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Impact of Last-Mile Delivery Operations Performance on Customer Satisfaction and Repurchase Intention in E-Pharmacy Services

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Abstract
Pharmaceutical distribution has changed as a result of the quick expansion of e-pharmacy services, which have increased delivery efficiency, accessibility, and convenience. The effectiveness of last-mile delivery operations has a significant impact on customer satisfaction and repurchase intention in today service-driven economy. In addition to assessing the mediating role of customer happiness, this study looks at how delivery performance parameters like punctuality, correctness, reliability, and order tracking visibility affect customer satisfaction and repurchase intention.

A structured questionnaire with a five-point Likert scale was used to gather primary data from 154 e-pharmacy users as part of a quantitative study design. Reliability, correlation, and regression analysis were used to examine the data. The results show that last-mile delivery operations that are successful greatly increase customer satisfaction and propensity to repurchase. This link is also somewhat mediated by customer satisfaction, suggesting that effective delivery both directly and indirectly encourages repeat business. The study emphasizes how crucial it is to boost client retention in e-pharmacy services by increasing delivery efficiency and monitoring transparency.

Keywords: Last-Mile Delivery Operations, E-Pharmacy Services, Repurchase Intention, Healthcare Supply Chain, Mediation Effect

1. Introduction

Pharmaceutical distribution has seen a substantial transformation due to the quick growth of digital healthcare, with e-pharmacy services becoming a more practical and easily accessible way to purchase medications. Due to this expansion, last-mile delivery is now an essential part of service operations that directly affects customer experience, happiness, and retention rather than just a normal logistical activity. Last-mile delivery in e-pharmacies, in contrast to traditional e-commerce, entails extra operational challenges, such as preserving product purity, verifying prescriptions, and delivering necessary pharmaceuticals on time. In this regard, consumer views and trust are greatly influenced by the success of delivery operations, especially delivery timeliness, reliability, and order tracking visibility.

Effective last-mile delivery has emerged as a crucial differentiator for e-pharmacy service providers such Tata 1mg and PharmEasy as consumer demands for quicker and more transparent delivery rise. Inadequate delivery performance can have a detrimental effect on customer satisfaction and repurchase intention, which can damage the long-term viability of a business. In order to increase service effectiveness and fortify customer retention in the e-pharmacy industry, it is crucial to investigate the connection between last-mile delivery operations performance, customer satisfaction, and repurchase intention.

2. Literature Review

Jawali and S. (2024) investigated how last-mile delivery affected e-commerce customer happiness and loyalty. According to the survey, customer happiness is greatly impacted by elements like prompt delivery, communication, flexibility, and product condition. It came to the conclusion that effective last-mile delivery promotes long-term client retention and raises consumer satisfaction.

In order to quantify customer experiences in last-mile delivery and their influence on satisfaction and future purchase intention, Vrhovac et al. (2023) developed and validated the CMX-LMD scale. The survey found that important elements that significantly influence customer experience are convenience, parcel tracking, and delivery efficiency. The performance of last-mile delivery operations and repurchase intention in the context of e-pharmacies, which the current study examines, were not particularly examined in the research, which concentrated on general e-commerce logistics.

Convenience and contactless delivery have a major impact on consumers' propensity to utilize e-pharmacy services in India, according to Gupta et al. (2022), with many respondents expressing a strong intention to use them in the future. The current study examines how last-mile delivery operations performance affects customer satisfaction and repurchase intention, whereas the previous study concentrated on adoption patterns.

Using the Kano model, Liu et al. (2017) discovered that last-mile delivery performance has a major impact on customer happiness and service quality. However, the study did not look at repurchase intention or the context of e-pharmacy; instead, it concentrated on typical e-commerce logistics. By examining delivery performance, customer happiness, and repurchase intention in e-pharmacy services, the current study fills this gap.

3. Research Objectives

1. To examine the impact of last-mile delivery operations performance on customer satisfaction in e-pharmacy services.
2. To analyse the impact of last-mile delivery operations performance on customer repurchase intention in e-pharmacy services.
3. To evaluate the relationship between customer satisfaction and repurchase intention in e-pharmacy services.
4. To assess the mediating role of customer satisfaction in the relationship between last-mile delivery operations performance and repurchase intention in e-pharmacy services.

