An Integrated Service Quality and Sentiment Analytics Framework for Assessing Customer Satisfaction in Indian Quick-Commerce Delivery Platforms

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Abstract

The fast-growing Indian quick-commerce (q-commerce) has disrupted retail with fast delivery in 10–30-minute windows. This study presents an Integrated Service Quality and Sentiment Analytics Framework to measure customer satisfaction through a combination of operational measures that are structured and unstructured textual responses. The study evaluates core dimensions in terms of delivery time, accuracy of order and service quality analysing a dataset consisting of 500,000 reviews on such platforms as Blinkit and Zepto. The study is methodologically a hybrid as it deploys Multiple Regression, ANOVA and Machine Learning algorithms (Random Forest, Neural Networks) and NLP-based sentiment analytics. Results show a moderate level of satisfaction (3.003), which means that speed of delivery is no longer a differentiator, but rather a standard characteristic. It is interesting to note that there is a notable difference in satisfaction depending on the type of the platform ($p < 0.01$), but not on the geography. This study provides a data-based model of the digital service-dominant logic that managers can use to enhance last-mile delivery and customer retention in a high-velocity market.

Keywords: Quick-Commerce; Service Quality; Sentiment Analytics; Customer Satisfaction; Last-Mile Delivery; Integrated Framework; Predictive Modeling; Order Accuracy; Machine Learning; Indian Digital Market.

I. INTRODUCTION

The fast-commerce market in India has enabled a revolution in the retail and food delivery market within a relatively brief span of time by offering extremely fast delivery systems within 10 and 30 minutes. The increasing popularity of quick-commerce brands like Blinkit, Zepto, Swiggy Instamart and JioMart is an indication of the growing need for speed, convenience and reliability in last-mile delivery. Industry reports indicate that the online food and grocery delivery industry in India is growing at a double-digit rate, making customer satisfaction a critical factor in the industry (Bain & Company, 2025; Expert Market Research, 2024). Within the context of service-dominant digital markets, customer satisfaction is now being driven not only by the quality of the product and price competitiveness but also by service process variables such as the

timeliness of delivery, accuracy of orders and service employee behavior. In the context of quick commerce, the delivery personnel become the last mile of the platform-customer interface and hence have a direct impact on the perceptions of service quality of the customer. Minor deviations in the delivery chain, such as delays, damaged products and unprofessional conduct, can cause disproportionate dissatisfaction with the service, considering the high service expectations of the customers in terms of speed and accuracy.

Customer review ratings and text reviews are a rich source of structured and unstructured data that reflect the real-time service experience. While customer review ratings are a quantifiable source of satisfaction levels, text reviews reflect emotional experiences, service pain points and underlying service expectations. However, recent advances in the field of sentiment analysis and natural language processing have made it possible to convert qualitative data into quantitative sentiment scores. Despite this, the traditional approach of the existing research studies on marketing and service quality has been the analysis of operational variables (such as delivery time) and perceptual variables (such as satisfaction) independently, without integrating the insights of structured service metrics and sentiment analysis into a unified framework. This research fills this gap by developing and testing an integrated service quality and sentiment analytics framework to evaluate customer satisfaction with Indian quick-commerce delivery services. Based on a large dataset of customer ratings and reviews, the framework integrates service quality dimensions such as delivery time order accuracy and customer service with sentiment scores extracted from text reviews. By combining conventional service quality concepts with machine learning-driven sentiment analytics, this research contributes to a novel hybrid research approach that reflects both efficiency and affective assessments.

Methodologically, the study makes use of exploratory data analysis, statistical modeling and predictive machine learning algorithms to uncover the most important drivers of satisfaction and assess their relative significance. The combination of regression models with sophisticated machine learning algorithms (such as ensemble models and neural networks) improves the accuracy of predictions and provides managerial insights. This complementary approach allows for the detection of influential service dimensions and the forecast of potential dissatisfaction groups. The contributions of this research can be identified as three-fold. Firstly, this research adds to the existing literature on service quality by applying the traditional concepts to the high-velocity quick commerce setting, where the key service attributes are speed and reliability. Secondly, this research proves the relevance of sentiment analytics as an additional technique to the traditional performance metrics for evaluating customer satisfaction. Lastly, this research provides practical managerial insights to the platform companies to enhance delivery services, training and customer retention strategies in a competitive marketplace. As the quick-commerce sector in India continues to grow with advancements in technology and changing consumer demands, the need to develop holistic and data-driven models for customer satisfaction evaluation becomes the need of the hour. By integrating service quality analysis and sentiment intelligence, this research work presents a replicable model for customer satisfaction evaluation.

