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Research Article

BANKING TECHNOLOGY AND ITS IMPACT ON CUSTOMER RELATIONSHIPS: A STUDY IN NORTHERN INDIA

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A B S T R A C T

The Indian banking sector, nowadays, is experiencing a shift from the traditional branch customer channel to more technology-centric delivery channels. The adoption of innovative technology in the form of internet banking, ATMs and mobile applications has created a profound impact on the banking services particularly bank-customer relationship. In addition, a growing segment of technologically savvy customers, these days, actually prefer the convenience of technologically based service delivery systems over the delivery of those by bank employees. The increasing use of these new age technologies facilitate the marketers to manage customer relationships on individual basis. In view of these developments in technology in banking industry, an attempt has been made in the present paper to study the customer perception of the impact of technology on customer relationships in the Indian banks with a view to offer suggestions on the basis of the study results. The study is based on a sample of one thousand two hundred (1200) customers of four major banks operating in northern India. The responses have been integrated into important factors by applying factor analysis to validate specific measure of relationship banking. Linear regression was performed to study the effect of technology on customer relationships. The empirical findings reveal that the technology usage has a positive and significant impact on customer relationships.

INTRODUCTION

In this era of growing competition, the establishment and maintenance of long-term customer relationships has been increasingly recognized for its role in enhancing profitability thereby increasing the effectiveness of interaction with key customers (Mohammed, *et. al*., 2002). Reichheld (1993) concluded that a 5 percent increase in customer retention boosts the company's profit by 60 percent by the fifth year. It has been argued that long-term relationships where both parties over time learn how best to interact with each other lead to decreasing relationship costs for the customer as well as for the supplier or service provider. Hanson (2000) also indicates that it is less costly to serve existing customers than to continually find and attract new prospects. The marketers, during the last couple of decades, have embraced the technology-enabled services, delivered through electronic channels to facilitate the process of customer relationship management (Mulligan and Gordon, 2002; Winer, 2001; Peters, 1997; Han, 1997; Grant and Schlesinger, 1995). This provides customers with relatively more choice and accessibility, greater convenience and faster response.

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The relationship between the business and its customers is critical in financial sector particularly in banking industry (Colgate and Stewart, 1998; Devlin, 2000; O' Loughlin and Szmigin, 2006) where there is a great deal of interaction between the customer and the bank, and technology plays a major role in that interaction (Brynjolfsson, 1996; Lang and Colgate, 2003). The higher costs of delivering services through personnel and increased competition from technology innovative competitors compel the firms to adopt latest technologies (Byers and Lederer, 2001). Also the changes resulting from deregulation in the banking industry, rapid global networking, and the rise in personal wealth have thus made the implementation of the sophisticated delivery systems a strategic necessity in many cases (Lewis, *et. al*., 1994).

To know each and every customer is impossible these days without the aid of sophisticated technology in place. Grant and Schlesinger (1995) point out that in the past we lacked the technological capability to be able to maximise profitability from customer relationships. Now technology enables companies to link their investments in customer relationships more directly to the returns that customers generate. Companies can thus optimise the value exchange, which is relationship between a company's financial investment in customer relationships and the return that customers generate in responding to that investment.

The developments in information technology will assist the firms to identify individual buyers' needs and preferences thereby leading to the development of tailor made products (Blattberg, *et. al*., 1995). With the development of this unique relationship, each customer becomes a segment in his or her own right (Blatterberg, 1995; Mckenna, 1995). However, bringing the customers online, transfers the control of the business systems from the bank to the customer and by doing that banks may lose power because the technology is now in the hands of customers (Carrington *et al*., 1997; Evans and Wurster, 1997). This implies that informed customers will always try to move from one bank to another for better service. Therefore, technology has the potential to empower customers with easy access to comparative data and that it allows them to switch providers at the click of a mouse. In line with this argument, present study seeks to understand in what way the practice of using the technology affects relationships that are established between banks and their customers.

LITERATURE REVIEW

With the adaptation of technology by banks throughout the world, a large segment of customers prefer to conduct a portion of their banking business using self service delivery systems (Pyun, *et. al*., 2002; Quinn, 1996). Literature shows that most customers are willing to accept more and more technology if they are given some level of autonomy over transactions (Cowles and Crosby, 1990). Technology provides a tool to organise all relevant information around individual customers which can be used to provide customers with a broad range of products and services. The information technology has the enormous potential to influence the banking industry and for some researchers it is the decisive tool to effect relationships (Rayport and Sviokla, 1995; Schwartz, 1997; Zineldin, 2000) by enhancing customer's perception of banks commercial and technological competence, which being a significant determinant of bank-customer relationship (Mushtaq and Aaijaz, 2013). Information technology represents an absolute revolution by which relationships could be managed effectively. It also offers the co-production between buyer and seller (Carrington *et al*., 1997) and provides an opportunity for one to one marketing (Peppers and Rogers, 1995). As such the information technology can facilitate to foster loyalty and provide scope to establish enduring relationships with customers and a wider network of contacts (Coupey, 2001). Several studies have suggested that technological advances and the tools of communication enable close and long-term relations to be created and developed with customers (Heinen, 1996; Evans and Wurster, 1997; Kara and Kaynak, 1997; Dannenberg and Kellner, 1998; Jayawadhena and Folly, 2000; Mols, 2001; Ricard *et al*., 2001). However, there is no consensus as to whether these relationships are strengthened or, rather, weakened by the use of technology (Durkin and Howcroft, 2003). If, on one hand, the potential exists for technology to improve communication and customisation, on the other hand, increasing virtualisation may translate into no direct personal interaction, diluting links between company and customers.

