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Research plan: Utilizing multiple regression analysis to evaluate factors influencing customer satisfaction with banking services

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Abstract: The main objective of the research will be to evaluate factors that affect customer satisfaction with the banking service provided through multiple regression analysis. As the banking industry has geared itself towards the driver of customer satisfaction as the paradigm for its success, the precise determinants for the same need to be unearthed. The examination of this paper includes service quality, responsiveness, personal interaction, security, and their direct contributions to levels of customer satisfaction. A structured survey is being designed to collect quantitative data on a representative sample of bank customers regarding various aspects that will be analyzed through multiple regression to identify and quantify the influence of each factor. The research is carried out using a quantitative technique, and the main analysis approach in this respect is a statistical analysis technique. Each of the variables will be looked at separately in an attempt to find out not only which one has a greater effect but how the change or fluctuation in the variables would relate to customer perceptions and, hence, overall satisfaction. The findings are anticipated to illuminate pragmatic insights for banking institutions in providing directions regarding which areas the services should be worked on to bring about a significant enhancement in customer satisfaction. The research will thus have set up the provision for the banking institutions to improve their services based on data and enhance the strength of customer relationships. The research also highlights possible constraints, such as demographic variance in customer expectations, to present a complex understanding of satisfaction determinants within a banking context. Therefore, as a result, the research intends to enhance theoretical knowledge and, at the same time, provide practical solutions toward customer satisfaction to enable banks to build better operational service models that are centered on the needs of the customers.

Keywords: *Banking services, Customer satisfaction, Customer experience, Multiple regression, Service quality.*

1. Methodological Framework

1.1. Introduction and Importance of the Study

In this reliable and competitive environment, satisfaction is considered one of the best performance indicators that have direct links with customer loyalty, retention, and overall performance by any particular bank. In a scenario in which customers have multiplicities of options and expectations, banks are concentrating on delivering services that go above and beyond those expectations. Happy customers keep coming back, use more of the bank's products, and refer the bank to other people, supporting higher profitability and market shares. Thus, the pursuit of customer satisfaction becomes pertinent for any long-term success and expansion in the banking field.

The research has used multiple regression analysis as its main statistical technique for identifying and measuring factors affecting customer satisfaction significantly in relation to banking services. Multiple regression analysis is a very powerful statistical tool that allows for the determination of the relationship between several independent variables at the same time, namely, service quality, responsiveness, security, and personal interaction and how they relate to an individual dependent

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variable, in this case, customer satisfaction. The study thus intends to use this analysis to identify the most driving factors and how much each of these contributes to the satisfaction of customers. This would further help banking institutions to have a focus on certain areas so that resource allocation is focused on those factors that have the highest potential to improve customer experience.

1.2. Research Objectives

The primary objectives of this study are as follows:

- Determine the Factors Influencing Customer Satisfaction Directly Form the Service Sector of the Economy: This will focus on identifying the major determinants of customer satisfaction in the banking sector and understanding which specific services most influence satisfaction among customers. The main issue to be determined through this analysis is which components of banking services under service quality, responsiveness, and assurance influence and are most important to customers in as far as satisfaction is concerned.
- Assessment of the Unique Contribution of Each Variable to Customer Satisfaction: This objective is to assess the separate contribution of each identified factor toward bringing about changes in customer satisfaction levels. By using multiple regression analysis, the study will be able to ascertain the extent of each variable's unique contribution to understanding how changes relating to a specific issue, for instance, service quality or security bettering overall satisfaction levels. Such analysis will help gain an understanding of the preference given to improvements on the basis of their effectiveness in improving customer satisfaction.

1.3. Research Questions:

- What are the main factors influencing customer satisfaction with banking services?
- How can changes in these factors affect customer satisfaction levels?

1.4. Research Hypotheses

The study will formulate the following hypotheses to examine the impact of various factors on customer satisfaction in the banking sector:

- H1: Service Quality positively affecting customer satisfaction. This hypothesis proposes that higher levels of service quality are related to increased customer satisfaction since customers would appreciate an efficient, accurate, and responsive service.
- H2: Security has a positive and significant effect on customer satisfaction. It is assumed that a high level of perceived security in a transaction and data in banking or for its protection would add positively to the satisfaction of customers since they are most concerned about the safety of their financial as well as personal information.
- H3: responsiveness positively affect customer satisfaction. The hypothesis suggests that providing timely responses to customer inquiries, quick issue resolutions, upon further examination, could improve their overall experience and hence satisfaction.
- 4. Personal interaction has a considerable effect on customer satisfaction. Positive and friendly service from the staff for instance empathy and support provided to clients, and personalized service tends to enhance satisfaction with service.

