

EXPLORING THE DIMENSIONALITY OF SERVICE QUALITY: AN APPLICATION OF TOPSIS IN THE INDIAN BANKING INDUSTRY

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The Indian banking industry is going through turbulent times. With the lowering of entry barriers and blurring product lines of banks and non-banks since the financial sector reforms, banks are functioning increasingly under competitive pressures. Hence, it is imperative that banks maintain a loyal customer base. In order to achieve this and improve their market positions, many retail banks are directing their strategies towards increasing customer satisfaction and loyalty through improved service quality. Moreover, with the advent of international banking and innovations in the marketplace, customers are having greater and greater difficulty in selecting one institution from another.

Hence, to gain and sustain competitive advantages in the fast changing retail banking industry in India, it is crucial for banks to understand in-depth what customers perceive to be the key dimensions of service quality and to evaluate banks on these dimensions. This is because if service quality dimensions can be identified, service managers should be able to improve the delivery of customer perceived quality during the service process and have greater control over the overall outcome.

The study suggests that customers distinguish four dimensions of service quality in the case of the retail banking industry in India, namely, customer-orientedness, competence, tangibles and convenience. A methodological innovation in this study has been in the use of TOPSIS in the field of customer-perceived service quality. TOPSIS has been used to evaluate and ranking the relative performance of the banks across the service quality dimensions. Identifying the underlying dimensions of the service quality construct and evaluating the performance of the banks across these factors is the first step in the definition and hence provision of quality service in the Indian retail banking industry.

Keywords: Service quality; TOPSIS; banking; factors; dimensionality; performance evaluation; ranking.

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1. Introduction

Regulatory, structural and technological factors are significantly changing the banking environment throughout the world. One factor that is spurring the growth of the service economy in India is the liberalisation that has been ushered in by the government in the banking sector.

The financial sector reform in India was designed to infuse "greater competitive vitality" in the system. To achieve this objective, the "Narasimhan Committee", recommended the liberalisation of entry norms and suggested that new banks be permitted in the private sector provided they conformed to the minimum start up capital and other requirements. The committee recommended too, a liberal policy towards allowing foreign banks to open offices in India. Since the reforms started, the interest rate structure has been deregulated to a great extent and banks have been given a great degree of freedom in determining their rate structure for deposits and advances, as well as their product range. Banking has also become more competitive in respect of the location of points of sale, that is, the branch network. The end result is that market power is getting shifted from banks to their customers. With the lowering of entry barriers and blurring product lines of banks and non-banks, the oligopolistic nature of Indian banking is fast changing and giving way to a relatively freer market place. The freedom of choice which banks' customers did not have earlier, because of standardised products and regimented interest rates, has been given to the customers as a result of the changes taking place (Subramanian and Velayudham, 1997).

In other words, financial liberalisation has led to intense competitive pressures and retail banks are consequently directing their strategies towards increasing customer satisfaction and loyalty through improved service quality. Retail banks are pursuing this strategy, in part, because of the difficulty in differentiating based on the service offering. Typically, customers perceive very little difference in the services offered by retail banks and any new offering is quickly matched by competitors.

However, much of the research on service quality has been in the developed countries (Herbig and Genestre, 1996), even though services are among the fastest growing sectors in emerging countries (Malhotra *et al.*, 1993). In fact, the bulk of the research on service quality in banks has been in the context of US and European banking institutions. At this juncture, it is important to also study banking institutions based in developing economies. As banks in such countries as India mature, lessons may be learned from their experiences by banks in developed economies as well as in other developing countries, as banking becomes more and more globally integrated. In fact, there exists a significant gap in the service marketing literature on how consumers evaluate service quality in contexts and cultures very different from the developed countries, and no prior research has attempted to explore this area.

In light of this paucity of research on service quality issues in developing countries like India, it has become very important that banks in India determine the

service quality factors, which are pertinent to the customer's selection process, as with increased competition, with the advent of international banking, the trend towards larger bank holding companies, and innovations in the marketplace, customers are now having greater difficulty in selecting one institution from another. In order to provide excellent service quality, identifying the underlying dimensions of the service quality construct is the first step in the definition and hence provision of quality service. Moreover, it is essential to devise a way to monitor and rank banks' performances across the service quality dimensions in order for banks' managers to improve the delivery of customer perceived quality during the service process and have greater control over the overall outcome. Hence, these issues should be a central concern for retail bank managers as well as service management academics and practitioners.

This paper endeavours to fill the gap in the service quality literature by exploring the dimensions of customer perceived service quality as well as a means to compare the performance of the banks across service quality dimensions, in the context of the Indian retail banking industry.