The use of technology is considered to have a positive effect on relationship between bank and their customers, essentially due to the increase in the efficiency of communication that enables a reciprocal flow of information (Naude and Holland, 1996; Glazer, 1991). The new means of contact enable interactivity between the parties and reduce possible asymmetries of information. The increase in collaborative production between the customer and bank enables one-to-one marketing, associated with better knowledge of customer's needs, in the provision of products tailored to individual customers and in pro-active selling (Carrington, *et. al*., 1997; Peppers, *et. al*, 1999; Blattberg, *et. al*., 1995; Berger, 2009). Each relationship becomes unique and each individual customer constitutes a true market segment (Blattberg, *et. al*., 1995; Burnham, *et. al*., 2003). The decrease in the differences of access to information allows greater customer power and trust in the development of the relationship (Evans and Wurster, 1997). A key attraction of the internet in this relational role is the level of interactivity that can exist between the relational partners. Deighton (1996) proposes that the term interactive points to two features of communication: the ability to address an individual and the ability to collect and remember the responses of that individual. The promise of interactivity lies in its aptitude to put a more human face on the market place without losing the scale of economies of mass marketing (Blattberg and Deighton, 1991).

Some authors argued that customers should feel as if they are in control of the technology and not the other way around particularly when conducting the transaction via internet (Kangis and Passa, 1997; Newman and cowling, 1996). In the absence of direct contact with the technology, customers often perceive that they have less control over the transactions. Ledingham (1984) concluded that consumers are thought to have a positive perception of technology based service attributes since they believe that technology delivers services faster and efficiently than employees. The design of technology should be flexible enough to allow customers to make changes during the transaction and banks should make customer service representatives available so that waiting time for customers is reduced (Dabholkar, 1994). While there is apparently still strong demand for personalized customer service, banks that offer both branch location and technology based banking service may be in a better competitive position than banks offering only one or the other (Byers and Lederer, 2001).

Research Objective

In light of above cited research studies, an attempt has been made, in the present study, to study the impact of bank technology on customer relationships in select banks in India. Such an analysis will provide banks a quantitative estimate of technology impact and would provide suggestions regarding the deployment of technology.

Research Hypotheses

The above discussion leads to the following research hypotheses:

The main hypotheses

H_0: There is no significant impact of information and communication technologies on bank customer relationships

RESEARCH METHODOLOGY

Sample Design and Description

The data for the present study has been collected from two private sector banks viz. Jammu and Kashmir Bank (JKB), Housing and Development Financial Corporation Bank

(HDFC Bank); and two public sector banks viz. Punjab National Bank (PNB) and State Bank of India (SBI). These four banks have been purposely chosen as they are the leading banks in private and public sector operating in northern India. The study involved distributing 1200 questionnaires, which represents 300 (three hundred) /25% bank customers from each bank. A mall intercept method was used by following convenience sample method of data collection. All important demographic characteristics like age, sex, level of income, level of education and profession were taken into consideration while seeking the response from the customers. All these demographic characteristics have an important bearing on the bank-customer relationships. The effort was made to give a balanced representation to above demographic characteristics to make the sample representative.

A sizeable number of respondents belonged to the age group of 31-40 years (37.41%) followed by the age group of 20-30 years (34.75%) where as the age group of above 51 years were the least (6.67%) followed by the age group of 41-50 years (21.17%). Male respondents were highest in number (69%). A significant number of respondents were graduates (48.08%) followed by post graduates (39.84%) and the remaining had their secondary level education (12.08%). Heavy participants (39.92%) belonged to the income group of 21,000-40,000 per month followed by the income group of 41,000-60,000 (27.17%) where as the least participants (10.33%) belonged to the income group of above 61,000 followed by the income group of up to 20,000 (22.58%). Service class respondents were highest in number (60%) followed by business (28.42%) where as professionals were the least (11.58%). Saving account holders were large in number (74.50%) followed by current account holders (22.42%).

Research Gadget

The study is based on the primary data collected from the bank customers through a questionnaire designed and developed after consultations and discussions on the aforesaid research problem with the panel of customers, bank officials and academicians as well as after reviewing the relevant literature. A five-point Likert scale, ranging from strongly disagrees which scored 1 to strongly agree which scored 5, was used for this study and all questions were phrased positively. The instrument was divided into three sections. Section one dealt with customer's perception of bank-customer relationship. Section two dealt with customer usage of technology enabled services. The last section collected demographic information about the respondents. Further, the questions in section two relating to the usage of information and communication technologies, have been put in a dummy form and comprise of usage related to e-banking, SMS banking, Credit Card and Debit Card. These are discussed below:

E-Banking: A system of banking that allows bank customers to carry out wide range of banking transactions by electronic means through the web site of the bank via internet.

