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ANALYZING THE EFFECT OF REAL-TIME TRACKING SYSTEMS ON OPERATIONAL PERFORMANCE IN COURIER SERVICES

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ABSTRACT

The rapid growth of e-commerce and digital logistics has increased the demand for fast, reliable, and transparent courier services. Real-time delivery tracking systems have become an essential technological innovation in improving operational performance within logistics organizations. Technologies such as GPS, barcode scanning, Internet of Things (IoT), RFID, and digital logistics platforms enable continuous shipment monitoring and provide accurate delivery updates to customers and operational staff. The present study examines the impact of real-time delivery tracking systems on operational performance at DTDC Courier Services. The study focuses on how tracking systems influence delivery efficiency, delivery reliability, customer satisfaction, operational coordination, and shipment transparency. Primary data was collected from 103 employees of DTDC Courier Services through a structured questionnaire using simple random sampling. Secondary data was collected from journals, company reports, websites, and previous research studies. Statistical tools such as percentage analysis, mean, standard deviation, correlation, regression, chi-square, and ANOVA were used for analysis through MS Excel and SPSS. The findings indicate that respondents strongly agree that real-time tracking systems improve service efficiency, customer satisfaction, delivery accuracy, and operational transparency. Customers also expect more frequent tracking updates and improved user-friendliness in tracking systems. The study concludes that real-time delivery tracking systems significantly contribute to improving operational performance and customer confidence in DTDC Courier Services.

KEYWORDS:

Real-Time Tracking, Operational Performance, DTDC, Logistics Management, Customer Satisfaction, Courier Services, Delivery Efficiency.

I. INTRODUCTION

The courier and logistics industry plays an important role in supporting e-commerce, retail trade, manufacturing, and global supply chain activities. Customers increasingly expect faster, safer, and more transparent delivery services. In response to these expectations, logistics companies have adopted advanced technologies such as GPS tracking, barcode scanning, RFID, IoT, and cloud-based logistics systems to improve operational performance and customer experience.

Real-time delivery tracking systems allow logistics companies to monitor shipment movement continuously and provide accurate updates regarding delivery status. These systems help reduce uncertainty, improve operational coordination, minimize delays, and strengthen communication between warehouses, delivery personnel, and customers. Real-time tracking also enables companies to identify operational issues quickly and take corrective actions.

DTDC Courier Services is one of India's leading logistics and courier service providers with an extensive domestic and international delivery network. The company handles a large volume of shipments daily and uses digital tracking systems to improve delivery performance and customer service quality. Despite

technological advancements, customers still expect faster updates, improved tracking accuracy, and better system usability.

This study focuses on examining the impact of real-time delivery tracking systems on operational performance at DTDC Courier Services. The research analyzes how tracking systems improve service efficiency, customer satisfaction, delivery reliability, transparency, and operational coordination.

II. REVIEW OF LITERATURE

Juanita Zainudin et al. (2021) developed a parcel tracking system using barcode scanners and verified notifications. The study found that automated tracking systems significantly improve parcel security, reduce human errors, and enhance tracking efficiency.

Zhiwen Fang (2025) proposed a cloud-native logistics platform integrating real-time tracking and automated customs clearance. The study concluded that real-time visibility and automation improve operational efficiency and reduce logistics delays.

Longfei Qin and Keyong Wan (2024) designed an IoT-based logistics tracking system integrating RFID and sensors for distribution monitoring. Their findings revealed that IoT technologies improve logistics transparency, operational control, and delivery monitoring.

Nia Novitasari and Nashirudin Anwar (2022) examined RFID-enabled courier delivery systems and found that RFID implementation improves logistics service quality, tracking reliability, and operational accuracy.

Maureen Atieno (2023) analyzed the influence of tracking technology on courier service quality in Kenya. The study concluded that real-time tracking improves operational efficiency, customer trust, and delivery performance.

Mohammed Balfaqih et al. (2023) studied blockchain-enabled IoT logistics systems for shipment tracking. The research emphasized that blockchain technology improves tracking transparency, shipment security, and operational trust.

