

THE IMPACT OF SERVICE QUALITY ON CUSTOMER SATISFACTION OF PUBLIC SECTOR BANKS IN TAMIL NADU USING LINEAR MODELS AND ARTIFICIAL NEURAL NETWORK

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ABSTRACT

The banking sector is now sensing the effects of technological advancements, economic volatility, increased competition, and more demanding customers. The success and expansion of a bank depend on a consistent base of loyal and satisfied customers. Banks in today's highly competitive market are always on the lookout for ways to improve their services in order to keep their existing customers and win over new customers. When it comes to keeping customers, banks no longer settle for merely meeting their expectations; instead, they are actively working to exceed those expectations through customer delight. Indians favor public sector banks over private ones for a number of reasons. The purpose of this research is to analyze the relationship between service quality and the customers' level of happiness and loyalty in public sector banks in Tamil Nadu. The 650 clients of Tamil Nadu's public sector banks were polled using a standard questionnaire. The predictive analysis is performed using a deep learning technology called Artificial Neural Network (ANN). Predicting bank customers' satisfaction required correlation, regression, and ANN analysis. This study uses empirical research. Artificial Neural Networks provide predictive analysis. ANN models validate and predict customer satisfaction. Statistical measures assess ANN model efficacy. 5 iterations predicted customer satisfaction with 86.87 percent accuracy. The survey concluded that select public sector banks in Tamil Nadu have a very good service, which helped them to increase their satisfaction level of the customer.

Keywords: Services Quality, Customer Satisfaction, Customer Loyalty, Deep Learning Technology & Artificial Neural Network (ANN).

Introduction

Like any other industry experiencing major structural growth and reformation, the Indian financial services sector has changed over the last several decades. Reforms to financial industry rules have led to a favorable, catalytic, and dramatic turnaround in the banking ecosystem's competitiveness, efficiency, productivity, improvement, and performance. Globalization and liberalization of market fundamentals, dynamics, and participation have also shaped the US and worldwide economy (Debab, 2011). The Indian banking system performs well globally in macro and micro prudential requirements, financial regulation, supervision, and capitalization.

A competitive, dynamic, lucrative, efficient, and effective banking system is needed to encourage, support, and promote economic growth and sustainable development in a complex and fast-changing economy like India. India needs this to succeed. Hence, the continuing reform has improved the financial health, competitive space, and overall soundness of the Indian banking sector. Lastly, the banking sector must prioritize client-focused services to increase customer satisfaction, retention, and loyalty by simplifying and customizing their operations and procedures. If they wish to compete, firms must always put client pleasure first in their marketing efforts (Nwakanma, Jackson, & Burkhalter, 2007). Our clients depend on us to deliver, yet this has always been difficult. Technology and digital transformation have transformed banking transaction delivery. ATMs, credit/debit cards, internet, mobile phones, and landlines have proliferated due to this transformation.

In a technologically evolved market where online transactions are replacing conventional service delivery methods, customers must trust both the service provider and the digital transition to get high-quality products and services. Consumer rights, interests, and property are more crucial due to market competition. The Consumer Protection Act of 1986 gives Indian buyers the opportunity to choose what they purchase and complain about poor quality. Listening to consumer comments can help determine where improvements are needed. This discovery would spur firm expansion and success.

Service providers must prioritize service quality, customer happiness, and customer loyalty to stay competitive, develop their client base, raise profitability, and improve service delivery and staff efficiency. This improves market service efficiency, delivery, and production (Akroush, Dawood, & Affara, 2015). Service marketing and literature research have shown that service quality positively and statistically significantly affects customer satisfaction and other attributes (Aftab & Sarwar, 2016). These investigations show a high association between customer satisfaction, service quality, and loyalty (Rahim, Mohamad, & Ramayah, 2010). Quantitative and qualitative research shows that providing superior, better, and higher-quality services encourages repeat purchasing (Mmutle & Shonhe, 2017). The only way to please customers is to keep up with their changing needs.

