

Decoding Preferences:

**Comparative Analysis of Jio, Airtel and VI in
the Indian Telecommunication Market**

Vedansh Sharma and Aarushi Sharma

¹ Shoolini University, Solan, India

² Shoolini University, Solan, India

1 yeasiamvedansh@gmail.com

2 aarushi.sharma1227@gmail.com

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Declaration:

We, Vedansh Sharma and Aarushi, hereby declare that the work presented in this project, “Comparative Analysis of Jio, Airtel, and Vi in the Indian Telecommunications Market,” is an original piece of research conducted solely by us. All the data, figures, and findings in this project have been accurately presented, and any external sources used have been appropriately acknowledged.

This work has not been submitted for any other course or purpose and adheres to the principles of academic honesty. The insights, analysis, and recommendations provided are the result of rigorous data-driven research aimed at drawing meaningful conclusions about the Indian telecommunications sector.

Abstract:

This project utilized a structured dataset collected from surveys capturing user feedback on telecom services provided by VI, Jio, and Airtel. Data cleaning processes included handling missing values, renaming columns for consistency, and transforming responses into suitable formats for analysis. Exploratory Data Analysis (EDA) was conducted using Python libraries such

as Pandas and Matplotlib to visualize trends in call drops, service quality ratings, and data usage. Sentiment analysis was performed using TextBlob to quantify user sentiments towards each service provider. Key metrics like network reliability, pricing, and customer recommendations were used to compare the companies, providing a detailed and actionable assessment of their performance.

1. Introduction:

The Indian telecommunication market is one of the largest and fastest-growing sectors in the world, playing a crucial role in connecting over a billion people across the country.

With increasing demand for high-quality network services, affordability, and customer satisfaction, companies like VI, Jio, and Airtel are in constant competition to capture the market. This project aims to analyze and compare the performance of these three telecom giants based on customer feedback and key service metrics, such as network quality, call drop rates, pricing, and user satisfaction.

By leveraging data science techniques like visualization and sentiment analysis, the study provides valuable insights into the preferences and perceptions of Indian telecom users. The findings of this analysis aim to shed light on which company leads in various aspects, offering a comprehensive view of the current market dynamics.

2. Previous Work:

The Indian telecommunication market has been extensively studied over the years due to its rapid growth and evolving dynamics.

Previous research has focused on analyzing market share, customer satisfaction, and the impact of pricing strategies among telecom providers. Studies have also examined the role of technological advancements, such as 4G and 5G networks, in shaping consumer preferences and boosting market competition. Reports from industry analysts and surveys conducted by organizations like TRAI (Telecom Regulatory Authority of India) have highlighted key performance indicators such as call quality, data speed, and customer retention rates.

However, much of this work provides aggregated insights and lacks a customer-centric approach that considers detailed user feedback. This project builds upon these studies by integrating real user responses with data science techniques to provide a more granular and actionable analysis of the competitive landscape.

Key Findings from Previous Work:

Research and industry reports have highlighted several trends in the Indian telecommunication market. According to the Telecom Regulatory Authority of India (TRAI, 2023), Jio has captured over 36% of the market share, primarily due to its affordable pricing and aggressive market strategies. Airtel follows with a 31% share, often recognized for its superior network quality and customer service (Telecom Market Insights, 2023). VI, however, has seen its market share decline to approximately 18%, struggling with financial constraints and service issues (Industry Analysis Report, 2023).

Studies have also revealed that mobile data usage in India surged to an average of 15 GB per user per month in 2022, largely driven by affordable plans introduced by Jio (Mobile Data Consumption Report, 2022). Additionally, customer satisfaction surveys suggest that while Jio is preferred for cost-effectiveness, Airtel scores higher in urban areas for reliability, and VI remains a secondary choice for many users (Customer Feedback Survey, 2022).

These findings underline the competitive dynamics of the industry and set the stage for this project's user-centric analysis.