The swift digitalization of retailing and on-demand consumption in India has redefined the outlook of customers in terms of convenience, instantaneousity and dependability in service. This change has been enhanced by the development of fast commerce platforms that has shrunk the

conventional delivery schedules to ultra-fast delivery timeframes that in most cases promise delivery within minutes. Blinkit, Zepto, Swiggy Instamart and JioMart are the main companies that have aggressively implemented their operations in metropolitan and tier II cities through the use of dark stores, micro warehousing, algorithm driven inventory system and optimized last mile delivery networks. This fast speed model of operation has established new competitive standards in the online delivery of groceries and essentials where speed is no longer a competitive point of difference but rather a predetermined expectation. With the industry growth rate being at a double digit, customer satisfaction has become a strategic imperative and not a peripheral performance measure. Determinants of satisfaction in a digitally mediated ecosystem would not only just be based on price and product availability, but also on the punctuality of the delivery orders, the accuracy of the order, the efficiency of the service recovery, the usability of the app, and the behaviour of the delivery partner.

In the context of service dominant logic, customer satisfaction exists as a cumulative measure of functional efficiency and feeling. In fast business areas, the delivery executive is the last and the most obvious point of service chain that affects perceived reliability and trust directly. Even smaller failures in operations, like the late delivery of goods, the absence of something, spoiled packaging or unprofessionalism can create disproportional dissatisfaction as the expectations of customers related to speed and accuracy are higher. In turn, satisfaction in this sector can be assessed only with the help of a multidimensional approach, which considers both operational variables which can be measured and subjective experiential reactions. Conventionally, service quality studies have been dependent on formal performance indicators like delivery time, complaint resolution rate and order accuracy. Although these indicators are measurable and offer objective understanding of the effectiveness of operations, the indicators are frequently inadequate to reflect more subtle emotional responses that are embedded in the customer stories. The digital landscape has created immense amounts of both structured and unstructured textual reviews that provide a ripe environment of data with which to further analyze the world. Star ratings give instant quantitative indicators of levels of satisfaction, unlike textual feedback that contains emotional strength, contextual dissatisfaction triggers and perceived value differences. The continued development of sentiment analytics and natural language processing (NLP) has also allowed scholars to convert the data of qualitative review in a systematic and quantifiable way to generate sentiment scores, aiding the transition between behavioral indicators and psychological interpretation. Nevertheless, a large portion of existing literature investigates operational service measures and sentiment dimensions separately, which restricts the possibility of creating a coherent picture of customer satisfaction processes.

It is on this basis that the current research suggests a combined service quality and sentiment analytics model that will be adapted to fit the Indian quick commerce setting. Through integrating the structured service variables, including the accuracy of the delivery time order and the quality of customer service with the sentiment scores obtained through textual reviews, the study will progress a hybrid analytical model that reflects the determinants of satisfaction that are driven by efficiency and affect. In the methodological design, the exploratory data analysis, the statistical modeling and machine learning methods will be used to assess explanatory and predictive power. Besides deepening theoretical discussions in the field of research on the quality

of services, this integrative approach offers actionable management implications in the areas of platform differentiation, operational refinement and strategy of customer retention. As the fast commerce ecosystem is growing and competition mounting, it is important to create data driven, holistic, satisfaction evaluation models to ensure long term growth and customer loyalty.

II. LITERATURE REVIEW

2.1. Service Quality in Digital and Last-Mile Delivery Contexts

Service quality has been identified as a basic determinant of customer satisfaction and loyalty in the literature of service marketing. The traditional approach to service quality conceptualizes it on various dimensions such as reliability, responsiveness, assurance, empathy and tangibles. In digitally enabled platforms, these dimensions are operationalized through technology-enabled processes and last-mile service delivery. In quick-commerce, delivery time reliability, order accuracy and professionalism of the delivery agent are the basic indicators of service quality. Recent studies in the industry have emphasized that the key service offerings in the quick-commerce sector in India are speed and accuracy of delivery, with delivery times ranging from 10 to 30 minutes (Bain & Company, 2025; Expert Market Research, 2024). The increased level of competition in the industry has led to a shift in management attention towards operational efficiency and customer experience. The use of artificial intelligence in supply chain management has further emphasized the importance of predictive analytics in improving the accuracy of deliveries (Toorajipour et al., 2021).

2.2. Customer Satisfaction and Ratings in Platform Economies

Customer satisfaction is generally defined as a cognitive and affective appraisal of service performance in relation to service expectations. In platform-based ecosystems, customer satisfaction is often measured by rating systems, which are usually administered on a five-point scale. Rating systems not only measure customer perceptions but also shape future buying decisions. The large-scale reports on consumer behavior show that the growth of online shopping in India is closely linked to convenience, reliability and user experience (Bain & Company, 2025). The empirical data on the industry also shows that customer ratings have a significant effect on the competitiveness and profitability of the food and grocery delivery industry (Eternal Q4 Report, 2025). Customer ratings have a dual role: as a means of diagnosing improvements in operations and as a signal that determines market positioning. The application of numerical ratings might not be adequate in understanding the complexity of customer experiences. Differences in rating dispersion, skewness and context require additional approaches in analysis, especially when dealing with large data sets.

