The Impact of Technology Based Self Service Banking Dimensions On Customer Satisfaction

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ABSTRACT

The technology based self service banking (TBSSB) refers to automated banking services that customer avail in self service mode using various electronic banking channels, without any interaction with bank employees. This paper investigates the relationship between key dimensions (factors) of TBSSB service quality and Customer Satisfaction. A structured questionnaire was formulated by identifying and adapting attributes on the basis of past studies on service quality of automated services and customer satisfaction. Data was collected from sample of bank customers in India. The collected data was divided into two sub-samples of equal size. The TBSSB service quality and customer satisfaction dimensions were identified by conducting an exploratory factor analysis (EFA) on the half of the collected data using SPSS 16.0 software. Factor structure was confirmed by conducting confirmatory factor analysis (CFA) using AMOS 20.0 software on the remaining half of the collected data. The proposed model was empirically tested for uni-dimensionality, reliability, and validity. AMOS 20.0 was also used to examine the link amid TBSSB service quality and Customer Satisfaction by testing hypotheses using structural equation modeling (SEM). This study may help banks' management to investigate the customers' quality perceptions about TBSSB services, thereby helping banks to formulate strategies to improve the quality of service and customer satisfaction.

KEYWORDS

Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), Technology based self service banking (TBSSB), structural equation modeling (SEM), India

1. INTRODUCTION

Today almost all commercial Public, Private or Foreign National banks are offering automated self service banking services [1]. As the products offered by the banks are more or less identical, banks are trying to have edge over rivals on other parameters which may enhance customer satisfaction and loyalty. This is because organizations having satisfied and loyal customers will be able to survive and compete in future [2-3]. Today almost every bank is using technology to deliver services to customers. With time automated banking services acceptance is increasing among bank customers. This is apparent from the reduction in transactions through branches and the increase in the transactions through automated self service modes in many of the banks. Both researchers and managers are equally interested in managing service quality as it affects customer satisfaction, loyalty and business performances [2,4,5]. Study of service quality of automated banking services is required because it leads to competitive advantage and customer attractiveness [4,6]. Most of the studies on technology based self service banking quality covers only one of the automated banking channels. In these studies service quality has been measured taking into consideration particular channel like ATM banking, Internet banking and tele banking. As Customer may use more than one automated banking channel, so limiting research to only one channel will not give the overall representation of automated self service banking service quality. To get the comprehensive picture, in the present study broad attributes affecting technology based self service banking (TBSSB) service quality are grouped into dimensions and their relationship with Customer Satisfaction is studied.

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The remainder of the paper is organized as follows: The first sections present the literature review on automated banking service quality and customer satisfaction. Next, the paper discusses the research methodology used in the paper as well as the survey instrument used for data collection. Finally, results are presented along with conclusion.

