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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# A Study on Challenges in Logistics Operations and Their Impact on Operational Efficiency at Nallangaru Transport Company

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**ABSTRACT:** Purpose: This study identifies major operational challenges in logistics and analyzes their impact on service delivery efficiency at Nallangaru Transport Company, Chennai.

**Methodology:** A descriptive and analytical research design was adopted. Primary data were collected from 144 employees using a structured questionnaire. Percentage analysis, mean score analysis, and chi-square tests were used for data interpretation.

**Findings:** Coordination gaps (23.6%) and external factors (22.2%) are the primary causes of delays. Over 57% of respondents face delays often or always. Manual documentation affects 50% of processes and 73.6% agree it causes errors. Chi-square analysis confirms a significant relationship between delays and service timelines ( $\chi^2 = 76.207$ ,  $p < 0.001$ ).

**Practical Implications:** Management should digitize documentation, improve coordination mechanisms, and adopt real-time tracking systems.

**KEYWORDS:** Logistics challenges, operational efficiency, coordination gaps, manual documentation, chi-square analysis.

## I. INTRODUCTION

Logistics plays a vital role in modern business by ensuring efficient movement of goods from origin to consumption. It includes transportation, warehousing, inventory management, documentation, and inter-departmental coordination. Effective logistics operations help organizations deliver products on time, reduce costs, and improve efficiency.

In today's competitive environment, logistics has become a key factor influencing customer satisfaction and organizational success. Companies rely on efficient logistics systems to maintain service quality and build strong customer relationships. However, logistics operations often face challenges including transportation delays, poor coordination, manpower shortages, and dependence on manual processes. These challenges lead to increased errors, longer processing times, and reduced service reliability.

This study focuses on understanding key logistics challenges and their impact on service delivery at Nallangaru Transport Company, a Chennai-based road transport provider established in 2008, serving over 850 active clients across Tamil Nadu.



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### II. OBJECTIVES OF THE STUDY

#### Primary Objective:

To identify major challenges in logistics operations and analyze their impact on operational efficiency at Nallangaru Transport Company.

#### Secondary Objectives:

- To identify operational challenges related to delays, coordination, manpower, and technology
- To examine how these challenges influence service delivery timeliness and reliability
- To understand employee perceptions regarding logistics efficiency
- To suggest practical measures for improving logistics operations

### III. REVIEW OF LITERATURE

**Ivanov (2020)** found that supply chain disruptions including delays and poor coordination significantly impact logistics performance. **Queiroz et al. (2020)** identified that lack of coordination, limited digital integration, and manual processes reduce logistics efficiency. **Chowdhury et al. (2021)** reported that transportation delays, manpower shortages, and inadequate planning are major challenges affecting service reliability.

**Sharma et al. (2021)** identified communication gaps and manual documentation as major causes of delays. **Gupta and Verma (2021)** found that manual documentation increases errors and processing time. **Bag et al. (2022)** demonstrated that insufficient digital adoption leads to reduced efficiency. **Kaur and Singh (2022)** concluded that poor inter-departmental communication leads to operational delays.

**Patel and Mehta (2024)** and **Sharma and Gupta (2026)** confirmed that delays, manpower constraints, and lack of real-time data remain top barriers to service excellence in emerging market logistics.

### IV. RESEARCH METHODOLOGY

#### Research Design:

A combination of descriptive and analytical research design was adopted.

#### Sampling Technique:

Convenience sampling was used. A total of 144 employees from various departments participated in the study.

#### Data Source:

Primary data were collected using a structured questionnaire containing 24 closed-ended items on 5-point Likert and frequency scales.

#### Tools Used:

- Percentage Analysis: To calculate response distributions
- Mean Score Analysis: To determine average agreement levels
- Chi-Square Test: To examine relationships between delays and service timelines

#### Hypothesis Tested:

**H0:** No significant relationship between logistics delays and service delivery timelines.

**H1:** Significant relationship exists between logistics delays and service delivery timelines.

Significance level:  $\alpha = 0.05$



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### V. DATA ANALYSIS AND FINDINGS

#### 5.1 Percentage Analysis

**Table 1:** Key Percentage Analysis Results

Statement	Percentage
Procedures clearly defined (Agree/Strongly Agree)	69.5%
Delays faced often or always	57.6%
Coordination as major delay cause	23.6%
External factors as delay cause	22.2%
Coordination effective (Agree/Strongly Agree)	49.4%
Communication gaps frequently or very frequently	47.9%
Manpower sufficient (Agree/Strongly Agree)	48.7%
Challenges increase during peak periods	75.0%
Manual documentation process	50.0%
Manual processes cause errors	73.6%
Technology used effectively	59.0%
Operational challenges affect service timelines	60.4%
Delivery delays due to operational issues	68.8%
Customer complaints increase due to delays	70.2%
Challenges negatively affect customer satisfaction	77.1%
Management takes corrective actions	58.3%
Employees receive adequate training	61.1%
Management support reduces challenges	66.6%
Clear instructions improve efficiency	72.2%
Process improvement reduces delays	81.3%
Better technology improves operations	84.8%
Improved coordination enhances delivery	79.9%
Overall improvement increases satisfaction	77.8%

#### Interpretation:

Coordination gaps and external factors dominate as delay causes. Manual documentation remains prevalent, and an overwhelming majority supports technological and process improvements.

#### 5.2 Mean Score Analysis

Mean scores were calculated on a 5-point scale where lower scores indicate stronger agreement.

