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# Enhancing Operational Efficiency: Supply Chain Management Strategies in Manufacturing

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**Abstract**

The goal of the current study is to determine the difference in the adoption and agreement levels of different supply chain management (SCM) techniques among Indian paint companies. An empirical investigation involving paint firms was conducted. Multiple regression analysis was performed to examine the link between dependent and independent variables, and the Paired Samples t-test was employed to determine the variation in agreement and adoption level of different SCM approaches. The degree of agreement with SCM procedures and the degree of adoption of these practices in the responses from Indian paint companies were found to differ significantly. There is a strong link between SCM practices and an organization's operational performance. The study must be generalized because it was restricted to the Indian paint business.

**Keywords:** supply chain management, operational performance, manufacturing sector

## Introduction

The supply chain is crucial for delivering products to customers at the right time, under suitable conditions, and at a lower cost. However, it can be complicated and unpredictable, leading to supply-demand imbalances. To address these issues, the "smart supply chain" concept emerged, a modern networked commercial framework that uses statistics to manage complexity and risk. Smart technology, such as AI, algorithms, and big data, can enhance efficiency and competitiveness in Industry 4.0 and manufacturing by connecting resources within organizations and the supply chain. This study intends to develop operational excellence and improve the organization's environmental information processing skills by establishing a strong connection between these aspects. The study shows how smart supply chains, smart technology, and operational performance are related, adding theoretical information and real-world examples to the body of current knowledge. It focuses on the interconnected supply chain, intelligent supply chain, and instrumented supply chain as three indications of the smart supply chain. Businesses that comprehend these metrics can use intelligent supply chains to improve operational performance or make focused investments.

## Operational performance

Performance is a set of metrics used to measure the efficiency and effectiveness of supply chain processes and relationships across multiple organizational functions and firms. To improve performance, organizations must accurately measure it. Previously, performance was measured by cost, but over time, more financial indicators were added, such as return on asset and return on investment. The balance scorecard approach added operational indicators, and other approaches included quantitative or qualitative measures, strategic, tactical, and operational measures. A comprehensive review revealed that for good performance measurement, all members should be considered, considering both financial and non-financial items, all levels of the supply chain, and all processes of the supply chain. A model has been developed for measuring overall performance, considering cost, quality, flexibility, customer satisfaction, capacity, time, and consistency.

**Literature review**

The theory of operational performance in the manufacturing sector is examined in this paper. Increasing the degree of smart technology may improve the manufacturing supply chain's performance, according to 18 earlier studies. All technical developments, therefore, cannot guarantee optimal operational performance in the manufacturing sector. Moreover, it's possible that many companies lack the know-how to advance their smart technology capabilities, which would obscure the overall effects of smart supply chain strategies on manufacturing companies' operational performance.

**Usoro, A. A. (2023).** Investigated on Impact of system integration of automation and autonomation supply chain strategies in operational performance of manufacturing firms.The study investigates the relationship between automation and autonomation supply chain strategies and manufacturing firms' operational performance. Data was collected from 415 Nigerian employees using a structured questionnaire. The research found a significant relationship between automation and autonomation strategies and the operational performance of manufacturing firms, bridging a knowledge gap in this area.

**Farooq, S. (2020).** Explored on Supply chain risk management and operational performance: The enabling role of supply chain integration. This paper explores the relationship between supply chain integration (SCI) and supply chain risk management (SCRM) to improve operational performance. Using data from 931 manufacturing companies, the study finds that internal, supplier, and customer integration positively affect SCRM, with internal integration partially mediated by supplier and customer integration. SCRM partially mediates the relationship between internal integration and operational performance, and fully mediates the association between supplier and customer integration.

**El Khatib, M. (2023).** Investigated on Adopting smart supply chain and smart technologies to improve operational performance in manufacturing industry. The study investigates the relationship between smart supply chains and operational performance in the manufacturing industry. A survey questionnaire was conducted among registered industries, and four hypotheses were supported. The findings suggest that implementing smart technologies can enhance operational performance, providing valuable insights for policymakers, academics, and industry practitioners to improve competitiveness.

**Sohu, S. (2018).** Investigated on The impact of supply chain collaboration on operational performance: Empirical evidence from manufacturing of Malaysia. This study investigates the potential benefits of supply chain collaboration in Malaysia's manufacturing sector, focusing on the impact of information sharing and joint decision making approaches. The research, conducted using factor analysis and SPSS, found that these approaches significantly affect operational performance, while Electronic Data Interchange (EDI) did not have a significant effect. The manufacturing sector's growth rate and economic shift towards China and India pose challenges for its performance.

**Research Methodology**

Indian paint producers face intensifying rivalry, requiring firms to enhance operational performance and gain a competitive edge. Supply chain management is crucial for reducing costs and maximizing customer value. Strategic planning and management of supply chain practices can help Indian firms thrive in this competitive market.

