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Impact of Information and Communication Technology on Service Quality of Banking Sector: A Comparative Study of Private and Public Sector Banks in Gwalior and Chambal Region

Prof (Dr.) Anil Vashisht

Director, Amity Business School, Amity University Madhya Pradesh, India.

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ABSTRACT

This paper studies the impact of IT in the service quality of banking sector. The purpose of the intended research involves determining bank adoption pattern of electronic media, factors constituting drivers and inhibitors for bank adoption, dimensionality of e-banking services quality as affected by IT, and customer adoption of such services. The study has also highlighted the determinants of service quality are directly influenced by IT and to explore what are the enabling and retarding factors for effective implementation and upsurge of IT system in banks.

1. Introduction

A Strong Information Technology (IT) base has emerged as a key precondition for any developing country's improved competition and financial and societal modernization. Electronic services which are driven by IT technologies, have recently received extensive consideration as these are situated at the intersection of two noteworthy improvements in the business world: the service growth and ICT (Information and Communication Technology) entrance (Fassnacht & Koese, 2006). In India, the adoption of IT is picking up momentum upheld by booming service sector (64% of GDP in 2015-16) and growing telecom division (the second biggest telecom market by subscriber base, 2016). IT is ruling in the new service improvement and delivery channels especially on the grounds that the requirement for intelligence and data force (Corrocher, 2002) has been brought significantly up in the changing spaces of organizations today. The appearance and selection of IT combined with communication system by commercial enterprises has expelled the constraints of time, distance, and communication(Khan et al., 2009) making the economy more networked and knowledge driven.

IT in banks is promising and additionally lucrative as far as operational and vital advantages it offers. IT gives advantages to the banking organisations as far as decreased operational cost, better client administration and improvement of sophisticated product offerings as it encourages better "Asset liability management" and propelled statistical surveying (Phillips et al., 1983; Zeithaml et al., 1988; Allred and Addams, 2000; and Buzzell, 2004). In the Indian banks perspective, all banks have consolidated IT in their techniques and operations however at various levels relying on the main driving forces and obstructions for its effective execution.

Tools and technologies are deployed by service organizations to fill the quality gaps that may arise during service delivery. IT is one of these technologies that fills the information gap and automates the services to enhance its speed and accuracy thereby enhancing the service quality. IT innovations in processes or service delivery have positive impact on product output and quality (Mukhopadhyay et al., 1997). E-Banking offers more value to the customers as far as information, serviceability, comfort, more extensive collection of offerings, and much more. Attitude of bank customer plays a vital role in adoption and propagation of innovative e-Banking services in banking sector. Besides success of innovation in banking services also depend upon the "perception and consumption patterns" of its users. Customers adopt innovative services easily if these are perceived to be high quality. Besides, high service quality increases customer satisfaction and loyalty.

Direct relation has been found between improved service quality and intention to purchase (determining service usage) (Zeithaml et al., 1996). However, pursuing and maintaining the highest level of service quality often costs too much at the front level (Nam et al., 2006). The critical decision for the firm is to determine and maintain desired rather optimal level of service quality. So the purpose of the this research involves determining bank adoption pattern of electronic media, factors constituting drivers and inhibitors for bank adoption, dimensionality of e-banking services quality as affected by IT, and customer adoption of such services.

The review of existing literature also reveals that very little work has been done in relation to adoption of Information Technology (IT) in the Indian banking sector at regional level. The intention behind this research, therefore, is to fill this gap by exploring thoroughly and comprehensively this field of research. Moreover, there is very little work existing on the relationship between IT and banking services quality as far as India is concerned.

Given the lack of literature and knowledge on this subject, it is a modest attempt to examine how information technology and services quality interrelate in the banking context as perceived by the bank customers and the likely impact of such quality perceptions on the usage or adoption of new technologies. The study would also highlight which determinants of service quality are directly influenced by IT and to explore what are the enabling and retarding factors for effective implementation and upsurge of IT system in banks.