Consumers' comments and worries regarding the banking sector, another hot subject, are crucial. They should be allowed to complain about service issues. When we discuss bank service delivery, customer happiness, and customer loyalty in the context of service marketing in a more competitive and dynamic business environment, the virtues of the banking policy reforms, metrics, and frameworks that drive the sector's development trajectory are lost. We don't compare the advantages of banking policy changes, strategies, and frameworks that support the sector's underlying development trajectory. Many think that the RBI's reforms and the banking sector's follow-through have established the framework for the financial services industry's development, in which the banking sector is crucial. This stance has clear arguments. Service quality refers to how well a company meets its customers' demands. In the banking industry, service quality characteristics like tangibles, responsiveness, reliability, empathy, assurance, use of technology, service charges, and service convenience are crucial to maintaining and sustaining long-term, mutually beneficial relationships between customers and business organizations to build a strong customer base and gain a competitive advantage over other market competitors. Due to their relevance in building long-term, mutually beneficial partnerships, In today's fast-paced, competitive market, customers have greater expectations than ever before, and a firm's service quality must satisfy those expectations.

Of course, a thriving banking sector is necessary to provide outstanding customer service and retain consumers. It's also believed that a company's success and development depend on client satisfaction (Chiguvi & Guruwo, 2017). Service quality is the most significant component in customer happiness and loyalty (Joudeh & Dandis, 2018). Most companies concentrate on client acquisition and retention by offering superior goods and services (Boakye, 2011).

Given the severe rivalry in the banking industry, this study seeks to examine how various service quality factors impact customers' happiness. Service quality's effect on customer satisfaction and loyalty has been studied extensively by customer service specialists in industrialized and emerging nations. These studies show that customer satisfaction is strongly correlated with service quality (Mahfooz, 2014).

Statement of the Problem

The banking industry must demonstrate its capacity to meet customer service quality standards. By dividing the banking sector into segments, consumers may assist banks simplify policy choices to compete globally in this changing business climate. The researcher examined Tamil Nadu public sector bank clients' perceived and aspired service quality.

Scope of the study

This research examines how bank service quality affects customer satisfaction in Tamil Nadu Public Sector Banks. This study seeks to identify Tamil Nadu Public Sector Bank account holders who use their services and goods. Customers should be diverse in age, gender, occupation, income, and region. Customer happiness and loyalty depend on their views, experiences, and expectations of services and goods. This study used 650 bank customer data. This research will help banks prioritize customer happiness and quality service and product delivery, which will increase customer contentment and loyalty.

Significance of the Study

This research will help bank management understand service quality delivery procedures and how they affect service and satisfaction. This research examines how service quality affects customer satisfaction and loyalty in Tamil Nadu Public Sector Banks. The researcher is also interested in how efficient and effective these PSBs are in providing quality services and products to their customers through experiences, perceptions, and expectations, and whether the underlying service quality dimensions adopted for this study would positively or negatively affect customer satisfaction and loyalty in the banking sector.

Literature review

Prakash (2019) IT, finance, manufacturing, higher education, and healthcare enhanced service quality, research found. Almost 60 service quality models analyzed participant satisfaction and viewpoints. Service providers should implement customer satisfaction programmes. Service providers improve with customer feedback. This study affects 814 30 year-old publications. Understanding consumer expectations may improve service quality, standards, and customer value. Good service delivery systems improve service-based industries' efficiency, competitiveness, and profitability.

Kann (2018) Quick technological developments and increasing competition provide customers more financial institution alternatives. Clients are increasingly demanding in today's fast-paced, varied company. Finance several local and multinational banks emerged through globalization and deregulation. The research examines customer service expectations, Surveys collected information, Standard deviations, significance, and T-tests.

(Ali 2017) Pakistani Islamic banks and satisfied consumers are examined in this study. SERVQUAL-modified self-administered surveys were completed by 450 Islamic bank customers. Exploratory factor analysis, confirmatory factor analysis, and structural equation modeling were utilized to analyze customer survey data to assess service quality and satisfaction. Customer satisfaction rises with service excellence. Customer happiness is primarily affected by compliance, a new SERVQUAL model component.

(Ok, Suy, Chhay, 2018) Today's service businesses require satisfied customers. Analyzed were service quality, customer satisfaction, and realistic expectations. Explanation, Described. Consumer satisfaction and service quality research is explored. Public and private sector marketing benefits from quality and customer happiness.