SMS Banking: Instant notification of transactions via mobile phone.

Credit and Debit Cards: Electronic cards contain microchips capable of performing online payment.

The questionnaire was piloted on forty bank customers of four commercial banks in Srinagar. After the elimination, addition and rephrasing of several questions, the final questionnaire was prepared consisting of twenty-three items.

The study was conducted in the Northern India in States of Jammu and Kashmir, Punjab and union territory of Delhi during the months of October, 2012 to March, 2013. The target population comprised retail bank customers of the said banks. A multi-stage convenience sampling approach was employed, in which 1200 (twelve hundred) respondents participated in the survey.

The data collected from bank customers was analysed and purified through factor analysis with the help of 19.0 version of Statistical Package for Social Sciences (SPSS) software to identify the factors that explain the pattern of correlation within a set of observed variables and to simplify and reduce the data to identify a smaller number of factors that explained most of the variances observed in the much larger number of manifested variables (Foster and Thomas, 2001). The study used R-mode Principal Component Analysis with a Varimax Rotation and Eigen value equal to or more than 1 (Kinnear and Taylor, 1987). Five (5) factors were extracted with loadings equal to or above 0.50, thereby deleting 2 items within 06 iterations with 68.239% variance explained. The communalities of a twenty-one (21) items ranged from 0.513 to 0.761 indicating that a large amount of variance has been extracted by the Factor Solution. In addition, two items (V12 and V22) namely, your bank is flexible in serving your needs and your bank provides customized services to customers respectively were below the suggested value of 0.50 (Haier and Anderson, 2006) and were not considered for further analysis.

The factors finally selected have been named indicating various variables/statements grouped under the given set. Thus out of 23 statements, 21 got grouped under five factors, viz., Trust (16.03% VE (Variance Explained), Competence (15.40% VE), Commitment (14.23% VE), Communication (12.14% VE), and Conflict Handling (10.41% VE) (Table 3). The first factor Trust followed by Competence explains most of the variance (16.03%, and 15.40% respectively) and contains most of the elements (6 and 4 respectively). Thus, Trust and Competence are important determinants of perceived relationship marketing dimensions in banks.

Table 1 Summary of Results from Scale Purification: Dimensions, Factor Loadings, communalities, Eigen value, Cronbach's Alpha and Variance Explained

Items	Factors					Communalities
	F1	F2	F3	F4	F5	
V1	.802					.651
V16	.649					.513
V17	.616					.725
V18	.618					.637
V19	.720					.706
V21	.665					.730
V4		.754				.757
V7		.703				.747
V8		.794				.684
V14		.590				.743
V3			.708			.590
V9			.606			.520
V10			.846			.755
V11			.805			.677
V2				.796		.741
V5				.793		.688
V6				.561		.722
V20				.534		.583
V12					.780	.667

V13					.759	.761
V15					.593	.731
Eigen Value	3.368	3.236	2.990	2.550	2.187	14.331
% of Variance	16.038	15.409	14.237	12.141	10.413	68.239
Cronbach's Alpha Score	.825	.768	.793	.784	.644	.825
Number of Items	6	4	4	4	3	21

The Reliability of the scale was tested by using Cronbach's Alpha (α). The present generated scale achieved the scores of 0.825 (Table-1) which is highly acceptable reliability coefficient (Nunnaly, 1978). The Cronbach's Alpha was also applied to each factor/dimension which revealed an Alpha (α) score of 0.825 for Trust (F1); 0.768 for Competence (F2); 0.793 for Commitment (F3); 0.784 for Communication (F4) and 0.644 for Conflict Handling (F5). All the five factors/dimension scored more than 0.644, revealing an acceptable level of reliability.

The adequacy of the sample size was confirmed using both the Kaiser-Meyer Olkin (KMO) Sampling Adequacy Test and Bartlett's Test of Sphericity (BTS). In fact, KMO for relationship scores (0.904) exceeded satisfactory value and revealed a Chi-Square at 8244.578, (P≤0.000) which verified that correlation matrix was not an identity matrix, thus validating the suitability of factor analysis. The KMO measure of sample adequacy was performed which showed KMO=0.904 is higher than the suggested value of 0.6 (Tabachnik and Fidell, 2011).

Table 2 KMO and Bartlett's Test

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin measure of sampling adequacy	.904
Bartlett's Test of Sphercity (Approx. Chi- Square)	8244.578*

*Significant at 1%level.

Independent and the dependent variable

The Dependent Variable

BCR: Bank customer relationship (BCR) is the relationship between the bank and the customer as perceived by the bank customers.

The Independent Variables

ICT: Information and Communication Technology (ICT) is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards. It includes:

E-Banking: A system of banking that allows bank customers to carry out wide range of banking transactions by electronic means through the web site of the bank via internet.

SMS Banking: Instant notification of transactions through the use of smart phone in conjunction with the internet facility in the Banking Industry.