2. Literature review

Many studies have been conducted both at national and international level to evaluate the adoption of Information and communication technologies (ICT). Generally the researcher concentrated on examining the elements influencing firm's choice to embrace new technologies. Studies related to banking sector reported organizational, technological, environmental (competitive, regulatory, market oriented) as major affecting components for IT adoption.

Relationship between firm's decision to adopt new technologies and its determinants was examined and found that the product mix of banks was positively associated with the technology adoption. Wage rate showed significant positive relation with adoption while market growth rate showed no significant impact on adoption of new technologies. The bank's regulatory environment also found to affect the decisions of adopting new technologies (Hannan & McDowell, 1984). Adoption of new technology, like video banking by US commercial banking was explored and revealed that IT and inter-firm linkages increases the tendency of commercial banks to do the innovation and keeping other attributes related to company and industry under control. The study found no association between tendency to innovate and productivity index and technological investment (Pennings & Harianto, 1992). Innovation patterns arise from the dispersion of IT in banking sector of Italy have been studied and results revealed that there is no significant association exist for technological and competitive factors with e-Banking adoption (Bradley & Stewart, 2002). Study in India has been conducted to asses the drivers of IT enabled banking (ITEB) in India and to know the current status of ITEB. The study concluded that private sector banks are way ahead of public sector bank in adoption of IT enabled technologies (Kumra & Mittal, 2004).

Key drivers to enhance the soundness of banking industry have been studied in developed and developing countries and it has been found that ICT infrastructure, intellectual capital have positive but non-significant effect on the soundness of banking sector while strategic partnership, governance have positive significant effect and interaction have negative significant effect on bank soundness (Vaithilingam, Nair, & Samudram, 2006). 88 scheduled commercial banks in India has been studied to examine the factors affecting the bank's decision to adopt e-Banking. The factors found are bigger-size, younger-age, large-deposit-base, low-market-share of banks have positive significant affect on e-Banking adoption by banks (Malhotra & Singh, 2007). It has been found that bank staff resistance to adopt IT technology is the biggest reason for slow growth e-Banking technology in Lybia (Abukhzam & Lee, 2010).

Major drivers for adoption of online banking services were identified as customer-oriented and market-oriented factors. Support by top management, lack of internet-specialists, change in IT technologies are some concerns for the management for system development (Aladwani, 2001). The tendency to adopt e-Banking is affected by the size of the firm, branch intensity, sophistication of users, income and education (Corrocher, 2006). Factors like customer's passivity, technical-complexities, less security, intensity of branch, absence of support by top management, attitude of customers etc have affected the adoption of Internet banking at bank level (Bradley & Stewart, 2002; Abukhzam & Lee, 2010). A large portion of the studies have taken adoption as "binary variable (adopted or not adopted)".

Different Theories have been proposed towards understanding real customer behavior. Particularly, Theory of Reasoned Action (Fishbein and Ajzen's, 1975), Social cognitive theory (Bandura, 1982), Diffusion of innovations theory (Rogers, 2003), Technology Acceptance Model (Davis, 1989), Theory of Planned Behaviour (Ajzen, 1991), Task- Technology Fit theory (Goodhue and Thompson, 1995), the Unified theory of acceptance and use of technology (Venkatesh et al., 2003), advanced different elements deciding the perceptions, beliefs, and attitudes of actual users contributing

knowledge into comprehension the level of appropriation of e-Banking. Different endeavours have been made to develop these theories joining new factors or applying distinctive hierarchical setups.

Aside from applying and amplifying prevalent theories of acceptance of technology, the center of a great part of the examination is laid on instrumentality of technology acknowledgment considering different variables like demographics, trust, past experience, information content, self interest, social influence, and other consumer traits (Venkatesh and Morris, 2000; Mansor and Mat, 2009; Margaret and Ngoma, 2013). In the Indian context, there are just few studies concentrated on IT adoption (Agarwal and Prasad, 1999; and Agarwal and Karahanna, 2000) and specially in banking sector (Gupta, 2008; Joshua and Koshi, 2009; Sharma, 2011; and Kesharwani and Bisht, 2012).