2. LITERATURE REVIEW

2.1. Automated Banking Service Quality

With time numerous models have been developed for measuring service quality. In literature, main conceptualizations of service quality are either based on the disconfirmation between perception and expectation [7,8,9], or performance only approach [10]. [11] found that performance-only measure is more reliable and stronger indicator of service quality than performance-expectations measure. A study done by [12] showed that measuring service quality using perception only scale encapsulates more deviation in service quality than studies based on differences. In addition to this, the performance-based scale reduces the number of items to be measured by half as compared to the disconfirmation scale. So, performance only measure is used in this study. "Automated service quality" is customer's evaluation of services rendered using electronic channels [6]. [13] examined the part that technology plays in Australian banking services. Researchers found six e-banking quality dimensions as efficiency; convenience/accuracy; accessibility; queue management; feedback/complaint management and customisation. [14] proposed 17 factors of e-banking quality as responsiveness, diverse features /product variety, courtesy, reliability, access, competence, credibility, ease of use , communication, aesthetics, understanding the customer, collaboration, accuracy, continuous improvement, content, security and timeliness. Researchers put forward that both electronic bank as well as traditional banks offering e-banking services should focus on reliability, responsiveness and access dimensions. [15] proposed service quality model in Internet banking. They identified the following five dimensions: the image and reputation of the service organization, customer expectations of the service, customer participation, aspects of the service setting and service encounter. Among these factors, customer participation and service setting have the major influence on service evaluation. [4] conducted study to establish the critical determinants of automated service quality by including attributes of three main banking services channel (ATM, Telephone Banking and Internet Banking) along with attributes corresponding to two additional dimensions of Perceived Price and Core Service. The paper proposed a conceptual model of automated banking services quality. Using open-ended exploratory interviews, past studies and quantitative analyses [16] proposed 7 dimensions of Internet banking quality: convenience, auxiliary features, personal finances, security, exploration, investment and status. The researcher made suggestion that banks offering electronic banking services should pay more attention towards young customers. [17] found that there is a direct association between technology and quality of service in banking sector. [18] conducted research on electronic banking in Nigeria. He found the major factors accountable for internet banking. He gave a structure of the factors for assessing the perception about e-banking. Researcher found major factors as queue management, security, accessibility, user friendliness, fund transfer and time. Survey results showed that 88% respondents were of the opinion that e-banking is flexible and convenient way of banking. [19] proposed dimensions affecting service quality as e- Fulfillment , System availability, efficiency, accuracy , responsiveness, security, convenience, ease to use, problem handling, cost effectiveness, contact and compensation. [3] conducted a research on undergraduate students of a University in the Massachusetts state of the USA and identified service quality dimensions as technology convenience, technology usage easiness and reliability, technology security and information quality, and customer service.

2.2. Automated Banking-Customer satisfaction Relationship

Customer satisfaction refers to post consumption feelings or judgments about a product [20]. In the present study satisfaction is considered as a multi-item construct [3,21,22]. Good service quality leads to satisfying relationship with customers [23] and Higher customer satisfaction results in better profits and word-of-mouth recommendation [24,25]. Therefore, studying the relationship of service quality with satisfaction is considered important. The impact of service quality on customer satisfaction was investigated in many studies. In automated banking, customer satisfaction is found to be affected by service quality [3,21,26]. But, most of the such studies considered effect of single technology like ATM banking [27,28] and Internet Banking [22,29,30] on customer satisfaction.

A review of the literature uncovers that majority of the automated banking service quality studies covers one electronic banking channel service quality and does not include other important automated banking service channels. So in the present study, broad attributes affecting technology based self service banking (TBSSB) service quality are identified. Considering these attributes, relationship between TBSSB service quality and Customer satisfaction is investigated.

3. METHODOLOGY

3.1. Scale Development

A survey was conducted to in order to study the impact of TBSSB service quality on customer satisfaction. The survey questionnaire constituted questions related to TBSSB service quality attributes and customer satisfaction along with other questions. Table 1 shows 20 items related to TBSSB service quality and 3 items related to customer satisfaction. TBSSB service quality attributes are identified and adapted through a comprehensive review of various studies on automated service quality [3,13,31,32,33,34,35 ,36,37,38,39,40,41,42,43,44,45,46,47]. The items related to customer satisfaction are identified and adapted from [3,21,22,35,48, 49,50].

Table 1: Attributes affecting TBSSB service quality and customer satisfaction

Attribute	Attribute Name
A1	TBSSB services are able to conduct error free transactions every time
A2	TBSSB services are available 24 x 7 (7 days, 24 hours)
A3	TBSSB give directions to new users
A4	I receive prompt responses to my requests while using TBSSB
A5	TBSSB provides consistent services
A6	TBSSB provides customer feedback services
A7	TBSSB acknowledges me by name
A8	TBSSB provides the precise and sufficient information I need
A9	TBSSB provides product offerings according to my preferences
A10	TBSSB services provides accurate records of all transactions that have taken place
A11	I feel secure that my personal information will not be shared with third party in using TBSSB
A12	Financial transactions done using TBSSB are secure
A13	TBSSB services are cost effective

