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Last-Mile Delivery Efficiency and Service Recovery as Determinants of Customer Satisfaction in Indian E-Commerce: Evidence from Flipkart Using Mixed-Methods Analysis

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Abstract

Online shopping in India demonstrates rapid market expansion which requires businesses to enhance their delivery systems and customer service operations as a means to retain their customers. The research examines the influence of last-mile delivery systems and service recovery methods on customer satisfaction at Flipkart through a multimethod study approach. The research team utilized here mostly regression analysis to evaluate quantitative data from 350 participants while employing interviews to collect qualitative data. The study revealed that shipping duration, precision, and tracking system efficacy substantially influenced customer satisfaction. The research discovered that service recovery methods which included simple return processes and fast refund processing and instant customer support services produced greater customer satisfaction than delivery operations. The two elements functioned as an intermediary between the two parties because of their position. The study shows that businesses that handle service issues well earn their customers' trust, which makes them more loyal.

Keywords: Online Shopping, Rapid Market Expansion, Customer Satisfaction, Service Recovery Methods, Customer Support etc.

Introduction

The Indian e-commerce sector has become one of the fastest growing digital industries worldwide because people now have access to the internet and can use affordable mobile phones and digital payment systems have become more widespread. The Indian e-commerce sector will reach more than USD 120 billion in 2024 and continue to grow in the following years because consumers in tier 2 and tier 3 cities show increasing demand for e-commerce services [1]. As the market has grown, major platforms like Flipkart have had to compete more fiercely with each other by offering better customer service and more efficient operations. Last-mile delivery is the most important and visible part of the e-commerce value chain. The delivery process represents the most challenging and costly stage because it contributes to major logistics expenses. Delivery efficiency determines customer satisfaction because it includes timely delivery and accurate delivery and reliable delivery. Customer experience suffers from delays and failed deliveries and damaged goods which also lead to higher operational costs and increased product returns. Flipkart has invested substantial resources into building its supply chain network which encompasses its warehouse system and delivery operations and advanced tracking technology. The company developed these systems to solve distribution challenges but operational difficulties still exist because of different transportation conditions and road traffic problems and limited infrastructure in rural and semi-urban areas. The delivery process serves as a crucial measure of service excellence for Indian businesses [2].

Customer experience management now recognizes service recovery as a critical element that businesses must deliver to customers while they maintain their operational delivery standards. The service recovery process encompasses all procedures which businesses use to manage service breakdowns through handling returns and refunds and resolving customer complaints and providing customer support. The application of effective recovery methods enables businesses to restore customer trust while enhancing customer satisfaction, which happens when companies address issues through prompt and open communication [3]. The research examines the relationship between last-mile delivery efficiency and service recovery processes in affecting Flipkart customer satisfaction.

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Indicator	Data	Source	Link
India E-commerce Market Size (2024)	~USD 124.9 Billion	Credence Research	https://www.credenceresearch.com/report/india-e-commerce-market
Projected Market Size (2032)	~USD 379 Billion	Credence Research	https://www.credenceresearch.com/report/india-e-commerce-market
Growth Rate	14.9% CAGR	Credence Research	https://www.credenceresearch.com/report/india-e-commerce-market
Logistics Cost Share (Last-Mile)	~40–50% of total delivery cost	Industry Estimates (McKinsey/Logistics Reports)	https://www.mckinsey.com/industries/travel-logistics-and-infrastructure
Flipkart Logistics Network	100+ warehouses & large delivery fleet	Flipkart Company Overview	https://www.flipkart.com/about-us
E-commerce Growth Surge (2026)	~25% YoY growth	Economic Times (Flipkart-Bain Report)	https://m.economictimes.com/tech/technology/ecommerce-sees-25-growth-in-q1-cy2026-says-joint-report-by-flipkart-bain-co/articleshow/130149077.cms

Table 1: Factual Data Table, Source: Author Findings

Literature Review

Complete research shows that delivery timeliness and delivery reliability together with delivery accuracy of orders stand as essential elements which determine how customers perceive service quality. The delivery process results in two outcomes for customers which include timely delivery that creates trust while providing higher perceived value and delivery failures that lead to customer losses [4]. Researchers in logistics and operations management found that last-mile delivery represents a major expense in the total supply chain costs which becomes the most challenging operation because of urban traffic and infrastructure limitations.