Credit and Debit Cards: Electronic cards contain microchips capable of storing electronic cash that can be used for online and off line payment.

The Research Model

In trying to assess the impact of ICT usage on bank-customer relationship of the sample banks, the following regression model has been devised.

$$BCR = \alpha + \beta_1 e-banking + \beta_2 SMS\ banking + \beta_3 Cr.Card + \beta_4 DebitCard + \mu$$

Where

BCR = Bank Customer Relationship (the mean score of perceived customer relationships)

E-banking = the use of e-banking

SMS Banking= the use of SMS Banking

Credit Card = Credit Card Usability

Debit Card= Debit Card Usability

μ = Error Term

RESULTS AND DISCUSSION

The relationship between technology usage and over all bank customer relationship of the sample banks in aggregate has been presented in the Table 3, 4 and 5. The results indicate that the use of information and communication technologies is having a positive effect on the bank-customer relationship. Table 3.1 shows the explained variance of 4%, 21.8%, 21.6% and 12.5% in JKB, HDFC, PNB and SBI respectively. The data further shows there seems to be relatively low effect of technology on customer relationships of JKB (4%) while as relatively high effect (21.8%) is observed in case of HDFC.

Table 3 Model Summary of Technology and over all Bank Customer Relationship (BCR)

Bank	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
JKB	1	.246[a]	.061	.048	.62199
HDFC	1	.475[b]	.226	.218	.65132
PNB	1	.476[a]	.226	.216	.61052
SBI	1	.370[a]	.137	.125	.78364

a. Predictors: (Constant), e-banking, debit card, credit card, SMS banking
b. Predictors: (Constant), e-banking, credit card, SMS banking

Table 4 ANNOVA of Technology and Over-all BCR

Bank	Model		Sum of Squares	df	Mean Square	F	Sig.
JKB	1	Regression	7.369	4	1.842	4.762	.001**
		Residual	114.126	295	.387		
		Total	121.495	299			
HDFC	1	Regression	36.656	3	12.219	28.803	.000*
		Residual	125.567	296	.424		
		Total	162.223	299			
PNB	1	Regression	32.187	4	8.047	21.588	.000*
		Residual	109.957	295	.373		
		Total	142.144	299			
SBI	1	Regression	28.721	4	7.180	11.692	.000*
		Residual	181.159	295	.614		
		Total	209.880	299			

Note: * and ** represent the significant level 0.01, and 0.05 respectively.

Table 5 Coefficients of Technology and Over-all BCR

Bank	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
JKB	1	(Constant)	7.070	.254		27.843	.000*
		Debit Card	-.063	.261	-.014	-.240	.810
		Credit Card	.213	.076	.163	2.818	.005**
		SMS Banking	.162	.085	.126	1.896	.059***
		e-banking	.066	.085	.052	.776	.439
HDFC	1	(Constant)	6.370	.060		106.030	.000*
		Credit Card	.451	.082	.295	5.514	.000*
		SMS Banking	.219	.102	.149	2.140	.033**
		e-banking	.263	.105	.177	2.505	.013**
PNB	1	(Constant)	5.636	.095		59.056	.000*
		Debit Card	.229	.107	.114	2.146	.033**
		Credit Card	.393	.093	.234	4.214	.000*
		SMS Banking	.266	.132	.185	2.013	.045**
		e-banking	.171	.130	.116	1.309	.191
SBI	1	(Constant)	5.717	.126		45.516	.000*

Debit Card	.553	.144	.222	3.853	.000*
Credit Card	.226	.115	.117	1.965	.050***
SMS Banking	.241	.116	.135	2.070	.039**
e-banking	.084	.118	.050	.710	.478

Note: *, ** and *** represent the significant level 0.01, 0.05 and 0.1 respectively

The usage of credit card and SMS banking (beta scores of .163 and .126 at 0.05 at P<0.10 respectively) of JKB shows positive and significant (p<0.10) impact in their overall relationship with the bank while as the usage of debit card and e-banking is insignificant (p>0.10) as far as maintaining and enhancing customer relationships are concerned (Table 5). The usage of credit card, SMS banking and e-banking of HDFC shows that a positive and significant (p<0.05) impact on overall bank customer relationships while as automatic removal of debit card indicates that it is insignificant (p>0.10) predictor in bank customer relationship. The beta scores of PNB (Debit card (.114), Credit card (.234) and SMS banking (.185) in Table 5 shows that usage of technology has positive and significant (p<0.05) impact on the customer relationships. In the same way beta scores of SBI (Debit card (.222), Credit card (.117) and SMS banking (.135) on Table 5 shows that usage of technology has positive and significant (p<0.05) impact on the customer relationships. However, e-banking usage has been found to be insignificant (p>0.10) and doesn't contribute in maintaining customer relationships in both PNB and SBI.