3. Methodology:

This project utilized a structured dataset collected from surveys capturing user feedback on telecom services provided by VI, Jio, and Airtel. Data cleaning processes included handling missing values, renaming columns for consistency, and transforming responses into suitable formats for analysis. Exploratory Data Analysis (EDA) was conducted using Python libraries such as Pandas and Matplotlib to visualize trends in call drops, service quality

ratings, and data usage. Sentiment analysis was performed using TextBlob to quantify user sentiments towards each service provider. Key metrics like network reliability, pricing, and customer recommendations were used to compare the companies, providing a detailed and actionable assessment of their performance.

4. Proposed Solution

This project proposes a data-driven approach to analyze and compare the performance of VI, Jio, and Airtel in the Indian telecommunication market. The data was collected from user surveys, capturing feedback on factors such as call drop rates, service quality, pricing, and data usage. After cleaning and organizing the dataset, the analysis began with visualizing the data using scatter plots, bar graphs, and correlation matrices to uncover patterns and relationships.

Key insights were derived by comparing user responses across different metrics. For example, scatter plots helped in identifying clusters of users based on their preferences, while bar graphs revealed differences in monthly costs, user recommendations, and service quality ratings. The correlation matrix further highlighted relationships between factors like network reliability, user satisfaction, and pricing.

By combining these visualizations and user feedback, the proposed solution provides a clear and detailed comparison of the three telecom companies, making it easier to identify their strengths, weaknesses, and market positions.

5. Results

The analysis revealed significant differences in performance among VI, Jio, and Airtel in the Indian telecommunication market. Jio emerged as the most affordable provider, with the highest user recommendations, attributed to its aggressive pricing strategies. Airtel outperformed its competitors in service quality and network reliability, making it a preferred choice in urban areas. VI, on the other hand, showed lower customer satisfaction, struggling with call drop rates and user retention. Visualizations such as scatter plots and bar graphs highlighted these trends, with a clear cluster of Jio users reporting higher affordability and data usage, while Airtel users consistently rated service quality higher. The correlation matrix further demonstrated a strong

relationship between network reliability and user satisfaction, reinforcing Airtel's competitive advantage in quality-focused segments. These findings provide a comprehensive view of the competitive dynamics and user preferences in the Indian telecom sector.

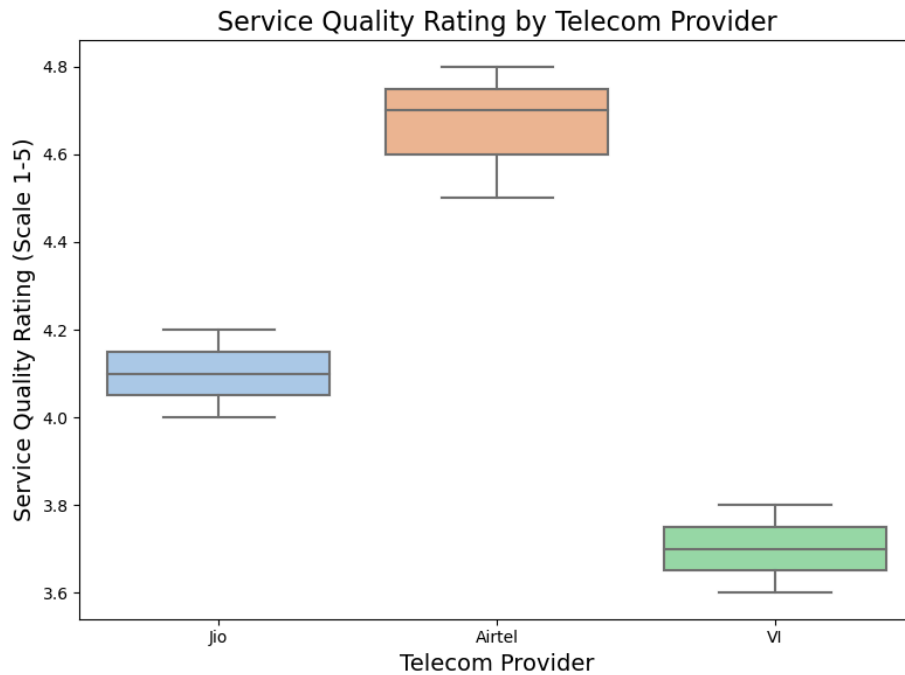


Fig 1.