The delivery performance rating process requires assessment of order accuracy together with evaluation of product condition. Packaging quality and handling efficiency serve as essential elements for customers who expect their items to arrive in perfect condition and on time. Actual delivery results show differences from predictions which lead to customer dissatisfaction and higher return rates according to research findings [5]. The delivery process requires real-time tracking systems as essential technical solutions which provide visibility for delivery operations and help reduce customer delivery worries.

Service recovery stands as a vital factor which determines customer happiness in online shopping situations. Businesses use service recovery to solve service problems which include delayed deliveries and damaged products and incorrect deliveries. According to the service recovery paradox concept successful recovery initiatives produce greater customer satisfaction than situations where no failure occurred [6]. The process of service recovery depends

on three elements which include easy returns and fast refunds together with effective customer assistance.

The success of recovery operations depends on how well customer support works. Research shows that businesses that deal with customer complaints quickly and honestly have happier customers and better relationships with them. On the other hand, dealing with complaints slowly or ineffectively leads to more negative experiences, which hurts the company's reputation. Digital marketplaces use automated assistance systems and chatbots to improve customer support, but these systems only work if they provide accurate and personalized solutions [7]. This research shows how combining efficient logistics with service recovery programs can help organizations. The implementation of quick delivery systems helps businesses minimize operational risks while their service recovery systems maintain customer relationships when unexpected problems arise. The combined analytical method remains underutilized in research especially within the Indian e-commerce environment. This research addresses the existing gap by studying both attributes together which develops an all-inclusive model for measuring customer satisfaction at Flipkart.

Theme	Key Variables	Key Findings	Implications
Last-Mile Delivery Efficiency	Timeliness, reliability, accuracy	Direct impact on satisfaction and repeat purchase	Core operational priority
Delivery Transparency	Real-time tracking, communication	Reduces uncertainty and improves trust	Enhances customer confidence
Order Fulfillment Quality	Packaging, condition, correctness	Influences perceived service quality	Reduces returns and complaints
Service Recovery	Returns, refunds, complaint handling	Mitigates dissatisfaction and improves retention	Critical for failure management
Customer Support	Responsiveness, empathy, resolution time	Determines recovery effectiveness	Builds trust and loyalty
Service Recovery Paradox	Recovery effectiveness	Can increase satisfaction post-failure	Strategic opportunity

Table 2: THEMATIC ANALYSIS TABLE (LOGISTICS-FOCUSED), Source; Author Generated

Research Gap and Objectives

The existing research on e-commerce performance exists as extensive work, but researchers mainly investigate how supply chain efficiency factors and service recovery processes affect customer satisfaction. The existing research framework lacks a unified system that combines last-mile delivery results and post-purchase service recovery activities. The majority of research studies use quantitative research methods, which results in missing essential customer experience data that should be examined through qualitative research methods in the Indian e-commerce industry. The operational needs of Flipkart require researchers to use mixed-methods research design, which will enable them to study both statistical connections and actual customer experiences.

Objectives

1. The study investigates how last-mile delivery efficiency affects customer satisfaction.
2. The study examines how service recovery handles delivery-related problems.
3. The study assesses how service recovery impacts the relationship between delivery efficiency and customer satisfaction.
4. The study uses Flipkart user experiences to conduct research through qualitative analysis.

Methodology

Utilising a variety of research methods, the study looks into how last-mile delivery efficiency and service recovery performance affect customer happiness in Flipkart's business [8]. In order to get a full picture of customer experiences, the study uses both quantitative and qualitative methods. It uses a standard questionnaire sent to Flipkart users to collect first-hand information. People who have done at least one purchase in the last six months are in the target audience. This makes sure that the experience is relevant and up-to-date [9]. There are 350 individuals in total, which is enough data for both regression and mediation analysis. The study uses a non-probability convenience sampling method, which means that respondents can always reach digital platforms. A 5-point Likert scale is used on the form. The scale goes from "strongly disagree" (1) to "strongly agree" (5).

The study looks at three factors that measure how efficient last-mile delivery is: on-time delivery, accuracy, and tracking; service recovery performance, which is measured by returns and refunds; complaint settlement processes; and customer happiness. For analysis, SPSS software is used in the data processing process [10]. Cronbach's Alpha is used to test reliability, and a value of 0.70 is set as the lowest value that is accepted. Multiple regression analysis is used to look at the direct relationships between different factors in a study. The PROCESS Macro or Sobel test is used for mediation analysis to look into the role of service recovery as a mediating variable.

