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Benchmarking Logistics Operations for Sustainable Development in Transport

Muneep Koshy HS[1], Dr. Anitha Kumari D[2*]

[1]MBA (Logistics & Supply Chain Management), School of Management Studies,
Vels Institute of Science, Technology & Advanced Studies, Chennai-117.
[2]Associate Professor, Department of Management Studies, School of Management Studies, Vels Institute of Science,
Technology & Advanced Studies, Chennai-117.
[*]Corresponding Author: Orchid ID http://www.orcid.org/0000-0003-1852-9773

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ABSTRACT

The study analysed the benchmarking methodology applied to logistics operations to assess operational performance and sustainability in freight transport. By examining structured measurement of performance, the study evaluated several key performance elements concerning truck utilisation, fuel efficiency, delivery reliability and the performance of reverse logistics to demonstrate their influence on overall logistics performance. Even though fleets and delivery systems work correctly and complete their tasks, the researchers noted several "operational gaps." Some examples include empty running, running a vehicle without a live cargo, fuel consumption control, e.g., tracking fuel usage, and how to coordinate reverse logistics. The outcomes of the study were that improving long-term logistics performance, reducing the impacts on the environment, and increasing efficiency all require implementing sustainable-driven operating methods and using benchmarking.

Keywords: Benchmarking, Logistics Performance, Sustainable Development, Fleet Utilisation, Fuel Efficiency, Reverse Logistics, Key Performance Indicators, Transport Efficiency.

INTRODUCTION

Logistics operations benchmarking is an important activity in today's transportation system for enhancing efficiency and supporting sustainable development. Logistics providers play a vital role in road freight transportation by connecting manufacturers, warehouses, and distribution centres, providing timely deliveries and reliable service. Benchmarking is a formalised approach to evaluating a company's performance against other companies in their industry based on the same metrics; this process is designed to identify ways to improve service levels, including evaluating operational metrics like empty running ratio, fuel efficiency, truck utilisation and on-time performance, as well as the current state of sustainability practices for logistics companies as a result of the increasing demand for sustainable development have driven many logistics companies to implement eco-friendly initiatives such as fuel consumption management, route optimisation and resource-efficient practices.

OBJECTIVE OF THE STUDY

- To evaluate current logistics and transport practices with a focus on operations (such as fleet utilisation, route efficiency, delivery load factor efficiencies)
- To establish KPIs (performance standards) for logistics excellence, including measures for on-time delivery, fuel utilisation rate, vehicle utilisation rate, load capacity utilisation, etc.
- To benchmark the logistics performance of Transport against industry standard averages and against best practice global transportation logistics
- To assess the impact of sustainable logistics practices, including fuel efficiency, routing efficiency, and reducing empty vehicle miles, upon logistics operations.
- To provide practical recommendations for improving logistics efficiency and sustainability based on benchmarking results and case study analysis

NEED FOR THE STUDY

This study aids logistics companies in finding ways to improve their transportation operations by identifying inefficiencies in the transport industry, like low vehicle utilisation, high fuel usage and delivery delays. The study shows that by analysing fleet movement and planning routes, companies can reduce the amount of empty running and

increase overall vehicle productivity. Additionally, measuring logistics performance will help organisations to maximise efficiency of resources while minimising waste associated with operations. Also, the study suggests that implementing sustainable logistics practices will provide organisations with the ability to respond quickly to customer demands while providing a satisfactory customer experience. Ultimately, the study provides organisations with opportunities for continuous improvement in logistics performance to achieve sustainable growth and development within transportation operations for future success.

SCOPE OF THE STUDY

The study examines logistics operations across key areas such as fleet management, route planning, and delivery performance to benchmark transportation efficiency. It focuses on important performance indicators, including vehicle utilisation, fuel consumption, delivery time, and load efficiency. The study also considers sustainable logistics practices such as improving fuel efficiency, reducing empty miles, and adopting environmentally responsible transportation methods. Benchmark comparisons with industry standards and selected global case studies are used to identify best practices. However, the study is limited to transportation logistics activities and does not include financial or marketing functions unrelated to logistics performance.