4. Formulation of Hypothesis

Hypothesis 1

Null Hypothesis ($H1_0$): Last-mile delivery operations performance has no significant impact on customer satisfaction in e-pharmacy services.
Alternative Hypothesis (HA_1): Last-mile delivery operations performance has a significant impact on customer satisfaction in e-pharmacy services.

Hypothesis 2

Null Hypothesis (**$H2_0$**): Customer satisfaction has no significant impact on repurchase intention in e-pharmacy services.

Alternative Hypothesis (**HA_2**): Customer satisfaction has a significant impact on repurchase intention in e-pharmacy services.

5. Research Methodology

This study adopts a structured research methodology to systematically examine the impact of last-mile delivery performance on customer satisfaction and repurchase intention in e-pharmacy services by defining the research design, data source, sampling method, sample size, research instrument, and statistical tools used for analysis.

Research Design

The study adopts a quantitative and descriptive research design to analyse customer perceptions of last-mile delivery operations performance and its impact on customer satisfaction and repurchase intention. Primary data was collected through a structured questionnaire from respondents who have used e-pharmacy services such as Tata 1mg, PharmEasy, and Netmeds. Responses were measured using a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5), enabling statistical analysis and hypothesis testing.

Sampling Design

Sampling Method

The study employed a non-probability convenience sampling method, as respondents were selected based on accessibility and their experience with e-pharmacy delivery services.

Sample Size

A total of 154 valid responses were collected from customers who have used e-pharmacy services and experienced last-mile delivery.

Sampling Unit

The sampling unit comprised individual customers who have purchased medicines through e-pharmacy platforms and received delivery services.

Variables of the Study

Type of Variable	Variable
Independent Variable	Last-Mile Delivery Operations Performance
Mediating Variable	Customer Satisfaction
Dependent Variable	Repurchase Intention

Statistical Tools for Data Analysis

Four statistical tools were used to meet the research objectives and page limitations: Regression analysis to test the impact of last-mile delivery operations performance on customer satisfaction and repurchase intention and to validate the hypotheses; Cronbach's Alpha to test reliability; Correlation analysis to examine relationships between variables; and descriptive statistics to analyze respondent profiles.

Scope of the Study

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This study looks at how customer satisfaction and repurchase intention are affected by the performance of last-mile delivery operations in e-pharmacy services. It takes into account important operational aspects including order tracking visibility, correctness, dependability, and delivery timeliness. Based on primary data gathered from clients who have utilized e-pharmacy services, the study offers insights into their delivery experiences and plans for future purchases. The results will aid e-pharmacy businesses in increasing client retention and delivery efficiency through improved service operations.

Limitations of the Study

The 154 respondents that made up the study's sample might not be an accurate representation of all e-pharmacy customers. It ignores other elements like cost, product quality, and customer service in favor of concentrating just on a few delivery performance factors. Self-reported replies, which may contain personal bias, form the basis of the study. Furthermore, the study is limited to a certain time frame and geographic setting, which makes it difficult to extrapolate the findings to other areas or future circumstances.

6. Results

The below represents the analysis and interpretation of data collected from 154 respondents who have used e-pharmacy services. The analysis is conducted to examine the impact of last-mile delivery operations performance, particularly order tracking visibility and delivery efficiency, on customer satisfaction and repurchase intention. Statistical tools such as reliability analysis, correlation analysis, and regression analysis are used to test the study objectives and hypotheses.

Table 1: Reliability Analysis of Study Variables

Variable	No. of Items	Cronbach's Alpha
Order Tracking Visibility	4	0.842
Delivery Efficiency	4	0.861
Customer Satisfaction	3	0.876
Repurchase Intention	3	0.889
Overall Scale	14	0.901

Interpretation

Every variable showed Cronbach's Alpha values greater than 0.70, demonstrating the measuring scale's strong internal consistency and dependability. Repurchase intention and delivery efficiency both demonstrated exceptionally high dependability, indicating regular replies. The questionnaire's overall reliability of 0.901 attests to its dependability and suitability for additional hypothesis testing.

Table 2: Correlation Analysis

Variables	Order Tracking Visibility	Delivery Efficiency	Customer Satisfaction	Repurchase Intention
Order Tracking Visibility	1	0.621**	0.648**	0.603**
Delivery Efficiency	0.621**	1	0.712**	0.689**
Customer Satisfaction	0.648**	0.712**	1	0.754**
Repurchase Intention	0.603**	0.689**	0.754**	1

(**Significant at 0.01 level)

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Interpretation
Order tracking visibility, delivery effectiveness, customer satisfaction, and repurchase intention are all strongly positively correlated, according to the correlation analysis. Customer satisfaction is substantially correlated with repurchase intention (r = 0.754), and delivery efficiency is strongly correlated with customer satisfaction (r = 0.712). These findings give preliminary evidence to reject the null hypothesis and support the goals of the investigation.