III. RESEARCH OBJECTIVE

- To examine the impact of real-time delivery tracking systems on operational performance at DTDC Courier Services.
- To evaluate how real-time tracking systems influence delivery reliability and service efficiency.
- To analyze customer satisfaction regarding tracking accuracy and timeliness.
- To examine whether real-time tracking reduces customer uncertainty.
- To identify customer suggestions for improving DTDC's tracking system.

IV. SCOPE OF THE RESEARCH

1. The study focuses on analyzing the impact of real-time delivery tracking systems on operational performance at DTDC Courier Services.
2. The research examines the influence of tracking systems on delivery efficiency, delivery reliability, customer satisfaction, operational transparency, and customer confidence.
3. The study covers employees working in operational departments such as delivery operations, warehouse management, customer service, and administration.

V. RESEARCH METHODOLOGY:

Research Design

The study adopted descriptive and analytical research designs.

- Descriptive research was used to understand employee perceptions regarding tracking systems.
- Analytical research was used to analyze the relationship between tracking systems and operational performance.

Sampling Technique

Simple random sampling was used for selecting respondents.

Sample Size

A total of 103 employees working in DTDC Courier Services participated in the study.

Sources of Data

Primary Data: Primary data was collected through a structured questionnaire distributed among DTDC employees.

Demographic Profile	Description	Frequency	Percent
AGE	Below 20 years	3	2.9
	21-30 years	50	48.5
	31-40 years	30	29.1
	41-50 years	18	17.5
	Above 50 years	2	1.9
	Total	103	100.0

Secondary Data: Secondary data was collected from journals, books, websites, company reports, and previous research studies.

Tools Used for Analysis

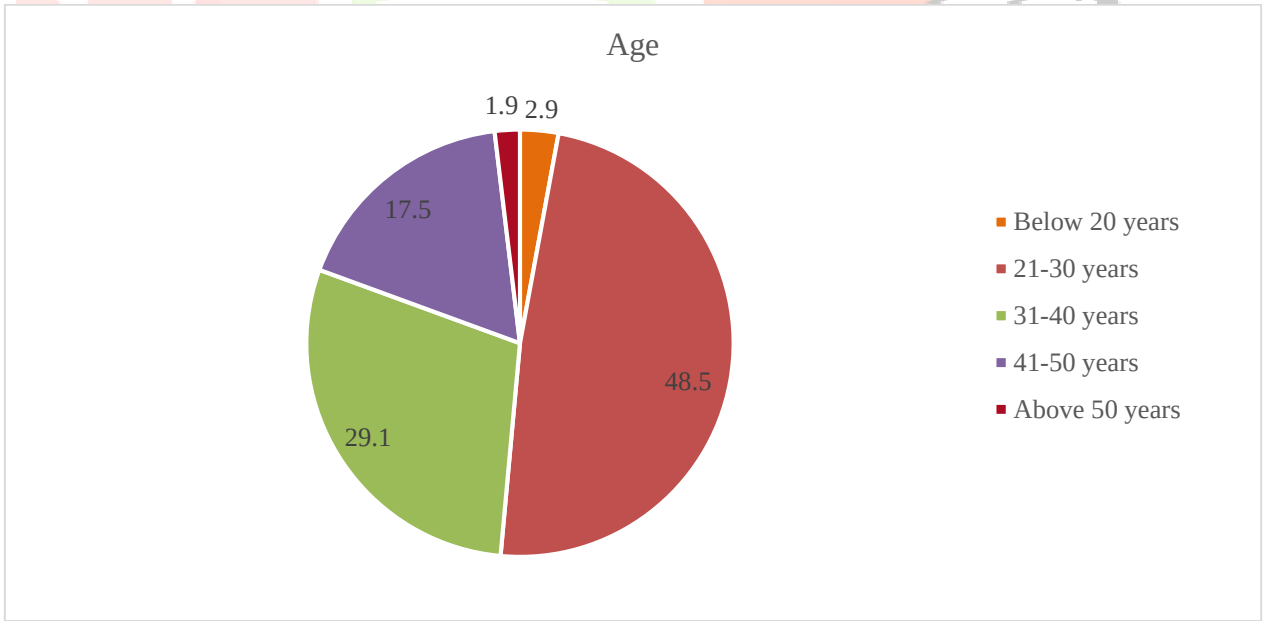
- Percentage Analysis
- Mean and Standard Deviation
- Correlation Analysis
- Regression Analysis
- Chi-Square Test
- ANOVA

MS Excel and SPSS software were used for statistical analysis.