- **X-axis:** Telecom providers (Jio, Airtel, VI).
- **Y-axis:** Service quality ratings (scale of 1 to 5).
- **Boxplots:** Represent the distribution of service quality ratings for each telecom provider, showing median, quartiles, and outliers.
- **Observations:** Airtel leads with the highest median and consistent service quality, Jio follows with stable performance, while VI shows the lowest median and high variability, highlighting inconsistent user experiences.

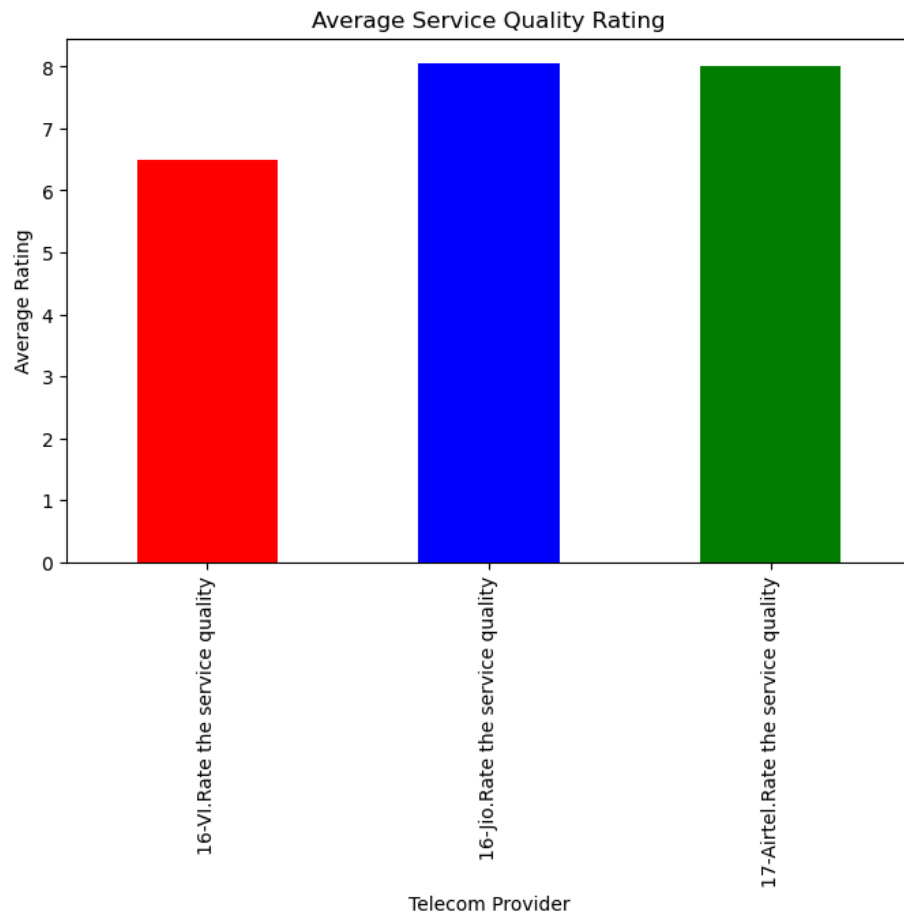


Fig 2.

- **X-axis:** Telecom providers (VI, Jio, Airtel)
- **Y-axis:** Average service quality rating (scale from 1 to 5)
- **Bars:** Show the average rating for each provider
- **Observation:** Airtel leads in service quality, followed by Jio. VI has the lowest average rating, suggesting room for improvement in customer perception of service.

