

Passenger Pulse: Analyzing trends of Airline Satisfaction

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Abstract—This study looks at passenger satisfaction trends across Indian airlines, including Indigo, Vistara, SpiceJet, and Air India. It uses surveys and data visualization to identify key factors influencing customer preferences in the post-COVID-19 era, such as service quality, punctuality, and hygiene. The findings highlight Indigo's operational efficiency, Vistara's premium appeal, and areas for improvement at Air India and SpiceJet. The study offers practical recommendations for increasing customer loyalty and maintaining competitiveness in the aviation industry.

Keywords—Airline, Satisfaction, Passenger, Service

I. INTRODUCTION

The airline industry has long been a cornerstone of global connectivity, playing a vital role in enabling millions of individuals to travel for leisure, business, and personal purposes. Beyond its primary function as a mode of transportation, the industry has become a key driver of economic growth and a facilitator of cultural exchange. This dynamic sector underscores the essence of globalization, seamlessly connecting people, markets, and ideas across the world. Over the decades, it has evolved into more than just a logistical mechanism—it is now a sophisticated ecosystem that blends cutting-edge technology, customer-centric service design, and robust operational frameworks to meet the complex demands of modern travelers.

As competition intensifies within the industry, so too have the expectations of passengers, who now demand a travel experience that extends beyond mere reliability. Today's travelers seek a seamless, enjoyable journey that prioritizes their comfort, convenience, and satisfaction. Elements such as value for money, cabin comfort, flight punctuality, and high-quality in-flight and on-ground services are no longer optional; they have become integral to shaping customer perceptions and fostering long-term loyalty. Airlines are increasingly tasked with balancing operational efficiency with the ability to offer personalized experiences tailored to the diverse needs of their customer base.

The onset of the COVID-19 pandemic marked a profound transformation within the airline industry, introducing unprecedented challenges that reshaped the competitive landscape and recalibrated customer priorities. Travel restrictions, safety concerns, and economic uncertainties redefined the way passengers approached air travel. Booking flexibility, stringent safety protocols, and superior hygiene

standards emerged as paramount considerations, often outweighing traditional factors like price or flight schedules. These shifts underscored the need for airlines to adapt rapidly, demonstrating resilience and innovation in the face of changing consumer demands. Airlines that successfully identified and responded to these evolving priorities gained a competitive edge, while those slow to adapt risked falling behind.

Recognizing these dynamics, the study *Passenger Pulse: Analyzing Trends of Airline Satisfaction* aims to explore the factors influencing passenger satisfaction and decision-making within the Indian airline market. Focusing on four prominent airlines—Indigo, Vistara, SpiceJet, and Air India—the research employs a multi-faceted approach that includes extensive passenger surveys, in-depth data analysis, and advanced visualization techniques. The study seeks to uncover the underlying drivers of satisfaction and loyalty, offering a comprehensive understanding of how variables such as service quality, price competitiveness, and operational efficiency shape customer preferences.

FIG. 1 – INDIAN AIRLINE AIR INDIA



By delving into these critical aspects, the research not only identifies trends but also highlights actionable insights that airlines can leverage to enhance their service offerings. For instance, understanding how passengers value elements such as on-time performance, in-flight entertainment, and customer support can help airlines tailor their strategies to meet and exceed expectations. The study also emphasizes the importance of adopting innovative solutions, such as leveraging technology to improve customer experiences, streamlining operations for greater efficiency, and

implementing sustainability measures to align with growing environmental awareness among consumers.

In a post-pandemic environment characterized by rapid evolution and heightened competition, these insights are particularly valuable. The study provides data-driven recommendations aimed at empowering airlines to strengthen customer relationships, improve satisfaction levels, and foster long-term loyalty. Ultimately, *Passenger Pulse* underscores the imperative for airlines to remain agile and forward-thinking, embracing a customer-first approach to thrive in a market that continues to evolve at an unprecedented pace.