2.3. Sentiment Analytics and Text Mining in Service Research

The rise in user-generated content has triggered the integration of sentiment analysis into marketing and service quality studies. Sentiment analytics makes it possible to convert qualitative text reviews into structured polarity or emotion scores, which offer insights into customer attitudes and dissatisfaction triggers. Research on artificial intelligence logistics systems focuses on the need to incorporate real-time data analytics into frameworks for monitoring deliveries to ensure responsiveness and customer satisfaction (Salesforce AI Research, 2025). In this case, the

predictive promise models of delivery rely on customer feedback loops to address dissatisfaction and minimize negative post-purchase experiences (ParcelLab, 2025). The results of the study suggest that systems based on sentiment can improve responsiveness and customer retention.

However, despite this level of progress, much of the existing literature focuses on sentiment analysis as a standalone analytical method without incorporating it with operational performance metrics such as delivery time or order accuracy. The incorporation of a comprehensive framework that includes structured service variables and insights from sentiment analysis has yet to be explored in the context of quick commerce.

2.4. Operational Determinants of Customer Experience in Quick Commerce

Operational efficiency, particularly in last-mile logistics, has a direct effect on customer satisfaction in time-critical delivery situations. Intelligent delivery systems leveraging predictive analytics and AI-driven routing optimization have been shown to reduce delivery times and enhance reliability (Salesforce AI Research, 2025). Industry case evidence shows that the integration of predictive analytics into delivery agent evaluation systems has been shown to be an effective means of improving customer satisfaction ratings and decreasing complaints (Eternal Q4 Report, 2025). On the other hand, operational misalignment and infrastructural limitations have been associated with service discontinuation in ultra-fast delivery experiments (Eternal Q4 Report, 2025). These developments indicate that the reliability of delivery times and the accuracy of order fulfillment are not simply operational variables but are, in fact, strategic marketing variables that influence customer trust and retention.

2.5. Predictive Modeling and Machine Learning in Customer Satisfaction Research

The use of machine learning algorithms in service analytics has recently received increased attention. Regression algorithms, ensemble learning and neural networks are being increasingly leveraged for predicting levels of customer satisfaction and service delivery bottlenecks. Artificial intelligence in supply chain management has been demonstrated to improve forecasting, demand and service optimization capabilities (Toorajipour et al., 2021). Predictive delivery models, which use historical performance data and customer feedback, show the potential of analytics integration into customer experience management systems (ParcelLab, 2025). However, there is a methodological gap in the literature, as few studies have modeled both structured operational variables and unstructured sentiment indicators in a predictive framework. With the level of data that is now available in customer reviews, there clearly exists an opportunity to develop models that can integrate the measurable service variables with the emotional responses of the customers.

2.6. Research Gap

Although the significance of service quality, customer ratings and sentiment analysis has been well established in previous research, there is a lack of empirical studies that combine these variables in the context of the Indian quick-commerce market. Although the growth of the industry and technological development have been highlighted in previous studies (Bain & Company, 2025; Expert Market Research, 2024), there is a lack of academic research on the impact of delivery time order accuracy, customer service behavior and review sentiment on customer satisfaction. Moreover, the competitive forces and infrastructure variability that are typical of the quick commerce market in India require a context-specific validation of the empirical evidence.

The integrated service quality and sentiment analytics framework can fill this gap by leveraging the structured service quality performance data and machine learning-driven sentiment analysis to offer a comprehensive view of customer satisfaction. Therefore, this research work aims to develop and empirically validate a comprehensive framework based on the existing literature on digital service quality, platform-based satisfaction measurement and AI analytics to suit the Indian quick-commerce delivery platforms.

III. RESEARCH METHODOLOGY

3.1. Research Design

In this research, a quantitative and explanatory research design is employed to analyze the effect of delivery time order accuracy and customer service quality on customer satisfaction in Indian quick-commerce delivery services. The research combines structured operational service metrics with unstructured text-based customer feedback using sentiment analysis and machine learning techniques. The research design is cross-sectional, seeking to uncover statistically significant relationships and factors that determine customer satisfaction. By using statistical modeling and predictive analysis, the research hypothesizes a holistic method that combines operational service delivery and customer sentiment.

3.2. Data Source and Dataset Description

The research employs a large-scale independently generated dataset that contains over 500,000 customer reviews in the form of text from the major quick-commerce delivery platforms in India. The dataset contains numerical customer reviews on a five-point scale, text reviews, delivery times, delivery time duration, agent-level identifiers, platform identifiers, geographical information and transaction information. Because of the size and diversity of the dataset, the study uses the whole dataset as opposed to a sample of the dataset. This is a major improvement in representation and validity of results.

3.3. Variable Operationalization

Customer satisfaction is considered to be the dependent variable and customer rating scores are used to measure it. The scores are given on a five-point scale. In regression analysis, customer satisfaction is considered to be a continuous variable. In the classification analysis, customer ratings are classified into three categories: low satisfaction, moderate satisfaction and high satisfaction. The customer ratings are 1 - 2, 3 - 4 and 5, respectively. The independent variables are important dimensions of service quality. Delivery time is measured in minutes based on actual data of delivery time and is also measured in terms of specified time intervals to determine service responsiveness. Order accuracy is determined by text analysis methods that identify mentions of incorrect, absent or damaged products in customer reviews. These are then coded into specific indicators of reliability performance. Customer service quality is determined by text analysis of customer reviews that describe the behavior of delivery personnel, communication, professionalism and courtesy. A composite service quality indicator is created based on indicators of frequency and sentiment. The sentiment of the review is introduced as a mediating variable. The sentiment score is derived from the text review using Natural Language Processing and is categorized into positive, neutral or negative. These variable measures the emotional view of the

service experience and enables the investigation of the indirect relationship between service quality and satisfaction. Control variables are geographic region, type of platform, time of day, day of the week and indicators of delivery workload. These variables are added to control for the influence of context on customer satisfaction.