STATEMENT OF THE PROBLEM

When logistics companies operate within a network, they may find it challenging to create an effective service because of issues such as delays from poor delivery route design or high traffic congestion on major routes used by many businesses. In many cases, this leads to overcapacity in their vehicles, which results in higher costs and lower productivity from the overall fleet. Transportation costs are further impacted by inconsistent fuel management systems, leading to fluctuating gas prices, which in turn lead to decreased long-term profitability. Most logistics companies have no benchmark system allowing them to evaluate their performance against the averages of other logistics companies in order to determine where there is room for improvement.

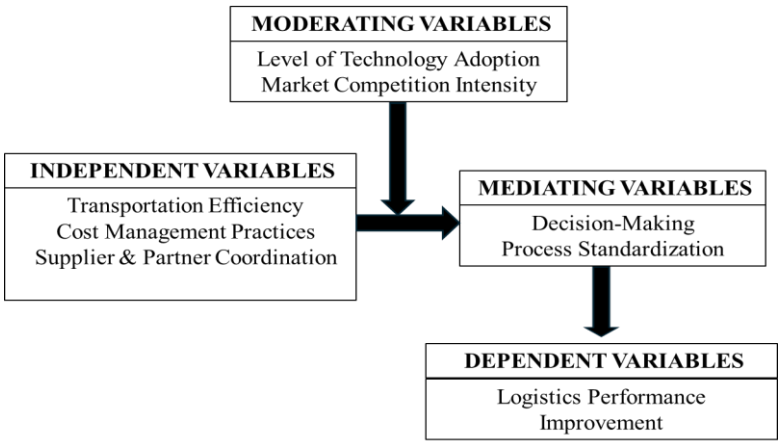
REVIEW OF LITERATURE

Carter and Rogers (2008). Implementation of sustainability benchmarking will improve the long-term competitive advantage, operational efficiency, and transparency of supply chain management and logistics systems. **Dekker et al. (2012)** focused on using the success of decision-making processes to increase sustainable logistics operations, which is highly dependent on mathematical modelling and optimisation. **Piecyk & McKinnon (2010)** stated that benchmarking against emissions levels provides an avenue for achieving sustainability within supply chain transportation operations and the development of sustainable logistics systems. **Wen et al. (2024).** Their findings demonstrated how improved alignment of operations and logistics infrastructure can lead to greater energy 35 efficiency, reduced emissions and support for the development of sustainable logistics across both the supply chain and the transportation networks. **Zagloel et al. (2024).** The findings of the study showed that evaluating performance in multiple dimensions enhances the long-term competitiveness of logistics and enables organisations to make decisions sustainably. **Farchi and Touzi (2021).** In summary, the authors provide evidence that the adoption of a comprehensive sustainability framework in logistics businesses will result in improved stakeholder satisfaction, compliance with environmental regulations and increased operational transparency, therefore contributing to the achievement of sustainable development goals in the supply chain and transportation industries. **Aksu (2025).** According to the findings of the research conducted by Aksu, structured sustainability benchmarking will enhance the effectiveness of logistics systems, reduce 36 potential environmental risks, and ultimately contribute to the sustainability of logistics operations over time in contemporary logistics and transportation management practices. **Moradi et al. (2024)** noted the importance of route optimisation and infrastructure for electric vehicle charging in order to improve efficiency for operating electric vehicles. Furthermore, the research found that establishing a benchmark for electric vehicle logistics systems increases the effectiveness of the transportation networks and provides environmental benefits, particularly for urban and regional freight operations. **McKinnon (2018)** The research also indicated that by implementing green logistics practices, organisations can comply with environmental regulations, reduce their total operating expenses, and improve their overall sustainability performance within their operations and supply chain management **McKinsey & Company (2022)** The study found that businesses using benchmarking for emissions outperform others in sustainability, lower their overall environmental risk, and enhance the operational efficiency of their supply chain and logistics functions.

RESEARCH METHODOLOGY

Primary data refers to original data collected directly by the researcher specifically for the study. In this research, primary data was obtained through case study analysis, which helped in understanding the operational challenges and problems faced by freight forwarders and carriers in their day-to-day activities. Secondary Data: Secondary data originates from already-existing sources such as websites, articles, books, company websites, Google, magazines, journals, and newsletters.