Ananda, Sonal (2017) harsh market competition, particularly in retail banking, has made service quality a key factor in consumer pleasure. Banks compete with quality products and services. Five service quality characteristics were analyzed through 25 statements. Retail banking in Oman is reviewed. Organized snowball surveys reached 152 consumers. Using the five service quality components, this quantitative study investigated performance and service expectation views. The five service quality components were investigated using descriptive statistics, regression, correlation, and one-sample t-tests. Customer expectations for all five service excellence qualities increased in the survey. Tangibility was surpassed by empathy. Providers and customers are happier with the five service quality areas. So, Omani banks may prepare to gratify customers with high-quality goods and services using this research.

(Jaroslav, Lenka, 2016) In the competitive banking industry, innovative marketing that sells more products and services to delighted customers may boost a commercial bank's bottom line. Consumers who are pleased spend more. Consumer purchasing is influenced by brand loyalty. Czech commercial bank client satisfaction, loyalty, and profitability are simulated in this study. The concept links customer happiness, loyalty, and repeat purchases to product quality, company financial sustainability and price.

Schirmer, Ringle, Gudergan, Feistel (2016) examined how demographic, situational, and consumer factors affect trust and commitment's mediation of customer satisfaction and loyalty. In homogeneous markets, trust and commitment affect client loyalty. Two further reasons pleased consumers return are examined. First, it examines whether trust and commitment partially moderate how much customer pleasure enhances customer loyalty and if this mediation is constant among consumers. Customer loyalty, contentment, trust, and commitment may be affected by demography. High-educated people's happiness and loyalty are totally mediated by trust and commitment, whereas low-educated people are somewhat happy.

(Theresia, Bangun 2017) Services are intangible. Goods and services differ. Service providers are not exceptional enterprises. Service quality and student satisfaction were reviewed by academics. Indonesian Technical Institute. Customer satisfaction rises with service excellence. Service quality involves responsiveness, punctuality, service confidence, and customer empathy, according to this study. Customer happiness depends on service and product quality. Data comes from surveys. Customers desire real, trustworthy items. Student satisfaction is unaffected by receptivity, certainty, or empathy.

Hennayake 2017) throughout the last two decades, technical factors have shaped the financial system, particularly the banking sector. Consumers must come first for competitive banking CEOs. Human and non-human service quality characteristics satisfy customers.

(Kooloor 2015) Customer-focused services are needed in competitive marketplaces. Tejarat Bank's customer loyalty was analyzed using SEM's regression model which proved that service keeps customers loyal.

The Indian financial sector was developed, reorganized, and expanded according to international norms, according to Sahu, Jitendra, Manabhajan (2016). Prominent Indian banks Commercial banks and rural/urban cooperatives. If banks paid attention, clients might choose reliable banks. Service quality theory covers consumers and providers. SERVQUAL assesses banks' service quality using Tangibility, Reliability, Responsiveness, Assurance, and Empathy. This crucial data was collected from 300 bank clients. SERVQUAL boosts bank product and service retention (Kumar, Sahu 2016).

Industry profile

India's financial institutions handle a lot of its everyday operations. India has governmental, private, and international banks. Government banks have greater than 50% government ownership. Public sector and nationalized banks are also called government banks. The Indian government's mergers had reduced the number of public sector banks from 27 in 2017 to 12 in 2021.

Objectives of the study

With such high and strong rivalry between competitor banks, previous research has shown that quality delivery of services and goods to consumers is important and critical for any organization to expand, earn profit, acquire and sustain competitive advantage. Providing goods and services that customers want is a top priority for banks. In light of this, the purpose of this research is to examine how public sector banks in the Indian state of Tamil Nadu rate in terms of customer satisfaction, with a special focus on the effect of service quality on this metric.

However, the objective of this study is stated as follows:

- To find out the gap between customer perceptions and expectations of quality of services delivered by Public Sector Banks in Tamil Nadu State.
- To study the impact of service quality on customer satisfaction and loyalty amongst Public Sector Banks.
- To better understand the importance of customer satisfaction from the perspective of service quality dimensions, perceived service quality and customer loyalty.