These hypotheses will be tested through multiple regression analysis to determine the significance and strength of each factor's influence on customer satisfaction.

1.5. Research Methodology

Numeric data analysis has been embraced by this paper to verify the determinants which may influence customer satisfaction in the banking sector. A structured survey questionnaire will be administered to a sample of customers of banks in soliciting their views on various service attributes including service quality, security, speed of service, and personal attention.

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The collected data will then be subjected to multiple regression analysis. Multiple regression is a statistical technique that helps to explore the relationship between several independent variables influencing a phenomenon (in this case, satisfaction) and a single dependent variable. This will enable it to look at each of the factors separately while controlling for the effects of other variables and thus draw a fuller picture of how various elements of the banking services contribute to total customer satisfaction.

The study will be quantitative in nature to produce an objective, data-driven recommendation that may help banks develop targeted strategies in enhancing satisfaction based on statistically significant findings.

1.6. Data Collection Tools

The data collection will be through a structured questionnaire, which will contain closed-ended questions and open-ended questions related to the customer perceptions and experiences concerning the provision of the various aspects of banking services. Major sections will encompass:

- Quality of service: This section seeks to pose queries that would draw out information from the respondents on their thoughts concerning the reliability, accuracy, and efficiency of the services offered by the bank.
- Responsiveness: This part shall detail how fast and effectively the bank responds to customer inquiries, as well as how it resolves problems.
- Security: How secure do you feel about your financial transactions and data protection?
- Personal Interaction: Were the interactions with the banking staff empathetic, attentive, and personalized? Please add any others you feel are relevant.

Each of them will comprise closed-ended questions, ratings on a Likert scale, and possibly a few open-ended questions to gather in-depth feedback. The survey ensures that adequate data is collected for each variable such that a comprehensive analysis using multiple regression can be conducted.

2. Theoretical Framework

2.1. Customer Satisfaction Concept

Customer satisfaction is defined as the extent to which products and services provided by a company meet or exceed customer requirements. It plays a crucial role in the banking industry, not just in terms of enhancing customer loyalty and retention but also in the overall financial performance of a bank. Key drivers of satisfaction in banking include quality of service, quick response, safety, and interpersonal touch. These collectively shape how customers feel about dealing with the bank and hence what they will do and say, as stated by Oliver [1] and Kotler and Keller [2] referencing Parasuraman, et al. [3].

The need for customer satisfaction is most essential in banking and financial services because of the intensity of competition. This is because services are homogenous, so differentiation through service quality and customer satisfaction is key. According to Oliver [1] in a competitive market, satisfaction is a distinct advantage and fosters increased customer loyalty and long-run commitment. Satisfied customers will not frequently change their banks and are more likely to extend their usage of various bank products, such as loans and credit cards, which in turn increases the profitability of the bank [2].

SERVQUAL model by Parasuraman, et al. [3] introduced the five dimensions of service quality affecting customer satisfaction: tangibles, reliability, responsiveness, assurance, and empathy. This model is predominantly used in the banking sector for gauging and improving customer satisfaction through a systematic approach to the realization and fulfillment of customer needs.

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Table 1.
Key drivers of customer satisfaction in banking.

Factor	Description	Impact on satisfaction
Service quality	Reliability, accuracy, and efficiency of banking services	Increases trust and satisfaction
Responsiveness	Speed and effectiveness in addressing customer inquiries and resolving issues	Enhances customer experience
Security	Perceived safety of financial transactions and data protection	Builds confidence and loyalty
Personal interaction	Quality of interactions with bank staff, including empathy and personalized service	Strengthens relationship with bank

2.2. Multiple Regression Analysis

2.2.1. Overview of Multiple Regression Analysis

Regression analysis is, in other words, the task of estimating the numerical value of a single dependent variable based on the numerical value of one independent variable or two or more independent variables. In customer satisfaction analysis, it allows one to figure out what kind of effect (dependent variable) will be produced by inputting various factors (independent variables). As Montgomery, et al. [4] write, multiple regression seems to be a perfect technique for discussing complicated interrelations considering numerous variables since it separates each predictor variable's effect while keeping other variables constant.

Multiple regression analysis will be used in banking to evaluate the relative contribution of service quality, responsiveness, security, personal interaction to customer satisfaction. This method assists banks in ranking respective improvements according to the importance and magnitude of each variable and hence adopt focused tactics for improving customer experience [5].