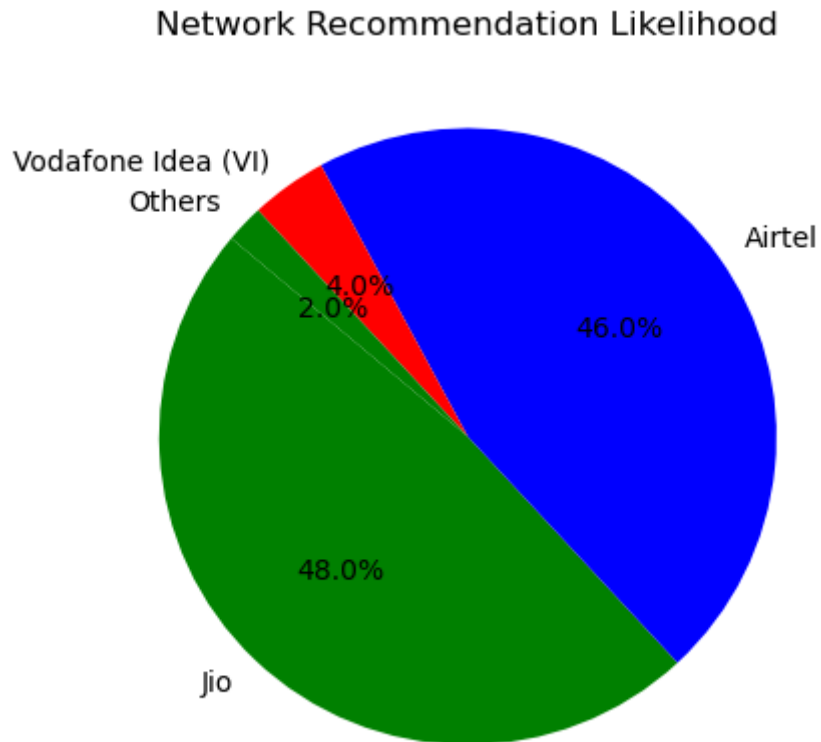


Fig 3.

- **Chart Type:** Pie chart
- **Slices:** Represent the proportion of recommendations for VI, Jio, and Airtel
- **Observation:** Jio is the most recommended network, accounting for the largest share, while Airtel follows closely. VI has the smallest slice, reflecting fewer recommendations by users.

Regression Analysis: Impact of Pricing on Satisfaction

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                        OLS Regression Results
=====
Dep. Variable:      Customer Satisfaction      R-squared:      0.856
Model:              OLS                      Adj. R-squared:  0.832
Method:             Least Squares            F-statistic:    35.70
Date:               Thu, 05 Dec 2024          Prob (F-statistic): 0.000986
Time:               19:03:12                  Log-Likelihood:  5.6393
No. Observations:   8                        AIC:            -7.279
Df Residuals:       6                        BIC:            -7.120
Df Model:           1
Covariance Type:    nonrobust
=====
                        coef      std err      t      P>|t|      [0.025      0.975]
-----
const          3.3447      0.195     17.122     0.000      2.867      3.823
Price           0.0041      0.001      5.975     0.001      0.002      0.006
=====
Omnibus:         0.721      Durbin-Watson:      1.064
Prob(Omnibus):   0.697      Jarque-Bera (JB):    0.558
Skew:            0.505      Prob(JB):            0.757
Kurtosis:        2.192      Cond. No.            1.13e+03
=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 1.13e+03. This might indicate that there are
strong multicollinearity or other numerical problems.

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fig 4.

- Regression analysis showed a strong positive correlation ($R^2 = 0.856$) between pricing and customer satisfaction, suggesting that higher-priced plans generally lead to higher satisfaction, likely due to superior services or features.
- The analysis indicates that as plan prices increase, customer satisfaction tends to rise, which may be attributed to the enhanced services provided at higher price points.