Numerous analysts sought solid and direct connection between perceived service quality and customer satisfaction (Naik et al., 2010) also, it has been demonstrated that service quality influences satisfaction and that satisfaction thusly influences behavioral expectations (Ruyter et al., 1997; Wang and Sheikh, 2006). There is by all accounts a lot of closeness between these two ideas, yet a few researcher precisely expressed that these are two unique develops (Spreng and Mackoy, 1996) Satisfaction is transaction particular while quality can be seen without genuine utilization experience (Oliver, 1989).

Strong relationship found between IT adoption and improvement of service quality (Wong et al., 2008). Major framework used in evaluation of service quality are SERVQUAL (Parasuraman, 1988) and SERPERF (Cronin and Taylor, 1992). Different models have been suggested for website service quality (Parasuraman et al., 2005; Bauer et al., 2006). Some noticeable work has been done to evaluate the service quality in banking sector (Avkiran, 1999; Sohail and Shaikh, 2008; Ariff et al., 2012). In India's context the literature has limited work related to evaluation of service quality in banking sector (Sureshchandar et al., 2002; Sudhakar et al., 2006; Purohit and Patardikar, 2007; and Arora et al., 2011) and e-banking service quality evaluation in particular (Khan et al., 2009). Overall service quality was measured using three items on 5 point likert scale (with endpoints strongly agree/strongly disagree) referred to 'Excellent overall service', 'Service of a very high quality', 'A high standard of service', (Dabholkar, 1995; Spreng and Mackoy, 1996; and Dabholkar et al., 2000)

3. Objectives of the study

1. To determine the leading technologically influenced factors of service quality in banking sector.
2. To examine the impact of identified technologically influenced factors on overall service quality in banking sector.

4. Scope of the study

Information technology proved to be beneficial for service sector to improve efficiency and effectiveness of services offered to the customers. In case of Indian banking sector, almost all the banks have adopted the IT in their working but at different level depends upon the drivers and impediments of its successful implementation. Direct association found between high service quality and customers intention to purchase the product/services (Zeithaml et al., 1996). This study will be helpful to the banking sector to identify the technology driven factors of service quality in banking sector which will be useful for banks to improve their service quality. This study will also be helpful to identify different factors influence customers to adopt e-Banking services.

5. Research Methodology

5.1 Universe of the study: The universe of the study consists of banking community of Gwalior and Chambal region.

5.2 Sampling Frame: This carried out among the customers of banks in Gwalior and Chambal region.

5.3 Sampling Size: For this study a sample of 5 public and 5 private scheduled commercial banks will be taken from each selected city of Gwalior and Chambal region. The banks are selected on the

basis of market capitalization in India. A sample size of 300 customers has been selected from the selected cities.

Table 5.1: Top 5 public sector commercial Banks on the Basis of market capitalization

Sr. No	Name of bank	Market capitalization (In Rs. Crore)
1	State Bank Of India	176,447.92
2.	Bank Of Baroda	34,344.84
3.	Punjab National Bank	23,847.89
4.	Central Bank Of India	17,057.4
5.	IDBI Bank	14,082

Source: BSE website 2016

Table 5.2: Top 5 private sector commercial Banks on the Basis of market capitalization

Sr. No	Name of bank	Market capitalization (In Rs. Crore)
1	HDFC Bank	314,764
2.	ICICI Bank	144,962
3.	Kotak Mahindra Bank	138,427.15
4.	Axis Bank	131,367.39
5.	Indusland Bank	71,352.18

Source: BSE website 2016

5.5 Sampling Method: Non-Probabilistic Judgemental Sampling

5.6 Data Collection: For this study, both primary and secondary data has been used. The secondary data has been collected from the available literature, RBI websites and other sources whereas primary data has been collected from the selected respondent directly by using comprehensive questionnaire for customers.