Regression analysis results include the regression coefficients for each independent variable, reflecting the change in customer satisfaction that is anticipated to result from a one-unit change in each factor when all other factors remain constant, as observed by Hair, et al. [6]. This, in turn, allows a much finer understanding of which factors it is that are "driving" satisfaction with the call center.

2.2.1.1. Building the Regression Model

To build a multiple regression model, the following steps are typically followed:

1. Define the Variables:
- Dependent Variable (Y): Customer Satisfaction.
- Independent Variables (X1, X2, X3, etc.): Service Quality, Responsiveness, Security, Personal Interaction.
2. Collect Data:
- Conduct a survey to gather quantitative data on customer satisfaction and the identified factors. Data should be sufficient in quantity to ensure statistical reliability.
3. Specify the Model:
- The model equation is defined as: $Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\cdots+\betanXn+\epsilonY = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + \epsilonY=\beta0+\beta1X1 +\beta2X2+\beta3X3+\cdots+\betanXn+\epsilon$
- Here, $\beta0\beta_0\beta0$ represents the intercept, $\beta1,\beta2,\beta3,\beta_1, \beta_2, \beta_3,\beta1,\beta2,\beta3$, etc., are the coefficients for each independent variable, and $\epsilon\epsilon$ is the error term.
4. Estimate the Model:
- Using statistical software, estimate the coefficients for each variable, which shows how each factor (e.g., Service Quality) affects customer satisfaction when other factors are held constant.
5. Evaluate Model Fit:
- Assess the model's fit using metrics such as R-squared (R^2), which indicates how well the independent variables explain the variance in the dependent variable. A higher R^2 value suggests a better fit Montgomery, et al. [4].

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2.2.1.2. Interpreting the Results

The results of multiple regression analysis provide insight into both the individual and combined effects of the factors on customer satisfaction.

- Regression Coefficients (β\betaβ): Each coefficient reflects the expected change in customer satisfaction for a one-unit change in the respective independent variable. For example, if the coefficient for service quality (β1\beta_1β1) is 0.5, this suggests that a one-unit increase in service quality results in a 0.5-unit increase in customer satisfaction, assuming all other factors remain constant.
- Significance Testing (p-values): A p-value for each coefficient tests whether the independent variable significantly influences customer satisfaction. Typically, a p-value less than 0.05 indicates a statistically significant effect.
- Model Fit (R^2): The R-squared value indicates the proportion of variation in customer satisfaction explained by the independent variables. For instance, an R^2 of 0.7 suggests that 70% of the variability in customer satisfaction is accounted for by the model, signifying a strong relationship between the predictors and customer satisfaction.
- Example Interpretation: Suppose we have the following output from a regression analysis (Table 1).

Table 2.
Key drivers of customer satisfaction in banking.

Variable	Coefficient (β)	p-value	Interpretation
Service quality	0.6	0.001	Significant; a one-unit increase in service quality increases satisfaction by 0.6 units.
Responsiveness	0.3	0.02	Significant; positively impacts satisfaction but to a lesser extent.
Security	0.4	0.05	Marginally significant; indicates that security also influences satisfaction.
Personal interaction	0.2	0.1	Not significant; suggests minimal effect on satisfaction in this context.

In this hypothetical model, service quality has the highest impact on customer satisfaction, followed by security and responsiveness. Personal interaction, however, does not show a statistically significant effect, which may indicate that customers prioritize efficiency and safety over interpersonal elements in banking.

2.3. Theories Related to Banking Services and Customer Satisfaction

The concept of customer satisfaction is one of the most researched phenomena not only in various sectors of the economy, like the financial industry but also in numerous other industries through models and theories. These models gauge client expectations, perceptions as well as experience. All these models contribute towards enabling banks to understand what influences customer satisfaction and hence formulate strategies that will enhance service quality and customer loyalty.

2.3.1. SERVQUAL Model

One of the most widely used models for assessing customer satisfaction in service industries, including banking, is the SERVQUAL model. Developed by Parasuraman, et al. [3] this model identifies five key dimensions of service quality that influence customer satisfaction:

- Tangibles – The physical appearance of facilities, equipment, and personnel.
- Reliability – The ability to perform services accurately and dependably.
- Responsiveness – The willingness to help customers quickly.
- Assurance – Knowledge and courtesy of the contact employees who instill trust and confidence.
- Empathy – Individualized attention or care extended to customers.