Period of the study

The period of primary data covered for the study, the impact of e-banking service quality on customer satisfaction using linear models and artificial neural networks is three months from September 2022 to December 2022.

Results and discussions

| Variable | Cronbach's alpha | Number of items |
|------------------------------------|------------------|-----------------|
| Customer satisfaction as perceived | 0.864 | |
| Responsiveness | 0.853 | 4 |
| Reliability | 0.824 | 4 |
| Assurance | 0.912 | 4 |
| Empathy | 0.854 | 4 |
| Tangibility | 0.879 | 4 |

Table 1: Reliability Statistics

Reliability tests (Cronbach's alpha) assessed each construct's internal consistency. All variables have reliable data. Social and organizational sciences employ Cronbach's alpha to assess reliability. In addition to Cronbach's alpha reliability at the sample level, a confidence interval for the population reliability number would be beneficial. Cronbach's alpha, which uses numerical coefficients, can analyze the variables' internal consistency. The Cronbach's alpha reliability coefficient can range anywhere from 0 (no dependability) to 1 (complete dependability) (perfect reliability). The Cronbach Alpha value in Table 1 is 0.864. The value of Cronbach's Alpha is more than 0.7, indicating that the data can be trusted. A high level of internal consistency can be inferred from the fact that all variables have a Cronbach's Alpha of at least 0.8 each. Given that each of the four-item aspects of responsiveness, dependability, assurance, empathy, and tangibility has a Cronbach's Alpha of 0.853, 0.824, 0.912, 0.854, and 0.879, respectively, there is a high degree of internal consistency.

| | |
|----------------------------|-------|
| Multiple R | .697 |
| R Square | .485 |
| Adjusted R Square | .479 |
| Std. Error of the Estimate | 1.260 |

Table 2: Model Summary

The above tables 2, provides the R and R² values. The degree of correlation is indicated by the R value of 0.697 which represents the basic correlation. How much of the overall variance in the dependent variable can be explained by the independent variable is represented by the R² value. The coefficient of determination (R²) is 0.479, indicating that the independent factors account for 47.9% of the total variation in the dependent variable. From table 2, it is evident that there is a very positive relationship between the various determinants of the service quality such as Tangibility, Assurance & Security, Reliability, Responsiveness and Empathy so the linear regression test is accepted.

| Effect | Model Fitting Criteria | Likelihood Ratio Tests | | |
|----------------------|------------------------------------|------------------------|-----|------|
| | -2 Log Likelihood of Reduced Model | Chi-Square | df | Sig. |
| Service Quality | 298.501 ^a | .000 | 0 | . |
| Assurance & Security | 584.197 ^b | 285.696 | 60 | .000 |
| Reliability | 553.818 ^b | 255.317 | 55 | .000 |
| Responsiveness | 688.730 ^b | 390.229 | 60 | .000 |
| Empathy | 470.395 ^b | 171.893 | 150 | .107 |
| Tangibility | 603.675 ^b | 305.174 | 55 | .000 |

Table 3: Likelihood Ratio Tests

In Table 3, the chi-square statistic is calculated using the difference in log-likelihoods of -2 between the complete model and the reduced model. The reduced model is created by deleting one or more effects from the comprehensive model. It is presumed that all of the parameters of the effect are equal to zero, which is also known as the null hypothesis. This simplified model is equivalent to the full model in terms of its applicability because the number of degrees of freedom does not increase when the effect is removed.

The likelihood can be defined as the probability that the observed findings would have occurred given the parameter estimates. Because the likelihood is a small value that is less than 1, the standard formula for calculating it is -2 times the log of the likelihood. The value of a model's -2LL can be used to get an idea of how well it fits the likelihood. When the anticipated and observed results are quite similar to one another, we can say that the model is accurate. To put it another way, this results in a value for -2LL that is not particularly high (If a model fits perfectly, the likelihood is 1, and -2 times the log likelihood is 0).

