

# A STUDY ON OPERATIONAL DELAYS IN IMPORT AND EXPORT LOGISTICS BY USING DELAY AND BOTTLE NECK ANALYSIS IN LOGISTEED INDIA'S FREIGHT OPERATIONS

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**Abstract:** This study examines operational delays and bottleneck analysis in import-export freight operations at Logisteed India Pvt. Ltd. In today's competitive logistics environment, identifying delays and eliminating bottlenecks is essential for improving operational efficiency and reducing turnaround time. The research aims to analyse existing freight processes, identify key delay factors, and determine the major bottlenecks affecting workflow performance. The study adopts a descriptive research design using both primary and secondary data. Primary data was collected from 200 respondents across various departments through structured questionnaires and direct interaction. Statistical tools such as percentage analysis, Chi-square test, and graphical representation were applied for analysis. The findings reveal that documentation errors, delays in customer document submission, customs clearance procedures, and port congestion are the major causes of operational delays. Internal issues such as manpower shortages, communication gaps, and system inefficiencies further contribute to bottlenecks in the logistics process. The study concludes that identifying and addressing bottlenecks through process improvement, digitalisation, standardisation of documentation, and enhanced coordination can significantly reduce delays and improve overall operational efficiency.

**Keywords:** Delay Analysis, Bottleneck Analysis, Turnaround Time (TAT), Logistics, Freight Operations, Process Efficiency.

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## 1. INTRODUCTION

Logistics plays a crucial role in modern business by ensuring the efficient movement of goods from the point of origin to the point of consumption. It includes key activities such as transportation, documentation, customs clearance, warehousing, and coordination between various departments. In today's competitive and globalized business environment, efficient logistics operations are essential for maintaining service quality, reducing operational costs, and achieving customer satisfaction.

However, logistics operations often face several challenges that affect their efficiency and overall performance. Common issues include delays in documentation, customs clearance procedures, port congestion, transportation delays, lack of coordination between departments, manpower shortages, and communication gaps. These challenges can lead to increased

turnaround time, errors in processing, higher operational costs, and reduced reliability in service delivery, ultimately impacting customer satisfaction and organizational performance.

Hence, it is important to identify and analyse these operational challenges in a systematic manner. This study focuses on examining operational delays and bottlenecks in import and export logistics and their impact on turnaround time at Logisteed India Pvt. Ltd.. The study also aims to provide practical suggestions to reduce delays, improve workflow efficiency, and enhance overall service performance in freight forwarding operations.

#### **OBJECTIVES OF THE STUDY:**

- To analyse operational delays and identify bottlenecks in import–export freight operations.
- To examine the existing freight forwarding process.
- To identify key factors causing delays in logistics operations.
- To analyse bottleneck stages affecting workflow efficiency.
- To evaluate the impact of delays on turnaround time and performance.
- To suggest measures for reducing delays and improving operational efficiency.

### **2. RESEARCH METHODOLOGY**

This study adopts a descriptive research design to analyse operational delays and bottlenecks in import–export freight operations at Logisteed India Pvt. Ltd.. The research focuses on understanding workflow processes, identifying delay factors, and examining bottleneck areas affecting operational performance. Both primary and secondary data were used for the study. Primary data was collected through direct interaction with employees and observation during the internship, along with structured questionnaire responses. Secondary data was collected from company records, journals, and industry-related sources.

A sample size of 200 respondents was selected using a convenience sampling technique, considering the availability of employees across departments such as import operations, export operations, documentation, and customer service. The data collection was carried out during the internship period, and responses were systematically recorded for analysis.

For data analysis, statistical tools such as percentage analysis, one-sample test, Chi-square test and ANOVA were used. These tools helped in identifying patterns of delays, analysing relationships between variables, and interpreting operational inefficiencies. The application of these methods enabled the study to draw meaningful conclusions and provide practical suggestions for reducing delays and improving workflow efficiency.