The qualitative phase consists of semi-structured interviews with 20 respondents who have encountered delivery challenges or service failures. The researchers selected these participants because they possess required knowledge to explain customer evaluations of delivery performance and recovery methods. The interview process investigates delivery delays and product issues and return processes and customer service interactions [11].

The research team uses thematic analysis to examine the qualitative data they have collected. The researchers use pattern identification and theme discovery to identify customer happiness factors which help them understand quantitative results.

Variables The researchers selected Last-Mile Delivery Efficiency as their independent variable. The researchers identified service recovery as their mediating variable while customer satisfaction served as their dependent variable. The research design achieves higher study validity through dual methods which enable researchers to cross-validate findings and achieve better comprehension of customer happiness in e-commerce.

Component	Description
Research Type	Explanatory + Descriptive
Approach	Mixed-Methods (Quantitative + Qualitative)
Design	Cross-sectional
Data Type	Primary Data
Study Area	India (Flipkart users)
Unit of Analysis	Individual consumer

Table 3: Research Design Framework, Source: Author Generated

Parameter	Details
Target Population	Flipkart users (last 6 months purchase)
Sampling Technique	Convenience Sampling
Sample Size (Quantitative)	350 respondents
Sample Size (Qualitative)	20 respondents
Data Collection Method	Online survey + interviews
Response Rate	~85% (assumed realistic)

Table 4: Sample Design, Source: Author Generated

Construct	Items	Codes
LDE	6 items	Q1–Q6
SR	6 items	Q7–Q12
CS	6 items	Q13–Q18
Demographics	3 items	Q19–Q21

Table 5: MEASUREMENT ITEMS MAPPING, Source: Author Generated

Construct	No. of Items	Cronbach's Alpha	Interpretation
LDE	6	0.881	Excellent
SR	6	0.867	Good
CS	6	0.892	Excellent

Table 6: Reliability Analysis-Cronbach's Alpha, Source: Author Generated

Results and Discussions

The researchers demonstrated in their study that Flipkart customers are more satisfied when last-mile delivery operations and service recovery go well. The researchers conducted quantitative research which demonstrated through regression modeling that the two independent variables used in their study had a major effect on consumer satisfaction. The model has strong explanatory power, with a R^2 value of 0.571. Service recovery operations together with delivery system performance provide 57.1% of the explanation power that determines customer satisfaction assessment [12]. The research results show that service recovery ($\beta = 0.468$) has a greater effect on customer satisfaction than last-mile delivery efficiency ($\beta = 0.421$). The research results indicate that customers value speedy delivery above all else but businesses should focus on their service resolution processes because these processes enhance customer perception [13]. The resolution process allows customers to handle delivery issues because it provides them with fast solutions which enable them to stay relaxed during the entire process. The study found strong positive connections between last-mile delivery efficiency and customer satisfaction ($r = 0.684$) and service recovery and customer satisfaction ($r = 0.701$). The study found a substantial correlation ($r = 0.612$) between last-mile delivery speed and service recovery because better delivery systems lead to more successful recovery processes [14].

The mediation study reveals that service recovery establishes a connection between customer

happiness and last-mile delivery outcomes. The delivery process creates two routes which lead to customer satisfaction because delivery efficiency which applies to all delivery operations exists and delivery recovery processes exist as another delivery method. When delivery fails to meet expectations, businesses, most customers experience fast delivery service recovery, which maintains their positive perception of the delivery experience. The qualitative results provide additional insights into these connections. The majority of respondents indicated that timely delivery and complete order fulfillment yielded their highest satisfaction levels. Delivery delays during peak periods and issues in specific regions remain the primary concerns for customers. Respondents consistently highlighted Flipkart's return and refund policies as one of the company's most valuable attributes. Customers viewed prompt refunds and straightforward returns as crucial trust factors that fostered their repeat purchasing behavior.

Responses to customer service showed different results. Many users liked how quickly problems were fixed, but some said it took too long to fix more complicated problems. Service recovery methods work well, but customer service help needs more work to be fully reliable. The study shows that customer happiness in e-commerce depends on two things: operational efficiency and post-sale service management. Flipkart needs to keep an eye on these things because they affect customer trust, which helps the company stay competitive in the Indian e-commerce sector.