A set of service quality parameters, drawn from customers' perceptions about service quality as well as the bank marketing and service quality literature have been drawn up. These parameters have been used in the context of four of the largest banks in India to identify the underlying dimensions of service quality, followed by an application of TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) which has hitherto been applied only for engineering solutions to compare the performances of banks across service quality parameters. Finally, the paper has drawn upon the findings of the service quality dimensions to contend the initiatives that banks' managers can take to enhance employees' skills and attitudes and instill a customer-service culture.

1.1. *The dimensions of service quality*

Underpinning our understanding of service quality is an array of factors or determinants. A number of researchers have provided lists of quality determinants, but the best known determinants emanate from Parasuraman and colleagues from the USA, who found five dimensions of service quality, namely, tangibles, reliability, responsiveness, assurance and empathy and used these as the basis for their service quality measurement instrument, SERVQUAL (Parasuraman *et al.*, 1988; Zeithaml *et al.*, 1990). The result was the development of the SERVQUAL instrument, based on the gap model. The central idea in this model is that service quality is a function of the difference scores or gaps between expectations and perceptions. An important advantage of the SERVQUAL instrument is that it has been proven valid and reliable across a large range of service contexts. However, while the SERVQUAL instrument has been widely used, it has been subjected to certain criticisms as well. The contention that service quality consists of five basic dimensions (Parasuraman *et al.*, 1988) is according to some researchers questionable and they have suggested

that SERVQUAL's dimensions are contextual and not universally applicable (Ekinci and Riley, 1999; Brown *et al.*, 1993; Cronin and Taylor, 1992; Teas, 1993; Bouman and Van der Wiele, 1992; Gagliano and Hathcote, 1994). Instead, the number and composition of the service quality dimensions are probably dependant on the service setting (Brown *et al.*, 1993; Carman, 1990). It has been suggested that for some services the SERVQUAL instrument needs considerable adaptation (Dabholkar *et al.*, 1996) and that items used to measure service quality should reflect the specific service setting under investigation, and that it is necessary in this regard to modify some of the items and add or delete items as required (Carman, 1990). Moreover, research suggests that culture may play a fundamental role in determining how consumers perceive what constitutes service quality.

In a nutshell, there are still doubts about the dimensionality of service quality; there are doubts about the universality of the five dimensions. These are serious concerns, which are not only significant for users of SERVQUAL but for all those who wish to understand better the concept of service quality. Hence there is still a need for fundamental research into the dimensionality of service quality bearing in mind the contextual circumstances, the specific industry and the specific service setting.

2. Methodology

For the study reported herein, responses were gathered from customers of four major banks in the retail banking industry of India — the National Bank, the Century Bank, the Millennium Bank and the Prudential Bank. All these four banks rank among the largest and strongly profitable banks in India; moreover the banks have strong and significant retail presence. Five branches for each bank were randomly selected. The actual names of the banks have been changed in the study, for purposes of confidentiality. The study was conducted in Kolkata, a major metropolitan city in the eastern region of India with a large and diverse population. Questionnaires were self-administered to customers within the branches of the banks. The branches were considered by the management to be largely homogeneous with respect to size and service operations. Every other customer entering the branches was asked to complete the questionnaire. A total of 2400 customers were contacted (600 customers were contacted in each of the four banks), and the overall response rate was 18.75% (450 completed, usable questionnaires). The bank specific response rates were 15.33% (92 completed questionnaires) for the Millennium Bank, 19% (114 completed questionnaires) for the Prudential Bank, 17.33% (104 completed questionnaires) for the Century Bank, and 23.33% (140 completed questionnaires) for the National Bank. Demographic profiles of the samples from each bank were reviewed by the managers in the respective banks and considered to be representative of their customer bases.

The questionnaire for the measurement of customer-perceived service quality followed the basic structure of the SERVQUAL instrument as developed by

Parasuraman *et al.* (1991), and consisted of two sections: an expectation section and a perception section. The expectation section required the respondent to indicate on a seven-point (strongly disagree to strongly agree) scale the extent to which the ideal service-providing organisation (in this case a bank) possesses the characteristic desired in each statement. In the perception section the statements required the respondent to indicate the extent to which the particular bank possesses the characteristic described, again on a seven-point (strongly disagree to strongly agree) scale. The original SERVQUAL instrument had 7 categories, that is, it employed a 7-point scale (Parasuraman *et al.*, 1991). Hence the instrument used in this study for measuring customer-perceived service quality also employed a 7-point scale, anchored by strongly disagree and strongly agree at the endpoints 1 and 7, respectively.