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In the context of banking, the SERVQUAL model can be used to assess customer satisfaction by evaluating each dimension. For example, tangibles may include the cleanliness and comfort of bank branches, while reliability might focus on the accuracy and security of transactions. Research shows that higher ratings in these dimensions generally correlate with increased customer satisfaction and loyalty in banking services [3, 7].

2.3.2. Expectancy-Disconfirmation Theory (EDT)

Expectancy-Disconfirmation Theory (EDT), proposed by Oliver [8] suggests that customer satisfaction is based on the comparison between customers' expectations and their actual experiences with a service. According to this theory:

- Positive disconfirmation occurs when the service exceeds expectations, leading to higher satisfaction.
- Negative disconfirmation happens when the service falls short, resulting in dissatisfaction.
- Confirmation occurs when the service meets expectations, typically resulting in moderate satisfaction.

In banking, EDT is associated with various services like loan processing, account management, and customer support. A customer who finds that a bank has consistently exceeded his expectations in delivering services is generally satisfied and likely to stay loyal towards the bank. In contrast, if a customer has to wait long for errors in transactions, among other reasons, this will lead to negative disconfirmation and result in dissatisfaction and eventually ganging up against the [8, 9].

2.3.4. Customer Perceived Value Theory

The value that the consumer receives is known as Customer perceived Value and was first introduced by Zeithaml [10] he stated that satisfaction is a consumer satisfaction from the service which is based on what they have to pay for it relative to its perceived value. In other words, the consideration is always about comparing benefits vis-à-vis price or sacrifice. Benefits according to Zeithaml [10] affect the perception of value:

- Quality of the service: Let's add high-quality services since this clearly enhances perceived value."
- Price fairness: Add reasonable fees or costs for price fairness since this also increases perceived value.
- Non-monetary costs: Overall, thus, these include the time, and effort that customers invest and convenience or easy access to the product.

In the case of banking, perceived value will appear in the grade of online banking services, how efficient in-branch transactions are and what kind of fees are charged for certain accounts or services. Said differently, a bank delivering high-value services at a reasonable cost is likely to carry high customer satisfaction because customers will perceive that they have received an advantageous exchange for the resources spent [10, 11].

Table 3.
Summary of theories and their application to banking services.

Theory/Model	Key concepts	Application in banking
SERVQUAL model	Service quality dimensions: tangibles, reliability, responsiveness, assurance, empathy	Assessing and improving customer interactions, branch environment, and service accuracy to boost satisfaction
Expectancy-disconfirmation theory	Satisfaction depends on whether experience meets, exceeds, or falls short of expectations	Ensuring service consistency in transactions, account management, and support to meet or exceed customer expectations
Customer perceived value theory	Perceived value based on service benefits versus costs	Enhancing perceived value by balancing service quality and price, offering accessible, efficient banking options to satisfy customers

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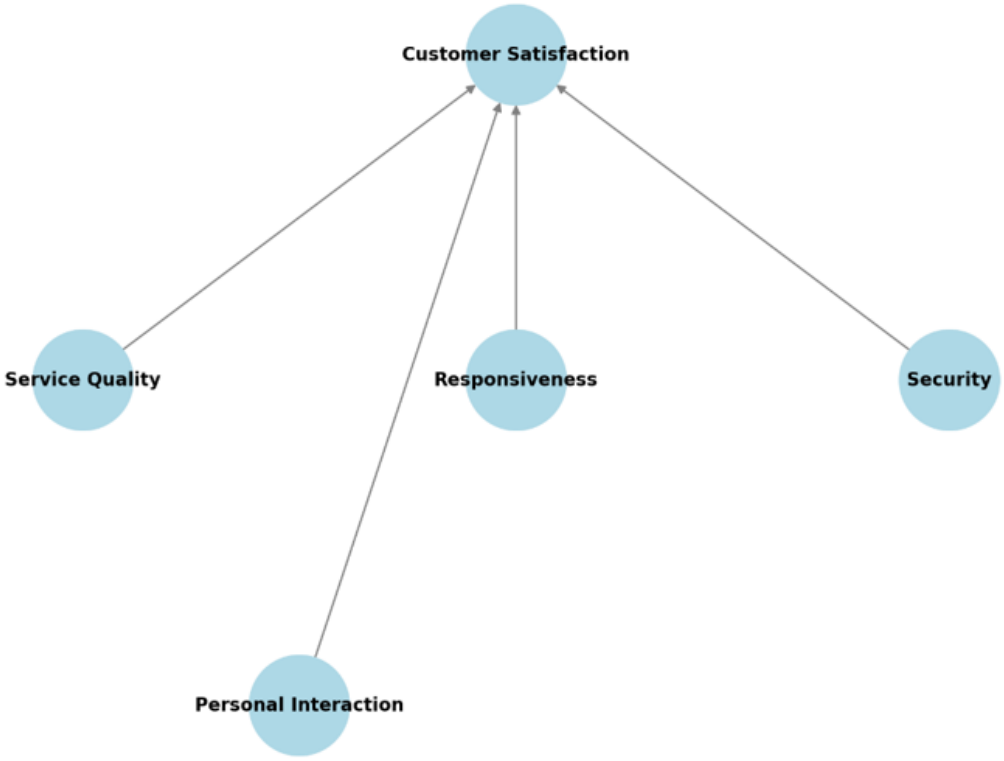