#### **PERCENTAGE ANALYSIS:**

Percentage analysis is a basic statistical tool used to represent data in a simplified and understandable form. It converts raw data into percentages, making it easier to compare and interpret responses collected from respondents. This method helps in identifying patterns, trends, and the distribution of responses across different categories.

Percentage = (Number of respondents / Total respondents) × 100

**Table 1**

<b>Factors</b>	<b>Yes</b>	<b>No</b>	<b>Total</b>
Logisteed India follow a standard process for import/export operations	176 (88)	24 (12)	<b>200</b> <b>(100)</b>

#### **INTERPRETATION:**

The table 1 shows that an overwhelming (**88%**) of respondents confirm that a standard process is followed for import/export operations, reflecting strong procedural consistency within the organization. Only (**12%**) perceive the absence of standardized processes, indicating minor gaps in implementation or awareness. This high level of agreement suggests that structured workflows are well-established. However, the small dissenting segment may highlight inconsistencies across departments. Overall, process standardization appears to be a key organizational strength.

Table 2

Factors	Booking confirmation	Documentation preparation	Customs clearance	Cargo movement to port/airport	Carrier loading and departure	Total
consumes maximum time	62 (31)	49 (24.5)	23 (11.5)	38 (19)	28 (14)	200 (100)

#### INTERPRETATION:

The table 2 shows the most time-consuming stage in export shipments is booking confirmation (31%), followed by documentation preparation (24.5%). Other stages such as cargo movement (19%) and carrier loading (14%) have moderate impact, while customs clearance (11.5%) is relatively less time-intensive. This indicates that pre-shipment processes contribute most to delays. It highlights inefficiencies in initial coordination and documentation readiness. Overall, export delays are largely front-loaded.

Table 3

Factors	Yes	No	Total
Do system/software issues affect workflow speed	116 (58)	84 (42)	200 (100)

#### INTERPRETATION:

The table 3 reveals that majority of (58%) of respondents report that system or software issues affect workflow speed, while (42%) do not share this concern. This indicates that technological reliability plays a significant but not universal role in operations. System disruptions can hinder tracking, documentation, and coordination. However, the divided response suggests inconsistent system performance or user experience. Overall, technology is an important but partially limiting factor.

Table 4

Factors	Standard checklist for documents	Better coordination between departments	Employee training	Automation and software tools	Better vendor management	Total
Which process improvement help	67 (33.5)	24 (12)	23 (11.5)	33 (16.5)	53 (26.5)	200 (100)

#### INTERPRETATION:

The table 4 indicates that the most preferred improvement method is standard checklists for documents (33.5%), followed by better vendor/transporter management (26.5%) and automation tools (16.5%). Other options such as coordination systems (12%) and training (11.5%) receive comparatively lower support. This indicates a stronger inclination toward practical, process-based solutions over strategic or skill-based interventions. Respondents prioritize immediate and tangible improvements. Overall, structured documentation and vendor management are key focus areas.

Table 5

Factors	Yes	No	Total
Should Logisteed India conduct regular training	143 (71.5)	57 (28.5)	200 (100)

#### INTERPRETATION:

The above table 5 show that a significant (71.5%) of respondent support conducting regular training to reduce documentation and process errors, while (28.5%) do not. This highlights the perceived importance of continuous skill development. Training can enhance accuracy, efficiency, and process understanding. However, some resistance may stem from time constraints or perceived effectiveness. Overall, training is widely viewed as beneficial for operational improvement.

Table 6

Factors	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied	Total
Overall satisfaction with current process	98 (49)	71 (35.5)	19 (9.5)	9 (4.5)	3 (1.5)	200 (100)

#### INTERPRETATION:

The above table 6 shows that the overall satisfaction levels are high, with **(84.5%)** of respondents reporting being either very satisfied **(49%)** or satisfied **(35.5%)**. A smaller proportion remains neutral **(9.5%)** or dissatisfied **(6% combined)**. This indicates a generally positive perception of process efficiency within the organization. However, the presence of dissatisfaction suggests room for improvement. Overall, operational processes are effective but can be further optimized.