VI. DATA ANALYSIS AND INTERPRETATION:

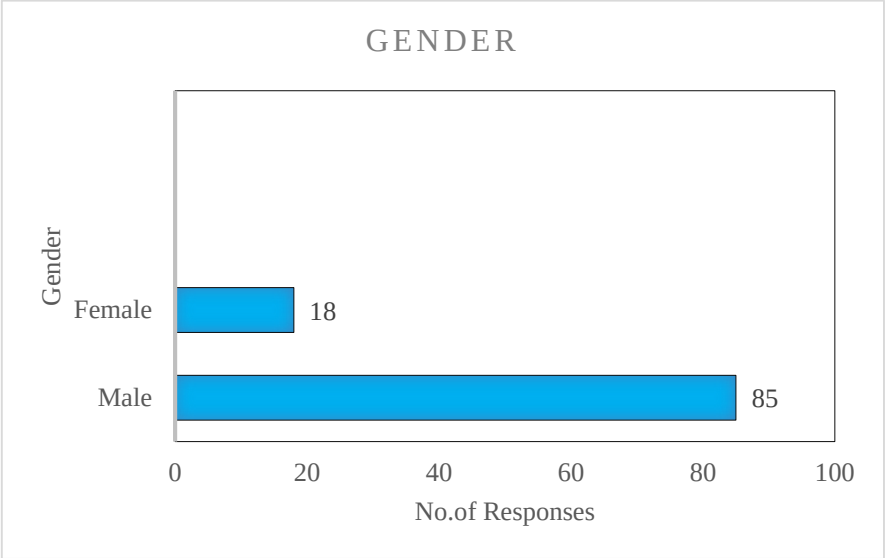
➢ PERCENTAGE ANALYSIS

Age of respondents



The majority of respondents (48.5%) belong to the 21–30 years age group, indicating a young and active workforce.

Gender of respondents

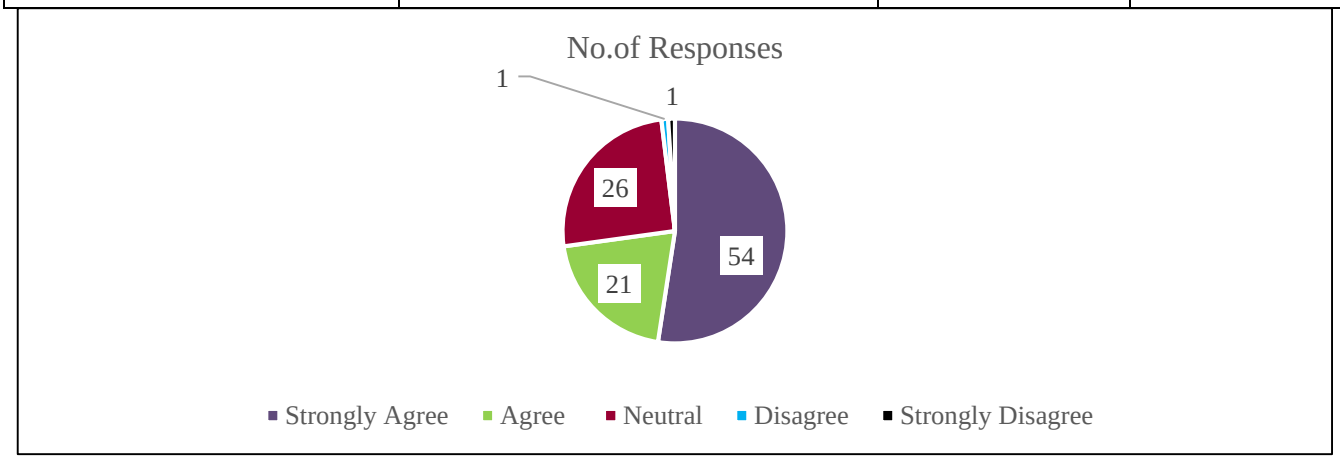


The majority of respondents were male (82.5%), indicating a male-dominated workforce in the logistics sector.

