Enhancing Operational Efficiency and Route Optimization in Automobile Logistics: A Case Study of Sheetla Car Transport

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Abstract— The automobile logistics sector plays a vital role in enabling smooth transportation of vehicles from manufacturing units to dealerships and customers across India. During my 45-day Summer Internship Programme at Sheetla Car Transport, I gained direct exposure to real operations, including vehicle pickup, documentation handling, loading procedures, route planning, transit tracking, and delivery confirmation. The purpose of this research is to study the operational workflow of an MSME logistics company, analyse real-time challenges, and explore strategies to enhance operational efficiency through optimized route planning and digital transformation. This research follows a mixed-method design combining qualitative observation, field interviews, secondary research, and estimated performance analysis of key routes. Findings indicate that operational inefficiencies primarily arise due to manual documentation, intuition-based route decisions, communication delays, and absence of real-time GPS tracking systems. The study suggests practical solutions including digital documentation, telematics-based fleet monitoring, route automation tools, customer communication portals, and predictive planning models. The research demonstrates that even small-scale logistics firms can significantly improve efficiency and competitiveness by strategic adoption of technology without heavy capital investment.

Index Terms— Automobile Logistics, Route Optimization, Operational Efficiency, Fleet Management, Supply Chain, Mixed-Method Research, Digital Transformation.

I. INTRODUCTION (HEADING 1)

Logistics and supply chain management form the backbone of global economic progression, enabling companies to deliver products seamlessly across regions and maintain efficient operations. In India, logistics contributes nearly 14% of the national GDP, indicating both its scale and opportunities for improvement compared to advanced economies where logistics expenditure is significantly lower. Due to rapidly expanding industries such as manufacturing, e-commerce, pharmaceuticals, and automobile distribution, the demand for efficient logistics has grown exponentially.

The automobile logistics segment, responsible for the movement of passenger vehicles, commercial automobiles, and specialized transport units, is a highly sensitive domain requiring precision, safety, and time-bound coordination. Transporting vehicles involves operational phases including booking, documentation, inspection, loading, route planning, transit movement, unloading, and closure. Any inefficiency in this chain results directly in financial loss, customer dissatisfaction, fuel wastage, and resource underutilization.

During my internship at Sheetla Car Transport, an MSME operating in regional automobile logistics, I gained firsthand understanding of real operational complexities. Observing daily processes revealed that despite strong work ethic and operational capability, the company struggled with efficiency due to heavy reliance on manual systems and traditional planning approaches. I witnessed delays caused by documentation errors, miscommunication between drivers and office, transit unpredictability, lack of live tracking, and customer frustration due to uncertainty in delivery progress. These experiences helped me identify clear improvement areas where structured planning and technological integration could significantly enhance productivity.

This research aims to study the operational workflow at Sheetla Car Transport, identify inefficiencies, analyse route performance patterns, and propose practical improvement strategies aligned with operational reality. The study bridges academic logistics theory with industry practice and demonstrates how MSMEs can enhance performance without substantial monetary investment.

II. OPERATIONAL WORKFLOW OVERVIEW

Through daily observation, I mapped and analysed the complete workflow process involved in automobile transportation. Understanding this process provided clarity on operational dependencies and bottlenecks.

Workflow Stages

Stage	Description
Order Booking & Scheduling	Customer booking received via phone, WhatsApp; scheduled manually
Vehicle Pickup & Inspection	Field staff inspect vehicles, prepare checklist, complete manual forms
Documentation & Permits	Insurance, RC copies, transport permits manually stored and verified
Carrier Loading	Vehicles loaded onto carriers using ramps, safety checks performed
Route Planning & Dispatch	Routes based on driver experience
Transit Monitoring	Driver phone updates only; limited visibility
Delivery	Unloading done and physical signature for completion
Billing	Offline payment processing often delayed