Dimension wise analysis

Trust

The data on Trust dimension of relationship marketing on Table 6 and 7 reveals that there is positive and significant (p<0.05) effect of technology on customers' perception of the banks conviction in relationship. The variance explained by independent variable i.e., technology is relatively higher in PNB (13%) followed by SBI (10%) while as low explained variance is observed in JKB followed by HDFC (2% and 9% respectively). The low explained variance in JKB reveals that technology usage by JKB customers does not enhance their confidence on the bank. The beta score of JKB on Table 8 reveal that all predictors, debit card, credit card, SMS banking and e-banking are insignificant (p>0.10) in improving the customers perception of banks trustworthiness. In case of HDFC and PNB, the beta score reveals that only credit cards (.153 and .206 respectively) has a positive and significant (p<0.05) impact on customers perception of banks trust worthiness while as other predictors are insignificant (p>0.10). The usage of debit card has positive and significant (p<0.05) effect on building trust of SBI customer while as the credit card, SMS banking and e-banking are insignificant (p>0.10) and does not contribute in building confidence of customers.

Table 6 Model Summary of Technology and Trust

Bank	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
JKB	1	.184[a]	.034	.021	.92496
HDFC	1	.320[b]	.102	.093	.83528
PNB	1	.387[a]	.149	.138	.92366
SBI	1	.335[a]	.112	.100	1.15883

a. Predictors: (Constant), e-banking, debit card, credit card, SMS banking
b. Predictors: (Constant), e-banking, credit card, SMS banking.

Table 7 ANNOVA of Technology and Trust

Bank	Model	Sum of Squares	df	Mean Square	F	Sig.
JKB 1	Regression	8.859	4	2.215	2.589	.037**
	Residual	252.388	295	.856		
	Total	261.246	299			
HDFC 1	Regression	23.582	3	7.861	11.266	.000*
	Residual	206.519	296	.698		
	Total	230.101	299			
PNB 1	Regression	44.235	4	11.059	12.962	.000*
	Residual	251.677	295	.853		
	Total	295.912	299			
SBI 1	Regression	50.186	4	12.546	9.343	.000*
	Residual	396.154	295	1.343		
	Total	446.340	299			

Note: * and ** represent the significant level 0.01, and 0.05 respectively.

Table 8 Coefficients of Technology and Trust

Bank	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
JKB 1	(Constant)	6.890	.378		18.246	.000*
	Debit Card	.101	.387	.015	.262	.794
	Credit Card	.157	.113	.081	1.390	.166
	SMS Banking	.210	.127	.112	1.657	.099***
	e-banking	.100	.126	.054	.796	.427
HDFC 1	(Constant)	6.370	.077		82.675	.000*
	Credit Card	.278	.105	.153	2.657	.008**
	SMS Banking	.206	.131	.118	1.573	.117
	e-banking	.257	.134	.145	1.909	.057***
PNB 1	(Constant)	5.248	.144		36.351	.000*
	Debit Card	.207	.162	.071	1.280	.202
	Credit Card	.498	.141	.206	3.529	.000*
	SMS Banking	.370	.200	.178	1.851	.065***
	e-banking	.129	.197	.061	.651	.515
SBI 1	(Constant)	5.379	.186		28.963	.000*
	Debit Card	.767	.212	.212	3.614	.000*
	Credit Card	.301	.170	.107	1.773	.077
	SMS Banking	.338	.172	.130	1.965	.050***
	e-banking	.060	.175	.024	.343	.732

Note: *, ** and *** represent the significant level 0.01, 0.05 and 0.1 respectively.

Competence

Table 9 Model Summary of Technology and Competence

Bank	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
JKB	1	.207[a]	.043	.030	.86546
HDFC	1	.458[b]	.210	.202	.78074
PNB	1	.288[a]	.083	.071	.90585
SBI	1	.270[a]	.073	.060	1.07560

a. Predictors: (Constant), e-banking, debit card, credit card, SMS banking
b. Predictors: (Constant), e-banking, credit card, SMS banking

Table 10 ANNOVA of Technology and Competence

Bank	Model	Sum of Squares	df	Mean Square	F	Sig.
JKB	Regression	9.895	4	2.474	3.303	.011**
	Residual	220.962	295	.749		
	Total	230.857	299			
HDFC	Regression	47.834	3	15.945	26.158	.000*
	Residual	180.428	296	.610		
	Total	228.262	299			
PNB	Regression	21.969	4	5.492	6.693	.000*
	Residual	242.068	295	.821		
	Total	264.037	299			
SBI	Regression	26.894	4	6.724	5.812	.000*
	Residual	341.292	295	1.157		
	Total	368.186	299			

Note: * and ** represent the significant level 0.01, and 0.05 respectively.

It is quite clear from the analysis of the data on competence dimension of relationship marketing (Table 9 and 10) that technology has positive and significant (p<0.05) impact on

customers' perception of banks technological and commercial competence across all banks. The explained variance of technology is relatively high in HDFC (20 percent at 0.01 significance level) while as relatively low explained variance has been observed in JKB (3 percent at 0.05 significance level), PNB (7 percent at 0.01 significance level) and SBI (6 percent at 0.01 significance level). The beta score of technology predictors in JKB reveal that Credit card (.120) and SMS banking (.148) have positive and significant ($p<0.05$) impact on competence while as debit card and e-banking are insignificant ($p>0.10$). Similarly the beta score of predictor's credit card (.331) and SMS banking (.168) are positively and significantly ($p<0.05$) related to customers' perception of HDFC's commercial and technological competence. The usage debit card by PNB and SBI customers has a positive and significant ($p<0.05$) effect on the customers perception of banks competence where as the other predictors, credit card, SMS banking, e-banking, are insignificant ($p>0.10$) as shown in Table 11.