II. LITERATURE REVIEW

Table 1 comprehensively summarizes relevant literature on airline service quality and passenger satisfaction. The findings from the reviewed studies highlight several key factors that significantly influence customer satisfaction and loyalty within the airline industry. These factors include aspects such as service quality, flight punctuality, cabin comfort, and value for money, all of which play a crucial role in shaping the overall passenger experience. Additionally, the table identifies the research gaps that exist within the current body of knowledge, such as limitations in sample sizes, the effectiveness of sentiment analysis tools, and the integration of both traditional and modern methods of evaluation. This study aims to address these gaps by exploring new methodologies and expanding the scope of research to better understand evolving customer needs, ultimately improving service quality and enhancing customer loyalty in the airline industry.

TABLE1. LITERATURE REVIEW SUMMARY ON AIRLINE SERVICE QUALITY

Year	The Subject of the Paper	Authors	Findings	Research Gap Identification
2020	Satisfaction Using Kano and RFM Models in Airlines	Sahar Tahanisaz, Sajjad Shokuhyar	Balanced essential and value-added services for satisfaction.	Lack of UGC and survey comparisons; limited multi-platform insights.
2021	Service Quality and Passenger Satisfaction in Indian Aviation	N/A	High service quality improves satisfaction and loyalty.	Limited sample size at one airport; no international scope.
2023	Sentimental Approach to Airline Service Quality Evaluation	N/A	Real-time, cost-effective insights using Twitter data (SASQUE).	Limitations in NLP tools for sarcasm, negations, and context.

III. RESEARCH METHODOLOGY

The proposed methodology incorporates a systematic approach to understanding airline satisfaction by analyzing the factors influencing customer experiences. This methodology is structured into distinct steps: Data Collection, Data Cleaning, Exploratory Data Analysis (EDA), Analysis,

1. Data Collection

The process begins with data collection, where insights are gathered from diverse sources such as surveys, social media platforms, customer feedback forms, and official airline records. Surveys are particularly valuable for obtaining direct responses from passengers about their experiences, preferences, and satisfaction levels. Social media data offers a complementary perspective, capturing real-time sentiments and opinions shared by passengers. This multi-faceted approach ensures that the dataset is representative and captures the nuances of customer satisfaction across various touchpoints.

2. Data Cleaning

Once the data is collected, data cleaning is performed to ensure accuracy, consistency, and reliability. This involves removing duplicate entries, handling missing values, correcting errors, and standardizing formats. The goal of this step is to prepare a high-quality dataset that minimizes biases and ensures the validity of subsequent analyses. Clean data provides a strong foundation for uncovering meaningful

3. Exploratory Data Analysis (EDA)

The third step is Exploratory Data Analysis (EDA), which involves a detailed examination of the data to uncover patterns, trends, and relationships. Using statistical techniques and visualizations, this phase provides an initial understanding of how various factors—such as flight punctuality, service quality, ticket prices, and in-flight comfort—impact customer satisfaction. EDA not only identifies the underlying structure of the data but also helps in detecting anomalies or outliers that might skew the results. This stage serves as the foundation for more advanced analyses by highlighting areas that require deeper exploration.

4. Analysis

Following EDA, the analysis phase quantifies the impact of key factors on customer satisfaction. This involves the use of statistical models and machine learning techniques to assess the influence of variables such as punctuality, pricing, customer service, safety, and amenities on passenger preferences and overall satisfaction. By breaking down the data, this step provides actionable insights into which factors are most critical in shaping the customer experience. For example, the analysis may reveal that flight punctuality significantly influences satisfaction levels, or that ticket price has a stronger impact on recommendations than in-flight amenities.

5. Reporting

Finally, the findings are compiled and communicated through reporting, ensuring that insights are accessible and actionable. This step involves creating visualizations, dashboards, and comprehensive reports to present key insights effectively. The goal is to translate the technical findings into recommendations that airline stakeholders can use to enhance their services. For example, the report might suggest specific areas for improvement, such as reducing delays, enhancing customer service, or introducing competitive pricing strategies. By presenting insights in a clear and actionable manner, the reporting phase enables airlines to make data-driven decisions to improve customer satisfaction, enhance loyalty, and maintain a competitive edge in the industry.

and Reporting. Each step plays a crucial role in ensuring that the research is both comprehensive and actionable.

