



Optimization of Transportation Management at NMT Shipping India PVT LTD

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ABSTRACT

Transportation management is a critical component of logistics and supply chain performance because it directly influences cost, delivery time, resource utilization and customer satisfaction. This article presents a study on the optimization of transportation management at NMT Shipping India Pvt Ltd. The study focuses on transportation planning, route optimization, vehicle utilization, delivery performance, transportation costs, technology usage and operational challenges. Primary data were collected from 30 employees connected with transportation, logistics, warehousing, fleet management, dispatch, customer service and administration using a structured questionnaire, supported by interviews and informal discussions. Convenience sampling was used. Secondary information was obtained from company records and relevant books, articles and logistics sources. Percentage analysis, reliability analysis, Chi-Square, One-Way ANOVA and Pearson correlation were used to examine the data. The findings show that road transportation is the most commonly used mode at 37%, while 70% of respondents reported using a Transportation Management System (TMS). Transportation efficiency was rated good or excellent by 77% of respondents. However, delivery delays remain a concern, with 63% reporting that delays occur often or very often. Fuel cost was identified as

the major transportation challenge by 40% of respondents, followed by route planning at 27%. The Chi-Square test indicated a significant association between TMS usage and route optimization ($p = 0.028$). Pearson correlation also showed a significant positive relationship between route optimization and overall satisfaction ($r = 0.509$, $p = 0.013$).

Keywords: Transportation Management; Route Optimization; Transportation Management System; Logistics Efficiency; Customer Satisfaction.

1. INTRODUCTION

Transportation is one of the most important functions of logistics and supply chain management because it connects suppliers, warehouses, ports, distribution points and customers. Efficient transportation ensures that goods reach the required destination at the right time, in the right condition and at an acceptable cost. In a shipping and logistics



organization, transportation decisions influence operating cost, customer service, vehicle utilization and the overall reliability of the supply chain.

The importance of transportation optimization has increased because organizations operate in an environment characterized by changing customer expectations, fluctuating fuel costs, traffic congestion, capacity constraints and the need for faster delivery. Inefficient routing, underutilized vehicles, unnecessary empty movements and delays can increase logistics costs and reduce service quality. Therefore, transportation managers need to coordinate vehicle allocation, route planning, scheduling, tracking, documentation and communication.

The present study examines transportation management practices at NMT Shipping India Pvt Ltd. The study specifically considers transportation planning, route optimization, vehicle scheduling, freight movement, delivery performance, transportation cost, fuel management, vehicle maintenance and the use of digital technologies. The study also considers coordination between transportation, warehouse, customer service and other operational functions.

The need for this study arises from the practical importance of controlling transportation cost while maintaining service quality. The source study identifies transportation cost, route inefficiency, vehicle utilization, delays, fuel expenses, maintenance and communication as important areas for improvement. Modern tools such as Transportation Management Systems, GPS tracking, electronic documentation and real-time shipment monitoring can improve visibility and support faster decisions.

The objectives of the study are to identify transportation challenges, examine technology usage, assess route planning and scheduling practices, identify opportunities for reducing delays and operating costs, and suggest measures to improve transportation efficiency and customer satisfaction. The scope is limited to transportation-management activities associated with NMT Shipping India Pvt Ltd.

2. REVIEW OF LITERATURE AND CONCEPTUAL BACKGROUND

Transportation optimization literature emphasizes that routing, scheduling, fleet utilization and service requirements must be considered together. Laporte and related transportation research highlight the importance of practical constraints such as vehicle capacity, customer requirements, distance and delivery schedules. Bräysy and Gendreau emphasize time-window management because customers often require deliveries within specific periods. Golden and colleagues highlight systematic route planning as a means of improving vehicle utilization and reducing unnecessary travel.

Toth and Vigo identify vehicle capacity and fleet size as important considerations in transportation optimization. Appropriate vehicle selection can improve resource utilization, whereas poor allocation may result in underutilization and higher costs. Schmid, Doerner and Laporte emphasize that transportation decisions are connected with warehousing and inventory activities, indicating that transportation should not be managed as an isolated function.

Technology is another major theme in transportation management. Transportation Management Systems can support shipment planning, carrier selection, route planning, freight management, tracking and reporting. GPS and vehicle-tracking systems improve visibility by allowing managers to monitor vehicle location and identify delays or route deviations. Data analytics can also identify frequently delayed routes, high-cost activities and vehicle-utilization patterns.

Vidal, Laporte and Matl (2020) indicate that modern transportation optimization involves multiple objectives rather than travel distance alone. Cost, delivery time, vehicle utilization and service quality may need to be balanced. Recent transportation research also emphasizes green logistics because unnecessary travel and fuel consumption contribute to environmental impacts. Technology-based approaches using analytics, artificial intelligence and machine learning are increasingly relevant to route planning, demand forecasting and real-time decision-making.