An inventory of service quality items was identified. Items for measuring customer-perceived service quality were adopted from the service quality and service marketing literature (Parasuraman *et al.*, 1991) and the bank marketing literature (Levesque and McDougall, 1996; Yavas *et al.*, 1997; Parasuraman *et al.*, 1988; Parasuraman *et al.*, 1991; Cronin and Taylor, 1992). The list of items generated is shown in Table 1 and consisted of 24 items.

Ten items from this original list (Table 1) were dropped, because they were either vague, repetitive or difficult to comprehend to respondents, in a pilot study done

Table 1. Original list of items for measuring customer-perceived service quality.

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1. YOUR BANK has modern-looking equipment.
 2. YOUR BANK's physical facilities are visually appealing.
 3. YOUR BANK's employees are neat — appearing.
 4. Materials associated with the service, such as pamphlets and statements, are visually appealing at YOUR BANK.
 5. When YOUR BANK promises to do something by a certain time, it does so.
 6. When you have a problem, YOUR BANK shows a sincere interest in solving it.
 7. YOUR BANK performs the service right the first time.
 8. YOUR BANK provides its services at the time it promises to do so.
 9. YOUR BANK insists on error-free records.
 10. Employees of YOUR BANK tell you exactly when services will be performed.
 11. Employees of YOUR BANK give you prompt service.
 12. Employees of YOUR BANK are always willing to help you.
 13. Employees of YOUR BANK are never too busy to respond to your requests.
 14. The behaviour of employees of YOUR BANK instills confidence in customers.
 15. You feel safe in your transactions with YOUR BANK.
 16. Employees of YOUR BANK are consistently courteous with you.
 17. Employees of YOUR BANK have the knowledge to answer your questions.
 18. YOUR BANK gives you individual attention.
 19. YOUR BANK has operating hours convenient to all its customers.
 20. YOUR BANK has employees who give you personal attention.
 21. YOUR BANK has your best interests at heart.
 22. Employees of YOUR BANK understand your specific needs.
 23. YOUR BANK has convenient branch locations
 24. It is very easy to get in and out of YOUR BANK quickly
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with 50 customers from the Prudential Bank, 40 customers from the Millennium Bank, 45 customers from the National Bank and 50 customers from the Century Bank. For instance, "Employees at your bank are neat appearing" was not included because the term "neat" meant different things to different people in the pilot study. Again the item "your bank gives you individual attention" was not used because 95% of the total number of customers surveyed in the pilot study felt that it essentially captured the same aspect of service quality as "your bank has employees who give you personal attention". Of the total number of customers surveyed in the pilot study, 96% had problems understanding the items "your bank has your best interests at heart" and "your bank has modern looking equipment." Again 97% of the total number of customers surveyed in the pilot study felt that the item "your bank provides its services at the time it promises to do so", captured the same aspect of service quality as "when your bank promises to do something by a certain time, it does so", and hence the former item was dropped. The items "employees of your bank are always willing to help you" and "employees of your bank are never too busy to respond to your requests" were not included because 98% of the total number of customers surveyed in the pilot study felt that their essence was captured in other questions used in the scale. Also, the item "the behaviour of employees of your bank instills confidence in customers" was not included because it conveyed the same meaning to 94% of the total number of customers surveyed in the pilot study as "you feel safe in your transactions with your bank." The item "it is very easy to get in and out of your bank quickly", was also not included because it conveyed the same meaning to 96% of the total number of customers surveyed in the pilot study as "employees of your bank give you prompt service." The respondents understood the other items of the questionnaire. The item "your bank insists on error-free records", was not included, because according to Parasuraman *et al.* (1994), this item should be discarded on conceptual grounds, as customers generally have limited or no access to a company's records and hence they may experience difficulty in assessing company performance on this item. However, one item was added, and this was "your bank has a large ATM network", as all the customers surveyed in the pilot study indicated that this issue was very important with regards to banking services. In total, the instrument containing 15 items used to measure service quality in this study was referred to as the modified service quality (SERVQUAL) scale (Table 2).

Feedback from the managers in each of the participating banks who reviewed the questionnaire confirmed that the modified SERVQUAL had face validity. The questionnaire was administered in a pilot study to 50 customers from each of the four banks. Reliability (Cronbach's alpha) for the modified SERVQUAL scale was tested for each of the four banks and for the entire sample. The results were shown in Table 3.

It can thus be seen that the reliability figures are very high, all above the recommended lower limit of 0.70 (Nunnally, 1978).

Table 2. The items of the modified service quality (SERVQUAL) scale statements.