A14	TBSSB services are easy to use
A15	TBSSB has adequate menu options for everyday banking needs
A16	Elements of security are incorporated in TBSSB by bank and I am made aware of them
A17	TBSSB services has a user-friendly system
A18	TBSSB gives me more freedom of mobility
A19	When problems occur, the TBSSB system guides me to solve them
A20	TBSSB is less time consuming as compared to branch banking
S1	I am satisfied with TBSSB services of my bank
S2	I am satisfied with the products offered by my bank
S3	Overall I am satisfied with my bank

Data was collected using self-administered paper-based questionnaires from the customers of different banks in Delhi and NCR region in India using convenience sampling. Only those customers were considered in the survey that are above 18 years of age and use at least one mode of electronic banking. Out of 600 distributed questionnaires, 440 were received back. Only 414 from 440 responses were usable, resulting in response rate of 69 percent. The respondents were requested to give their response corresponding to items (variables) on a five-point scale, having range from strongly disagree to strongly agree. Respondents' Demographic profile is presented in Table 2.

Table 2: Profile of the respondents

		Percent
Gender	Male	57.00
	Female	43.00
Age	18- up to 25 yrs	21.50
	More than 25 -up to 35 yrs	38.40
	More than 35- up to 45 yrs	30.00
	More than 45 yrs	10.10
Highest Completed Education	12th or Below	2.20
	Graduate	66.40
	Post Graduate and above	31.40
Occupation	Student	12.60
	Salaried	58.90
	Self employed	22.50
	Others	6.00
Annual Income(in INR per annum)	upto 2 Lacs	21.00
	More than 2- up to 5 Lacs	39.60
	More than 5- up to 10 Lacs	30.20
	More than 10 Lacs	9.20
TBSSB usage per month	Up to 5 times	54.83

	More than 5 – up to 10 times	31.40
	More than 10 – up to 20 times	10.63
	More than 20 times	3.14

4. DATA ANALYSIS AND RESULTS

For the purpose of analysis, Data sample of 414 was split into two sub-samples of 207 each. Sub-Sample 1 was used for exploratory factor analysis and sub-sample 2 for confirmatory purpose.

4.1. Exploratory Factor Analysis (EFA)

Factor analysis was applied to the captured responses corresponding to attributes. Before establishing the factor structure, initially the correlation matrix was checked to find its suitability for factor analysis. The sample size adequacy for factor analysis was determined by Kaiser-Meyer-Oklin (KMO) value, which is found to be more than 0.6 [51]. Also, the test statistic for sphericity [52] value was found to be big enough. Bartlett's test of sphericity was also significant at low significance level (0.000). In order to extract the factors, Principal Axis Factoring method was used by applying the constraint of higher than one eigen value for each factor [53]. Moreover only variables with loadings of at least 0.5 [54] were included in the analysis.

In the initial exploration, two variables 'TBSSB services provide accurate records for all transactions' and 'TBSSB services are cost effective' were deleted as they were having factor loadings of < 0.5. The remaining variables are again factors analyzed. The resulting factors satisfactory explained 70.046 percent of the total variance. The extracted factors were then rotated using Varimax rotation method. The dimensions (factors) with corresponding items (variables) and loadings are presented in table 3. Factors Reliability was computed using the Cronbach's alpha and values are shown in table 3. The magnitude of Cronbach's alpha was higher than or equal to 0.7, which indicated that the factors are reliable [54]. In this study every factor had adequate magnitude of Cronbach's alpha as shown in table 3.

Taking into consideration variables covered under various factors and relevant literature, TBSSB service quality factors are named as Convenience, Reliability and Security, Responsiveness and Personalization. Six variables loaded on factor 1 and were all related to "Convenience". The second factor has five variables which were all related to "Reliability and Security". Third Factor has four variables which are related to "Responsiveness". The forth factor has three items related with the "Personalization" and finally all three items S1, S2 and S3 loaded significantly on a single factor named Customer Satisfaction.