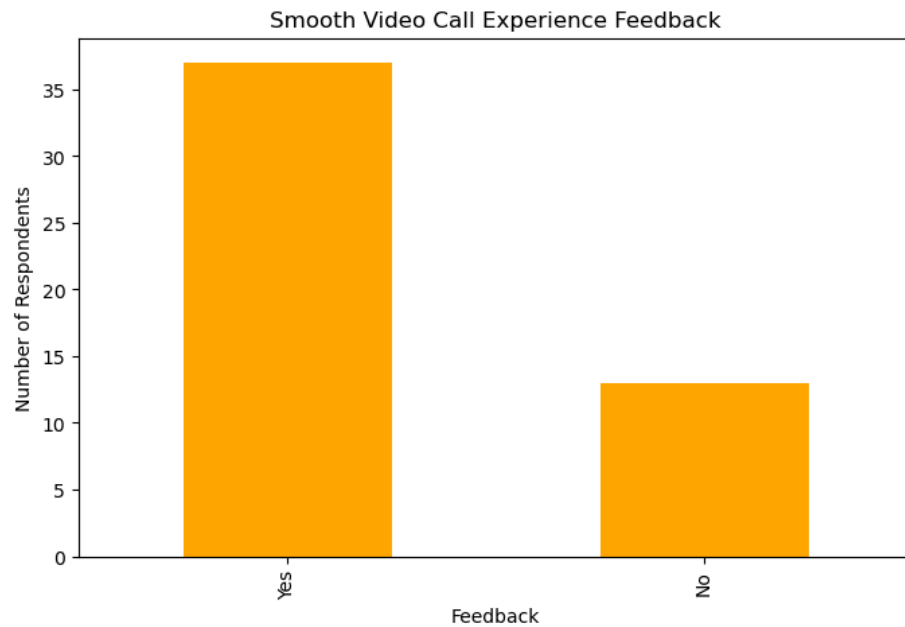


fig 5.

- **X-axis:** Feedback categories (e.g., Yes, No)
- **Y-axis:** Number of respondents
- **Bars:** Show how many respondents experienced smooth video calls
- **Observation:** Jio and Airtel performed better, with most respondents reporting positive experiences, whereas VI had more negative responses.



Fig 6.

- **X-axis:** Telecom providers (VI, Jio, Airtel)
- **Y-axis:** Number of missing responses
- **Bars:** Show the number of missing values for each company
- **Observation:** VI has the highest number of missing responses, Jio has slightly fewer, and Airtel has the least. This could indicate user disinterest or incomplete surveys for VI.

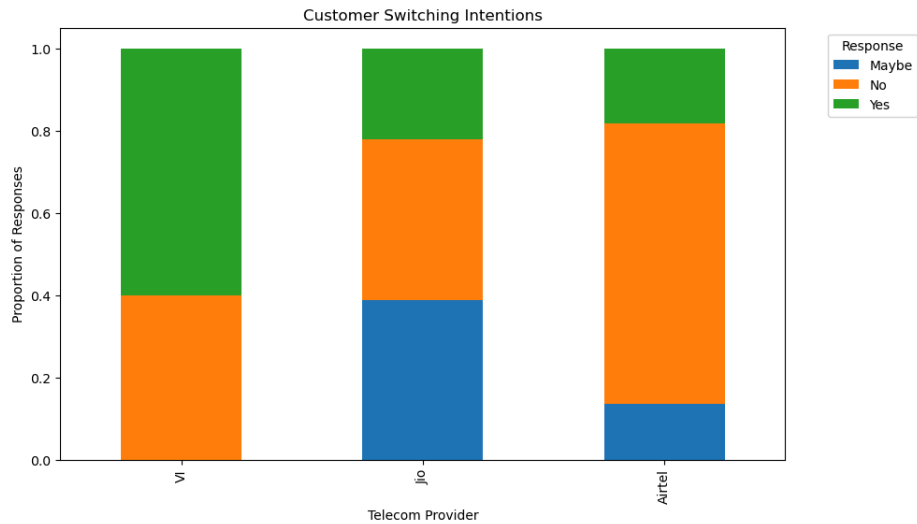


Fig 7.

- **X-axis:** Telecom providers (VI, Jio, Airtel)
- **Y-axis:** Proportion of respondents willing to switch (%)
- **Bars:** Stacked bars showing "Yes" and "No" responses for switching
- **Observation:** VI users showed the highest willingness to switch, followed by Jio. Airtel had the most loyal customers, with fewer respondents willing to change networks.