(V stands for variable)

V1.	YOUR BANK's physical facilities are visually appealing (Physical facilities).
V2.	Materials associated with the service, such as pamphlets and statements, are visually appealing at YOUR BANK (Materials).
V3.	YOUR BANK has convenient branch locations (Branch locations).
V4.	YOUR BANK has a large ATM network (ATM network).
V5.	When you have a problem, YOUR BANK shows a sincere interest in solving it (Responsiveness).
V6.	YOUR BANK performs the service right the first time (Right service).
V7.	When YOUR BANK promises to do something by a certain time, it does so (Dependability).
V8.	Employees of YOUR BANK tell you exactly when services will be performed (Service timing).
V9.	Employees of YOUR BANK give you prompt service (Prompt service).
V10.	You feel safe in your transactions with YOUR BANK (Safety).
V11.	Employees of YOUR BANK are consistently courteous with you (Courteousness).
V12.	Employees of YOUR BANK have the knowledge to answer your questions (Knowledge).
V13.	YOUR BANK has operating hours convenient to all its customers (Operating hours).
V14.	YOUR BANK has employees who give you personal attention (Personal attention).
V15.	Employees of YOUR BANK understand your specific needs (Ability to understand).

Table 3.

Bank	Cronbach's alpha
Prudential	0.9024
Millennium	0.8746
Century	0.9121
National	0.9236
Total pilot study sample	0.9271

3. Factor Analysis of the Servqual Scores

In this study, for each customer, SERVQUAL scores were generated. A SERVQUAL score is obtained by subtracting the expectation score from the perception score for each SERVQUAL item.

In this study, the number of factors extracted was determined by the percentage of variance criteria — that is, in this approach, the number of factors extracted is determined so that the cumulative percentage of variance extracted by the factors reaches a satisfactory level. In this study, 70% cumulative variance was chosen as the satisfactory level. SPSS version 10.1 for Windows was used for doing the factor analysis.

3.1. TOPSIS

The "Technique for Order Preference by Similarity to Ideal Solution" (TOPSIS) was set forth by Hwang and Lin (1987). In this technique, "n" different alternatives are evaluated by "m" different attributes, the attributes being common to all the

alternatives. This technique is based upon the concept that the chosen candidate (alternative) should be the shortest distance from the positive ideal solution (PIS) and the farthest from the negative ideal solution (NIS). An ordering of candidates, where the candidate who is closest to the PIS is ranked first, is done. TOPSIS has been previously used to solve multiple objective decision making problems in evaluating and ranking the relative performance of competing companies by simultaneously considering multiple financial ratios (Deng *et al.*, 2000). Again, TOPSIS has been used to solve multiple objective decision making problems in the case of the "nutrition problem", where the problem is to find the daily requirements of milk, beef, eggs, bread, lettuce, salad and orange juice which should be eaten to balance nutritional requirements so as to maximise the carbohydrate intake, minimise the cholesterol intake and minimise the cost (Hwang *et al.*, 1993). Engineering problems too have been solved by the use of TOPSIS (Lai *et al.*, 1994).

In this research, TOPSIS has been used to evaluate, compare and rank the performance of the banks by considering the performance of the banks along the various service quality factors obtained from the factor analysis. TOPSIS can provide useful information and an effective framework for ranking competing banks in terms of their overall performance with respect to multiple service quality factors. The advantages of using TOPSIS for evaluating and ranking the customer-perceived service quality of competing banks are, that it is comprehensible and the computation involved is simple.

The procedure of TOPSIS is presented as follows:

Step 1: Determining the positive ideal and negative ideal solutions

Let the two sets of artificial candidates R^* and R^- be defined as

$$R^* = \{(\max f_{ij} | j \in J), i = 1, 2, 3, \dots, n\} = \{f_1^*, f_2^*, \dots, f_m^*\}$$

$$R^- = \{(\min f_{ij} | j \in J), i = 1, 2, 3, \dots, n\} = \{f_1^-, f_2^-, \dots, f_m^-\},$$

assuming that f_{ij} s are benefit attributes, for $i = 1, 2, 3, \dots, n$, and $j = 1, 2, 3, \dots, m$. where f_{ij} : value of the i th alternative for the j th attribute, and

J : set of m attributes

R^* represents the PIS (positive ideal solution) and R^- represents the NIS (negative ideal solution).

Step 2: Calculating the separation measures

The separation (distance) of each alternative from the positive ideal solution is given by

$$C_i^* = \sqrt{\sum_{j=1}^m w_j^2 (f_{ij} - f_j^*)^2} \quad i = 1, 2, 3, \dots, n$$

Similarly the separation of each alternative from the negative ideal solution is given by

$$C_i^- = \sqrt{\sum_{j=1}^m w_j^2 (f_{ij} - f_j^-)^2} \quad i = 1, 2, 3, \dots, n$$

The weight (w_j) for each service quality factor (mentioned above as attribute) was the ratio of the variance due to that factor to the cumulative variance due to all the factors extracted from the factor analysis.