Table: 11 Coefficients of Technology and Competence

Bank	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
JKB	1	(Constant)	7.583	.353		21.463	.000*
		Debit Card	-.353	.362	-.056	-.975	.331
		Credit Card	.218	.105	.120	2.067	.040**
		SMS Banking	.263	.119	.148	2.214	.028**
		e-banking	.006	.118	.003	.049	.961
HDFC	1	(Constant)	6.698	.072		93.008	.000*
		Credit Card	.600	.098	.331	6.123	.000*
		SMS Banking	.293	.123	.168	2.387	.018**
		e-banking	.162	.126	.092	1.289	.198
PNB	1	(Constant)	6.094	.142		43.035	.000*
		Debit Card	.366	.158	.134	2.312	.021**
		Credit Card	.111	.139	.048	.801	.424
		SMS Banking	.351	.196	.179	1.790	.074***
		e-banking	.047	.194	.024	.244	.808
SBI	1	(Constant)	6.153	.172		35.691	.000*
		Debit Card	.480	.197	.146	2.434	.016**
		Credit Card	.287	.158	.112	1.819	.070***
		SMS Banking	.208	.160	.088	1.301	.194
		e-banking	.091	.162	.041	.564	.573

Note: *, ** and *** represent the significant level 0.01, 0.05 and 0.1 respectively

Commitment

The data on Table 12 and 13 on Commitment dimension of relationship marketing shows that the usage of technology have positive and significant ($p<0.05$) effect on customer's perception of bank's desire to maintain a valued relationship in all banks except JKB. The explained variance by technology is relatively high in HDFC (13.3%) where as relatively low explained variance is observed in PNB and SBI (9% and 3% respectively). Use of technology in JKB does not affect the customer relationships. The beta score on Table 14 reveal that all predicators i.e. debit card, credit card, SMS banking and e-banking are insignificant ($p>0.10$) and does not affect the customers' perception of banks' desire to maintain a valued relationship. The usage of SMS banking and e-banking by HDFC customers has a positive and significant ($p<0.05$) effect on relationship commitment while as automatic removal of debit card indicates that it is an insignificant ($p>0.10$) predictor of bank customer relationship. Further, the beta score of credit card usage in PNB (.273, significant at 1 percent) indicates appositive and significant effects on commitment in relationship while as other predictors are insignificant as is shown in Table 14. Similarly, the beta score of debit card (.145 significant at 5 percent level) usage shows that it has a positive and significant effect on customers perception of banks commitment in relationship whereas the other variable are insignificant ($p>0.10$) and do not contribute in enhancing the customers perception of value on commitment dimension of relationship marketing.

Table 12 Model Summary of Technology and Commitment

Bank	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
JKB	1	.090[a]	.008	-.005	1.10494
HDFC	1	.365[b]	.133	.125	1.37666
PNB	1	.329[a]	.108	.096	1.61502
SBI	1	.215[a]	.046	.033	1.30487

a. Predictors: (Constant), e-banking, debit card, credit card, SMS banking
b. Predictors: (Constant), e-banking, credit card, SMS banking

Table 13 ANNOVA of Technology and Commitment

Bank	Model		Sum of Squares	df	Mean Square	F	Sig.
JKB	1	Regression	2.963	4	.741		
		Residual	360.164	295	1.221	.607	.658
		Total	363.127	299			
HDFC	1	Regression	86.274	3	28.758		
		Residual	560.975	296	1.895	15.174	.000*
		Total	647.249	299			
PNB	1	Regression	93.330	4	23.332		
		Residual	769.441	295	2.608	8.946	.000*
		Total	862.771	299			
SBI	1	Regression	24.277	4	6.069		
		Residual	502.295	295	1.703	3.564	.007**
		Total	526.572	299			

Note: * and ** represent the significant level 0.01, and 0.05 respectively.

Table: 14 Coefficients of Technology and Commitment

Bank	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
JKB	1	(Constant)	6.000	.451		13.301	.000*
		Debit Card	-.382	.463	-.049	-.824	.410
		Credit Card	.028	.135	.012	.208	.835
		SMS Banking	-.103	.152	-.046	-.680	.497
		e-banking	.204	.150	.093	1.359	.175
HDFC	1	(Constant)	4.590	.127		36.147	.000*
		Credit Card	.330	.173	.108	1.913	.057***
		SMS Banking	.481	.216	.164	2.224	.027**
		e-banking	.548	.222	.185	2.475	.014**
PNB	1	(Constant)	3.583	.252		14.193	.000*
		Debit Card	-.312	.282	-.063	-1.105	.270
		Credit Card	1.131	.247	.273	4.578	.000*
		SMS Banking	-.150	.349	-.042	-.430	.667
		e-banking	.631	.345	.175	1.829	.068***
SBI	1	(Constant)	3.773	.209		18.040	.000*
		Debit Card	.572	.239	.145	2.392	.017**
		Credit Card	-.057	.191	-.019	-.298	.766
		SMS Banking	.270	.194	.096	1.397	.163
		e-banking	.125	.197	.047	.637	.525