Table 3: TBSSB service quality and Customer Satisfaction rotated factor matrix

Factor Name (Dimension)	Items (Variables)	Factor Loadings	Cronbach's Alpha
Convenience	TBSSB is less time consuming as compared to branch banking	0.690	0.889
	TBSSB services are easy to use	0.736	

	TBSSB services are available 24 x 7 (7 days, 24 hours)	0.699	
	TBSSB gives me more freedom of mobility	0.793	
	TBSSB services has a user-friendly system	0.775	
	TBSSB has adequate menu options for everyday banking needs	0.601	
Reliability and Security	Elements of security are incorporated in TBSSB by bank and I am made aware of them	0.696	0.919
	I feel secure that my personal information will not be shared with third party in using TBSSB	0.805	
	TBSSB services are able to conduct error free transactions every time	0.856	
	TBSSB provides consistent services	0.820	
	Financial transactions done using TBSSB are secure	0.791	
Responsiveness	TBSSB give directions to new users	0.681	0.800
	TBSSB provides customer feedback services	0.641	
	I receive prompt responses to my requests while using TBSSB	0.647	
	When problems occur, the TBSSB system guides me to solve them	0.722	
Personalization	TBSSB acknowledges me by name	0.751	0.875
	TBSSB provides product offerings according to my preferences	0.853	
	TBSSB provides the precise and sufficient information I need	0.828	

Customer Satisfaction	I am satisfied with TBSSB services of my bank	0.641	0.748
	I am satisfied with the products offered by my bank	0.708	
	Overall I am satisfied with my bank	0.761	

4.2. Confirmatory Factor Analysis (CFA)

Next objective was to confirm the factor structure using sample 2. AMOS 20.0 software was used to perform the confirmatory factor analysis. Confirmatory factor analysis showed that the variables loaded as per the pattern found during exploratory factor analysis. There are specific measures that can be used test the model fit. As per [56], using three to four fit indices provides sufficient evidence of model fit. The researcher needs to report at least one incremental index and one absolute index, along with value of chi-square and degrees of freedom (df). So, reporting the value of chi-square value and df, Tucker-Lewis Index (TLI) or Comparative Fit Index (CFI) and RMSEA will usually provide adequate unique information to evaluate a model. The fit indices values and acceptable fit criterion of the measurement model were as follows: Chi-square= 251.765, degrees of freedom (df) = 179, Chi-square/df = 1.407(<3) , CFI =0.973(>0.95), RMSEA=0.044(<0.05), TLI=0.969(>0.95). Computed values for measurement model pointed towards the well fitted model.

In addition, all the variables had a significant factor loading on the related factor (latent constructs). Taken together, the measurement model confirmed the structure constituting four factors of TBSSB service quality and one factor of Customer Satisfaction. Confirmatory factor analysis was also performed on the entire data set of 414 responses. Model data fit was confirmed using the results.

4.2.1. Uni-dimensionality, Reliability and Validity of the model

Uni-dimensionality

The dimensionality of the model was tested during EFA by reviewing the loadings of the factors. Each variable had a sufficient loading on the particular factor only. This supported the uni-dimensionality of the scale [56].

Reliability

The reliability of the model was checked through Cronbach's alpha [56]. The magnitude of Cronbach's alpha for all the dimensions were higher than the lower threshold acceptable limit of 0.7 [54]. The reliability coefficient values for the factors were as follows: Convenience (0.889), Reliability and Security (0.919), responsiveness (0.8), Personalization (0.875) and Customer Satisfaction (0.748). The value of Cronbach's alpha for the TBSSB service quality and Customer Satisfaction instrument was 0.883, showing that the instrument is reliable. Also, Average Variance Extracted (AVE) as well as Composite reliability (CR) of all the dimensions were more than the acceptable limit of 0.5 and 0.7 respectively [56,57] as shown in table 4**,** supporting the reliability of the instrument.

Table 4: Reliability and Convergent Validity metrics

	Composite Reliability	Average Variance Extracted
Customer Satisfaction	0.808	0.585
Reliability & Security	0.930	0.725
Responsiveness	0.829	0.550
Personalization	0.917	0.788
Convenience	0.912	0.636

Validity

Validity was tested by examine the face validity, discriminant validity and convergent validity.