CONCEPTUAL FRAMEWORK



The research is based on three primary operational factors that are believed to help improve Logistics Performance: transportation efficiency, cost management processes, and supplier/partner coordination. These independent variables serve as mediating factors that help to facilitate decision-making and to standardise processes for logistical operations. These operational procedures have been successfully implemented and continue to help reduce logistics delays and improve the coordination of the logistics functions in which they are used. However, the effectiveness of these three operational factors will be influenced by moderating factors, such as the degree of technology adoption and the level of competition in the marketplace. These external influences affect the extent to which companies effectively implement operational factors. Ultimately, efficient Logistics Performance results from coordinated partnerships, cost management, standardising processes, and efficient transportation.

CASE STUDY ANALYSIS AND INTERPRETATION

Challenges Facing Logistics Transporter 1 (Regional Fleet Operator)

Finding delays for deliveries depends on how much traffic is congested in key locations and how long it takes to load or unload trucks. The reason why vehicle utilisation was low is mostly due to the lack of backhaul opportunities, leading to empty return trips after deliveries. Additionally, poorly planned routes may have increased fuel use and reduced operational efficiencies because there was no real-time tracking of vehicle movements or timely delivery updates to customers, thereby impacting logistics and altering customer service.

Challenges Facing Logistics Transporter 2 (Mid-Sized Freight Transportation Company)

Inefficiency in fuel management processes, combined with volatility in diesel prices, has increased costs for the overall operation of logistics. In addition, the lack of a good way to benchmark against other industry-standard benchmarks has made it difficult to accurately assess performance and determine where improvements can be made. Inefficient reverse logistics processes have presented additional challenges to logistics operations, resulting in excessive amounts of time being spent waiting at the docks and delays in the return of cargo to their respective owners, and ultimately reducing productivity as well as service efficiency.

LOGISTICS TRANSPORTER 3 (Logistics Provider Used Technology)

With rising customer demand and increasingly complex scheduling needs, delivering orders on time has become a challenge. Moreover, employees need further training in their comprehension and use of digital tracking tools, which enable transportation businesses to operate successfully in today's world of logistics. Increased regulation on how to engage in sustainable transportation practices and pursue more fuel-efficient methods of transit has driven the need for companies to establish environmentally compliant processes. Additionally, there is a need to have an ongoing process in place that regularly tracks the performance of logistics companies, including certain sustainability criteria – such as how much fuel is used to transport goods, or how many emissions are created delivering goods to consistently monitor these companies and work with them for improvement.

SOLUTIONS FOR THE ABOVE PROBLEMS

Route Optimisation System Implementation: Logistics companies should implement GPS-based vehicle tracking systems and route optimisation software to determine the fastest and most efficient routes for their vehicles and cargo. Overall fleet productivity can be improved, delivery delays can be reduced, and fuel usage can be reduced through this

type of technology. Furthermore, the real-time tracking of vehicles allows for improved service reliability and coordination by enabling communication between drivers and management.

Using Benchmarking Techniques: Transportation companies should utilise structured benchmarking methods to track key performance metrics such as the utilisation of vehicles, fuel efficiency, on-time delivery, and empty running ratios. Consistent tracking of these metrics helps ensure continual improvement in logistics performance and identify gaps in operations.

Cost control and fuel management: Fuel Management & Control: One way companies can reduce wasted fuel is by having an effective fuel monitoring system, combined with driver-training initiatives that promote fuel-efficient driving habits and highlight proper vehicle maintenance techniques.

Enhancement of Planning for Reverse Logistics: Reverse logistics planning must be improved to reduce the amount of empty running and to improve the utilisation of the vehicles. Efficient backhaul planning and reverse logistics coordination can be implemented to reduce the amount of empty running. Establishing strategic partnerships with customers for return freight reduces idle vehicle time and improves resource utilisation.

Using Sustainable Logistics Techniques: Sustainable logistics practices must be employed by logistics companies, including load consolidation, using vehicles that are fuel-efficient and monitoring pollution/greenhouse gas emissions. The above practices will help create sustainable logistics as part of a long-term development strategy and improve the operations of logistics providers and minimise their impact on the environment.

CONCLUSION

To summarise, logistics transporters encounter many obstacles in maintaining an optimal and unbroken flow of goods through the various modes of transportation. To increase operational efficiency, logistics transporters will need to improve performance by developing a structured approach due to the collective challenges posed by rising fuel costs, repeated journeys without cargo, delayed deliveries, and increased environmental legislative requirements. Integration of sustainable logistics solutions, benchmarking methods, and effective monitoring of logistics performance will require ongoing monitoring and strategic planning to achieve operational efficiency.

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