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|--|------------|----------------|-----|-------------|--------|-------------------|
| 1 | Regression | 627.006 | 4 | 125.401 | 79.004 | .000 ^b |
| | Residual | 665.074 | 644 | 1.587 | | |
| | Total | 1292.080 | 649 | | | |
| A. Dependent variable: Customer satisfaction | | | | | | |
| B. Predictors: (constant), Tangibility, Assurance & Security, Reliability, Responsiveness, Empathy | | | | | | |

Table 4: ANOVA

Table 4 shows that the ANOVA test is accepted since there is a strong correlation between the independent variable (customer satisfaction) and the numerous service quality predictors (Tangibility, Assurance & Security, Reliability, Responsiveness, Empathy). It is a device that can compare the likelihood of a certain collection of data to the value that is estimated to be returned by a statistical function. From the above figure it is evident that the overall customer satisfaction level is high because of the predictors used.

| | | | |
|-----------------|--|--------------------|-----------------------|
| Input Layer | Factors | 1 | Customer satisfaction |
| | Number of Units ^a | 12 | |
| Hidden Layer(s) | Number of Hidden Layers | 1 | |
| | Number of Units in Hidden Layer 1 ^a | 6 | |
| | Activation Function | Hyperbolic tangent | |
| Output Layer | Dependent Variables | 1 | Service Quality |
| | Number of Units | 5 | |
| | Activation Function | Softmax | |
| | Error Function | Cross-entropy | |

Table 5: Network Information

Neural networks use multiple layers of multiplication with learning weights and non-linear modifications to forecast. Depending on neural network design, a prediction might require millions of mathematical operations. A neural network prediction is understood by millions of complicated weights.