Figure 1.
Theories of customer satisfaction applied to banking.

3. Experimental Framework

3.1. Study Sample

Thus enhancing a wider spread of demography and therefore enhancing the generalizability of the findings to other unidentified customers in the system. A combination of random and stratified sampling techniques was used to get customers from different branches in the banking network in order to avoid homogeneity. Key demographic characteristics considered in the sample include:

- Age: The sample includes customers across multiple age groups to understand how customer satisfaction may vary with age. Age categories typically include:
    - 18-30 years
    - 31-45 years
    - 46-60 years
    - Over 60 years
- Gender: Both male and female customers are included in the study to capture any gender-related differences in perceptions of banking services.
- Education Level: Education level is categorized to determine if satisfaction levels vary with educational background. Categories include:
    - High School or Less
    - Associate Degree
    - Bachelor's Degree
    - Graduate or Professional Degree
- Income Level: The study also considers income levels, as financial needs and expectations can vary greatly across income brackets. Income is typically categorized as:

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    - Low Income (below average)
    - Middle Income (average)
    - High Income (above average)
- Employment Status: Employment status is included to examine if customer satisfaction is influenced by occupational needs. Categories include:
    - Employed
    - Self-employed
    - Student
    - Retired
- Frequency of Bank Use: Frequency of bank use may also affect satisfaction, so the sample includes customers who visit the bank frequently, occasionally, and rarely.

A sufficient number of participants from each demographic group is selected to enable meaningful analysis and comparison. This sample ensures that the study accurately reflects the needs and expectations of diverse customer groups, providing a comprehensive view of customer satisfaction with banking services.(attached (1))

3.2. Research Tool

The primary research instrument employed in this study is a structured questionnaire in order to gather quantitative data concerning different dimensions of customer satisfaction with banking services. It attempts to draw minutely into the customers' perceptions and experiences with the pivotal service attributes. Each of these various attributes is gauged by a set of statements measured on the Likert scale, usually varying from 1 (Strongly Disagree) to 5 (Strongly Agree), to measure the satisfaction level .(attached(2))

3.3. Data Collection

Data collection has been well structured so that all the relevant information related to the sample may be true, and it is a quite reliable reflection of the level of customer satisfaction regarding banking services. The process will go on through several steps as follows:

3.3.1. Survey Distribution

- Distribution: The survey will be conducted through online and on site at branches to ensure maximum outreach. Online survey will be emailed to selected customers and consented customers with captured contact information, whereas, hard copies will be available at selected branches only.
- Sampling Method: To see that the sample would be representing various demographic segments like age, gender, income level, and education, a stratified random sampling method is used. Hereby introduced at the stage of the sample selection, the method secures minimizing the formal error in one's analytics due to incompleteness with information obtained through the method.

3.3.2. Ensuring Participation and Data Quality

- Incentives: Participation is encouraged through provision of nominal incentives like raffle entry or discounts on banking services and thus response rates are improved.
- Clear Instructions: Each questionnaire carries carefully written instructions to help the respondents carry out a correct filling process. They are briefed on the need to be open and repeat their previous responses.

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3.3.3. Data Accuracy and Reliability Measures

- Pilot testing with a small group of participants will be carried out before the full deployment of the survey. This aims to find any ambiguities or potential issues in the questions that may confuse respondents when answering the survey items.
- Data collection process is standardized, the format of the survey on, for example, Likert scale, will be made uniform across all methods of distributions to maintain uniformity in responses.
- Data Validation Checks: Like the mandatory fields for online surveys, validation checks will become a part so that all questions are answered. Any skipped items are usually caught by employees conducting in-branch surveys, who are trained to help respondents fill out the survey.