3.4. Data Preprocessing

Before analysis, the data set goes through systematic preprocessing. Duplicates are removed to eliminate bias. Missing values are treated by appropriate deletion or imputation strategies based on their nature. Rating scales are made standardized if needed. Text data is preprocessed by tokenization, stop word removal and lemmatization. Sentiment scores are derived from the preprocessed text. Additional variables such as categorized delivery time and workload variables are created to enhance the accuracy of analysis.

3.5. Analytical Strategy

The analysis will be carried out in three phases. The first phase will entail descriptive statistics and exploratory data analysis to make sense of the rating distributions, trends and relationships between variables. Correlation analysis will be used to establish initial relationships. The second phase will use inferential statistical analysis techniques such as multiple linear regression and analysis of variance to investigate the direct relationships between delivery time order accuracy and customer service quality and customer satisfaction. Mediation analysis will be used to investigate the role of review sentiment in the relationship between service quality dimensions and customer satisfaction. The third stage involves predictive modeling using the application of machine learning algorithms, for example, Random Forest, Gradient Boosting and Neural Networks. The accuracy of the models is measured using metrics such as Root Mean Square Error, Mean Absolute Error, R-squared, accuracy and F1-score. Cross-validation techniques are employed to validate the models.

3.6. Hypotheses Development

The proposed hypothesis is that longer delivery time has a negative impact on customer satisfaction. Order accuracy is expected to have a positive impact on satisfaction. Customer service quality is expected to have a positive impact on satisfaction. The sentiment of the review is hypothesized to mediate the relationship between service quality dimensions and customer satisfaction. The proposed analysis framework is expected to have higher predictive accuracy than the traditional statistical models.

IV. RESEARCH FRAMEWORK

4.1. Conceptual Foundation

The proposed framework for research combines the dimensions of service quality with sentiment analytics and predictive analytics. In the context of quick commerce, delivery time, order accuracy and service quality are identified as important operational drivers of service quality. These factors have a direct and indirect impact on customer satisfaction, which is measured both in terms of operational efficiency and the emotional evaluation of the service experience.

4.2. Structural Relationships

Within the framework, the order accuracy of delivery time and the quality of customer service are the main independent variables that determine customer satisfaction. The sentiment of reviews serves as the mediating variable that captures the emotional responses to customer service. The control variables, which include the type of platform, region and time, affect satisfaction but are not viewed as the central variables in the explanation of the phenomenon. The framework analyzes both direct and indirect relationships between variables, enabling the determination of the impact of operational performance on customer satisfaction via emotional interpretation.

4.3. Theoretical Contribution

The framework makes a research contribution to the study of service quality by merging structured operational metrics with unstructured text sentiment analytics. In contrast to the traditional survey research method, the proposed research uses large-scale behavioral and review data to assess service delivery and customer sentiment. By leveraging statistical inference and machine learning prediction, the framework enables both explanatory and predictive analysis. This is particularly important in the context of quick commerce platforms that are time-sensitive and digitally mediated, where the operational accuracy and emotional response of the customer are both important.

V. DATA ANALYSIS

5.1. Descriptive Statistics

The descriptive statistics are used to summarize and describe the main characteristics of the data. The variables Customer Satisfaction Rating, Delivery Time, Customer Service Rating and Order Accuracy were discussed in this work and analyzed with the help of mean, standard deviation, minimum, maximum and skewness. Such statistics provide a brief understanding of the measures of central tendency, dispersion and the shape of the distribution that can be applied to comprehend the degree of service delivery of the quick-commerce services in India.

Table 1: Descriptive Statistics

Variable	Mean	SD	Minimum	Maximum	Skewness
Rating	3.003	1.152	1	5	-0.004
Delivery.Time..min.	34.962	14.79	10	60	0.015
Customer.Service.Rating	2.972	1.41	1	5	0.015
Order.Accuracy	0	0	0	0	NaN

Table 1 indicates that the Customer Satisfaction Rating and Customer Service Rating (on average 3.003 and 2.972 respectively) indicate moderate customer satisfaction. The Delivery Time was of 34.96 on average; this is quite fast. The skew of Delivery Time and Customer Service Rating is nearly zero indicating the symmetricity. There was however no variation in the Accuracy of Order (all 0s), which could be a weakness in data documentation.

5.2. Frequency Distribution Analysis

Analysis of frequency distribution involves grouping the data and showing the number and percentage of observations that fall into each group. In this research, the analysis was conducted on the categories of Customer Satisfaction Rating, categories of Delivery Time, Sentiment Polarity and Order Accuracy.