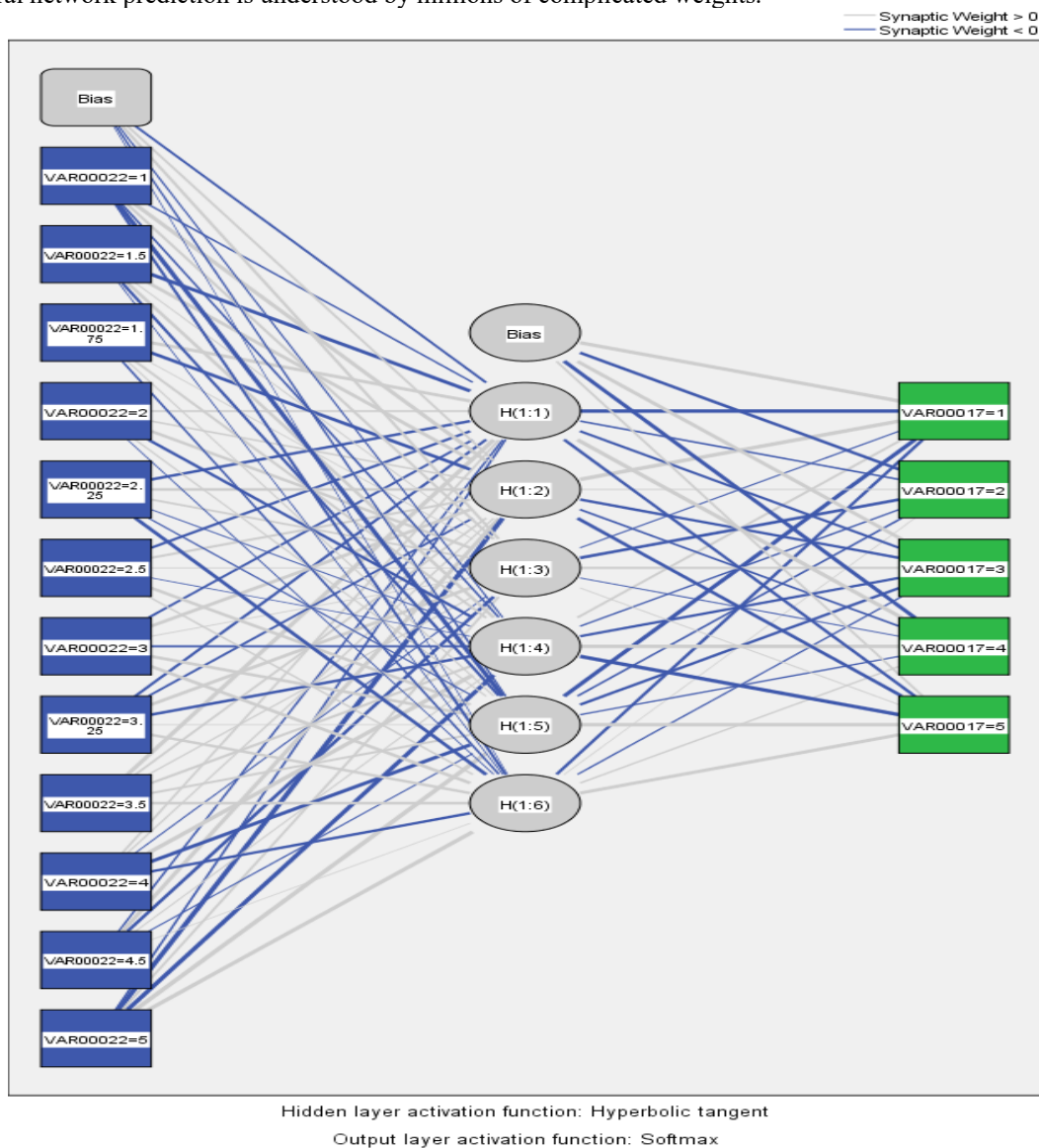


Figure 1: Neural Network

Testing of Hypothesis

To test the significant difference among the mean value of the variables measured under customer satisfaction against the average mean score, the following null hypothesis are framed.

Ho 1: The perception level of respondents towards customer satisfaction does not differ with the average score

| One-Sample Test | | | | | | |
|----------------------|----------------|-----|-----------------|-----------------|---|-------|
| | Test Value = 0 | | | | | |
| | T | Df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| Assurance & Security | 36.465 | 649 | .000 | 2.612 | 2.47 | 2.75 |
| Reliability | 35.739 | 649 | .000 | 2.330 | 2.20 | 2.46 |
| Responsiveness | 56.685 | 649 | .000 | 7.040 | 6.80 | 7.28 |
| Empathy | 51.531 | 649 | .000 | 2.889 | 2.78 | 3.00 |
| Tangibility | 45.160 | 649 | .000 | 3.009 | 2.88 | 3.14 |

Table : 6 One sample t-test for customer satisfaction of banking services

** Significant at 5% level

Table 6 shows that there is a significant difference between the means of the respondents' ratings of satisfaction with banking services and the average rating for the test at the 5% level for the values. Customers are most satisfied when they receive a good response (56.685) from the banker, then comes the importance of Empathy (51.531), then the customers value the tangibility dimension (45.160), Assurance & Security (36.465) and Reliability (35.739) are the other service dimensions which has been of least important to the customers.

Ho 2: There is no significant relationship between service quality dimension and customer satisfaction of banking services

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|-------------------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | (customer satisfaction) | .454 | .265 | | 1.711 | .088 |
| | Assurance & Security | .757 | .059 | .641 | 12.827 | .010 |
| | Reliability | -.015 | .065 | -.012 | -.232 | .817 |
| | Responsiveness | .863 | .024 | .093 | 14.604 | .010 |
| | Empathy | -.031 | .066 | -.021 | -.472 | .637 |
| | Tangibility | .206 | .055 | .162 | 3.745 | .010 |

Table 7: Relationship between dimensions implying service quality of customer satisfaction of banking services

Correlation value for the relationship between Responsiveness and satisfaction ($r=0.863$) is the highest when compared with other service dimensions such as Empathy, Reliability, Assurance & Security and Tangibility, so the null hypothesis is rejected at 1% level. So the Customer satisfaction with the banking service is boosted by Responsiveness, Assurance & Security and Tangibility, Reliability and Empathy are not positively increasing the customer satisfaction.

Ho 3: There is no significant impact of dimensions of service quality on customer satisfaction of banking services.

| One-Sample Statistics | | | | |
|-----------------------|-----|------|----------------|-----------------|
| | N | Mean | Std. Deviation | Std. Error Mean |
| Assurance & Security | 650 | 2.61 | 1.477 | .072 |
| Reliability | 650 | 2.33 | 1.344 | .065 |
| Responsiveness | 650 | 7.04 | 2.560 | .124 |
| Empathy | 650 | 2.89 | 1.156 | .056 |
| Tangibility | 650 | 3.01 | 1.374 | .067 |