Workflow Bottlenecks

Bottleneck	Impact
Paper-based documentation	Delays, loss risk, duplication
Communication delays	High workload for operations team
No real-time tracking	Customer dissatisfaction
Intuition-based routing	Cost & time unpredictability
Manual scheduling	Inefficient fleet utilization

III. INDUSTRY COMPARISON

Parameter	Large Logistics Firms	MSME: Sheetla Car Transport
Fleet Tracking	Real-time GPS/Telematics	Manual driver calls
Documentation	Digitized & automated	Paper-based
Route Planning	AI predictive tools	Driver intuition

Customer Interface	Web portal + App	Phone/WhatsApp
Delivery Proof	Digital PoD	Manual signatures
Scheduling	Centralized planning	Verbal coordination

Insight: The performance gap is driven by lack of structured information systems, not workforce capability.

4.Literature Review

Researchers state that logistics performance is directly associated with the level of technological integration and process automation. According to Rushton & Walker (2017), modern logistics systems require synchronization across workflow stages, supported by real-time data and centralized visibility. Without automation, delays and service inefficiencies become unavoidable.

Lean logistics emphasizes eliminating non-value-added activities such as paperwork redundancy, idle vehicle time, rework, unnecessary communication, and movement waste. Applying Lean principles results in improved flow, faster throughput, and reduction in operational cost.

Telematics systems provide remote access to vehicle movement, enabling real-time decision-making and proactive response to unexpected delays. Kumar & Bansal (2021) explain that organizations adopting telematics experience improvements in route accuracy, communication reliability, and driver management efficiency.

Automated documentation prevents administrative delays and loss of important records, ensuring transparency and audit traceability (Rogers, 2018). Predictive routing supported by AI and machine learning analyzes historical performance, traffic patterns, weather impact, toll costs, and route preferences to identify the most economical travel path (Miller, 2016).

Sharma & Patel (2020) emphasize that digital transformation barriers in MSMEs are mainly cultural resistance to change, limited technical capability, or perception of high cost. However, multiple studies confirm that small-scale logistics firms can improve performance using low-cost digital solutions without requiring large investments.

5. Research Methodology

This research follows a mixed-method descriptive approach combining qualitative observation and estimated quantitative analysis.

Data Collection

Data Type	Method
Primary	Real-time workflow observation, shadowing drivers & operations
Interviews	Informal discussions with operations manager & drivers
Secondary	Academic journals, industry reports, comparative studies
Analytical	Route and delay evaluation

Research Design

Component	Explanation
Descriptive	Documenting real operational behaviour
Case Study	Single organization deep evaluation
Experiential Learning	Practical participation
Benchmark Comparison	Comparing MSME vs. large company model

Scope and Limitations

Scope	Limitation
Real automotive logistics process	Limited access to confidential cost data
Observed dispatch cycles	No real-time GPS analytics available
Four major route analysis	Single firm case study

6. Data Analysis & Findings

Route Comparison Analysis

Route	Distance	Time	Toll Load	Fuel Impact	Risk
Guntur – Hyderabad	270 km	6 hrs	Low	Low	Low
Guntur – Chennai	450 km	8 hrs	Medium	Medium	Medium
Guntur – Bangalore	610 km	10 hrs	High	High	Medium
Guntur – Mumbai	990 km	18–20 hrs	Very High	Very High	High

Interpretation

- Mumbai route is highly vulnerable to unpredictable delays.
- Toll/fuel cost variation increases financial risk.
- Lack of GPS tracking magnifies uncertainty.

Issue–Impact Analysis

Issue	Impact	Severity
Manual documentation	Delays, errors	High
No GPS tracking	Poor visibility	Very High
Intuition route	Fuel & time inefficiency	High
Communication gaps	Operational pressure	Medium
No digital PoD	Audit difficulty	Medium

Deeper Interpretation

The data indicates that dispatch time could be reduced by 25–40 minutes if documentation were digitized. Similarly, lack of real-time tracking resulted in repeated communication cycles, consuming operational bandwidth. Route unpredictability increased fuel cost, which could otherwise be optimized through route simulation tools.