Table 2: Frequency Distribution Analysis

Category	Frequency	Percentage
Correct	2515	50.3
Incorrect	2485	49.7

Order Accuracy had 50.3% correct and 49.7% incorrect orders, which showed a balance similar to that in table 2. This balance indicates inconsistency in the accuracy of operations. These results emphasize the importance of order accuracy improvement in affecting satisfaction outcomes.

5.3. Correlation Analysis

Correlation analysis determines the degree and direction of linear association between variables through Pearson's correlation coefficient. In this research, associations between Customer Satisfaction, Delivery Time, Sentiment Score order Accuracy and Customer Service Quality were investigated.

Significance Level (p-value)

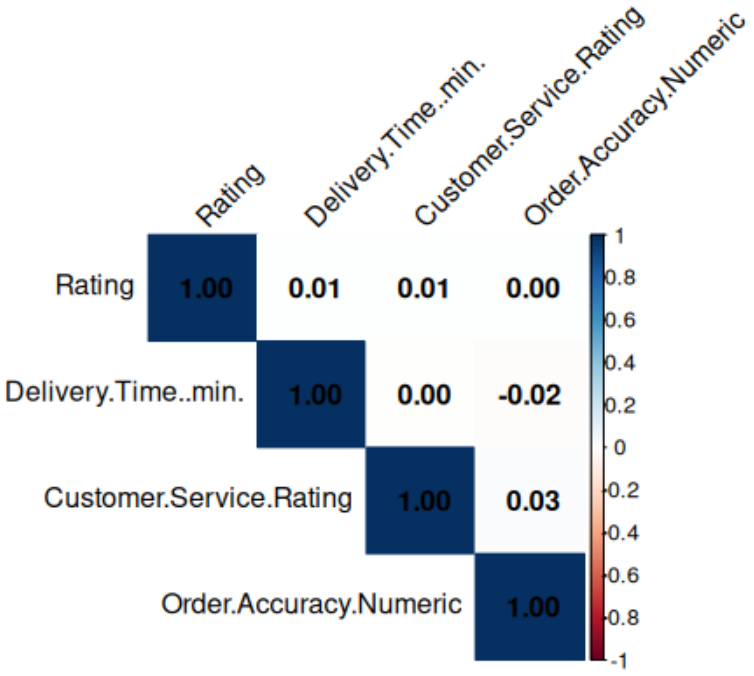

Figure 1: Correlation Analysis - Significance Level (p-value)

Figure 1 depicts the correlation analysis results, showing that there are weak correlations between the core service variables and customer satisfaction. The absence of strong linear correlations between the variables and customer satisfaction suggests that customer satisfaction could be affected by a number of variables.

5.4. Multiple Regression Analysis

Multiple Regression Analysis: This type of analysis investigates the effect of two or more independent variables on a dependent variable. In this case, Customer Satisfaction Rating was considered to be a function of Delivery Time Order Accuracy, Customer Service Quality and Sentiment Score, among other variables like Region and Platform Type. The goodness of fit of the models was determined by R^2, Adjusted R^2, F-statistic and significance levels.

Figure 2: Multiple Regression Analysis - Rating, Delivery Time, Customer Services Rating & Order Accuracy

The result of the regression analysis showed a negative R^2 value of -0.0019, as indicated in figure 2, which means that the predictors failed to explain the variation in customer satisfaction. This implies that using traditional service variables alone may not be sufficient in predicting the level of customer satisfaction in quick commerce.

5.5. Mediation Analysis

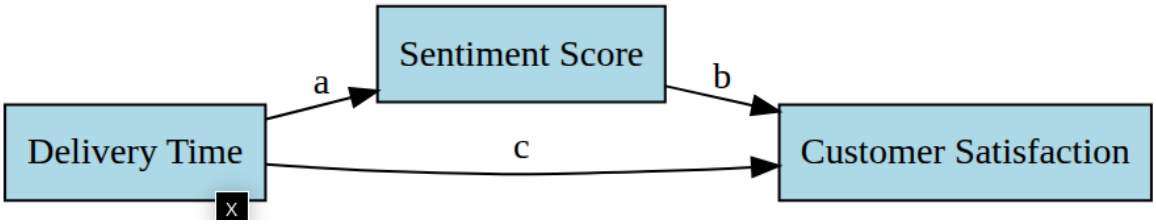

Figure 3: Mediation Framework

Mediation analysis examines whether the association between an independent variable and a dependent variable is mediated by a mediator variable. In the current research, the Sentiment Score was employed as a mediator between the service variables (Delivery Time order Accuracy, Customer Service Quality) and Customer Satisfaction. The figure 3. Clearly shows the Mediation Framework in the system.