Face validity was established by taking the attributes (items) in the study from the existing literature and adapting them.

Convergent validity is the extent to which variables under a factor measure that same factor [56,57]. AVE and factor loadings were used to examine convergent validity as suggested by [57]. All the variables had considerably large loadings on respective factors. Moreover, the AVE for each dimension is higher than 0.50 as shown in table 4, supporting convergent validity.

Discriminant validity according to [57], evaluates the degree of distinctiveness of measures i.e. correlation between them must not be high that appear to determine the same underlying factors [58]. [57] suggested that the comparison of the AVE with inter-construct squared correlation values can be used to determine discriminant validity.

In the table 5, Diagonal elements in the correlation matrix of constructs were the square root of the AVE values and off diagonal elements represented inter-construct correlations. The diagonal elements were greater than the off diagonal, supporting the discriminant validity of the constructs.

Table 5: Discriminant validity

	Customer Satisfaction	Reliability & Security	Responsiveness	Personalization	Convenience
Customer Satisfaction	0.765				
Reliability & Security	0.278	0.852			
Responsiveness	-0.02	0.019	0.741		
Personalization	0.606	0.239	-0.049	0.888	
Convenience	0.398	0.419	-0.018	0.346	0.798

4.2.2. Impact of TBSSB service quality dimensions on customer satisfaction

The proposed structural model is shown in figure 1. The overall fit indices and acceptable fit criterion for the proposed structural model were as follows: Chi-square= 251.765, degrees of freedom (df) = 179, Chi-square/df = 1.407(<3), CFI =0.973(>0.95), RMSEA=0.044(<0.05), TLI=0.969(>0.95). All computed values confirmed the fitness of the model. Hypotheses were tested by using the structural equation modelling (SEM) using AMOS 20.0. To study the effect of

Technology based self service banking quality on customer satisfaction following four hypotheses were tested

H1. Convenience has a direct positive influence on customer satisfaction.
H2. Reliability & Security has a direct positive influence on customer satisfaction
H3. Responsiveness has a direct positive influence on customer satisfaction
H4. Personalization has a direct positive influence on customer satisfaction

Table 6: Standardised regression weights and the significance level for hypothesised paths

Relation between Constructs	**Standardized Regression Weights**	**Significance Level**
Convenience ⟶ Satisfaction	0.186 * *	0.018
Reliability & Security ⟶ Satisfaction	0.075 (NS)	0.311
Responsiveness ⟶ Satisfaction	0.008(NS)	0.911
Personalization ⟶ Satisfaction	0.524* * *	* * *

NS implies "not significant"; * * Implies significant at $p < 0.05$; * * *Implies significant at $p < 0.001$

Examination of the path coefficients and the significance level between the constructs in the model were used to test the hypotheses. The analysis in table 6 shows that Convenience and Personalization dimension have a positive significant relationship with customer satisfaction. Thus, H1 and H4 are supported. But, Responsiveness and Reliability & Security dimensions do not have significant positive relation with customer satisfaction. Thus, H2 and H3 are not supported.

5. CONCLUSION

In this paper, attempt is made to study the impact of TBSSB service quality dimensions on customer satisfaction. In total 23 attributes affecting TBSSB service quality and customer satisfaction are considered for the purpose of evaluation. To study the impact, firstly key dimensions of TBSSB service quality and customer satisfaction are explored by conducting study on 414 Indian retail banking customers using structured questionnaire. Data sample of 414 was split into two equal sub-samples. Sample 1 is used for EFA to identify dimensions and sample 2 is used for CFA to confirm the factor structure. Analysis revealed and confirmed four dimensions of TBSSB service quality, named as Convenience, Reliability and Security, Responsiveness, Personalization and one dimension of customer satisfaction. The proposed factor structure of TBSSB service quality showed evidence of uni-dimensionality, reliability, face validity, convergent validity and discriminant validity. Moreover, various criteria indices for the model have also been found to exceed the obligatory requirements. Four hypotheses were tested to investigate the relationship between TBSSB service quality and Customer Satisfaction employing SEM. Result of hypotheses testing showed that Convenience and Personalization dimension have a positive significant relationship with customer satisfaction. But, the relation of Responsiveness and Reliability & Security dimensions with customer satisfaction is not significant. So, TBSSB service quality can be said to have weak influence on customer satisfaction. The findings of the study may act as input for banks, so that they may focus on those aspects of technology based self service banking which may enhance customer satisfaction, ultimately resulting in customer loyalty and higher profitability. The same method for establishing relationship between service quality and customer satisfaction can also be used for other multi mode technology based services like share and commodity trading by considering their broad self service technology attributes.