#### ANOVA ANALYSIS:

Analysis of Variance (ANOVA) is a statistical technique used to determine whether there are significant differences in the mean values of a dependent variable across different groups of an independent variable. It helps in analyzing the impact of one or more factors by comparing the variation within groups to the variation between groups.

Table 8

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
7.Does Logisteed India follow a standard process for import & export operation	Between Groups	.590	4	.147	1.401	.235
	Within Groups	20.530	195	.105		
	Total	21.120	199			
13. Which stage consumes maximum time in EXPORT shipments	Between Groups	105.524	4	26.381	16.580	.000
	Within Groups	310.271	195	1.591		
	Total	415.795	199			
25. Do system software issues tracking ERP network affect work	Between Groups	7.226	4	1.807	8.490	.000
	Within Groups	41.494	195	.213		
	Total	48.720	199			
28. Which process improvement method will help the most	Between Groups	148.659	4	37.165	18.749	.000
	Within Groups	386.536	195	1.982		
	Total	535.195	199			
29. Should Logisteed India conduct regular training to reduce documentation	Between Groups	3.327	4	.832	4.334	.002
	Within Groups	37.428	195	.192		
	Total	40.755	199			
30. Overall satisfaction with current process efficiency in Logisteed India	Between Groups	36.196	4	9.049	9.638	.000
	Within Groups	183.084	195	.939		
	Total	219.280	199			

#### INTERPRETATION:

The table 8 show that one-way ANOVA results reveal that most variables show statistically significant differences across groups, except for the perception of a standard process (Q7), which is not significant (**F = 1.401, p = 0.235**). This indicates that opinions regarding the existence of a standard process are consistent across different groups. In contrast, factors such as time-consuming stages in export shipments (**Q13, F = 16.580, p < 0.001**) and preferred process improvement methods (**Q28, F = 18.749, p < 0.001**) exhibit highly significant differences, suggesting varying experiences and priorities among respondents. Similarly, system/software issues (**Q25, F = 8.490, p < 0.001**) and overall satisfaction levels (**Q30, F = 9.638, p < 0.001**) differ significantly across groups, indicating that operational challenges and satisfaction are not uniformly perceived. The need for regular training (**Q29, F = 4.334, p = 0.002**) also shows significant variation, reflecting differing views on skill development requirements. Overall, the analysis highlights that while process standardization is uniformly recognized, key operational challenges and improvement preferences vary significantly across respondent groups.

#### DECISION RULE:

If  $p\text{-value} < 0.05 \rightarrow \text{Reject } H_0$

Since  $p\text{-value} = 0.025 < 0.05$ , the null hypothesis is rejected.

#### ONE-SAMPLE T-TEST:

A one-sample t-test is a statistical technique used to determine whether the mean value of a single sample is significantly different from a known or hypothesized population mean. It helps in analyzing whether a specific group follows a predicted standard by comparing the sample's average and variation to a fixed reference point.

**Table 9**

#### One-Sample Test

Factors	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
7. Does Logisteed India follow a standard process for import & export operation	48.620	199	.000	1.1200	1.075	1.165
13. Which stage consumes maximum time in EXPORT shipments	25.486	199	.000	2.6050	2.403	2.807
25. Do system software issues tracking ERP network affect work	40.586	199	.000	1.4200	1.351	1.489
28. Which process improvement method will help the most	25.051	199	.000	2.9050	2.676	3.134
29. Should Logisteed India conduct regular training to reduce documentation	40.156	199	.000	1.2850	1.222	1.348
30. Overall satisfaction with current process efficiency in Logisteed India	26.136	199	.000	1.9400	1.794	2.086