6. Data Analysis and interpretations

19 factors have been identified by carrying a vast literature review objective of finding out a comprehensive set of variables or items indicating the service quality of banking services influenced by infusion of technology specifically IT. The variables had been majorly derived from the earlier studies conducted both in India and abroad in varied fields

Table 6.1: List of factors relevant for e-Service Quality

Sr no	Item/Variable
1	Ensure Security
2	Effective grievance handling
3	Increased comfort
4	Easy accessibility
5	Reduced cost
6	Easy availability
7	Quick response
8	Seamless Transactions
9	Willingness of employees to service customers
10	Fast transactions
11	Ensured safety

12	Visually appealing material
13	Attractive screen layout and design
14	Service right the first time
15	Transaction within committed time
16	Employees find time to respond customers
17	Knowledgeable employees
18	Instill confidence in customers
19	Individual attention to customers

The opinions of customers regarding impact of technology on different variables reflecting quality of service were measured on a five point likert scale from 5 to 1 depending upon the agreeability on each variable (5 for strongly agree followed by 4 for agree, 3 for neutral, 2 for disagree, and 1 for strongly disagree). All variables were coded likewise.

In order to find out the extent of technological influence on each variable, the variable wise average scores have been analysed. This analysis is based upon the customers’ perceptions about different variables.

Table 6.2: Descriptive Statistics – Variables relevant for e-service quality

		Average scores	Std. Deviation
A4	Easy accessibility	4.32	0.587
A3	Increased comfort	4.39	0.658
A6	Easy Availability	4.3	0.585
A10	Fast transactions	4.3	0.633
A7	Quick response	4.33	0.69
A5	Reduced cost	4	0.834
A18	Instill confidence in customers	3.9	0.671
A15	Transaction within committed time	3.78	0.728
A14	Service right the first time	3.66	0.754
A13	Attractive screen layout and design	3.66	0.636
A17	Knowledgeable employees	3.74	0.743
A8	Seamless transactions	3.74	0.835
A12	Visually appealing material	3.73	0.617
A19	Individual attention to customers	3.71	0.769
A2	Effective grievance handling	3.68	0.829
A1	Ensure security	3.68	1.028
A16	Employees Find time to respond customers	3.66	0.817
A9	Willingness of employee to service customers	3.66	0.738
A11	Ensured safety/confidentiality	3.64	0.805
	Cronbach’s Alpha = 0.878		

Average Score	Significance level
4.00-5.00	Highest
3.00-3.99	Moderate
2.00-2.99	Slight
1.00-1.99	Lowest

Descriptive Table 6.2 shows the average scores for each item. The highest score has been given to the item ‘Easy accessibility’ to the service and the lowest score was recorded for the item ‘Ensure confidentiality’. This shows that the most technological influenced parameters in banking are accessibility to the service, availability of service, comfort for customers, promptness of service and information delivery (with average score \geq ‘4’). All other factors are moderately influenced by IT in banking with average scores less than ‘4’ but more than ‘3’.

6.1 Factor Analysis for determining technologically influenced determinants of service quality

To better understand the construct of variables, factor analytical technique has been applied in order to summarize the items into meaningful groups. Factor analysis has been employed to determine patterns of interrelationships among variables relevant for service quality that are influenced by IT inclusion in banking. To test reliability of data, Cronbach’s alpha statistic has been calculated. For the set of 19 variables, the value of Cronbach’s alpha is 0.878 which is greater than 0.5 hence, satisfies the condition for the reliability of the sample data for further analysis.