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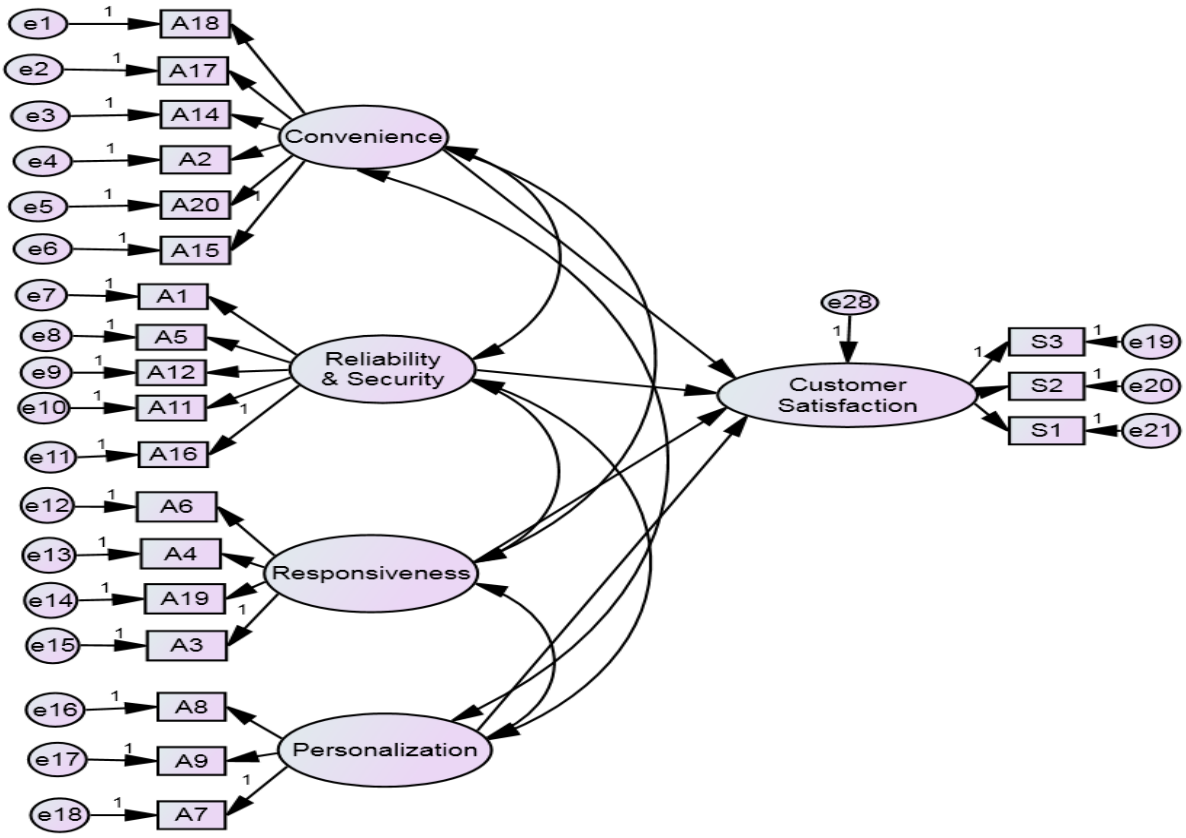

Figure 1. Model showing relationship between TBSSB service quality and Customer Satisfaction