**Table 2:** Mean Score Analysis Results

Statement	Mean Score
Logistics procedures clearly defined	2.22
Coordination between departments effective	2.61
Manpower sufficient for daily workload	2.72
Operational challenges increase during peak periods	2.03
Manual processes lead to errors	2.10
Technology effectively used	2.44
Delivery delays due to operational issues	2.13
Customer complaints increase due to delays	2.19
Operational challenges affect customer satisfaction	2.04
Employees receive adequate training	2.35



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Management support reduces challenges	2.25
Clear instructions improve efficiency	2.07
Process improvement reduces delays	1.81
Better technology improves operations	1.77
Improved coordination enhances delivery	1.90
Overall improvement increases satisfaction	1.83

### Interpretation:

The lowest mean scores (1.77-1.90) for improvement-related statements indicate very strong employee consensus that technology, coordination, and process enhancements will significantly improve logistics performance.

### 5.3 Chi-Square Analysis

The chi-square test examined the relationship between "Delays in logistics operations" (independent variable) and "Service delivery timelines" (dependent variable).

Table 3: Chi-Square Test Results

Test	Value	df	Asymptotic Sig.(2-sided)
Pearson Chi-Square	76.207	16	0.000
Likelihood Ratio	86.970	16	0.000
Linear-by-Linear Association	30.684	1	0.000

N of Valid Cases: 144

Decision: Since p-value (0.000) is less than  $\alpha = 0.05$ , the null hypothesis is rejected.

### Interpretation:

There is a statistically significant relationship between delays in logistics operations and service delivery timelines. Delays directly and substantially degrade service performance.

## VI. FINDINGS

### 6.1 Based on Percentage Analysis:

- 69.5% of respondents confirmed logistics procedures are clearly defined
- 57.6% face delays often or always
- Coordination (23.6%) and external factors (22.2%) are top delay causes
- Only 49.4% agreed coordination between departments is effective
- 47.9% experience frequent communication gaps
- 75.0% stated operational challenges increase during peak periods
- 50.0% of documentation processes remain fully or mostly manual
- 73.6% agreed manual processes lead to errors and rework
- 60.4% reported operational challenges affect service timelines
- 77.1% agreed challenges negatively affect customer satisfaction
- Over 80% supported process improvement and technology adoption

### 6.2 Based on Mean Score Analysis:

Coordination effectiveness (2.61) and manpower sufficiency (2.72) show only moderate to neutral agreement. Process improvement (1.81), better technology (1.77), and improved coordination (1.90) show very strong agreement as solutions.

### 6.3 Based on Chi-Square Analysis:

Significant relationship exists between logistics delays and service delivery timelines ( $\chi^2 = 76.207$ ,  $p = 0.000$ ). Delays directly cause service timeline failures.



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### VII. SUGGESTIONS

Based on the findings, the following recommendations are proposed:

- Implement Cross-Departmental Coordination Protocols: Establish daily coordination huddles and shared digital dashboards to reduce coordination-related delays.
- Digitize Documentation Processes: Replace paper-based waybills with mobile-based digital documentation integrated with barcode scanning at loading and unloading points.
- Adopt Lightweight Transportation Management System: Implement a cloud-based TMS with GPS tracking and automated alerts for real-time shipment visibility.
- Introduce Peak-Period Workforce Buffers: Maintain trained temporary staff for deployment during high-volume weeks and offer overtime incentives.
- Reduce Communication Gaps: Establish clear communication channels, regular inter-departmental meetings, and standardized reporting formats.
- Provide Role-Specific Training: Conduct quarterly training focused on documentation accuracy, tracking tools, and communication protocols with practical assessments.
- Strengthen Management Oversight: Conduct weekly service delivery reviews with assigned corrective actions and deadlines.
- Implement Customer Feedback Loop: Collect structured feedback from at least 20% of customers monthly to prioritize improvement areas.

### VIII. LIMITATIONS

- Study limited to a single company; findings may not generalize to all logistics firms
- Sample size of 144, though adequate, could be expanded
- Self-reported data may contain individual biases
- Confidentiality restrictions prevented access to objective operational logs
- Cross-sectional design captures a snapshot, not longitudinal trends
- External factors (fuel prices, regulations) not modelled

### IX. CONCLUSION

This study empirically analyzed operational challenges and their impact on service delivery at Nallangaru Transport Company, Chennai. The findings demonstrate that coordination gaps, manual documentation, communication breakdowns, and manpower limitations are the dominant internal challenges. Over 57% of respondents face delays often or always, and the chi-square test confirmed a statistically significant relationship between delays and service timeline degradation ( $p < 0.001$ ). Critically, employees strongly believe in solutions. Mean scores for process improvement (1.81), better technology (1.77), and improved coordination (1.90) indicate near-universal consensus that targeted interventions will work. The 84.8% support for better technology and 81.3% support for process improvements provide management with a clear mandate for change. Management should prioritize digitizing documentation, establishing structured coordination routines, and adopting real-time tracking systems. Peak-period workforce planning and regular training programs are also essential. By systematically addressing these operational gaps, Nallangaru Transport Company can transform challenges into competitive advantages, improving both service reliability and customer satisfaction.

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### APPENDIX: SAMPLE QUESTIONNAIRE ITEMS

- Logistics operational procedures are clearly defined. (5-point Likert)
- Delays are frequently faced in logistics operations. (Always/Never scale)
- Documentation process is: Fully Manual/Mostly Manual/Partially Digital/Fully Digital
- Operational challenges affect service delivery timelines. (Always/Never scale)
- Better use of technology can improve logistics operations. (5-point Likert)



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