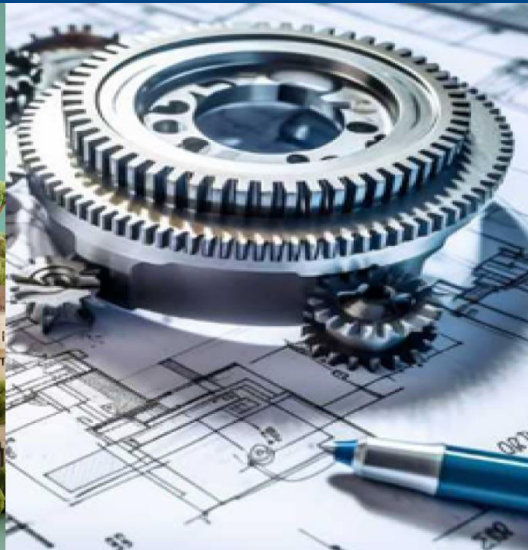
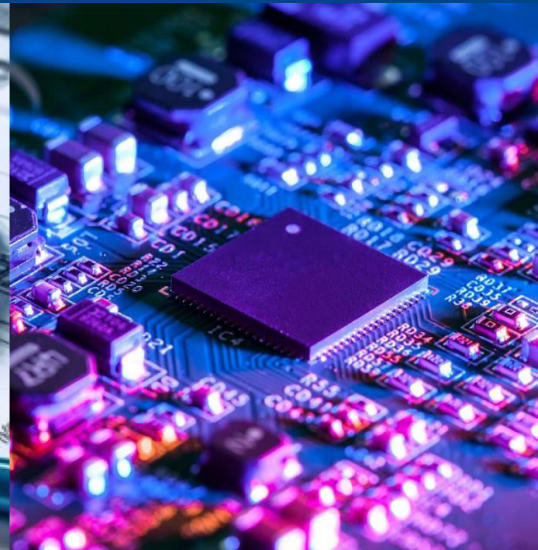
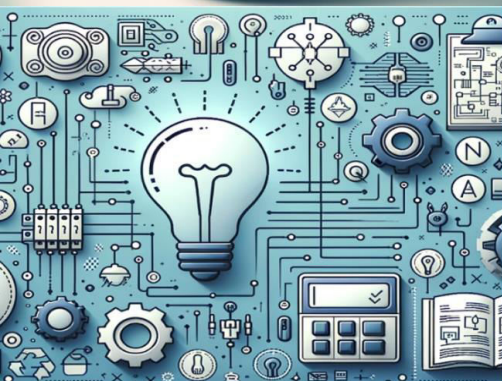




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An Analysis of Supply Chain Management Practices

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ABSTRACT: Supply chain management plays an important role in coordinating procurement, suppliers, inventory, logistics, information sharing and delivery. This article examines supply chain and operations practices using responses from 30 respondents associated with the study organisation. A descriptive research design was adopted, and primary data were collected through a structured questionnaire. Percentage analysis, Chi-Square tests, One-Way ANOVA, regression and correlation were used to analyse the responses at the 5% significance level. The descriptive results identify transportation delays, inventory tracking, supplier communication and component traceability as important areas for attention. Statistical tests show significant associations between operational challenges and preferred procurement improvements, and significant differences in perceived traceability effectiveness across methods and logistics-partner performance across assessment criteria. The article recommends stronger supplier communication, improved inventory visibility, structured logistics-partner evaluation and integrated risk planning.

KEYWORDS: Supply chain management, procurement, inventory management, logistics, traceability, supplier relationship, operations performance.

I. INTRODUCTION

Supply chain management involves the planning and coordination of procurement, inventory, transportation, production and information flows from suppliers to customers. Effective supply chain practices help organisations maintain material availability, control costs, improve quality and deliver products or projects on time. In project-based and engineering environments, delays in a single critical component can affect assembly, testing, dispatch and customer delivery. Coordination among procurement, suppliers, operations, quality and logistics is therefore essential. This article focuses on supply chain management practices and the operational issues identified through questionnaire responses. Particular attention is given to procurement communication, inventory tracking, transportation delays, supplier relationships, sustainability and traceability.

II. NEED AND OBJECTIVES OF THE STUDY

The study is needed to understand how procurement, supplier coordination, inventory control, logistics and information sharing influence operational performance. It also seeks to identify practical areas where supply chain processes can be improved.

- To understand the existing supply chain management process.
- To examine procurement practices and supplier coordination.
- To study inventory management and material availability.
- To assess information sharing and logistics-related challenges.
- To identify improvement opportunities based on respondent feedback and statistical analysis.

III. REVIEW OF LITERATURE

The literature reviewed in the source report highlights the growing importance of digitalisation, process integration, supplier integration and resilience in supply chains. Studies published between 2024 and 2026 discuss how digital



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technologies and integrated information flows can improve visibility, agility, operational performance and the ability to respond to disruptions. Research on green supply chain management also connects sustainable practices with environmental, operational and broader organisational performance.

Other studies reviewed address Industry 4.0 technologies, traceability, inventory automation and reinforcement learning for inventory management. Collectively, the literature suggests that organisations can strengthen supply chain performance through reliable data, collaborative supplier relationships, improved inventory visibility and coordinated risk-management practices. These themes provide a basis for interpreting the survey findings.

IV. RESEARCH METHODOLOGY

The study used a descriptive research design to examine current practices and respondent perceptions. Primary data were collected through a structured questionnaire. The source report describes a sample of 30 respondents selected using convenience sampling, based on availability, accessibility and willingness to participate. Secondary information was drawn from research articles, journals, reports and relevant published material.