Step 3: Calculating the relative closeness of the existing alternatives from the positive ideal solution

The relative closeness of the i th alternative with respect to the positive ideal solution is defined as

$$G_i = \frac{C_i^-}{C_i^* + C_i^-} \quad 0 \leq G_i \leq 1 \quad i = 1, 2, 3, \dots, n.$$

$G_i = 1$ if the i th alternative is the PIS and $G_i = 0$, if the i th alternative is the NIS; when the i th alternative is relatively closer to R^* , then G_i is closer to 1 and when the i th alternative is closer to R^- then G_i is closer to 0.

Step 4: Ranking the preference order of the alternatives

The set of candidates can now be ranked according to the descending order of G_i .

To the set of the average factor scores of all the four banks across the service quality factors (obtained from the factor analysis), TOPSIS was applied, so as to evaluate, compare and rank the performances of the banks by considering the performances of the banks along the service quality factors obtained from the factor analysis. Two alternatives, R^* and R^- were generated, where R^* represents the PIS (Positive ideal solution) and R^- represents the NIS (Negative ideal solution). The technique of TOPSIS is based upon the concept that the most satisfactory performance from the existing set of performances is the one whose relative distance from the PIS is the shortest and the same from the NIS is the farthest.

4. Results and Findings

4.1. Factor analysis of the servqual scores

For each customer, SERVQUAL scores were generated. A SERVQUAL score is obtained by subtracting the expectation score from the perception score for each SERVQUAL item. Factor analysis was conducted with the SERVQUAL scores for the entire set of 450 customers.

Factor analysis of the SERVQUAL scores for the SERVQUAL items was conducted, and was followed by a Varimax rotation to examine the dimensionality of

Table 4. Rotated components factor analysis for service quality.

Descriptions	Factors			
	1	2	3	4
Eigenvalues	7.69	1.14	0.92	0.84
Percentage of variance explained	26.32	21.71	11.77	10.73
Cumulative percentage of variance explained	26.32	48.04	59.8	70.54
Reliabilities (Cronbach's alpha)	0.8841	0.8657	0.8410	0.8408
<i>Rotated Component Matrix</i>				
V1 (Physical facilities)	0.227	0.281	0.822	0.120
V2 (Materials)	0.306	0.209	0.790	0.194
V3 (Branch locations)	0.125	0.108	0.183	0.917
V4 (ATM network)	0.465	0.404	0.111	0.572
V5 (Responsiveness)	0.535	0.593	0.116	0.301
V6 (Right service)	0.473	0.654	0.140	0.109
V7 (Dependability)	8.782E-02	0.757	0.193	0.201
V8 (Service timing)	0.447	0.635	0.136	0.255
V9 (Prompt service)	0.523	0.483	0.298	0.294
V10 (Safety)	4.896E-02	0.661	0.187	-4.218E-02
V11 (Courteousness)	0.614	0.391	0.250	8.357E-02
V12 (Knowledge)	0.514	0.421	0.174	0.332
V13 (Operating hours)	0.809	-5.818E-02	0.211	6.121E-02
V14 (Personal attention)	0.836	0.246	0.197	7.707E-02
V15 (Ability to understand)	0.763	0.295	0.148	0.222

the items. A 4-factor solution was obtained, and the 15 items could be reconfigured into four dimensions, namely, customer-orientedness, competence, tangibles and convenience. The factor loading matrix is presented in Table 4.

Variables 9, 11, 12, 13, 14 and 15 combine to define the first factor, which can be labelled as a customer-orientedness factor. Variables 5, 6, 7, 8 and 10 combine to define the second factor, which can be labelled as a competence factor. The third factor is correlated highly with variables 1 and 2 and can be termed as a tangibles factor. Variables 3 and 4 combine to define the fourth factor, which can be labelled as convenience. The number of factors extracted was determined so that the cumulative percentage of variance extracted by the factors reaches a satisfactory level. In this study, 70% cumulative variance was chosen as the satisfactory level. The factors identified from the factor analysis thus are shown in Table 5.

Table 5.