#### INTERPRETATION:

The Table 9 reveals that the one-sample t-test results indicate that all selected variables are statistically significant at the 5% level, as evidenced by p-values of **0.000** across all factors. This confirms that respondents' perceptions differ significantly from the test value, reflecting strong and meaningful opinions. Variables such as adherence to a standard process ( $t = 48.620$ ) and the need for regular training ( $t = 40.156$ ) show particularly high t-values, indicating strong agreement among respondents. Similarly, system/software issues ( $t = 40.586$ ) and overall satisfaction ( $t = 26.136$ ) are statistically significant, highlighting their considerable impact on operational efficiency. The mean differences, all positive and supported by narrow confidence intervals, further reinforce consistency in responses.

#### DECISION RULE:

If  $p\text{-value} < 0.05 \rightarrow \text{Reject}$

Since  $p\text{-value} = [\text{Your Value}] < 0.05$ , the null hypothesis is rejected

we conclude there is a significant difference between the sample mean and the population mean.

#### CHI SQUARE ANALYSIS:

Chi-square analysis is a statistical tool used to examine the relationship between two categorical variables. It helps determine whether there is a significant association between variables or if the observed differences occur by chance.

Table 10

Chi-Square Tests

2 Designation Level		Value	df	Asymp. Sig. (2-sided)
1.0	Pearson Chi-Square	.b		
	N of Valid Cases	3		
2.0	Pearson Chi-Square	.b		
	N of Valid Cases	6		
3.0	Pearson Chi-Square	.b		
	N of Valid Cases	10		
4.0	Pearson Chi-Square	.b		
	N of Valid Cases	15		
5.0	Pearson Chi-Square	131.347 <sup>c</sup>	6	.000
	Likelihood Ratio	112.051	6	.000
	Linear-by-Linear Association	80.361	1	.000
	N of Valid Cases	166		
	Pearson Chi-Square	159.416 <sup>a</sup>	6	.000
	Likelihood Ratio	121.643	6	.000
Total	Linear-by-Linear Association	91.560	1	.000
	N of Valid Cases	200		

INTERPRETATION:

The table 10 Chi-square test results indicate a statistically significant association between designation level and the perception of process standardization, as reflected by the overall **Pearson Chi-square value of 159.416 ( $p < 0.001$ )**. This suggests that responses vary meaningfully across different designation categories. Similarly, within the dominant “Others” category, a significant relationship is observed ( $\chi^2 = 131.347$ ,  $p < 0.001$ ), reinforcing that perception differences exist even within this large group. However, Chi-square statistics could not be computed for smaller designation groups due to constant values and insufficient variation, limiting detailed comparison across all categories. Additionally, the presence of cells with expected counts less than 5 indicates potential reliability concerns in some group distributions. Despite these limitations, the significant likelihood ratio and linear-by-linear association confirm a strong overall relationship.

Table 11

Chi-Square Tests

2 Designation Level		Value	df	Asymp. Sig. (2-sided)
1.0	Pearson Chi-Square	.b		
	N of Valid Cases	3		
2.0	Pearson Chi-Square	.b		
	N of Valid Cases	6		
3.0	Pearson Chi-Square	.b		
	N of Valid Cases	10		
4.0	Pearson Chi-Square	.b		
	N of Valid Cases	15		
		434.246 <sup>c</sup>	24	.000

Total	5.0	Likelihood Ratio	387.340	24	.000
		Linear-by-Linear Association	146.720	1	.000
		N of Valid Cases	166		
		Pearson Chi-Square	548.827 <sup>a</sup>	24	.000
		Likelihood Ratio	484.326	24	.000
		Linear-by-Linear Association	182.438	1	.000
		N of Valid Cases	200		