The analysis used percentage distributions to summarise responses. Chi-Square tests were used to examine associations between categorical variables, One-Way ANOVA to compare group means, and regression/correlation to assess relationships between selected variables. Statistical tests were evaluated at the 5% significance level ($\alpha = 0.05$).

V. RESULTS AND DISCUSSION

5.1 Descriptive Findings

- Transportation delays were the most frequently reported challenge, selected by 43.3% of respondents.
- Inventory management software was reported by 90% of respondents as the method used to manage inventory and replenishment.
- Enhanced communication with suppliers was the most frequently selected procurement improvement, at 46.7%.
- Enhanced inventory tracking systems were selected by 43.3% as an important improvement to logistics and supply chain operations.
- 76.7% of respondents reported having experienced transportation or shipping delays.
- 50% considered sustainability and environmental responsibility very important in procurement decisions.
- Barcoding was the most frequently selected traceability method (43.3%), followed by RFID (36.7%) and blockchain (20%).
- Regular supplier meetings were the most frequently reported approach to managing supplier relationships (43.3%).

5.2 Chi-Square Analysis

The relationship between operational challenges and procurement improvements was statistically significant ($\chi^2 = 34.289$, $df = 12$, $p = 0.0006$). The null hypothesis was rejected, indicating that the type of challenge reported was associated with the procurement improvement respondents preferred.

The association between suggested logistics improvements and risk-mitigation measures was not statistically significant ($\chi^2 = 7.942$, $df = 6$, $p = 0.2424$). The analysis therefore did not establish a significant relationship between these two variables in the sample.

5.3 One-Way ANOVA

The difference in mean ordering lead time across cost-priority groups was not statistically significant ($F = 1.285$, $p = 0.2930$). This suggests that the reported approach to prioritising cost-effectiveness was not associated with a statistically significant difference in average lead time in this sample.

Perceived traceability effectiveness differed significantly across barcoding, RFID and blockchain methods ($F = 8.941$, $p = 0.00105$). The reported mean scores were 6.37 for barcoding, 7.09 for RFID and 8.41 for blockchain. Logistics-partner assessment scores also differed significantly across criteria ($F = 9.117$, $p = 0.0009$). On-time delivery received the highest mean score (8.51), compared with cost competitiveness (7.07) and damage/loss rate (6.56).



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5.4 Regression and Correlation

The report identified a moderate positive relationship between age and reported stress/tension symptoms ($r = 0.504$, $p = 0.00451$; $R^2 = 0.254$). This result is an association in the sample and should not be interpreted as proof that age causes stress.

The relationship between rated operational efficiency and the perceived importance of optimisation was not statistically significant ($r = -0.011$, $p = 0.9543$). Respondents' rating of current efficiency was therefore not significantly related to how important they considered optimisation.

VI. KEY FINDINGS

- Transportation and shipping delays are prominent operational concerns.
- Supplier communication is a major perceived opportunity for improving procurement.
- Inventory tracking and visibility deserve continued attention, even where inventory software is already used.
- Respondents rated blockchain as the most effective of the three traceability methods examined, followed by RFID and barcoding.
- Logistics partners were rated more highly for on-time delivery than for cost competitiveness or damage/loss control.
- Operational challenges and preferred procurement improvements were significantly associated, while the link between logistics-improvement preferences and risk-mitigation measures was not significant.
- The study is limited by its sample of 30 respondents, time constraints, restricted access to some operational information and reliance on respondent perceptions.

VII. SUGGESTIONS

1. Improve communication with suppliers through regular status updates, clear purchase specifications, shared delivery schedules and prompt escalation of delays.
2. Strengthen inventory tracking by maintaining accurate stock records, monitoring critical components and using alerts for low stock and delayed replenishment.
3. Review logistics partners using a balanced scorecard covering on-time delivery, cost, damage/loss, responsiveness and service quality.
4. Connect logistics improvement plans with supply-chain risk management so that transport, inventory and supplier risks are reviewed together.
5. Assess RFID or blockchain-based traceability for critical components through a phased pilot, considering cost, data quality, integration and staff training before wider implementation.
6. Continue supplier performance reviews and collaborative planning to identify recurring problems and agree corrective actions.
7. Include sustainability and regulatory compliance in procurement decisions and supplier evaluation.

VIII. LIMITATIONS

The study is based on 30 respondents and convenience sampling; therefore, its findings may not represent the views of the full workforce or other organisations. The study was completed within a limited period, some internal operational information was not available, and responses may reflect individual experiences. The results should be interpreted within these limitations.

IX. CONCLUSION

The study indicates that effective supply chain management depends on coordinated procurement, supplier communication, inventory visibility, reliable transportation and appropriate traceability. Transportation delays were the most frequently reported challenge, while supplier communication and inventory tracking emerged as important improvement areas. Statistical analysis also identified differences in perceived traceability effectiveness and logistics-partner performance across assessment criteria. A more integrated approach to supplier coordination, inventory monitoring, logistics evaluation and risk planning could help improve operational reliability. Since the study uses a small convenience sample, the findings should be treated as indicative rather than universally generalisable.



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The source report includes a bibliography covering supply chain optimisation, digitalisation, sustainability, Industry 4.0, reverse logistics and related topics. The article should retain and verify the original references before academic submission; bibliographic details were not independently validated for this condensed article.

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