FIG. 2 – WORKFLOW OF DATA ANALYSIS



IV. RESULT AND DISCUSSION

Univariate Analysis on Preferred Airline Distribution and Overall Satisfaction:

Univariate analysis was conducted to explore the distribution and characteristics of key variables, focusing on Preferred Airline and Overall Satisfaction Distribution. This analysis provided insights into passenger preferences and satisfaction levels, offering a foundational understanding of the data.

The Preferred Airline variable highlighted customer loyalty and factors influencing airline choice, such as pricing, service quality, and reliability. Similarly, the Overall Satisfaction Distribution revealed variations in passenger ratings, identifying areas of strength and opportunities for improvement.

This initial analysis established a strong basis for further exploration, helping to uncover trends and actionable insights to guide strategic planning and enhance customer satisfaction in the airline industry.

Preferred Airline

The variable Preferred Airline was analyzed using a bar chart to visualize passenger preferences:

- **Dominance of IndiGo:** IndiGo is the most preferred airline, with a significantly higher frequency than others.
 - **Moderate Preferences:** Vistara and Air India cater to specific niches, with moderate preference levels.
 - **Low Preference for SpiceJet:** SpiceJet recorded the lowest count, suggesting potential areas for improvement in service quality or market positioning.
- distribution underscores IndiGo’s market leadership and provides a foundation for further analysis of the factors influencing passenger preferences.

Interpretation:

IndiGo's strong market presence reflects high customer satisfaction, affordable pricing, and a superior alignment with passenger expectations. In contrast, SpiceJet's lower preference suggests a need to assess its competitive offerings. Overall, this distribution underscores IndiGo's leadership in

the market and sets the stage for a deeper analysis of the factors that influence passenger preferences.

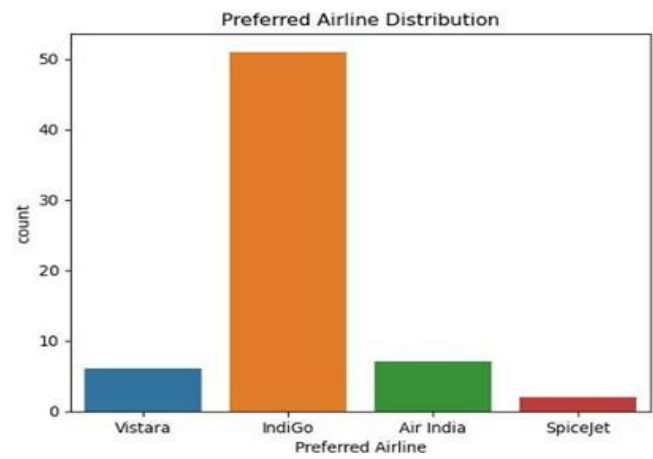


FIG 3. PREFERRED AIRLINE DISTRIBUTION

Overall Satisfaction Distribution

The Overall Satisfaction Distribution variable was visualized using a pie chart, highlighting the following:

- **Satisfied Passengers:** A majority (54.5%) expressed satisfaction, generally positive.
- **Neutral Responses:** A significant proportion (33.3%) felt neutral, indicating opportunities to enhance service and customer experience.
- **Very Satisfied Passengers:** A smaller group (10.6%) reported high satisfaction, suggesting areas of excellence that can be leveraged.
- **Low Dissatisfaction:** Only 1.5% of passengers reported dissatisfaction, indicating minimal negative sentiment.