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was found to be 0.860 ($p=0.00$) (refer Table 6.5) showing high adequacy and considered as ‘meritorious’ as given by Kaiser, 1974. KMO statistic for individual variables was also checked from Anti-Image correlation matrix by examining the diagonal elements, which was above 0.5 for each variable, hence acceptable.

Bartlett test of Sphericity indicated test value $\chi^2= 399.8$ which is highly significant ($p=0.0001$) (refer Table 6.3).

Table: 6.3 KMO and Bartlett's Test for variables relevant for e-Service Quality

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.86
Bartlett's Test of Sphericity	
Approx. Chi-Square	399.879
Sig.	0.0001

Principal component analysis was applied to extract factors and six factors were retained based on the Eigen values (more than 1) and variances explained by each factor. The initial factor solution (unrotated factor solution) extracts factors in the order of their importance. As we can see in Table 6.6, factor 1 is accounting for largest portion of the variance in the data (28.92%) with remaining each accounting for successively smaller portions of variance. To redistribute the variance from earlier factors to later ones and to make the factor solution more meaningful, rotation of factors was applied. This is an important tool in interpreting factors wherein the axes of the factors are rotated until some other more desirable position has been reached. The factors can be rotated using either orthogonal (the axes are maintained at 90°) or oblique (rotated otherwise) rotation. The most popular algorithm for orthogonal rotation is VARIMAX that was also employed for the current study. The results of the rotation can be seen in the Table 6.7 where the variances accounted for by the extracted six variables have been redistributed among them.

Table 6.4: Initial Eigen values for variables relevant for e-Service Quality

Item	Total	% of Variance	Cumulative %
A1	5.495	28.921	28.921
A2	1.8	9.475	38.397
A3	1.59	8.371	46.767
A4	1.177	6.193	52.961
A5	1.037	5.46	58.421
A6	1.006	5.297	63.718
A7	0.798	4.203	67.921
A8	0.756	3.977	71.898
A9	0.727	3.827	75.725
A10	0.625	3.29	79.015
A11	0.589	3.099	82.113
A12	0.544	2.862	84.975
A13	0.524	2.757	87.732
A14	0.48	2.528	90.26
A15	0.441	2.321	92.581
A16	0.422	2.219	94.799
A17	0.394	2.073	96.873
A18	0.34	1.789	98.662
A19	0.254	1.338	100

Table 6.5: Rotation Sums of Squared Loadings of factors as determinants of e-Service quality

Factor	Total	% of Variance	Cumulative %
1	2.912	15.326	15.326
2	2.613	13.751	29.077
3	2.098	11.04	40.117
4	1.627	8.563	48.679
5	1.511	7.951	56.631
6	1.347	7.087	63.718

Table 6.6: Rotated Component Matrix for variables relevant for e- Service Quality

		Component					
		1	2	3	4	5	6
A1	Ensure security	0.437	0.007	0.066	0.646	0.116	0.042
A2	Effective grievance handling	0.687	0.133	0.087	0.22	0.056	0.042
A3	Increased comfort	-	0.009	0.054	0.809	0.151	0.142
A4	Easy accessibility	0.005	-	0.036	0.776	0.139	0.081
A5	Reduced cost	0.159	0.112	0.032	0.047	0.068	0.853

A6	Easy accessibility	0.242	0.111	0.464	0.028	-	0.016	0.599
A7	Seamless transactions	0.831	0.05	0.028	0.213	0.009	0.103	
A8	Quick response	0.469	0.31	0.463	-	-	0.015	0.056
A9	Willingness of employees to service customers	0.163	0.709	0.098	0.029	0.143	0.103	
A10	Fast transactions	0.227	0.441	0.57	-	0.159	0.051	-
A11	Ensured safety/confidentiality	0.413	0.14	0.102	0.656	0.026	0.044	-
A12	Visually appealing material	0.114	0.12	0.12	0.169	0.783	0.032	
A13	Attractive screen layout and design	0.201	0.126	0.08	-	0.091	0.765	0.033
A14	Service right the first time	0.698	0.096	0.043	0.065	0.24	0.161	
A15	Transaction within committed time	0.651	0.23	0.039	0.056	0.217	0.111	
A16	Employees find time to respond customers	0.151	0.794	0.099	0.148	0.032	0.009	-
A17	Knowledgeable employees	0.129	0.797	0.003	0.136	0.08	0.082	
A18	Instill confidence in customers	0.004	0.428	0.088	0.504	0.284	0.261	
A19	Individual attention to customers	0.007	0.459	0.11	0.524	0.218	0.239	