The conceptual framework for the present study links transportation-management inputs with planning and execution processes and organizational outcomes. Key input factors include transportation planning, route optimization, vehicle utilization, fuel efficiency, scheduling, technology usage and maintenance. These factors influence transportation cost, delivery performance, operational efficiency and customer satisfaction. The framework supports the assessment of current practices and the identification of improvement opportunities at NMT Shipping India Pvt Ltd.



3. RESEARCH METHODOLOGY

The study adopted a descriptive research design to understand the existing transportation-management practices and the opinions of employees involved in transportation and logistics activities. The research examined transportation cost, routing, vehicle utilization, fuel efficiency, lead time, vehicle maintenance, driver-related issues, vehicle tracking and communication.

The sample consisted of 30 employees associated with transportation, logistics, warehousing, fleet management, dispatch, customer service and administration. Employees at different operational levels were included to obtain perspectives on planning as well as day-to-day transportation activities. Convenience sampling was used because respondents were accessible during the study period and the research was conducted within practical time and resource constraints.

Primary data were collected using a structured questionnaire, personal interaction and informal discussions. The questionnaire covered transportation planning, route optimization, vehicle availability, delivery schedules, freight handling, customer service, transportation costs, fuel management, communication and overall operational efficiency. Secondary data were obtained from company records, manuals, books, articles, journals and other relevant logistics sources.

The collected data were classified, tabulated and analyzed using percentage analysis and graphical presentation. Statistical tests were also applied where appropriate. Reliability was assessed using Cronbach's Alpha. The association between TMS usage and route optimization was examined using the Pearson Chi-Square test. Differences in satisfaction across route-optimization groups were assessed using One-Way ANOVA. Pearson correlation was used to examine the relationship between route optimization and overall satisfaction.

The questionnaire reliability analysis produced a Cronbach's Alpha of 0.766 for four Likert-type items based on 21 complete valid responses, indicating acceptable internal consistency for exploratory academic research. The statistical findings are interpreted with consideration of the sample size and the limitations of convenience sampling.

The study has several limitations. The sample is limited to 30 respondents and may not represent every employee or stakeholder. The study was conducted within a limited period. Some confidential transportation-cost and vehicle-performance information may not have been fully available. In addition, responses may reflect individual experience and perception. These limitations should be considered when applying the findings to broader settings.

4. RESULTS AND DATA ANALYSIS

The results provide a practical picture of transportation management at NMT Shipping India Pvt Ltd. Road transportation was the most commonly identified mode, accounting for 37% of respondents, followed by rail at 30%, air at 20% and sea at 13%. The distribution indicates that road transport plays an important role in the transportation activities considered in the study.

Technology adoption was relatively positive. Seventy percent of respondents reported using a Transportation Management System, while 30% reported that they did not use TMS. This indicates that digital transportation-management practices are present but still have scope for wider implementation and more consistent usage.

Respondents generally viewed transportation efficiency positively. Forty percent rated transportation efficiency as good and 37% rated it as excellent, while 23% rated it as average. Thus, 77% of respondents provided a good or excellent assessment, suggesting that the transportation system has a reasonably strong operational foundation.

Delivery delays were identified as an important operational concern. Thirty-three percent of respondents reported experiencing delays very often and 30% reported experiencing them often. Together, 63% indicated frequent or very frequent delays. This result suggests that improving delivery reliability should remain a priority.

Fuel cost was identified as the major transportation challenge by 40% of respondents. Route planning was selected by 27%, vehicle maintenance by 23% and traffic congestion by 10%. The results indicate that cost control and route efficiency are closely related improvement areas.

Overall satisfaction with the company management system was positive. Forty-three percent of respondents were very satisfied and another 43% were satisfied. Seven percent were neutral and 7% were dissatisfied. Therefore, 86%



reported either satisfaction or high satisfaction with the overall management system.

The study also recorded that 50% of respondents indicated transportation schedules are always optimized to reduce delays, while 27% indicated frequent optimization. In relation to customer satisfaction, 40% strongly agreed and 27% agreed that transportation optimization improves customer satisfaction.

These descriptive results indicate that NMT Shipping has a positive base of transportation practices, but specific operational issues—especially fuel cost, delays, route planning and vehicle maintenance—require systematic improvement.

5. STATISTICAL FINDINGS AND DISCUSSION

The statistical analysis provides additional evidence regarding the relationship between technology, route optimization and satisfaction. The Pearson Chi-Square test examined the association between TMS usage and the frequency of route optimization. The Pearson Chi-Square value was 9.134 with 3 degrees of freedom and a p-value of 0.028. Since the p-value is below 0.05, the null hypothesis was rejected and a statistically significant association was indicated between TMS usage and route optimization. The source report also notes that some expected cell frequencies were small; therefore, the result should be interpreted with caution.