Table 8: Impact of Dimensions of Service quality on customer satisfaction

Table 8 shows that Responsiveness has the highest mean which means that Responsiveness is the most important service dimension which helps to increase the customer satisfaction. The other service quality

dimensions are Tangibility, Empathy, Assurance & Security and Reliability are also helping in increasing the customer satisfaction.

| | | Assurance & Security | Reliability | Responsiveness | Empathy | Tangibility |
|---------------------------------|---------------------|---------------------------------|--------------------|-----------------------|----------------|--------------------|
| Assurance & Security | Pearson Correlation | 1 | .704** | -.026 | .302** | .283** |
| | Sig. (2-tailed) | | .000 | .587 | .000 | .000 |
| | N | 650 | 650 | 650 | 650 | 650 |
| Reliability | Pearson Correlation | .704** | 1 | .031 | .290** | .311** |
| | Sig. (2-tailed) | .000 | | .525 | .000 | .000 |
| | N | 650 | 650 | 650 | 650 | 650 |
| Responsiveness | Pearson Correlation | -.026 | .031 | 1 | -.157** | -.045 |
| | Sig. (2-tailed) | .587 | .525 | | .001 | .357 |
| | N | 650 | 650 | 650 | 650 | 650 |
| Empathy | Pearson Correlation | .302** | .290** | -.157** | 1 | .564** |
| | Sig. (2-tailed) | .000 | .000 | .001 | | .000 |
| | N | 650 | 650 | 650 | 650 | 650 |
| Tangibility | Pearson Correlation | .283** | .311** | -.045 | .564** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .357 | .000 | |
| | N | 650 | 650 | 650 | 650 | 650 |

Table 9: Correlation

The Pearson Correlation model is significant at the 1% level hence Ho3 can be rejected as the null hypothesis. This illustrates that Responsiveness and Assurance & Security is a key factor in increasing customer satisfaction. The other dimensions such as reliability, empathy and tangibility also significantly increase the customer satisfaction of the banking services.

| | Cluster | |
|---------------------------------|----------------|----------|
| | 1 | 2 |
| Assurance & Security | 1 | 1 |
| Reliability | 1 | 1 |
| Responsiveness | 13 | 3 |
| Empathy | 1 | 5 |
| Tangibility | 1 | 5 |

Table 10: Initial Cluster Centers

| Iteration | Change in Cluster Centers | |
|------------------|----------------------------------|----------|
| | 1 | 2 |
| 1 | 3.624 | 4.303 |
| 2 | .236 | .085 |
| 3 | .000 | .000 |

Table 11: Iteration History

Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 3. The minimum distance between initial centers is 11.239.

| | Cluster | |
|---------------------------------|----------------|----------|
| | 1 | 2 |
| Assurance & Security | 2 | 3 |
| Reliability | 2 | 2 |
| Responsiveness | 10 | 6 |
| Empathy | 2 | 3 |
| Tangibility | 3 | 3 |

Table 12: K- means Final Cluster Centers

K-Means Clustering, an unsupervised learning approach, clusters unlabeled datasets. Here, K=2 means there are two predefined clusters to construct. An iterative technique separates the unlabeled dataset into k clusters so that each dataset belongs to only one group with similar attributes. It helps us cluster data into groups and determine the categories of groupings in the unlabeled dataset without training. It uses centroid-based clustering. This algorithm minimises data point-cluster distances. The method separates the unlabeled dataset into k clusters and

repeats until it finds the best clusters. This algorithm should predetermine k. k-means clustering fulfils two key tasks: Iteratively finds the best K centre points or centroids. It assigns data points to their nearest k-centres.

Clusters form around k-centres. Thus, each cluster shares data points and is distinct from others. Before K-means clustering and after 3 rounds, bankers' responsiveness influenced client satisfaction more, so it is predicted that Responsiveness is the key dimension which has helped in increasing the customer satisfaction.

Predictive Analysis using Artificial Neural Network

In order to investigate the parameters of the customer perspective model and the factors of adaptation of the service quality model in public sector banks in Chennai, neural network models are now being utilised. The parameters are tuned in order to make the most of the adaption of the service quality model in the public sector bank in Chennai in accordance with the customer perspective Neural Networks Architecture and network information. This is done in order to maximise the overall outcome of the adaptation of the model.