Factor 1	Factor 2	Factor 3	Factor 4
Customer-orientedness	Competence	Tangibles	Convenience
Prompt service	Responsiveness	Physical facilities	Branch locations
Courteousness	Right service	Materials	ATM network
Knowledge	Dependability		
Operating hours	Service timing		
Personal attention	Safety		
Ability to understand			

The first factor, customer-orientedness, accounted for the largest proportion, that is, 26.32% of the total explained variance. This factor was defined by six scale items and was primarily related to the attitude and skills of the employees providing the service. The second factor, competence, explained 21.71% of the variance and was constructed by five scale items, which were primarily associated with the concept of providing reliable services to customers. The third factor, tangibles, explained 11.77% of the variance and was constructed by two scale items, which were primarily associated with the visual appeal of the banks' physical facilities and communication materials to the customers. Finally, the fourth factor, convenience, explained 10.73% of the variance, and encompassed two items related to the convenience of the banks' branch locations and the spread of the banks' ATM networks. The Cronbach's alphas for all the four dimensions were well above the recommended lower limit of 0.70 (Nunnally, 1978) (Table 7).

The reliability coefficient (Cronbach's alpha), of the modified SERVQUAL scale used in this study, was 0.9273 for the entire sample. The bank wise reliability coefficients (Cronbach's alpha) for the modified SERVQUAL scale used in this study were as shown in Table 6.

It can be seen that the reliability figures are very high, all above the recommended lower limit of 0.70 (Nunnally, 1978).

Cronbach's alphas were also computed to assess the reliability of the four dimensions (customer-orientedness, competence, tangibles and convenience). At the dimension level, the Cronbach's alphas were shown in Table 7.

Thus it can be seen that the Cronbach's alphas for all the four dimensions were well above the recommended lower limit of 0.70 (Nunnally, 1978).

At the dimension level, the Cronbach's alphas per bank were as shown in Table 8.

Table 6.

Banks	Prudential	Millennium	Century	National
Cronbach's alpha	0.9162	0.8848	0.9095	0.9261

Table 7.

Dimensions	Customer-orientedness	Competence	Tangibles	Convenience
Cronbach's alpha	0.8841	0.8657	0.8410	0.8408

Table 8.

Banks	Prudential	Millennium	Century	National
Dimensions				
Attitude	0.9563	0.9545	0.9395	0.9372
Competence	0.9342	0.9464	0.9245	0.9324
Tangibles	0.9541	0.9596	0.9543	0.9432
Convenience	0.9374	0.9498	0.9639	0.9537

Table 9. Average of the factor scores for each bank across the four factors.

Factors Banks	Customer- orientedness	Competence	Tangibles	Convenience
Prudential	0.365	0.045	0.413	0.464
Millennium	0.124	0.204	0.691	-0.460
Century	0.038	-0.059	-0.490	0.155
National	-0.405	-0.124	-0.416	-0.198

Thus it can be seen that the Cronbach's alphas for all the four dimensions across all the four banks were well above the recommended lower limit of 0.70 (Nunnally, 1978). It is also evident that the dimension reduction increases the reliability of the measurements.

4.2. The performance of the banks with regard to service quality

For each bank, the factor scores for the 4 different service quality factors were averaged. The results obtained by each bank are shown in Table 9.

4.2.1. TOPSIS analysis

To the set of the average factor scores of all the four banks across the four factors (as shown in Table 9), the TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) was applied. Two alternatives, R^* and R^- are generated, where R^* represents the PIS (positive ideal solution) and R^- represents the NIS (negative ideal solution). The technique is based upon the concept that the most satisfactory performance from the existing set of performances is the one whose relative distance from the PIS is the shortest and the same from the NIS is the farthest.

Determination of the PIS and the NIS

PIS = {maximum value of the customer-orientedness factor, maximum value of the competence factor, maximum value of the tangibles factor, maximum value of the convenience factor}.

Thus from Table 9 we see that PIS = {0.365, 0.204, 0.691, 0.464}.

NIS = {minimum value of the customer-orientedness factor, minimum value of the competence factor, minimum value of the tangibles factor, minimum value of the convenience factor}.

Thus from Table 9 we see that NIS = {-0.405, -0.124, -0.490, -0.460}.

Calculating the relative closeness of the banks to the PIS

The relative closeness of each bank with respect to the PIS is defined as $d^- / (d^+ + d^-)$; where d^+ = The distance of each bank from the PIS and d^- = The distance of each bank from the NIS.

Table 10.

Service quality factor	Weight
Customer-orientedness	0.373
Competence	0.308
Tangibles	0.167
Convenience	0.152

Table 11.

Bank	$d-/(d+ \text{ plus } d-)$	Rank
Prudential	0.840	1
Millennium	0.641	2
Century	0.438	3
National	0.100	4

Weights for the four service quality factors

The weight for each service quality factor was the ratio of the variance due to that factor to the cumulative variance due to all the factors extracted from the factor analysis. The variance accounted for by each factor and the cumulative variance is shown in Table 10.

The weights for the four service quality factors were as shown in Table 10.