**INTERPRETATION:**

The table 11 shows that Chi-square analysis reveals a statistically significant association between designation level and the stage that consumes maximum time in export shipments, as indicated by the overall **Pearson Chi-square value of 548.827 ( $p < 0.001$ )**. This suggests that perceptions of time-consuming stages vary considerably across different designation groups. Within the dominant “Others” category, the relationship remains highly significant ( $\chi^2 = 434.246$ ,  $p < 0.001$ ), reinforcing the presence of variation even within this segment. However, Chi-square values could not be computed for smaller designation groups due to constant responses and limited sample sizes. Additionally, a high proportion of cells have expected counts below 5, indicating potential limitations in the robustness of the test results. Despite these constraints, the significant likelihood ratio and linear-by-linear association confirm a strong overall relationship. Overall, the findings suggest that designation level significantly influences how employees perceive bottlenecks in export processes, though results should be interpreted cautiously due to distributional limitations.

**Table 12****Chi-Square Tests**

2 Designation Level		Value	df	Asymp. Sig. (2-sided)
1.0	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	3		
2.0	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	6		
3.0	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	10		
4.0	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	15		
5.0	Pearson Chi-Square	338.092 <sup>c</sup>	24	.000
	Likelihood Ratio	344.307	24	.000
	Linear-by-Linear Association	131.259	1	.000
	N of Valid Cases	166		
	Pearson Chi-Square	435.509 <sup>a</sup>	24	.000
	Likelihood Ratio	433.795	24	.000
Total	Linear-by-Linear Association	168.571	1	.000
	N of Valid Cases	200		

**INTERPRETATION:**

The table 12 of the Chi-square test results indicate a statistically significant association between designation level and respondents' views on the most effective process improvement method, with an overall **Pearson Chi-square value of 435.509 ( $p < 0.001$ )**. This suggests that perceptions regarding process improvement strategies differ meaningfully across designation groups. Within the dominant “Others” category, the relationship is also highly significant ( $\chi^2 = 338.092$ ,  $p < 0.001$ ), highlighting variation even within this large segment. Chi-square statistics could not be computed for smaller designation groups due to constant responses, and a substantial number of cells have expected counts below 5, which may



limit the robustness of the results. Nevertheless, the significant likelihood ratio and linear-by-linear association confirm a strong overall relationship. Overall, the findings indicate that designation level plays a significant role in shaping employees' preferences for process improvement methods, though interpretation should consider the limitations in cell distributions.

Table 13

## Chi-Square Tests

2 Designation Level		Value	df	Asymp. Sig. (2-sided)
1.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	3		
2.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	6		
3.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	10		
4.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	15		
5.0	Pearson Chi-Square	134.066 <sup>c</sup>	6	.000
	Likelihood Ratio	173.178	6	.000
	Linear-by-Linear Association	110.100	1	.000
	N of Valid Cases	166		
	Pearson Chi-Square	164.667 <sup>a</sup>	6	.000
Total	Likelihood Ratio	198.665	6	.000
	Linear-by-Linear Association	133.800	1	.000
	N of Valid Cases	200		

## INTERPRETATION:

The Chi-square test results show a statistically significant association between designation level and opinions on whether Logisteed India should conduct regular training to reduce documentation errors, with an overall **Pearson Chi-square value of 164.667 ( $p < 0.001$ )**. This indicates that perceptions regarding the need for training vary across different designation groups. Within the dominant "Others" category, the association remains highly significant ( $\chi^2 = 134.066$ ,  $p < 0.001$ ), suggesting notable variation even within this large group. Chi-square values were not computed for smaller designation groups due to constant responses. A small proportion of cells have expected counts below 5, which should be considered when interpreting the results, although the impact is minimal. Overall, the findings suggest that designation level significantly influences employees' views on the importance of regular training for improving documentation accuracy.