Reduction In Customer Uncertainty

[Real-time tracking reduces customer uncertainty about delivery status]				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
1	1	1.0	1.0	1.0
2	1	1.0	1.0	1.9
3	26	25.2	25.2	27.2
4	21	20.4	20.4	47.6
5	54	52.4	52.4	100.0
Total	103	100.0	100.0	

Demographic Profile	**Description**	**Frequency**	**Percent**
GENDER	Male	85	82.5
	Female	18	17.5
	Total	103	100.0



The percentage analysis shows that real-time tracking helps reduce customer uncertainty by improving transparency and confidence in delivery services.

- **CHI SQUARE**

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.359[a]	3	.949
Likelihood Ratio	.523	3	.914
Linear-by-Linear Association	.000	1	.983
N of Valid Cases	103		
a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .17.			

H0: There is no significant association between gender and perception of service efficiency.

H1: There is a significant association between gender and perception of service efficiency.

Interpetation: The significance value (p = 0.949) is greater than 0.05, indicating that there is no statistically significant association between the variables.

Since the p-value is greater than 0.05, the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected. Therefore, it is concluded that gender does not influence the perception of service efficiency.

- **ANOVA**

ANOVA					
[Real-time tracking improves delivery reliability at DTDC]					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.715	4	.429	.635	.639
Within Groups	66.149	98	.675		
Total	67.864	102			

H0: There is no significant difference between groups in perception of delivery reliability.

H1: There is a significant difference between groups in perception of delivery reliability.

Interpretation:

ANOVA was conducted to examine whether there is a significant difference between groups (such as age or experience) in their perception of delivery reliability due to real-time tracking. The significance value ($p = 0.639$) is greater than 0.05, indicating that there is no statistically significant difference between the groups.

VII. FINDINGS

- The majority of respondents belong to the age group of 21–30 years.
- Male employees dominate the workforce in logistics operations.
- Most respondents are undergraduates and diploma holders.
- Warehouse staff and delivery executives form the majority of respondents.
- Delivery operations and warehouse departments are highly influenced by tracking systems.
- Respondents strongly agree that real-time tracking improves service efficiency and customer satisfaction.
- Customers expect more frequent tracking updates.
- Respondents believe that the user-friendliness of DTDC's tracking system should be improved.
- Real-time tracking enhances transparency and customer confidence.
- Mean analysis indicates strong positive opinions regarding tracking systems

VIII. SUGGESTIONS

- DTDC should improve the speed and frequency of tracking updates.
- The tracking interface should be simplified and made more user-friendly.
- Advanced technologies such as AI, IoT, GPS, and RFID should be integrated for better operational monitoring.
- Employees should receive regular technical training regarding tracking technologies.
- Communication between warehouses, delivery staff, and customer service departments should be strengthened.
- Automated notification systems should be implemented for delivery alerts.
- DTDC should improve last-mile delivery operations to minimize delays.
- Customer feedback should be regularly collected for continuous improvement.
- Data security and privacy measures should be strengthened.
- Operational performance indicators should be continuously monitored.

IX. CONCLUSION

The study examined the impact of real-time delivery tracking systems on operational performance at DTDC Courier Services. The findings reveal that real-time tracking systems positively influence service efficiency, delivery reliability, customer satisfaction, transparency, and operational coordination.

The study also highlights that customers expect more accurate and frequent tracking updates along with improved user-friendliness of digital tracking systems. Technologies such as GPS, barcode scanning, IoT, RFID, and digital logistics platforms play an important role in improving delivery operations and customer confidence.

Overall, the study concludes that real-time delivery tracking systems significantly contribute to operational performance improvement at DTDC Courier Services. Continuous technological advancements and improved tracking mechanisms can further strengthen logistics efficiency and customer satisfaction in the courier industry.

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