Additional patterns observed:

- Manual processes delay throughput by accumulating inefficiencies
- Drivers experience communication pressure due to repeated calls
- Customer satisfaction declines when uncertainty increases
- Lack of performance metrics prevents continuous improvement

Operational insights showed differences in perception between drivers and office staff. Drivers prioritized avoiding toll expenses, while management prioritized time reliability. This conflict directly affected cost-time balance.

7. Discussion

The findings from this case study clearly show that information flow, rather than physical assets alone, is the main driver of operational efficiency in MSME automobile logistics. Manual documentation, intuition-based routing, and phone-based communication created repeated delays and uncertainty even though the workforce was experienced and committed. This aligns with logistics digitalisation studies which argue that visibility, standardised processes, and real-time data are essential to reduce variability and waste in transport operations.

The observed bottlenecks strongly reflect classic lean logistics waste categories such as waiting time, over-processing, unnecessary movement, and rework. Paper-based records resulted in duplication and errors, while the absence of structured performance metrics prevented systematic elimination of recurring issues. As seen in broader MSME research, the challenge was not the lack of awareness of problems but the absence of simple digital tools and change management practices to address them.

Human and behavioural factors emerged as equally important as technical gaps. Drivers prioritised avoiding toll costs and sticking to familiar routes, whereas management prioritised on-time delivery and customer satisfaction, leading to conflicting decisions that were resolved by intuition instead of data. Similar tensions between operational staff and management have been reported in MSME digital transformation literature, which emphasises the need for participative implementation and training when introducing telematics and routing software.

The case also reinforces evidence that telematics and basic fleet tracking can transform decision-making in small fleets without large capital outlays. Real-time GPS data, automated alerts, and simple dashboards can reduce the need for constant phone calls, improve customer communication, and support more rational route selection. In line with national logistics and MSME competitiveness objectives, incremental adoption of such tools can help small transporters like Sheetla Car Transport integrate better with formal supply chains and e-commerce networks.

8. Conclusion

This study concludes that operational efficiency in MSME automobile logistics is significantly constrained by manual processes, fragmented information flows, and limited use of digital tools across day-to-day activities such as booking, documentation, routing, and customer communication. The detailed examination of Sheetla Car Transport's workflow showed that paper-based documentation, intuition-driven route planning, and phone-dependent coordination collectively created avoidable delays, cost variability, and inconsistent service quality, even though the firm has capable staff and strong work ethic. By mapping each step from order booking to billing, the research made visible how small inefficiencies accumulate into larger performance gaps when information is not captured and shared systematically.

At the same time, the case demonstrates that these constraints are not structural or irreversible; they can be addressed through targeted, low-cost digital interventions that are feasible for MSMEs. Simple measures such as digitising trip documents, using

cloud storage for permits and PoDs, and adopting basic GPS tracking for carriers can immediately reduce uncertainty and dependency on verbal updates. When combined with even a basic level of route analysis, these tools enable better choices on distance, tolls, and risk, and help align driver practices with management priorities for reliability and customer satisfaction. In this sense, technology becomes a practical enabler of lean logistics by eliminating rework, reducing waiting time, and improving visibility without demanding large-scale capital expenditure.

The findings also reinforce the view that technology should be treated as a decision-support system rather than a replacement for human judgment. Driver experience about road conditions, safe parking locations, and local risk factors remains invaluable, but its impact becomes more powerful when complemented by data from telematics, digital records, and route analytics rather than being used in isolation. When data and experience are integrated, MSME logistics firms can move from reactive firefighting to proactive planning, using objective information to negotiate with customers, schedule trips realistically, and manage exceptions more calmly. This shift from intuition alone to evidence-informed decision-making is central to building more consistent, transparent, and predictable operations.

9. Recommendations

The findings of this case study led to a set of phased recommendations that MSME automobile logistics firms can realistically implement.

Immediate actions (0–6 months).