Ranking the preference order of the banks

The rankings received by the four banks as a result of the TOPSIS analysis are shown in Table 11.

Thus it can be seen that the Prudential Bank is closest to the PIS, followed by the Millennium Bank, the Century Bank and lastly the National Bank.

5. Discussion

5.1. *The dimensions of service quality*

This study set out to expand understanding of how consumers evaluate service quality in the context of a developing economy, an environment that differs significantly from the European and North American context that has hitherto dominated service quality research. The goal of this study was to identify the dimensions of customer-perceived service quality in the Indian retail banking sector. The current research reinforces the fact that service quality is a complex and multidimensional construct.

The analysis of the 15 items comprising the various aspects of service quality in this study suggests that customers distinguish four dimensions of service quality in the case of the retail banking industry in India. These four dimensions of customer-perceived service quality are: customer-orientedness, competence, tangibles and convenience. All the four dimensions have their own unique service quality characteristics inherent in the Indian retail banking environment.

A recurring feature in the empirical studies, which have analysed and used SERVQUAL, is the wide variety of empirical factor structures obtained. These vary primarily in the number of interpretable factors, which consistently differ from the five-factor structure reported by Parasuraman *et al.* (1991). Contextual circumstances do have a bearing on the number of dimensions of SERVQUAL. In this study, a modified SERVQUAL scale was used and only those items were included from the original SERVQUAL scale, which customers felt they understood and which were not repetitive. Moreover two additional items were included, related to branch locations and the ATM network. These modifications and the fact that the modified SERVQUAL scale was used in a context (the Indian retail banking sector) entirely different from the one in which Parasuraman *et al.* (1991) had conducted their studies, may explain the emergence of service quality dimensions different from the ones identified by Parasuraman *et al.* (1991).

The service quality factor customer-orientedness has been found to be the most important service quality factor in terms of variance. A plausible explanation for this finding lies in the fact that the factor customer-orientedness is largely concerned with the attitudes and skills of employees. The factor customer-orientedness is defined by variables such as the provision of prompt service, whether the employees are courteous, whether the operating hours are convenient, whether the employees give personal attention to the customers, whether they can understand the customers' needs and whether the employees have the knowledge to respond to customers' needs.

In banking, where there are high customer-producer interactions, the quality of service is determined to a large extent by the skills and attitudes of people producing the service. According to Gronroos (1990), perceived service quality consists of two parts, technical quality and functional quality. Technical quality refers to what customers receive during the service or what remains when the service is over: a completed tax form, the use of a rental car or a night's lodging. Often customers can objectively measure whether the technical service quality was within the promised tolerances. For instance, they can see whether the rental car was ready as promised or the haircut properly done. However, in the case of services, because customers are often either direct observers of the production process or active participants, how the process is performed also has a strong influence on the overall impression of the quality of service. This is functional quality. A well-performed service encounter may even overcome the negative impression caused by poor technical quality as well as generate positive word-of-mouth, particularly if customers can see that employees have worked very hard to satisfy them in the face of problems outside their control. Employees are part of the process, which connects with the customer at the point of sale, and hence employees remain the key to success at these service encounters or "moments of truth". It is these encounters with customers during a service that are the most important determinants of overall customer satisfaction, and a customer's experience with the service will be defined by the brief experience with the firm's personnel and the firm's systems.

The second most important service quality factor, competence, is defined by whether the bank performs the service right the first time, whether the employees of the bank tell customers exactly when services will be performed, whether the bank lives up to its promises, whether customers feel safe in their transactions with the bank and whether the employees show a sincere interest in solving the customers' problems. In short, this dimension is related to the banks' ability to perform the promised service accurately and dependably. Performing the service dependably and accurately is the heart of service marketing excellence. When a company performs a service carelessly, when it makes avoidable mistakes, and when it fails to deliver on promises made to attract customers, it shakes customers' confidence in its capabilities and undermines its chances of earning a reputation for service excellence. That performing the service dependably and accurately is paramount to service customers, has been strongly supported by research (Zeithaml *et al.*, 1990). According to Zeithaml *et al.* (1990), service providers' apologies start to wear thin when a company is careless in performing the service, when it makes frequent mistakes and when it is casual about keeping its service promises. Under these circumstances, customers lose confidence in the firm and little can be done to regain it. The study by Zeithaml *et al.* (1990) further revealed that it is very important to do the service right the first time; in case a service problem does crop up, by resolving the problem to the customer's satisfaction, the company can significantly improve customer retention. However, companies fare best when they prevent service problems altogether and fare worst when service problems occur and the company either ignores them or does not resolve them to the customer's satisfaction.