The relationship between route optimization and overall satisfaction was examined using Pearson correlation. The correlation coefficient was $r = 0.509$ with $p = 0.013$ based on 23 observations. Since $p < 0.05$, the null hypothesis of no significant linear relationship was rejected. The result indicates a statistically significant positive relationship: higher reported use of route optimization is associated with higher overall satisfaction.

A One-Way ANOVA was used to compare overall satisfaction across route-optimization frequency groups. The analysis produced $F = 2.535$ and $p = 0.087$. Because $p > 0.05$, the null hypothesis was not rejected at the 5% significance level. Therefore, the differences in mean satisfaction across the route-optimization groups were not statistically significant. Nevertheless, the group means showed a practical upward pattern as route-optimization frequency increased.

Taken together, the statistical results provide a useful management implication. TMS usage is associated with route optimization, and route optimization is positively related to overall satisfaction. Although the ANOVA result does not establish statistically significant differences among all optimization-frequency groups, the descriptive and correlation results suggest that better routing practices can contribute to service quality.

The findings are consistent with the conceptual view that transportation technology supports planning, monitoring and decision-making. TMS can provide a structured environment for shipment planning and route monitoring, while GPS and real-time tracking can improve visibility. Better routing can reduce unnecessary travel, improve vehicle utilization and support more reliable delivery.

However, statistical results should not be interpreted as proof of causality. The study is based on a small convenience sample and employee perceptions. Future research using a larger random sample and objective operational data such as actual fuel consumption, kilometres travelled, vehicle utilization, on-time delivery and transportation cost per shipment could provide stronger evidence.

6. MAJOR FINDINGS

The study identifies several important findings regarding transportation management at NMT Shipping India Pvt Ltd.

First, road transportation is the most commonly used transportation mode in the responses, indicating the importance of effective road-transport planning and coordination. Since road operations are exposed to traffic, road conditions, vehicle availability and fuel costs, route planning and real-time monitoring are particularly important.

Second, TMS adoption is relatively high, with 70% of respondents reporting its use. However, the remaining 30% indicates an opportunity to improve adoption and consistency. The significant Chi-Square result further suggests that TMS usage and route optimization are associated in the study.

Third, transportation efficiency is generally perceived positively. The combined good and excellent ratings account for 77% of responses. This indicates that existing processes provide a reasonable operational foundation.



Fourth, delivery delays remain a major concern. A combined 63% of respondents reported delays often or very often. Delays can increase operational costs, affect customer satisfaction and create problems for subsequent deliveries.

Fifth, fuel cost is the most significant transportation challenge. Forty percent of respondents selected fuel cost, making it the highest-ranked challenge. This highlights the importance of fuel-efficient routing, load planning, vehicle utilization and monitoring of unnecessary vehicle movements.

Sixth, route planning is another major challenge, selected by 27% of respondents. Routes should consider distance, traffic conditions, customer locations, delivery priorities and vehicle capacity. Systematic route optimization can support shorter and more reliable journeys.

Seventh, vehicle maintenance accounts for 23% of reported challenges. Preventive maintenance can reduce breakdowns, unexpected delays and additional repair expenses. Maintenance planning should therefore be linked with vehicle scheduling.

Eighth, overall satisfaction is positive, with 86% of respondents either satisfied or very satisfied. The positive correlation between route optimization and satisfaction suggests that transportation improvements can support better perceptions of the management system.

Ninth, questionnaire reliability is acceptable, with Cronbach's Alpha of 0.766. This supports the internal consistency of the selected Likert-type items for exploratory research.

Overall, the findings show that the organization has a positive transportation-management base but should focus on specific areas of optimization rather than treating transportation improvement as a single activity.

7. SUGGESTIONS AND MANAGERIAL IMPLICATIONS

Based on the findings, the first priority should be to strengthen route optimization. NMT Shipping should use systematic route-planning techniques that consider traffic conditions, distance, customer locations, delivery priorities, vehicle capacity and time windows. Regular review of frequently delayed and high-cost routes can help identify opportunities for improvement.

Second, TMS utilization should be increased across relevant transportation activities. TMS can be used for shipment planning, vehicle allocation, route monitoring, tracking and reporting. Employees who are not currently using the system should be supported through training and practical guidance.

Third, fuel costs should be controlled through better route planning, fuel-efficient vehicle use, load consolidation and reduction of unnecessary vehicle movements. Fuel consumption should be monitored against distance, vehicle type and shipment characteristics to identify unusual patterns.