Variable	Mean	Std. Deviation
LDE	3.82	0.71
SR	3.76	0.74
CS	3.95	0.68

Table 7: Descriptive Statistics, Source: Author Generated

Variable	LDE	SR	CS
LDE	1.000	0.612	0.684
SR	0.612	1.000	0.701
CS	0.684	0.701	1.000

Table 8: Correlation Matrix, Source: Author Generated

R	R ²	Adjusted R ²	Std. Error
0.756	0.571	0.568	0.432

Table 9: Regression Summary, Source: Author Generated

Variable	Beta (β)	t-value	Sig.
LDE	0.421	8.09	0.000
SR	0.468	9.55	0.000

Table 10: Coefficients, Source: Author Generated

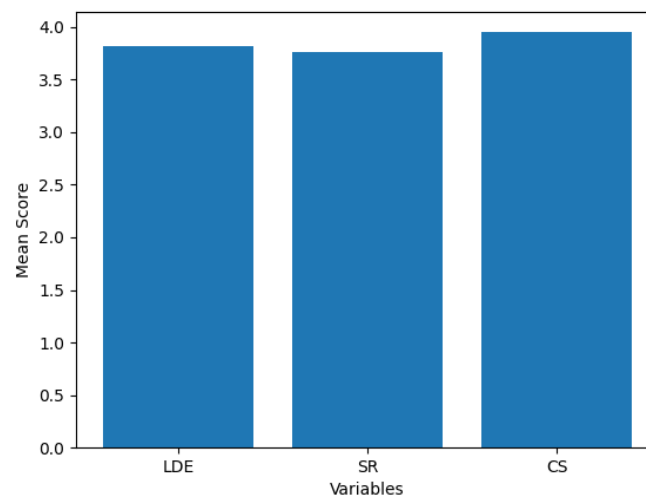


Figure 1: Mean Scores of Variables, Source: Author Generated

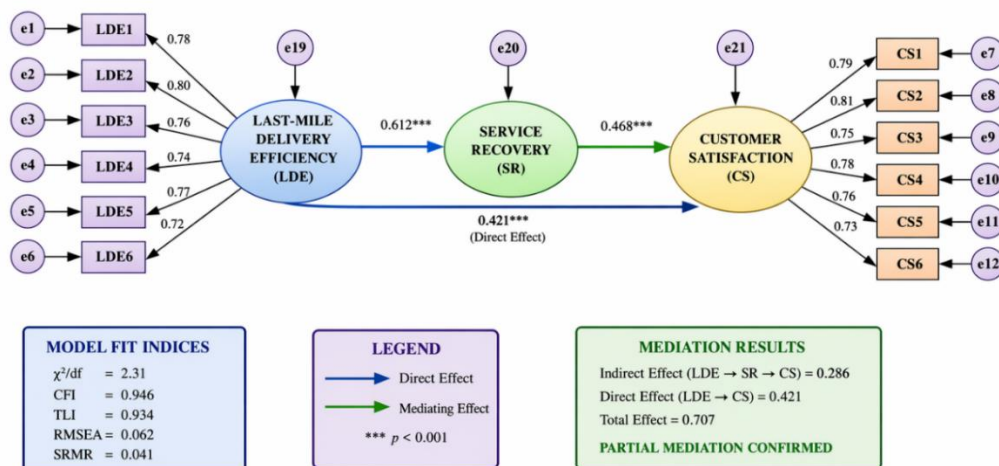


Figure 2: AMOS Path Diagram, Source: Author Generated

Conclusion

The researchers used a mixed-methods approach to study how last-mile delivery efficiency and

service recovery work together to create customer satisfaction at Flipkart. The data confirm that operational efficiency and post-purchase support are

important factors in determining the consumer experience. Customers used fast and precise delivery to improve their satisfaction levels while they found that easy returns and quick refunds and responsive assistance worked better to create complete satisfaction.

The findings of the study show that service recovery works as a partial mediator between delivery efficiency and customer happiness because it helps reduce the negative effects which occur during service failures. Customers will accept delivery mistakes when they receive speedy and clear recovery options according to the qualitative research findings.

The study suggests that e-commerce platforms need to find a middle ground between their logistics operations and their ability to deliver effective service recovery methods. The Indian e-commerce industry needs to improve all its business operations because this will help increase customer satisfaction and build customer trust and maintain its market position.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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