Customer satisfaction with the banking service quality is measured in the five dimensions such as convenience, assurance and safety, responsiveness, reliability, site visual appearance. An artificial neural network, a deep learning technology, is used to do the prediction analysis. With this data, public sector banks in Chennai may better estimate how well they will meet the needs of their customers based on the criteria important to them.

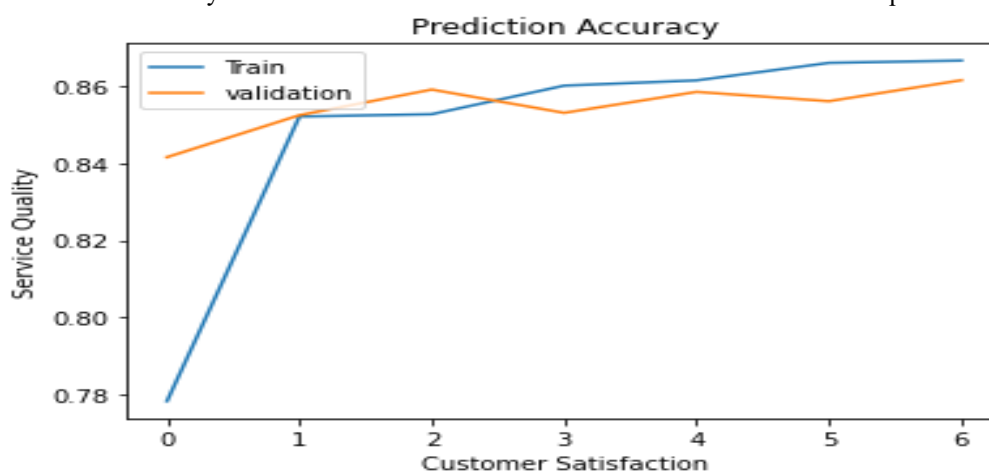


Figure 2: Prediction Accuracy for Customer Satisfaction Vs Service Quality.

The information contained in the training dataset is utilised in order to "train" the model. After performing hyper-parameter tuning on the training dataset, the performance of the model is evaluated using a validation dataset that is a subset of the initial data. As additional information from the validation dataset is included into the model setup, the evaluation will become increasingly biased as a result. The first layer of the artificial neural network (ANN) is made up of five distinct nodes in the neural network; the ANN as a whole is composed of three layers. In the second layer, there are five additional neural nodes, and then in the third layer, all of the neurons are united into a single node. After 5 rounds, we are confident in our ability to anticipate future levels of customer satisfaction with a 93.87 percent accuracy rate. It is possible to achieve an incredibly fine degree of precision. The model's ability to accurately predict bank quality measures based on service quality criteria is demonstrated by an incredibly low loss percentage of 0.2785. It is possible to construct a highly accurate approach for predicting service quality with virtually no error loss at all thanks to the fact that model loss is kept to a minimum and a high prediction rate is achieved across all five dimensions.

Limitations of the study

The study has the following limitations.

- The study is limited to Public Sector Banks only.
- The study is based on the questionnaire and opinion survey of customers only.
- Larger sample of respondents may have produced different results.
- The findings of the study can't be comprehensive as the study is made covering a limited area namely, Tamil Nadu state only.

Managerial Implications of the study

This study's main goal was to design a model, but it also assessed customer service quality from every angle, including the consumers' perspective. The survey found that public sector banks are well-liked, but they need

ongoing changes to be competitive and satisfy clients. Financial services firms should invest more in staff training to improve customer service. Businesses need employees to build strong customer relationships. A corporation cannot succeed without them. In the face of fierce competition, training and development help organisations become more adaptive, optimistic, and customer-focused.

Conclusions

A literature review on service quality and banking customer satisfaction indicated a favourable association between the two factors. This research confirmed prior findings that exceptional customer service increases repeat business. After analysing the data, it was clear that consumers' views of each of the five elements of service quality exceeded their expectations. Customers value banks' responsiveness, safety, and reliability. This research found that public sector banks can only succeed if its employees care about consumers. Satisfied customers motivate bank employees to perform better, which benefits customers and encourages growth.

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