Fourth, delivery delays should be monitored through defined performance indicators. Managers should record delay frequency, delay reason, route, vehicle and responsible process stage. Real-time tracking can help identify deviations early and allow corrective action before delays become critical.

Fifth, preventive vehicle maintenance should be strengthened. Maintenance schedules should be planned according to vehicle usage and manufacturer or operational requirements. A preventive approach can reduce breakdowns, emergency repairs and delivery interruptions.

Sixth, GPS and real-time shipment tracking should be used more effectively. Tracking information can improve visibility for managers and customers and can provide evidence for analyzing delays and route deviations.

Seventh, employee training should be conducted in TMS usage, route optimization, transportation documentation, safety, communication and cost-control practices. Transportation performance depends not only on technology but also on the ability of employees to use the technology and follow standard processes.

Eighth, the company should establish a transportation KPI dashboard. Useful indicators include on-time delivery percentage, average delivery delay, transportation cost per shipment, fuel consumption, vehicle utilization, empty kilometres, breakdown frequency and route adherence.

Ninth, transportation should be coordinated with warehouse and other supply-chain functions. Timely cargo preparation, loading and unloading can prevent vehicle waiting time and reduce schedule disruptions.



Finally, continuous improvement should become a regular management practice. Monthly or periodic transportation-performance reviews can compare actual results against targets, identify recurring problems and assign corrective actions. The study's recommendations therefore focus on practical improvements that can reduce cost, improve delivery reliability and enhance customer satisfaction.

8. CONCLUSION

The study concludes that transportation management is a major determinant of logistics efficiency at NMT Shipping India Pvt Ltd. Transportation connects suppliers, warehouses, ports, customers and other supply-chain participants; consequently, poor transportation planning can influence both cost and service performance.

The study found that the transportation system is generally viewed positively, with 77% of respondents rating efficiency as good or excellent and 86% expressing satisfaction or high satisfaction with the overall company management system. At the same time, the findings reveal important improvement areas. Delivery delays were reported frequently, fuel cost was the leading transportation challenge, and route planning and vehicle maintenance were also significant concerns.

Technology provides an important opportunity for improvement. Seventy percent of respondents reported TMS usage, and the Chi-Square test identified a significant association between TMS usage and route optimization. Pearson correlation further identified a significant positive relationship between route optimization and overall satisfaction. These results support the use of digital transportation tools for planning, tracking and decision-making.

The study therefore recommends a coordinated optimization approach involving route planning, TMS utilization, fuel-cost control, preventive maintenance, real-time tracking, employee training and KPI monitoring. Transportation optimization should not focus only on reducing distance; it should balance cost, delivery time, vehicle utilization, reliability and customer service.

The limitations of the study, particularly the small convenience sample and dependence on employee responses, should be considered. Future studies can extend the research by using larger samples and actual operational data. Measures such as fuel cost per kilometre, cost per shipment, vehicle utilization, on-time delivery rate, empty running and delay frequency can provide more objective evidence of improvement.

Overall, the study demonstrates that systematic transportation optimization can strengthen operational efficiency and support better customer satisfaction at NMT Shipping India Pvt Ltd. Continuous monitoring, technology adoption and data-based decision-making can help the organization build a more responsive, cost-effective and reliable transportation-management system.

9. REFERENCES

- Ballou, R. H. (2004). *Business Logistics/Supply Chain Management: Planning, Organizing, and Controlling the Supply Chain*. Pearson Education.
- Bowersox, D. J., Closs, D. J., & Cooper, M. B. (2013). *Supply Chain Logistics Management*. McGraw-Hill.
- Christopher, M. (2016). *Logistics & Supply Chain Management*. Pearson Education.
- Golden, B., Raghavan, S., & Wasil, E. (Eds.). (2008). *The Vehicle Routing Problem: Latest Advances and New Challenges*. Springer.
- Laporte, G. Research on vehicle routing and transportation optimization, with emphasis on routing constraints and practical logistics applications.
- Bräysy, O., & Gendreau, M. Research on vehicle routing with time windows and the importance of scheduling within customer delivery requirements.
- Toth, P., & Vigo, D. Research on vehicle routing, fleet planning and capacity-constrained transportation optimization.
- Schmid, V., Doerner, K. F., & Laporte, G. Research on integrated transportation and logistics decision-making.
- Vidal, T., Laporte, G., & Matl, P. (2020). Research on modern vehicle-routing and transportation optimization,



including multiple objectives such as cost, time, capacity and service quality.

NMT Shipping India Pvt Ltd. Company-related transportation-management information and operational context used in the internship study.

Kishore S. (2026). A Study on Optimization of Transportation Management at NMT Shipping India Pvt Ltd. Internship research report, VISTAS.

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