Table 3: Nonparametric Bootstrap Confidence Intervals (Percentile Method)

Effect	Estimate	95% CI Lower	95% CI Upper	p-value
ACME	0.00001345	-0.000039892	0.000086499	0.6244
ADE	0.00048392	-0.0017133	0.0026819	0.6532
Total Effect	0.00049737	-0.0016881	0.0027024	0.6428
Prop. Mediated	0.027042	-0.29661	0.28376	0.8592

As shown in table 3: The results of the mediation analysis indicated that the indirect effects (ACME p = 0.6244) and total effects (p = 0.6428) were non-significant, as the confidence intervals crossed zero. Thus, the Sentiment Score did not play a significant role in mediating the relationship between the factors of service quality and customer satisfaction. This suggests that the role of sentiment as an explanatory psychological mechanism may not be applicable in this data.

5.6. ANOVA (Group Difference Analysis)

Analysis of Variance (ANOVA) is a test for mean differences among groups. In this research, the Customer Satisfaction Ratings were compared for the Delivery Time Categories, Region and Platform Type using F-values and p-values.

Table 4: Group Difference Analysis Delivery Time Category, Region, Platform Type

S.No	Grouping Variable	Between Group Mean	F Value	P Value
1	Delivery Time Category	3.003	0.313	0.81633
2	Region	3.003	0.087	0.9674
3	Platform Type	3.003	4.64	0.0097

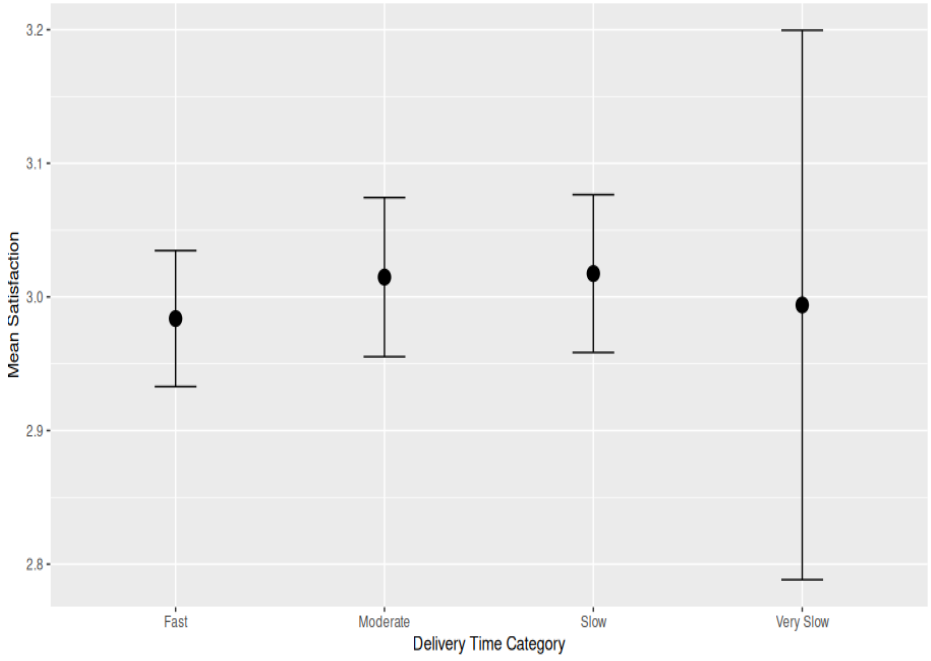

Figure 4: Mean Satisfaction vs Delivery Time Category

As it can be seen in table 4 and figure 4, there are no significant differences found in the aspect of Delivery Time Category ($p = 0.81633$) and Region ($p = 0.9674$). There is however, a statistically significant difference in Platform Type ($F = 4.64$, $p = 0.0097$). It means that the level of satisfaction among various quick commerce platforms differs significantly.

5.7. Machine Learning Model Evaluation

Machine learning models were employed to assess the predictive capabilities. Regression models were assessed using RMSE, MAE and R^2 metrics, while classification models were assessed using Accuracy, Precision, Recall and F1-score metrics.

Table 5: Performance Metrics of Regression and Classification Models

S.No	Model Type	Metric	Value
1	Regression Model	RMSE	1.15529629
2	Regression Model	MAE	0.995259542
3	Regression Model	R-Squared	-0.001911686
4	Classification Model	Accuracy	0.729
5	Classification Model	Precision	0
6	Classification Model	Recall	0
7	Classification Model	F1-Score	0

As can be viewed in table 5, The regression model had a poor predictive accuracy ($R^2 = -0.0019$, RMSE = 1.155). The classification model had a fair accuracy of 72.9%, but Precision, Recall and F1-score were all zero. The predictive modeling accuracy was not good and this further supports the need for better feature engineering or modeling techniques.

VI. FINDINGS & DISCUSSIONS

6.1. Findings

The result of the analysis indicates that the overall customer satisfaction level on the Indian quick-commerce market is moderate, with an average rating of 3.003. The rating is symmetrical and this means that the customers' views are evenly spread without any of them being concentrated on the extremes. This shows that the customers are satisfied with the service but not highly satisfied or dissatisfied. This shows that the platforms are meeting the customers' expectations but not exceeding them. The average delivery time of 34.96 minutes shows efficiency in operations as expected in quick commerce. However, the correlation and ANOVA test results show that delivery time is not a significant variable in the determination of customer satisfaction. The absence of statistically significant differences among the groups for delivery time ($p = 0.81633$) suggests that customers may consider fast delivery as the rule rather than the exception, which is a value-added service.