3.3.4. Data Entry and Cleaning

- Automated Data Collection: With the online survey, data are collected automatically eliminating the possibilities of errors during data entry.
- Manual Verification: Paper-based surveys that are completed at the branches are entered into the system by trained staff, who verify the consistency of the responses.
- Data Cleaning: A complete data cleaning operation is done right after the entry to sort out inconsistencies and outliners like double entries, and blanks in questions.

3.3.5. Reliability Testing

- Cronbach's Alpha: In order to test the instrument's reliability, the survey instrument's Cronbach's Alpha has been calculated. It examines the internal consistency of the questionnaire items regarding each attribute (in this case, service quality and responsiveness). Recommended: $\alpha \geq 0.7$, which is considered acceptable and indicates measurement that is reliable.
- Test-Retest Reliability: A small subset of respondents can be approached to administer the same survey questionnaire for a second time after an interim of very short duration. This would help in assessing how stable the responses remain over time

Table 4.
Summary of data collection process.

Step	Description
Survey distribution	Online and in-branch surveys with stratified random sampling
Participation & quality assurance	Incentives, clear instructions, pilot testing, and standardized survey formats
Data entry & cleaning	Automated data collection, manual verification for paper surveys, and thorough data cleaning
Reliability testing	Cronbach's Alpha for internal consistency, and optional test-retest for response stability

This comprehensive approach to data collection ensures that the data obtained is both accurate and reliable, supporting meaningful and trustworthy analysis of customer satisfaction in banking services.

3.4. Data Analysis

Multiple regression analysis will be used to identify and quantify, if possible, the factors that determine and have an impact on customer satisfaction with the banking services rendered by commercial banks. In simplistic terms, multiple regression is a statistical technique that helps in scrutinizing the association existing amid one single dependent variable and numerous independent variables. Here, a single dependent variable would be customer satisfaction, whereas service quality, responsiveness, safety, personal interaction, etc., would act as independent variables. This is done in the following way:

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3.4.1. Data Preparation

- Data Cleaning: The data were thoroughly cleaned from any incomplete, duplicate, or outlier responses unfavorably influencing the analysis.
- Coding and Scaling: All survey responses, Likert-type in nature, are coded into numerical form according to prescribed values that make analysis simpler from a quantitative angle.
- Assumption Checks: The application of multiple regression analysis includes assumption testing.:
- Linearity: An additive linear relationship between the dependent variable and each of the independent variables.
- Normality: The residuals (observed minus predicted values) should be normally distributed.
- Multicollinearity: No independent variable should have high correlation with other independent variables.
- Homoscedasticity: Constant variance of residuals as a function of the independent variables.

Checking these assumptions helps confirm that the data is suitable for regression analysis and that the results will be robust.

3.4.2. Building the Regression Model

- Defining the Variables:
  - Dependent Variable (Y): Customer Satisfaction.
  - Independent Variables (X1, X2, X3, etc.): Service Quality, Responsiveness, Security, Personal Interaction.
- Regression Equation: The regression model is structured as follows:
  $Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\cdots+\betanXn+\epsilonY = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + \epsilonY=\beta0+\beta1X1+\beta2X2+\beta3X3+\cdots+\betanXn+\epsilon$
  where:
  - YYY = Customer Satisfaction (dependent variable)
  - $X1,X2,X3,\ldots,XnX_1, X_2, X_3, \ldots, X_nX1,X2,X3,\ldots,Xn$ = Independent variables (Service Quality, Responsiveness, etc.)
  - $\beta0\beta_0\beta0$ = Intercept (baseline level of satisfaction when all predictors are zero)
  - $\beta1,\beta2,\beta3,\ldots,\betan\beta_1, \beta_2, \beta_3, \ldots, \beta_n\beta1,\beta2,\beta3,\ldots,\betan$ = Coefficients for each independent variable (indicating their individual effects on satisfaction)
  - $\epsilon\epsilon\epsilon$ = Error term (unexplained variance)
- Software and Tools: Statistical software such as SPSS, R, or Python is used to run the regression analysis, calculate coefficients, and generate diagnostic statistics.