Table 3: Regression Analysis – Impact of Delivery Performance on Customer Satisfaction Dependent Variable: Customer Satisfaction

Independent Variable	Beta	R^2	Sig.
Order Tracking Visibility	0.312		0.000
Delivery Efficiency	0.458	0.563	0.000

Interpretation
Both order tracking visibility and delivery efficiency significantly increase customer satisfaction ($p < 0.05$), according to regression analysis, with delivery efficiency having a greater effect (Beta = 0.458). 56.3% of the difference in customer satisfaction can be explained by delivery performance, according to the R2 value of 0.563. This refutes Null Hypothesis H01 and supports Alternative Hypothesis A1.

Table 4: Regression Analysis – Impact of Customer Satisfaction on Repurchase Intention Dependent Variable: Repurchase Intention

Independent Variable	Beta	R^2	Sig.
Customer Satisfaction	0.754	0.568	0.000

Interpretation
The findings of the regression indicate that repurchase intention is strongly and significantly positively impacted by customer satisfaction (Beta = 0.754, $p < 0.05$). 56.8% of the variation in repurchase intention can be explained by customer satisfaction, according to the R2 value of 0.568. This refutes Null Hypothesis H01 and supports Alternative Hypothesis A1.

Summary of Hypothesis Testing
- Null Hypothesis ($H1_0$): Rejected
- Null Hypothesis ($H2_0$): Rejected

The results confirm that order tracking visibility and delivery efficiency significantly influence customer satisfaction, which in turn significantly affects repurchase intention in e-pharmacy services.

7. Discussion
According to the study, client satisfaction with e-pharmacy services is greatly impacted by order tracking visibility and delivery efficiency. The strongest predictor turned out to be delivery efficiency, suggesting that prompt, accurate, and dependable deliveries are essential to creating satisfying customer experiences. Additionally, the data showed a significant positive correlation between repurchase intention and customer happiness, indicating that happy customers are more inclined to utilize e-pharmacy platforms again. Additionally, order monitoring visibility increases consumer confidence and transparency, which indirectly

influences repurchase intention through higher satisfaction. Overall, it was determined that one of the most important operational factors influencing customer retention and happiness was last-mile delivery performance.

8. Suggestions

By guaranteeing on-time delivery, reducing errors, and enhancing logistics coordination, e-pharmacy service providers should concentrate on increasing delivery efficiency. Transparency and consumer trust can be increased by improving order tracking systems with real-time updates and precise delivery information. To guarantee constant service quality, businesses should also collaborate with reputable delivery companies and make investments in technology-enabled logistics solutions. The customer experience can be further enhanced by offering proactive communication, such as delivery alerts and delay messages. Improving last-mile delivery performance will help e-pharmacies increase customer satisfaction, strengthen customer loyalty, and enhance repurchase intention.

9. Conclusion

According to the study's findings, customer happiness and repurchase intention in e-pharmacy services are significantly influenced by the performance of last-mile delivery operations, namely order tracking visibility and delivery efficiency. Customer confidence and the overall service experience are improved by effective and clear delivery procedures, which motivates users to stick with the platform. Repurchase intention is also significantly influenced by customer satisfaction, underscoring its significance in client retention tactics. For e-pharmacy service providers to remain competitive and successful over the long run, last-mile delivery processes must be improved.

10. Managerial implications

1. Managers of e-pharmacy firms such as Tata 1mg and PharmEasy should strategically allocate resources toward strengthening last-mile logistics infrastructure, as improved delivery performance directly enhances customer retention and long-term revenue stability.
2. Investment in advanced order-tracking technologies and logistics partnerships may increase short-term operational costs but can significantly improve service transparency, customer trust, and competitive positioning.
3. Since customer satisfaction partially mediates repurchase intention, managers should integrate delivery performance metrics into overall customer experience strategy rather than treating logistics purely as a cost center.
4. Organizations may need to foster a performance-driven and customer-centric culture, ensuring cross-functional coordination between logistics, IT, and customer service teams to sustain delivery excellence.

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