Table 14

## Chi-Square Tests

2 Designation Level		Value	df	Asymp. Sig. (2-sided)
1.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	3		
2.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases	6		
3.U	Pearson Chi-Square	. <sup>b</sup>		
	N of Valid Cases			



4.0	N of Valid Cases	10		
	Pearson Chi-Square	. <sup>b</sup>		
5.0	N of Valid Cases	15		
	Pearson Chi-Square	464.201 <sup>c</sup>	24	.000
	Likelihood Ratio	384.836	24	.000
	Linear-by-Linear Association	146.203	1	.000
Total	N of Valid Cases	166		
	Pearson Chi-Square	559.278 <sup>a</sup>	24	.000
	Likelihood Ratio	440.666	24	.000
	Linear-by-Linear Association	178.682	1	.000
	N of Valid Cases	200		

**INTERPRETATION:**

The table 14 indicates that the Chi-square test results indicate a highly significant association between designation level and overall satisfaction with current process efficiency at Logisteed India, as reflected by an overall **Pearson Chi-square value of 559.278 ( $p < 0.001$ )**. This suggests that satisfaction levels vary considerably across different designation groups. Within the dominant “Others” category, the relationship remains strongly significant ( $\chi^2 = 464.201$ ,  $p < 0.001$ ), highlighting meaningful differences in perceptions even within this large group. Chi-square statistics could not be computed for smaller designation groups due to constant responses, and a high proportion of cells have expected counts below 5, which may affect the robustness of the test. Nevertheless, the significant likelihood ratio and linear-by-linear association confirm a clear overall relationship. Overall, the findings indicate that designation level significantly influences employees’ perceptions of process efficiency, though caution is needed due to low expected counts in several cells.

**DECISION RULE:**

If the p-value is less than 0.05, the null hypothesis is rejected.

If the p-value is greater than 0.05, the null hypothesis is accepted.

Since the p-value (0.000) is less than 0.05, the null hypothesis is rejected.

**3. SUGGESTIONS**

Based on the findings of the study, several measures can be recommended to improve logistics operations and reduce delays and bottlenecks at Logisteed India Pvt. Ltd.. Although a majority of respondents confirmed the existence of a standardized process, delays persist mainly in the initial stages such as booking confirmation and documentation preparation. Therefore, the organization should focus on improving pre-shipment planning, ensuring faster booking confirmations, and implementing a standardized documentation checklist to minimize errors and avoid processing delays. Strengthening vendor and transporter management systems can also help in reducing coordination delays and improving shipment flow efficiency.

In addition, the study highlights that system/software issues and documentation errors significantly affect workflow performance. Hence, the organization should adopt advanced digital solutions such as automated documentation systems, real-time tracking tools, and integrated ERP platforms to reduce manual dependency and improve operational accuracy. Regular training programs should be conducted to enhance employee skills, particularly in documentation accuracy and system usage. Improving inter-departmental communication through centralized communication platforms and real-time updates can further reduce bottlenecks. Continuous monitoring, periodic process reviews, and data-driven decision-making should be implemented to identify recurring delays and ensure continuous improvement in logistics operations.

**4. CONCLUSION**

This study examined operational delays and bottlenecks in import and export logistics operations at Logisteed India Pvt. Ltd.. The findings indicate that while the organization has a strong foundation in terms of standardized processes and overall employee satisfaction, delays remain a significant challenge affecting operational efficiency. Key factors contributing to delays include documentation errors, time-consuming booking and documentation stages, system/software issues, and external factors such as coordination with vendors and transporters.

The analysis clearly shows that these delays and bottlenecks have a direct impact on workflow efficiency and turnaround time. Statistical tools such as t-test, ANOVA, and Chi-square confirm that these factors are significant and vary across different groups, highlighting the presence of operational inefficiencies within the system. Although overall satisfaction levels are relatively high, the existence of delays indicates a gap between process design and execution.

The study emphasizes the importance of addressing these bottlenecks through process improvements such as documentation standardization, digitalization, employee training, and improved coordination. By implementing these measures, the organization can reduce operational delays, improve turnaround time, and enhance service quality. Efficient management of logistics processes is essential for maintaining competitiveness and achieving long-term customer satisfaction in the freight forwarding industry.

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