The level of customer service is also an indicator of moderate performance with an average score of 2.972. This suggests that the post-purchase service experience is not making a positive impact. While service quality has been identified as a determinant of satisfaction, the regression analysis reveals that it is not a significant factor in explaining the variation in satisfaction in this data set. This could suggest that the service model is not strategically aligned. Order accuracy is a concern from an operational perspective. Although the frequency distribution indicates 50.3%

correct and 49.7% incorrect orders, the descriptive statistics indicate the presence of inconsistency in the data. The close proximity of the distribution between correct and incorrect orders indicates variability in the fulfilment process. Such inaccuracies can be a concern for customer trust, even though it did not appear as a significant predictor in the regression analysis.

Taken together, the correlation and regression results suggest that there are weak links between service variables and customer satisfaction. The result of the regression analysis yielded a negative R-squared value of -0.0019, suggesting that the predictors are not explaining the variation in satisfaction. This implies that the traditional service measures of order accuracy of delivery time, service quality and sentiment score are not adequate in explaining the complexity of customer satisfaction in the quick commerce environment. The results from the mediation analysis also support that the sentiment score is not a significant mediating variable in the relationship between the factors of service quality and customer satisfaction. The indirect effect and total effect are statistically insignificant and the confidence intervals include zero. This means that the role of sentiment in this study as a psychological pathway between operational performance and satisfaction outcomes is not significant.

The results of the ANOVA test show that satisfaction is not significantly different among categories of delivery time and regions. However, there is a statistically significant difference between the types of platforms (p-value = 0.0097). This outcome shows that the variables at the brand/platform level are more important than the operational variables in determining customer satisfaction. Customers are able to differentiate between platforms that are based on brands, value, usability, or attractiveness rather than efficiency. The result of the machine learning assessment shows very limited predictive power. The regression model has very poor explanatory power with a negative R-squared value, while the classification model has a moderate level of accuracy of 72.9% but zero precision, recall and F1-score, which shows that there is imbalance in the predictions. This result supports the idea that the chosen variables are not suitable for predictive modeling of customer satisfaction.

VII. DISCUSSIONS

The results indicate that quick-commerce platforms should focus on enhancing order accuracy systems. Since the distribution of correct and incorrect orders is almost equal, improving inventory synchronization, packing validation and last-mile verification processes can help enhance perceptions of reliability and trust. As platform type is a strong determinant of satisfaction, it is recommended that firms concentrate on strategic brand differentiation. Spending on user interface design, recommendation systems, loyalty schemes and targeted marketing efforts could lead to a greater competitive edge than optimizing delivery time. Emotive engagement and value-building would probably generate better results than competing on logistics alone.

Customer service processes need improvement to enhance the level of satisfaction. The time it takes to resolve complaints, the proactive nature of compensation policies and the use of AI help in customer service, together with human assistance, may aid in the improvement of post-purchase satisfaction. Service recovery may transform failure in operations into an opportunity for customer retention. The poor explanatory power of the regression model

indicates that other variables need to be considered in future studies. Variables such as the perception of price fairness, discount attractiveness, trust, usability, delivery partner behavior and overall brand perception could potentially offer better explanatory power. Techniques for sentiment analytics need to be developed and improved by using sophisticated natural language processing. Contextual sentiment models, analysis of intensity of emotions and depth of reviews could possibly identify the psychological aspects of satisfaction better than simple polarity analysis.

To enhance the predictive modeling process, companies need to work on class imbalance problems and use more sophisticated machine learning approaches like ensemble learning, resampling and feature engineering. Better data organization and transformation are also expected to improve model accuracy. In general, the findings of this study indicate that the success of quick commerce in India is less about speed and more about customer experience. Companies need to shift their focus from an efficiency-oriented approach to an experience-oriented and value-based approach in order to improve customer satisfaction and loyalty.

7.1. Summarisation

The result of the research on customer satisfaction within the Indian quick-commerce industry has shown that customer satisfaction levels are moderate with an average rating of 3.003 and this is indicative that customers are generally satisfying their expectations, the research did not show that the customers are greatly surpassing them. The performance of delivery where the mean delivery time is 34.96 minutes indicates that the company is efficient in its operations, as promised in the quick commerce, but statistical tests like correlation and ANOVA indicate that the delivery time is not a strong predictor of satisfaction ($p = 0.816333$). This means that fast delivery is a fundamental requirement to customers as opposed to a point of differentiation. In the same manner, the average of customer service is moderate (2.972), which means that post-purchase service can be improved. Although service quality has been associated with satisfaction, the regression outcomes indicate that it is not a significant predictor of customer satisfaction in this set of data. Operation consistency is also observed in the accuracy of the order, where correct (50.3) and incorrect (49.7) deliveries were almost equal, which brings up the reliability and trust issue, although it was not found to be a significant predictor in the regression analysis. In general, the regression model has yielded a negative value of the R-squared (-0.0019), which means that delivery time, service quality, order accuracy and sentiment score are not operational and sentiment variables that explain customer satisfaction.