First, the company should introduce a simple digital document management system using cloud storage or transport management software to capture booking details, inspection checklists, permits, and proof of delivery in a structured and searchable format. This will reduce errors, prevent loss of records, and shorten documentation time before dispatch. Second, basic GPS-based telematics devices should be installed on carriers to enable live tracking, automated location updates, and geofencing alerts. Third, automated SMS or WhatsApp notifications can be configured to inform customers when vehicles are dispatched, in transit, and delivered, reducing the volume of manual follow-up calls.

Medium-term initiatives (6–18 months).

In the next phase, Sheetla Car Transport can develop a simple online booking and tracking portal where customers can submit transport requests, view status updates, and download digital proof of delivery. Integrating this portal with basic route planning or simulation tools will support data-driven selection of routes based on distance, toll cost, historical delays, and risk levels. The company can also introduce service level agreements (SLAs) with indicative delivery windows for key corridors, using telematics data to monitor adherence and identify recurring bottlenecks.

Long-term strategic actions (18 months and beyond).

Over the longer term, the firm can explore AI-enabled predictive routing tools that factor in traffic patterns, seasonality, and past performance, especially for long-distance routes such as Guntur–Mumbai. Fleet modernisation decisions can be guided by telematics data on utilisation, idle time, and maintenance history, helping to prioritise which vehicles to replace or upgrade. Finally, building a data analytics dashboard with key performance indicators (on-time delivery rate, average delay, fuel cost per kilometre, number of customer calls per trip) will institutionalise continuous improvement and professionalise operations to match larger logistics players.

10. Practical Implications

The practical implications of this research extend notably to owners and managers of MSME logistics firms operating with thin margins, limited managerial bandwidth, and constrained access to technology. The case of Sheetla Car Transport illustrates that a clear, structured process mapping combined with carefully selected digital investments unlocks disproportionate improvements in operational efficiency, visibility, and customer satisfaction. Instead of pursuing costly, complex enterprise resource planning systems, MSMEs can begin by adopting affordable, scalable technologies such as GPS-based telematics solutions, cloud-based

document storage, and automated customer communication tools. These allow firms to fit digital transformation to their scale, complexity, and operational realities, minimizing disruption while building foundations for gradual growth.

For policymakers, technology vendors, and financial institutions supporting MSME digitalization, this study underscores the critical need for targeted awareness campaigns, accessible training programs, and tailor-made financing products. Lowering the barriers to adoption—whether cultural, informational, or financial—is essential for making telematics and logistics software usable and attractive to small transport operators. Technology providers should design modular, subscription-based digital solutions explicitly for the logistics segment's unique needs and constraints, focusing on ease of use, mobile accessibility, and integration with popular communication apps like WhatsApp. Government schemes and industry associations can link financial incentives and capacity-building initiatives to measurable improvements in logistics formalization, supply chain transparency, and service quality.

Moreover, increasing digital maturity among MSMEs creates broader economic benefits by enhancing the competitiveness of India's logistics ecosystem. As MSMEs improve their operational transparency and data-driven decision making, they can participate more effectively in evolving digital supply chains, e-commerce platforms, and global value networks. This transformation not only boosts individual firm resilience but also strengthens the supply chain's responsiveness, reduces carbon footprint through optimized routing, and ultimately contributes to national economic goals such as reducing logistics costs below 8% of GDP. Thus, the digital transformation of MSME logistics is aligned with wider initiatives like the National Logistics Policy, Digital India, and Start-Up India, playing a pivotal role in empowering the MSME sector to thrive in a rapidly digitizing global marketplace.

11. Limitations

- Short internship research window
- Lack of detailed cost database
- Single geographic observation

12. Future Research Scope

Future research may explore:

- Cost-benefit modelling of digital tools in MSME logistics
- Performance evaluation after telematics adoption
- Comparative studies across multiple logistics regions
- Digital twin simulation for route optimization
- Customer satisfaction impact of tracking transparency

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