Note: *, ** and *** represent the significant level 0.01, 0.05 and 0.1 respectively

Communication

Table15 Model Summary of Technology and Communication

Bank	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
JKB	1	.256[a]	.066	.053	.89158
HDFC	1	.263[b]	.069	.060	.87550
PNB	1	.321[a]	.103	.091	.98485
SBI	1	.246[a]	.060	.048	.96416

a. Predictors: (Constant), e-banking, debit card, credit card, SMS banking
b. Predictors: (Constant), e-banking, credit card, SMS banking

Table 16 ANNOVA of Technology and Communication

Bank	Model		Sum of Squares	df	Mean Square	F	Sig.
JKB	1	Regression	16.504	4	4.126	5.190	.000*
		Residual	234.499	295	.795		
		Total	251.002	299			
HDFC	1	Regression	16.926	3	5.642	7.361	.000*
		Residual	226.886	296	.767		
		Total	243.812	299			
PNB	1	Regression	32.926	4	8.231	8.487	.000*
		Residual	286.126	295	.970		
		Total	319.052	299			
SBI	1	Regression	17.627	4	4.407	4.740	.001**
		Residual	274.233	295	.930		
		Total	291.859	299			

Note: * and ** represent the significant level 0.01, and 0.05 respectively.

From the analysis of the Tables (15 and 16) on communication dimension of relationship marketing, it is observed that technology has a positive and significant ($p<0.05$) effect on customer's perception of the bank's ability to provide the timely and trustworthy information. The data further shows that variance explained by technology is 5 percent, 6 percent, 9 percent and 4 percent in JKB, HDFC, PNB and SBI respectively. The beta score (Table 17) of credit card usage in JKB and HDFC (.197 and .210 significant at 5% and 1% respectively) indicate that it has positive and significant impact on customers perception of banks ability to provide trustworthy information while as the other predictors are insignificant ($p>0.10$). The usage of debit card by PNB customer has a positive and significant ($p<0.05$) impact on their perception of the bank's ability to provide readily information while as the other predictors are insignificant. In case of SBI all the four predictors are insignificant ($p>0.10$) and don't have any effect on communication dimension of relationship marketing.

Table: 17 Coefficients of Technology and Communication

Bank	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
JKB	1	(Constant)	7.542	.364		20.720	.000*
		Debit Card	.017	.373	.003	.045	.964
		Credit Card	.372	.109	.197	3.426	.001**
		SMS Banking	.241	.122	.130	1.971	.050***
		e-banking	.007	.121	.004	.056	.956
HDFC	1	(Constant)	7.167	.081		88.744	.000*
		Credit Card	.394	.110	.210	3.589	.000*
		SMS Banking	.093	.138	.052	.677	.499
		e-banking	.124	.141	.068	.877	.381
PNB	1	(Constant)	6.594	.154		42.836	.000*
		Debit Card	.414	.172	.138	2.404	.017**
		Credit Card	.254	.151	.101	1.689	.092***
		SMS Banking	.386	.213	.179	1.812	.071***
		e-banking	.052	.210	.024	.247	.805
SBI	1	(Constant)	6.786	.155		43.915	.000*
		Debit Card	.385	.177	.131	2.180	.030**
		Credit Card	.241	.141	.106	1.707	.089***
		SMS Banking	.121	.143	.058	.844	.400
		e-banking	.109	.145	.055	.748	.455

Note: *, ** and *** represent the significant level 0.01, 0.05 and 0.1 respectively.

Conflict Handling

It is evident from the data (Table 18 and 19) on conflict handling dimension of relationship marketing that usage of technology have a positive and significant ($p<0.05$) impact on customer perception of the banks' ability to minimize the consequences of potential and apparent conflicts. The variance explained by the independent variable i.e. technology is relatively high in HDFC (9 percent) at 1 percent significance level while as relatively low variance is explained by ICT in JKB (2 percent), PNB (4 percent) and SBI (5 percent) at 5 percent significance level.

The beta score on Table 20 reveals that in JKB and HDFC, credit card usage (.142 and .273) has positive and significant ($p<0.05$) effect on conflict handling management perception of the customers while as other predictors are found to be insignificant. The automatic exclusion of debit card in HDFC indicates that the usage of debit card is immaterial for customers and does not have any effect on over all bank customer relationship. In case of PNB and SBI debit card usage has been found to have a positive and significant ($p<0.05$) impact on customers perception of the bank's ability to eliminate potential conflicts as is revealed by the beta score (.145 and .152 respectively) while as the others variable s are insignificant ($p>0.10$) in both the banks.