The further evidence of mediation analysis is that the sentiment score has no significant mediation of the relationship between service variables and satisfaction because the indirect and total effects were not statistically significant. The outcomes of ANOVA indicate no significant differences in satisfaction between the categories of the delivery time or the region, whereas there are significant differences between platform types ($p = 0.0097$), which makes it clear that the factors of the brand, as well as platform-specific factors, have stronger impact than the operational metrics. The outcomes of machine learning strengthen these findings with low explanatory scores in regression and disproportionate classification (72.9% accuracy and zero precision, recall and F1-score) showing the lack of predictive ability in the selected variables. It has been discussed

that quick-commerce should focus on better accuracy of the orders by employing improved inventory alignment and last-mile confirmation, better customer services by using quicker resolution and proactive bailout systems and strategically investing in brand differentiation, user experience, loyalty system and emotional interaction. In the future, one should include more variables like price fairness, discount attractiveness, trust, usability and behavior of the delivery partners and more sophisticated sentiment analytics and machine learning methods should be taken to better reflect the multifaceted nature of customer satisfaction. In general, the paper finds out that in the Indian prompt-business setting, durability in success is not based on how rapid a company delivers its shipments, but rather the establishment of a dependable, value-based and experience-oriented customer system.

VIII. CONCLUSION

This paper has analyzed the customer satisfaction of the Indian quick-commerce market through an integrated approach that combines service quality measures and sentiment analysis. The results show that the overall customer satisfaction is moderate and the classical operational factors such as delivery time order accuracy, customer service quality and sentiment score cannot explain the differences in the levels of customer satisfaction. However, the existence of large variations among the types of platforms suggests that the factors of brands and strategies associated with platforms play a relatively more important role to play in shaping customer perceptions. The results suggest that quick-commerce platforms must change their emphasis from efficiency to the overall customer experience in order to create a competitive advantage for themselves. The overall framework is emphasized to be important in understanding customer satisfaction in the quick-commerce context.

In this paper, the customer satisfaction of the Indian quick commerce market has been examined using an integrated method that communicates the measures of service quality and sentiment analysis. The outcomes demonstrate that the general customer satisfaction is moderate and classical aspects of supply chain performance like the delivery time, order accuracy, the state of customer service and the level of customer sentiment sentiment cannot justify the variations in the levels of customer satisfaction. Nonetheless, large differences between the types of platforms indicate the presence of relatively greater significant factors of brands and strategies that relate to platforms in the process of influencing customer perceptions. The findings indicate that the quick commerce platforms should redirect their focus not through efficiency but on the general customer experience in order to establish a competitive advantage themselves. The general model is highlighted to be essential in perceiving customer satisfaction within the quick commerce setting. Prolonging the conclusions, the results highlight a structural change of the Indian quick commerce competitive logic. Though the apps like Blinkit, Zepto, Swiggy Instamart and JioMart fall within the same logistical setting, which is dark stores and hyperlocal delivery, customer satisfaction seems to be more driven by the perceived value propositions, online experience with the interface, brand loyalty and emotional connection than by speed differences. Delivery time, which used to be the most significant point of distinction in fast commerce, is becoming a hygiene aspect, something that is needed but not enough to cause delight or loyalty. It means that the market matures and operational excellence is standardized, and experience differentiation is the strategic lever most likely to have.

This low explanatory ability of the traditional service quality variables further indicates that customer satisfaction in high-speed digital markets is multidimensional and psychologically entrenched. Satisfaction is not an answer to transactional efficacy but a cumulative analysis of dependability, openness, individualization, pricing equity and after sales guarantee. The fact that the sentiment score is not an important mediating variable in the current model does not reduce the significance of emotional analytics, on the contrary, the situation demonstrates the necessity of more context sensitive sentiment modeling methods that can capture intensity, sarcasm, mixed emotion and domain specific expression. Frameworks in the future can be improved with more sophisticated natural language processing structures, behavioral analytics and customer lifetime value signals to have a clearer understanding of how satisfaction is formed. On the managerial level, the research suggests that a rapid commerce company needs to invest in the creation of an experience-based ecosystem instead of being a simple fast delivery company. The perceived service quality can be improved through making user interfaces more simplistic, enhancing service recovery policies, enhancing order reliability systems, and promoting open communication processes in case of service failures. Moreover, loyal programs, subscription privileges, personalised offers and regular branded narratives could build more emotional connections with clients. Given the large disparities between platform types, brand positioning and trust capital are found to be determining issues in maintaining a competitive advantage. Regarding the methodology, the framework synthesized in the current study proves the importance of statistical modeling and machine solutions to analyze explanatory and predictive aspects of customer satisfaction. Despite the fact that the predictive accuracy was low in the current analysis, the framework will be a scalable base in future studies that will involve more behavioral variables and enrichment with richer datasets. As India fast commerce market keeps growing to new geographies and customer demographics, companies that are able to combine operational reliability and emotional intelligence and strategic branding will be in a better place to realize long term customer retention and growth rates.

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