**Objectives of Study**

- To analysis the Supply chain management strategies in manufacturing practices in Indian paint industry.
- To assess the impact of information & communication technology tools to Supply chain management strategies in manufacturing

**Research Hypotheses**

The study has been carried out with following hypotheses:

**H1:** There is significant difference in agreement level and Supply chain management strategies in manufacturing practices in Indian paint industry.

**H2:** Information & communication technology (ICT) tools and impact of information & communication technology tools to Supply chain management strategies in manufacturing.

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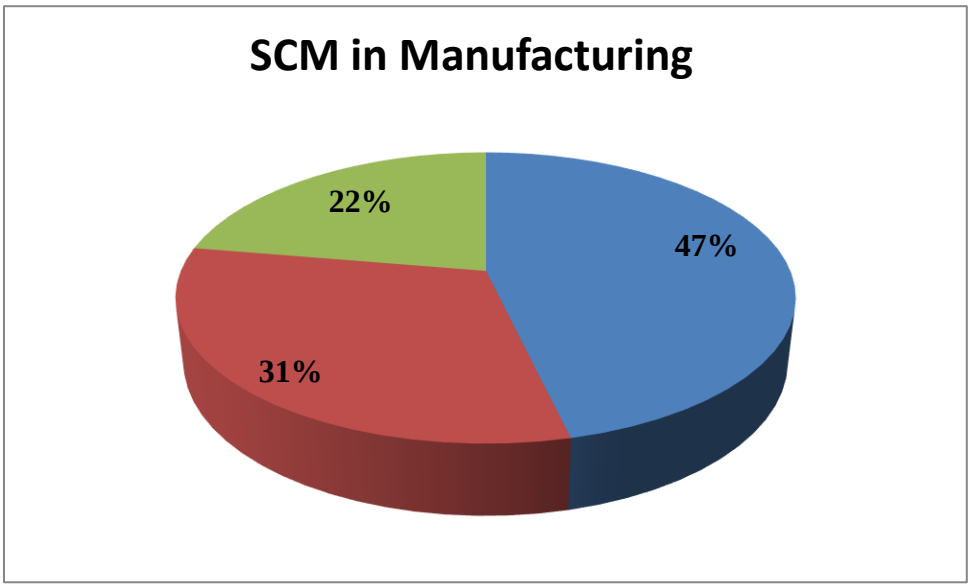
**Sampling of Paint Companies**

This study focuses on supply chain management (SCM) issues in Indian paint companies, targeting managers or executives. The sample includes all paint companies registered in the Confederation of Indian Industry (CII). The study adopted simple random sampling, with a response rate of dismal. The study then adopted judgmental sampling to cover the top 15 companies in both decorative and industrial coatings segments. Secondary data was collected through CII reports, CMIE, research reports, and company websites. Primary data was collected through questionnaires, interviews, and discussions with managers and executives. The study used operational performance as a dependent variable and SCM enablers as independent variables, including ICT practices, strategic sourcing, supply chain manufacturing, inventory and warehouse management systems, transportation and distribution management systems, and customer relationship management practices. The questionnaire was pre-tested and self-administered to respondents.

**Operational performance**
**Chart 1**




From above chart show that 47 per cent of SCM in SME's ( Less than 75 employees) And 31 per cent in Sme's ( between 75 to 200 employees) and 22 per cent Large manufacturing.

**Result of Paired Sample T- test**
**Table 1**

| Sl. | Factor | T | P |
|---|---|---|---|
| 1. | Information and Communication Technology Practices | 6.233 | 0.074 |
| 2. | Strategic Sourcing and Supplier Relationship Practices | 9.392 | 0.131 |
| 3. | Supply Chain Manufacturing, Inventory | 5.784 | 0.899 |
| 4. | Warehousing Management Systems | 8.306 | 0.099 |
| 5. | Transportation and Distribution Management Systems | 6.68 | 0.822 |
| 6. | Customer Relationship Management | 7.954 | 0.836 |

The mean values were used to know the differences between agreement level and adoption level of various SCM practices by Indian paint companies. A significant difference in opinion about agreement and adoption level of various SCM practices was found. There was less difference found between agreement level and adoption level in the case of Information and Communication Technology Practices, Strategic Sourcing and Supplier Relationship Practices, Supply Chain Manufacturing, Inventory, Warehousing Management Systems, Transportation and Distribution Management Systems and Customer Relationship Management a significant difference was found. There were various reasons behind the differences between agreement and adoption level of different SCM practices such as lack of information and awareness

about various ICT practices and tools, ICT enabled techniques such as ERP practices, data warehousing and data mining techniques and understanding the utilities of such techniques among paint companies.

**Conclusion and implications**

The study explores the impact of smart supply chains and technologies on Malaysia's manufacturing industry's operational performance. It finds that implementing interconnected and intelligent supply chains alongside smart technologies is crucial for improving performance. The study highlights the importance of raising awareness and encouraging businesses to adopt smart supply chains for enhanced operations. It also highlights the influence of smart technology on decision-making within these chains, aiding in capacity planning decisions and enhancing operational performance.

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