Table: 18 Model Summary of Technology and Conflict Handling

Bank	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
JKB	1	.198[a]	.039	.026	.99138
HDFC	1	.318[b]	.101	.092	1.09469
PNB	1	.248[a]	.062	.049	1.04633
SBI	1	.259[a]	.067	.055	1.27624

a. Predictors: (Constant), e-banking, debit card, credit card, SMS banking
b. Predictors: (Constant), e-banking, credit card, SMS banking

Table: 19 ANNOVA of Technology and Conflict Handling

Bank	Model		Sum of Squares	df	Mean Square	F	Sig.
JKB	1	Regression	11.843	4	2.961	3.012	.019**
		Residual	289.936	295	.983		
		Total	301.779	299			
HDFC	1	Regression	39.866	3	13.289	11.089	.000*
		Residual	354.709	296	1.198		
		Total	394.575	299			
PNB	1	Regression	21.204	4	5.301	4.842	.001**
		Residual	322.966	295	1.095		
		Total	344.169	299			
SBI	1	Regression	34.634	4	8.659	5.316	.000*
		Residual	480.490	295	1.629		
		Total	515.125	299			

Note: * and ** represent the significant level 0.01, and 0.05 respectively

Table: 20 Coefficients of Technology and Conflict Handling

Bank	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
JKB	1	(Constant)	7.332	.405		18.115	.000*
		Debit Card	.305	.415	.043	.735	.463
		Credit Card	.293	.121	.142	2.424	.016**
		SMS Banking	.198	.136	.098	1.454	.147
		e-banking	.009	.135	.004	.066	.947
HDFC	1	(Constant)	7.029	.101		69.607	.000*
		Credit Card	.651	.137	.273	4.741	.000*
		SMS Banking	.022	.172	.010	.129	.897
		e-banking	.219	.176	.095	1.245	.214
PNB	1	(Constant)	6.656	.164		40.697	.000*
		Debit Card	.473	.183	.152	2.586	.010**
		Credit Card	-.029	.160	-.011	-.179	.858
		SMS Banking	.372	.226	.166	1.645	.101
		e-banking	-.001	.224	-.001	-.005	.996
SBI	1	(Constant)	6.489	.205		31.724	.000*
		Debit Card	.566	.234	.145	2.420	.016**
		Credit Card	.353	.187	.117	1.888	.060***
		SMS Banking	.265	.189	.095	1.398	.163
		e-banking	.035	.192	.013	.180	.857

Note: *, ** and *** represent the significant level 0.01, 0.05 and 0.1 respectively.

Therefore, on the basis of empirical results reported in table 3 to 20, the null hypothesis is rejected that there is no significant impact of the usage of technology on bank customer relationship.

CONCLUSION AND SUGGESTIONS

The role of technology in customer relationships has been increasingly debated since the advent of the technology. The financial services industry, one of the most information intensive industries, is particularly affected by these technological developments, which are challenging the structure of business and banking relational strategies. Given the academic debate about virtualization of relationships, the paper discusses the impact of the use of technology such as debit and credit cards, e-banking and SMS banking, in banking relationships. Considering the potential of technology to be a double-edged sword in building (or weakening) relationships, the paper sought to add further insight into the debate. As such, the linear regression was used to study the impact of the use of technology on customer relationships.

The objective of this paper was to study the impact of technology on customer relationships. The results reveal that the use of technology is positively and significantly ($p<0.01$) related to customer relationship in the sample banks. The findings of the study are in-line with Naude and Holland (1996) and Glazer (1991). The broad range of products and services driven by the technology seems to be an important tool used by the banks for improving relationship with the customers. High end clients tend to use a huge range of services which can help in building strong relationships with their customers.

The other findings are that the credit card holders have relatively better relationships with their banks because of the personal care they receive from the bank. The credit card holders generally use more technology based self service delivery options compared to other bank customers which ultimately affects their relationship. In addition the usage of SMS banking by customer tend to improve the bank customer relationship as the customers always feel connected with their bank besides ensuring correct record keeping.

As the customers adopt more and more electronic delivery channels the importance of relationship management becomes even more important. The introduction of electronic delivery channels reduces the opportunity for social interchange. To overcome this social deficiency there will be increased need to collect information on consumer behaviour patterns and use it to reinforce customer relationships. In this way the technology will assist the banks in collecting the necessary information about the customers which in turn provides banks with an opportunity to target specific customer segments with products and promotions.

As customers interact with their banks through channels sustained by remote technologies, the implications resulting from this type of interaction in the supplier customer relationship are increasingly important. From the management point of view, this evolution has immediate effects at the level of determining investment policies in technology, but also has indirect effects on the seller's positioning: a focus on remote relationships means a focus on specific customer segments and an opportunity to redesign structures, relegating the front-office to second place. Bearing in mind the growing integration of self-service technological media, particularly Internet banking, into the habits of consumers and considering the advantages for banks resulting from their use, they must take into consideration the importance of the relationship with the customer and make efforts to maintain and develop this relationship. The relationship marketing approach enables the banks to develop a more productive, tailor-made and efficient interaction with its customers.

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