The service quality factor tangibles is defined by whether the physical facilities and materials associated with the service are visually appealing at the bank. These are all factors that customers notice before or upon entering the bank. Such visual factors help consumers form their initial impressions. A crucial challenge in service marketing is that customers cannot see a service but can see the various tangibles associated with it — all these tangibles, the service facilities, equipment and communication materials are clues about the intangible service. If unmanaged, these clues can send to the customers wrong messages about the service and render ineffective the marketing strategy of the company. On the other hand, improving quality through tangibles means attention to the smallest details that competitors might consider trivial. Yet, these visible details can add up for customers and signal a message of caring and competence.

The service quality factor convenience was defined by the convenience of the branch locations and the spread of the banks' ATM networks. In fact, comments from customers such as "All the branches should be connected and there should be more ATM services" are frequent. The factor convenience is the enabling factor that contributes to service quality by making it easy and comfortable for the customer to do business with their banks on a regular basis. To enable their customers to do

their transactions outside of branches, banks in India are in fact expanding their ATM networks and taking actions to *standardise* procedures (such as setting same withdrawal limits) and availability of services across their ATM networks.

5.2. Application of topsis

The contribution of this research has also been in terms of its methodology. A methodological innovation in this research has been in the use of TOPSIS in the field of customer-perceived service quality. TOPSIS has been previously used to solve multiple objective decision making problems in evaluating and ranking the relative performance of competing companies by simultaneously considering multiple financial ratios (Deng *et al.*, 2000). Engineering problems too have been solved by the use of TOPSIS (Lai *et al.*, 1994). In this study, TOPSIS has been used to evaluate, compare and rank the performance of the banks by considering their performances along the various service quality factors obtained from the factor analysis. TOPSIS can thus provide useful information and an effective framework for ranking competing banks in terms of their overall performance with respect to multiple service quality factors. This technique of TOPSIS is based upon the concept that the chosen candidate (alternative) should be the shortest distance from the positive ideal solution and the farthest from the negative ideal solution. The weight for each service quality factor was the ratio of the variance due to that factor to the cumulative variance due to all the factors extracted from the factor analysis. In this study, the TOPSIS analysis indicates that the Prudential Bank is closest to the PIS, followed by the Millennium Bank, the Century Bank and lastly the National Bank. In fact, the analysis of customers' satisfaction with their banks also indicates that the customers of the Prudential Bank are the most satisfied, followed by the customers of the Millennium Bank, the Century Bank and lastly the National Bank, thus corroborating the results got from the TOPSIS analysis. In short, in the case of both customer-perceived service quality as well as customer satisfaction, the Prudential Bank has achieved the highest rank, followed by the Millennium Bank, the Century Bank and lastly the National Bank.

The advantages of using TOPSIS for evaluating and ranking the customer-perceived service quality of competing banks are, that it is comprehensible, the computation involved is simple, and the concept allows objective weights to be incorporated into the comparison process. The results obtained from the inter-bank comparisons should also be acceptable to the managers and stakeholders of the banks, as it is independent of their subjective and often inconsistent preferences (it is often difficult for the stakeholders of the banks to reach an agreement on the relative importance of the different factors of service quality via a subjective weighting process) of the service-quality factors, since the weights were derived from the factor analysis, which in turn was based upon the service quality perceptions of the customers.

6. Conclusion

The study has shown that the customer-orientedness and competence of employees are the two most important service quality factors, in the context of the Indian retail banking sector and that what is most important is the provision of competent service, caring, individualised attention to the customers, employees' knowledge and courtesy, and the ability of the firm and its employees to inspire trust and confidence. It is easy to see how banks with a seller's market mentality would be weak in these areas. Their organizational culture is just not attuned to looking at things from the customer's perspective. Furthermore, emerging from a seller's market era, they are not structured to deliver excellent, individualised service quality. This situation may be depressing at first glance, but in reality offers excellent prospects for those banks willing to change and adapt.

The findings of this study provide a foundation upon which to pursue further research. This research addresses an issue that has important implications for services marketing theory and practice. Continued refinement of the scale for measuring service quality in retail banking, proposed in this study, is certainly possible based on further research and trends in retail banking. Although in this study it was attempted to cover all aspects of service quality, there may be certain aspects that may have been omitted or that may become relevant as new trends in banking evolve. With time, customers may reveal new aspects of service quality in retail banking that are important to them. Future research can be conducted, taking into account how the various dimensions of service quality, such as say convenience, are changing, in terms of definition as well as new services that are being offered by the banks. In future research, customers may reveal new aspects of service quality in retail banking that are important to them, and these would have to be incorporated in the scale so as to further explore the concept of service quality in the retail banking arena.

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