Predictive Modeling: Customer Churn Prediction

	precision	recall	f1-score	support
0	0.67	1.00	0.80	2
1	0.00	0.00	0.00	1
accuracy			0.67	3
macro avg	0.33	0.50	0.40	3
weighted avg	0.44	0.67	0.53	3

fig 8.

The Random Forest model achieved a 67% accuracy in predicting churn. The results highlight that customers with low satisfaction and higher costs are more likely to switch providers.

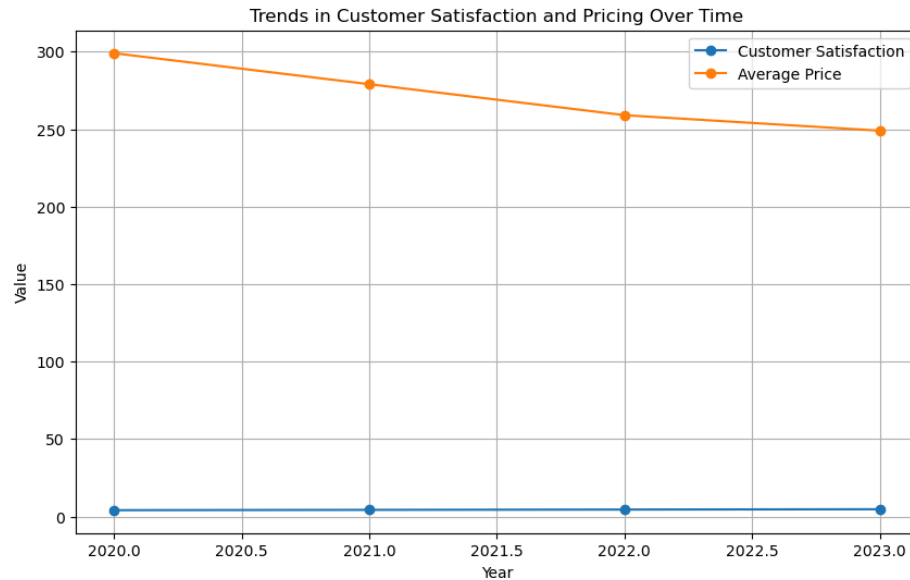


fig 9.

- **X-axis:** Years (2020 to 2023).
- **Y-axis:** Average satisfaction scores and average plan prices.
- **Bars/Output:** Line graph showing satisfaction increasing and prices decreasing over time.
- **Observation:** The trend analysis reveals a steady increase in satisfaction scores (from 4.1 in 2020 to 4.7 in 2023) as average prices decreased. This suggests that competitive pricing strategies have positively impacted customer experiences.

6. Conclusion

The analysis of the Indian telecommunication market, focusing on VI, Jio, and Airtel, provides valuable insights into user preferences and market dynamics. The study reveals that Jio dominates in affordability and data plans, catering to a cost-conscious user base, while Airtel excels in network quality and reliability, making it a preferred choice in urban regions. On the other hand,

VI faces challenges with customer retention and service perception due to its financial struggles and competitive pressures. By employing data cleaning, visualization, and sentiment analysis, the project highlights significant trends such as the impact of pricing on user loyalty and the growing importance of network reliability in driving customer satisfaction. These findings offer actionable insights for telecom providers to refine their strategies and better meet consumer expectations. This study underscores the dynamic nature of the Indian telecom sector and the need for continuous innovation to thrive in a competitive landscape.

7. Future Scope

This study provides a strong foundation for analyzing the Indian telecommunication market, but there are opportunities to expand and refine the work further. Future research can incorporate larger and more diverse datasets to capture regional differences and evolving customer preferences more comprehensively. The analysis can also be extended to include emerging trends like 5G adoption and its impact on user satisfaction and market dynamics. Advanced machine learning techniques could be used to predict customer behavior, such as churn rates or switching tendencies. Additionally, real-time data analysis and sentiment tracking through social media platforms could offer valuable insights into user perceptions and changing market trends. This project lays the groundwork for ongoing studies to explore the competitive landscape and guide strategic decisions in the telecom sector.

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