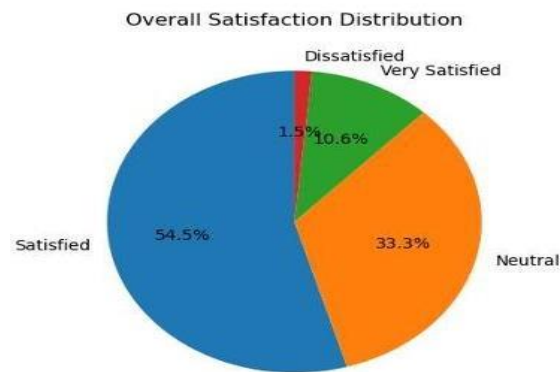


FIG 4. OVERALL SATISFACTION DISTRIBUTION

Interpretation:

While satisfaction levels are strong, the neutral segment represents a key opportunity for improvement. Targeted strategies focusing on factors like punctuality, cleanliness, or value for money could help convert neutral respondents into satisfied or very satisfied customers. The low dissatisfaction rate highlights service consistency, which should be maintained.

Bivariate Analysis on Preferred Airline vs. Overall Satisfaction:

The chart visualizes the relationship between the Preferred Airline and Overall Satisfaction, categorizing satisfaction

levels (Dissatisfied, Neutral, Satisfied, and Very Satisfied) for each airline.

Key Observations:

- **IndiGo:**
The majority of passengers prefer IndiGo, with high proportions reporting satisfaction and neutrality. A significant number of passengers are also "Very Satisfied," while dissatisfaction is minimal.
- **Air India:**
Shows moderate preference levels, with most passengers falling into the "Satisfied" category. A smaller proportion is neutral, and dissatisfaction is minimal.
- **Vistara:**
Similar to Air India in preference levels, but has a slightly higher proportion of "Very Satisfied" passengers.
- **SpiceJet:**
The least preferred airline, with very few passengers reporting satisfaction or high satisfaction. Most passengers fall into the "Neutral" category.

Interpretation

IndiGo: Its high preference and satisfaction levels reinforce its position as a market leader. The large satisfied base suggests that its services align well with passenger expectations.

Vistara and Air India: These airlines appeal to specific customer segments, with reasonable satisfaction levels but room to increase their "Very Satisfied" group.

SpiceJet: Low preference and neutral satisfaction indicate significant room for improvement, particularly in delivering services that exceed customer expectations.

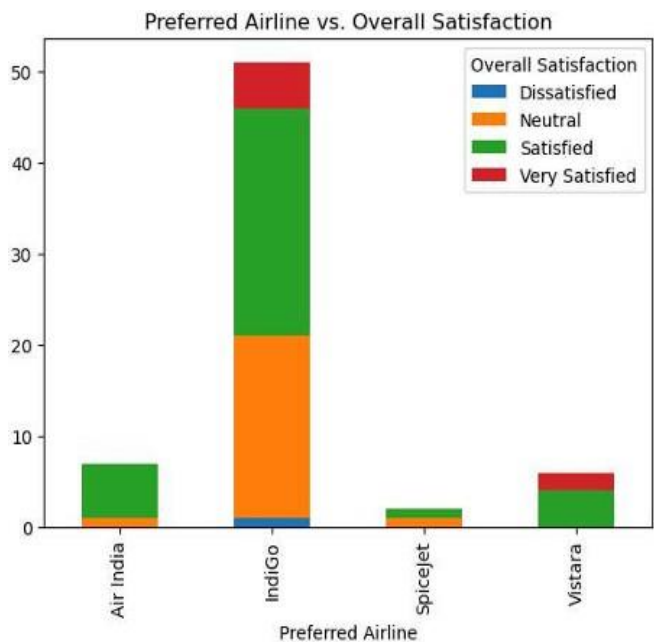


FIG 6. PREFERRED AIRLINE VS. OVERALL SATISFACTION

Key Observations

- **Price of the Ticket:**
Dominates as the most influential factor, with a majority of passengers marking it as "Likely" to recommend. A sizable neutral group suggests variability in passenger expectations regarding affordability.
- **Flight Schedule and Punctuality:**
A strong driver for recommendations, with a notable proportion of passengers selecting "Very Likely" and "Likely". Neutral and "Unlikely" responses are minimal, indicating broad agreement on its importance.
- **Customer Service:**
Moderate influence, with most passengers falling into the "Likely" category. Few responses for "Very Likely" highlight a potential area for improvement.
- **Safety Record:** Has fewer responses overall, suggesting it may not be a differentiating factor unless negative experiences occur.
- **In-flight Comfort and Amenities:**
Shows mixed responses, with "Neutral" and "Likely" being the most common, indicating room to enhance passenger experience.

