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Procurement Optimization and Cost Reduction in Assistive Mobility Manufacturing: A Study on NeoMotion Pvt. Ltd.

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Abstract: This paper presents a case study on procurement optimization and cost-saving strategies implemented at NeoMotion Pvt. Ltd., a pioneering startup in the assistive mobility sector. The study focuses on the company's sourcing processes for components like cushion covers, zippers, fabrics, reflective materials, and aluminum tube end caps used in customized wheelchair models such as NeoFly and NeoBolt. Using tools like Pareto analysis, cost-benefit comparisons, vendor evaluation matrices, and root cause analysis, the project identifies cost drivers, supplier inefficiencies, and material wastage. The interventions implemented—vendor negotiation, design optimization, and parallel sourcing—led to a 15% BOM cost reduction, 12% material saving, and improved lead times. This study highlights the significance of structured procurement systems in enhancing quality and operational efficiency in emerging manufacturing setups.

I. INTRODUCTION

The assistive mobility sector is growing rapidly due to the rise in geriatric and physically challenged populations. NeoMotion Pvt. Ltd., an IIT Madras-incubated company, designs customizable wheelchairs for Indian terrain and user comfort. However, being a startup with a high-mix, low-volume production model, it faces procurement challenges such as limited vendor options, long lead times, high costs, and inconsistent quality.

This project aimed to evaluate the company's sourcing systems for cost-intensive components and suggest actionable improvements. With a focus on cushion-related parts and small mechanical accessories, the study integrates real-time data with supply chain frameworks to achieve measurable savings and process efficiency.

STATEMENT OF PROBLEM:

NeoMotion was incurring high costs in raw material procurement and experiencing procurement delays due to:

- Lack of alternate vendor sources
- Manual cost comparisons
- Design-related material wastage
- Long lead times and poor negotiation margins

Without structured sourcing and performance evaluation systems, operational delays and budget overruns hindered timely delivery and product scalability. This inefficiency not only resulted in operational disruptions but also constrained product delivery timelines, reducing competitiveness and scalability potential in the assistive mobility sector.

OBJECTIVES OF THE STUDY:

- To analyze high-cost contributors using Pareto analysis
- To evaluate vendor cost and performance using matrices
- To reduce fabric wastage through design optimization
- To minimize lead times by on boarding alternate vendors
- To collaborate with R&D for ergonomic and cost-effective component design
- To enhance procurement reliability through process improvement

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The study also aimed to promote sustainability by minimizing resource wastage and introducing a structured vendor selection framework that balances cost, quality, and delivery timelines.

II. METHODOLOGY

The study followed a descriptive and exploratory research design with a qualitative focus. Data collection was done through observation, vendor interviews, interaction with the R&D team, and procurement documentation. Analytical tools used include:

- **Pareto Analysis** to identify major cost contributors (e.g., fabrics, zippers)
- **Vendor Evaluation Matrix** using a weighted scorecard (cost, quality, delivery)
- **Cost-Benefit Analysis** comparing existing and new vendors
- **Wastage Analysis** to monitor fabric and material loss
- **Fishbone Diagram** for root cause identification
- **Process Flow Mapping** to visualize the procurement cycle

In addition to primary data, secondary sources such as previous audit reports, supplier records, and industry benchmarks were reviewed to validate the findings and reinforce proposed solutions.

III. ANALYSIS AND FINDINGS

BOM Cost Reduction

Negotiation with new vendors and alternate sourcing reduced average component costs by 15% while maintaining quality. Threads, zippers, and fabric saw the highest savings.

Detailed comparative charts and cost sheets showed that new vendors provided savings ranging from ₹1.50 to ₹3.00 per unit, depending on volume and material type.

Material Optimization

Pattern reconfiguration and lean cutting techniques led to a 12% reduction in fabric wastage, verified through before-and-after layout analysis.

The introduction of reusable cutting templates and alignment jigs helped standardize production, minimizing inconsistencies and improving fabric yield.

Vendor Evaluation

Out of four shortlisted vendors, two were onboarded using a scoring model. Vendor A scored highest (79.5%) based on reliability and cost.

Scores were weighted as: 30% cost, 25% quality, 20% delivery time, 15% communication, and 10% technical support. This structured approach provided clarity and objectivity.

Lead Time Improvement

Through better vendor coordination and dual sourcing, procurement lead time reduced from 10–12 days to 6–8 days, improving production flow.

Time stamps from PO generation to GRN entry were tracked over 2 months to establish improvement metrics.

R&D Collaboration

Product design enhancements such as ergonomic cushion shaping and waterproof inner covers were introduced without increasing cost.

The R&D team also assisted in selecting alternate thread and fabric types to balance functionality, durability, and cost.

SUGGESTIONS

- Implement a structured vendor rating system
- Digitize procurement tracking and documentation
- Conduct regular vendor audits
- Maintain a backup vendor database
- Train internal staff on lean procurement practices

Additionally, it is recommended that NeoMotion develop a centralized supplier database with performance history and establish long-term contracts with high-performing vendors to ensure price stability.

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IV. CONCLUSION

This study demonstrates the strategic value of optimizing procurement operations within an emerging assistive technology manufacturer. The use of practical tools, cross-functional collaboration, and structured evaluations enabled measurable improvements in cost, quality, and process efficiency.

By implementing low-cost, high-impact changes, the company has improved not only its procurement process but also set the groundwork for scalable operations. Future efforts can focus on integrating ERP tools and automating vendor scorecards to enhance real-time decision-making.

The project enhanced the researcher's understanding of procurement dynamics, vendor management, and real-time decision-making. The findings serve as a model for cost-efficient sourcing strategies in small to mid-sized manufacturing enterprises.

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