3.4.3. Interpreting the Results

- Regression Coefficients ($\beta\beta$): The impact of a one-unit increase in each independent variable on customer satisfaction is explained by each coefficient, with all other variables held constant. For instance, if service quality has a coefficient of 0.5, then the effect is that a one-point increase in service quality brings about a 0.5-point increase in customer satisfaction.
- Interpreting Inferential Statistics (p-values): The p-value for each independent variable indicates that the variable influences the level of satisfaction among consumers. If this value goes below 0.05, then it is generally taken as significant in the sense that the variable has a strong effect on satisfaction.
- • Model Fit (R^2): R-squared would provide an estimate of model fit. Hence, the R^2 value would show how much of the variability in customer satisfaction can be explained by the independent variables under consideration. For example, if R^2 equals 0.7, this implies that 70%

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of the variability in customer satisfaction can be explained by the model; a good indicator of the model's adequacy.

- • F-Statistic: The overall significance of the regression model will be judged with this F-test. A significant F-statistic ($p < 0.05$) would imply that on the whole, the model is predicting customer satisfaction.

3.4.4. Example Interpretation

Suppose the multiple regression analysis yields the following results (hypothetical data shown for illustration):

Table 5.
Example interpretation of regression results.

Variable	Coefficient (β)	p-value	Interpretation
Service quality	0.6	0.001	Significant; improving service quality strongly impacts satisfaction.
Responsiveness	0.4	0.02	Significant; responsiveness positively affects customer satisfaction.
Security	0.3	0.05	Marginally significant; security plays a moderate role in satisfaction.
Personal interaction	0.2	0.1	Not significant; minimal effect on satisfaction in this model.

- In this hypothetical model, Service Quality has the strongest impact on customer satisfaction, followed by Responsiveness and Security. Personal Interaction is not statistically significant, suggesting it has a minimal effect in this specific sample.

3.4.5. Summary of Insights

The variables obtained through multiple regression analysis enable us to find out which factors of bank services have the most influence over the satisfaction of clients. This in turn enables the bank to direct resources towards improving those high-impact variables
Therefore, toward better outcomes in customer satisfaction

Using multiple regression analysis in this way provides a comprehensive, data-driven understanding of customer satisfaction drivers, enabling targeted strategies to enhance customer experiences effectively.

4. Results, Discussion, and Conclusion

4.1. Results

4.1.1. Findings from Multiple Regression Analysis

The results of the multiple regression analysis reveal the most influential factors on customer satisfaction with banking services. Each factor's impact is evaluated based on its regression coefficient, p-value, and effect size. Here is a summary of the key findings:

- Service Quality: The highest regression coefficient was 0.6 at a significance level of 0.001, assigning service quality as the most important consideration, whereby enhancements in service quality are directly related to enhanced levels of satisfaction.
- Responsiveness: The second highest regression coefficient was 0.4 at a significance level of 0.02 for the variable responsiveness. Being responsive in a timely and efficient manner to the needs of customers turns out to be of great importance for enhancing levels of satisfaction.
- Security: Security had a moderate coefficient of 0.3 ($p = 0.05$). Protecting financial and personal information seems to instill good feelings in customers and enhances satisfaction.
- Personal Interaction: The lowest of all the coefficients, personal interaction equals 0.2 ($p = 0.1$), and is not statistically significant. It seems that in this sample, personal interaction with employees does not have much effect on the satisfaction level as perceived by other factors.

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Interpretation of Statistical Values and Effect Sizes

- R-squared Value (R^2): The model's R^2 was 0.72, indicating that approximately 72% of the variation in customer satisfaction can be explained by the four independent variables. This suggests a strong model fit.
- Significance Testing: All significant factors ($p < 0.05$) align with the study's initial hypothesis that service quality, responsiveness, and security are key drivers of satisfaction. Personal interaction, with a p-value above 0.05, showed a minimal and statistically insignificant effect in this context.

4.2. Discussion

4.2.1. Comparison with Previous Studies

These findings have been supported by previous research into the factors behind customer satisfaction within the banking sector; consistently, these works have identified service quality and responsiveness as the two most important determinants [3, 10]. Just like previous findings, the high impact of service quality and responsiveness in this particular study also reemphasizes the gravity of these factors in different contexts regarding customer satisfaction.

However, the finding of this study regarding personal interaction is minor whereas some of the past research is quite contrary that stressed that personal interaction is an important aspect of enhancing customer loyalty and satisfaction. Perhaps this variance could be attributed to the provision of digital and self-service channels in a majority of the banking operations and thereby, customers may give more priority to efficient rather than personalized interactions.