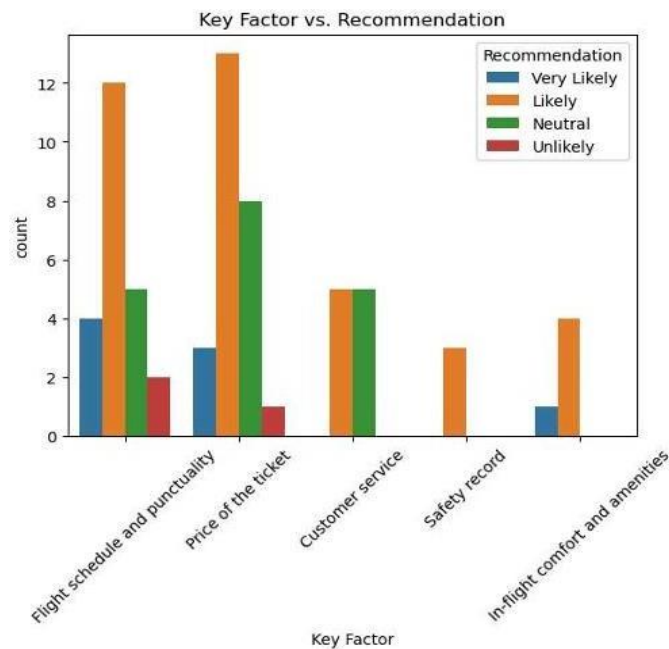


FIG 7. KEY FACTOR VS. RECOMMENDATION

Interpretation

Price and Punctuality are the most significant factors driving recommendations, underscoring the importance of affordability and reliability in influencing customer decisions. **Customer Service and Amenities** have moderate impacts, highlighting areas for improvement to elevate passenger satisfaction. **Safety Record** is less frequently mentioned, likely due to its baseline expectation rather than a value-added feature.

V. CONCLUSION

The study Passenger Pulse: Analysing Trends in Airline Satisfaction provides valuable insights into the factors

This chart visualizes the impact of various key factors (Flight Schedule and Punctuality, Price of the Ticket, Customer Service, Safety Record, and In-flight Comfort and Amenities) on passengers' likelihood to recommend the airline. The likelihood categories include Very Likely, Likely, Neutral, and Unlikely.

influencing customer preferences in the Indian aviation industry, as well as trends in passenger satisfaction. It discovered that operational efficiency, pricing, punctuality, and service quality are important factors influencing customer satisfaction using a combination of univariate and bivariate analyses.

The findings show that Vistara's premium products appeal to niche markets, whereas IndiGo's operational dependability and customer-focused strategy drive its market dominance. However, there are areas in which Air India and SpiceJet's competitive positioning and service quality could be improved. While customer service and in-flight amenities provide airlines with opportunities to enhance customer experiences, ticket prices, flight schedules, and punctuality all have a significant impact on passenger satisfaction.

According to the findings, a sizable percentage of passengers are neutral, indicating untapped potential for customer engagement even though overall satisfaction levels are positive. Airlines can convert indifferent customers into dedicated ones by implementing strategies such as increasing service personalization, eliminating operational inefficiencies, and providing better value.

This study emphasizes the importance of adapting to changing consumer demands in the aftermath of a pandemic. By implementing the practical suggestions provided, airlines can increase customer satisfaction, foster loyalty, and maintain competitiveness in a rapidly changing market with rising customer demands.

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