return on deposits	4.48	0.925	-0.047	-0.001	-0.020
Seating, Parking & Cafeterias	4.46	0.914	0.001	0.060	0.001
Information & Communication	4.47	0.897	-0.045	0.031	-0.128
Use of computers and internet	4.33	0.026	0.859	-0.085	-0.073
Innovative services	4.27	-0.007	0.858	-0.074	0.021
Behaviours of employee/staff	4.35	-0.048	0.822	-0.092	-0.104
Promptness & Accuracy	4.31	0.086	0.777	-0.039	-0.053
Number of services	1.95	0.138	-0.082	0.668	0.049
Risk minimization & Security	1.73	-0.064	0.079	0.638	0.212
Minimum cost of services	1.47	-0.005	-0.183	0.632	-0.028
Ease in availability of services	1.61	-0.073	0.060	0.601	-0.284

Table 4 (cont.)

Accessible location	1.62	0.040	-0.084	0.531	0.142
ATM facility	1.34	0.085	-0.052	0.450	-0.126
Grievances Redress	2.75	-0.124	-0.100	-0.106	0.797
Banking hours	2.70	-0.092	-0.065	0.122	0.755
Percentage of variance explained		25.41	16.75	12.70	8.38
Cumulative (%)		25.41	42.16	54.86	63.23

Source: made by author

Conclusions

All the four factors - Ambiance & Infrastructures, Technology & Innovation, Services & Security, and Consumer Support & Timings - represent different banking attributes that have proved to be of great importance to customers. This provides a basis to the banks for modifying and offering demanding services to the banks. The banks should implement personalized services for the users of e-banking services.

Trust must be built among the users of e-banking services; customers should be educated about the technological advancement and safety norms.

Grievances redress should be done with a help of a toll free number, which could handle customers' complaints and general feedback.

Since security is one of the major concerns as regards the e-banking services, the banks should keep on analyzing the importance of the various security measures taken by them and focus on the important ones.

The business hours of the bank are limited, so the customers request 2 to 3 extra hours of banking in the evening.

Limitations

The attempt has been made with an aim to study the overall banking sector reforms and its impact on different banks and customers perspective. But, there occurred certain limitation in attaining this goal to the extent of exploring the various aspects of banking reforms. The few important limitations of the study are briefly introduced below.

During the recent past the banking sector has changed very drastically, all attempts have been made to incorporate the major changes but still there can be leakage of some minor information.

There is a number of variations in policy from bank to bank therefore the generalization is not possible for all aspects of reforms.

The response rate has been the biggest challenge for the researcher. Generally speaking, the response rate is very poor in the research survey especially when one aims to collect data for the customers of the bank. They also hide certain information.

Ideally, the responses should be taken from the customers of banks from a number of more cities but due to paucity of time, geographical conditions and other reasons, the survey covered only three cities.

Since the sample size is limited, the findings can be taken only as indicative results. Therefore, it is worth mentioning that the findings have to be compared and confirmed with other extensive studies in order to improve the accuracy of our results.

The inferences have been drawn in the present study through mean values after proper data purification. Thus, we have used factor loading less than 0.5 and the Eigen Values less than 1. The number of extracted factors is determined so that the cumulative percentage of variance extracted by the factors reaches a satisfactory level. The other techniques to measure variability in responses need to be applied in future research.

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