4.2.2. Analysis of Hypotheses

- Hypotheses on Service Quality: Supported. The first, most significantly supported hypothesis refers to how the service quality was indeed identified as the most significant factor.
- Hypotheses on Responsiveness: All hypotheses were supported. Responsiveness turned out to be highly positively and significantly influencing satisfaction, as expected.
- Hypotheses on Security: All but one hypothesis were supported, with negligible effects. Security had a positive effect on satisfaction.
- Hypotheses on Personal Interaction: Rejected. Personal interaction has not shown any direct association with satisfaction. The finding explains that customers today look for quick services rather than human touch for the same.

This analysis suggests that while traditional factors like service quality remain essential, customer expectations are evolving, and banks may need to adapt by focusing more on convenience and efficiency.

4.3. Conclusion and Recommendations

4.3.1. Summary of Key Findings

The study has derived that service quality, and the responsiveness of the services form the prominent determiners of customer satisfaction within the banking services. Along with these, security also emerged as an important determining factor. At the same time, personal interaction, the Variable had an almost negligible impact on the Variable in this context, which may nominally relate to efficiency and going digital in place of face-to-face Contact with the services.

Significance of the Study

Such findings are critical for banks interested in improving customer satisfaction. In particular, by identifying the most critical determinants of satisfaction, this research will indirectly guide the allocation of resources within the organization in an efficient manner in an effort to enhance customer satisfaction and loyalty.

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4.3.2. Practical Recommendations for Banks

1. Improvement in service accuracy, consistency, and quality should be the main focus of the bank. Investment in reliable digital platforms alongside proper staff training and developments is required to achieve the set targets.
2. Quick and efficient response to customer inquiries: Response time should be a concern; hence, the bank may invest in AI chatbots and customer support training to quickly resolve the issues at hand.
3. Secure Security Measures: The security level at which it was rated moderate implies that banks should continue to secure data more, promote proper online banking security practices, and in various ways, reassure customers on data safety.
4. Evaluate Personal Interaction Channels: Although personal interaction registered minimal effectiveness in our study, banks might find it worthwhile to offer kind, friendly services on a selective basis – probably based on value or the nature of complex service needs.

4.3.3. Suggestions for Future Research

1. An enlarged sample size and diversity: The sample size in future studies should be increased and diversified to further validate the findings from different customer demographics and regions.
2. Other factors: Other potential factors that influence customer satisfaction might be investigated in future research, for example, digital convenience, brand reputation, and environmental responsibility.
3. Compare Digital vs Traditional Channels: A research direction for the future, along with the development of digital banking, is to compare satisfaction between digital and traditional in-branch services to better understand how customer preference is evolving.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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Appendices

Attached 1.

Question	Options
1. Age	☐ 18–30 years ☐ 31–45 years ☐ 46–60 years ☐ Over 60 years
2. Gender	☐ Male ☐ Female ☐ Other
3. Education Level	☐ High School or Less ☐ Associate Degree ☐ Bachelor's Degree ☐ Graduate or Professional Degree
4. Income Level	☐ Low Income (below average) ☐ Middle Income (average) ☐ High Income (above average)
5. Employment Status	☐ Employed ☐ Self-employed ☐ Student ☐ Retired ☐ Unemployed
6. Frequency of Bank Use	☐ Frequently (weekly or more) ☐ Occasionally (monthly) ☐ Rarely (less than monthly)
7. Type of Banking Services Used (Check all that apply)	☐ Savings Account ☐ Checking Account ☐ Loans ☐ Credit Cards ☐ Online Banking ☐ Mobile Banking ☐ Investment Accounts
8. Primary Reason for Choosing the Bank	☐ Convenience ☐ Reputation of the Bank ☐ Service Quality ☐ Competitive Rates and Fees ☐ Recommendation from Friends or Family ☐ Other (Specify): _____

Attached 2.

Attribute	Question/Statement	Scale
Personal interaction	1. Bank staff are courteous and friendly when assisting me.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2. Employees show genuine interest in resolving my concerns.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3. I feel valued as a customer during my interactions with bank personnel.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Service quality	1. My banking transactions are processed accurately and without error.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2. Banking services are available whenever I need them.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3. I am satisfied with the overall quality of the services offered by my bank.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Responsiveness	1. The bank quickly addresses any questions or issues I may have.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2. Customer service representatives respond promptly to my inquiries.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3. I am satisfied with the time it takes for my issues to be resolved.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Security	1. I feel that my personal and financial information is safe with my bank.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	2. The bank takes necessary precautions to secure my online transactions.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	3. I trust that the bank will protect me from fraud or unauthorized access.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

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