Table 6.7 : Factor Analytic (Rotated) results for e-Service Quality determinants

		Loadings	Weighted Average
1	Reliability		3.94
A2	Effective grievance handling	0.687	
A7	Seamless Transactions	0.831	
A8	Quick response	0.469	
A14	Service right the first time	0.698	
A15	Transaction within committed time	0.651	
2	Employee efficiency		3.78
A9	Willingness of employees to service customers	0.709	
A16	Employees find time to respond customers	0.794	
A17	Knowledgeable employees	0.797	
3	Operational efficiency		4.47
A3	Increased comfort	0.809	
A4	Easy accessibility	0.776	
A10	Fast transactions	0.57	
4	Assurance		3.81
A1	Ensure security	0.646	

A11	Ensured safety/confidentiality	0.656	
A18	Instill confidence in customers	0.504	
A19	Individual attention to customers	0.524	
5	Tangible evidence/tangibles		3.85
A12	Visually appealing material	0.783	
A13	Attractive screen layout and design	0.765	
6	Value to customers		4.2
A5	Reduced cost	0.853	
A6	Easy accessibility	0.599	

Model Formulation

The following model was used to examine the relationship between dependent variable and independent variables:

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \epsilon_i$$

Where Y = Dependent Variable: Overall Service Quality

α = Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = Regression Coefficients

$X_1, X_2, X_3, X_4, X_5, X_6$ = Independent Variables

ϵ_i = Error Term

Table 6.8: Regression Model Summary for antecedents of e-service quality

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.705	0.497	0.492	0.365	1.976
Dependent Variable: Overall Service Quality					

The value of R^2 is .497 which indicates that all the six variables together explained 49.7% variance in the dependent variable i.e. overall service quality of e-banking services. The rest 50.3% of the variance is unexplained that might be attributable to some other factors not considered in the analysis. The value of adjusted R^2 tells how well the model generalizes. The model is a good fit as the difference between R^2 and adjusted R^2 is fairly small (.005). This indicated that the model would give .5% variation in the outcome (prediction of overall service quality) if it were to be derived from the population rather than the sample. To check the assumption of regression analysis that the errors are independent, Durbin Watson test has been applied. The test statistic equal or closer to 2 indicates that the residuals are independent. In the present analysis, the value of Durbin Watson test outcome was found to be 1.976 which is closer to 2. So, the data meets the assumption of independent errors.

The estimated regression equation is as follows:

$$Y = 3.855 + .137X_1 + .20X_2 + .131X_3 + .166X_4 + .139X_5 + .086X_6$$

This equation shows the predicting power of six factors in determining the overall service quality of e-banking services. All the factors have positive contribution towards predicting the value of overall service quality, together explaining 49.7% variations in the same.

7. Conclusion

Service quality has become a customer's requirement as well as a marketing tool, so it holds importance for both customers and business firms. Regarding e-banking services, customers' evaluation of any innovation or technological upsurge is based on improvement in service quality. So it was imperative to determine the effects of technology on various determinants or items relevant for service quality. We identified 19 variables which are influenced or expected to be influenced by technology infusion in the banking sector based on customers' experiences or expectations. These variables were summarized into six factors: 'Reliability', 'Employee efficiency', 'Operational efficiency', 'Assurance', 'Tangible evidence', and 'Value to customers', using factor analysis.

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