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## ROLE OF SUPPLY CHAIN MANAGEMENT IN OPTIMIZING WORKING CAPITAL

*A Case Study of Tata Steel*

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**Abstract:** This study examines the role of Supply Chain Management (SCM) in optimizing working capital, with a specific focus on Tata Steel. In capital-intensive industries like steel, efficient management of working capital is crucial for maintaining liquidity, profitability, and operational stability. The research explores how effective SCM practices—such as inventory management, supplier coordination, demand forecasting, and logistics optimization—contribute to minimizing working capital requirements while ensuring uninterrupted production and distribution.

The study adopts a case study approach, analyzing Tata Steel's supply chain strategies to understand their impact on key working capital components, including inventory levels, accounts receivable, and accounts payable. By integrating advanced technologies, streamlined procurement systems, and strategic supplier relationships, Tata Steel has been able to reduce lead times, improve cash flow cycles, and enhance overall efficiency. The research highlights the company's use of just-in-time inventory practices, digital tracking systems, and strong vendor management as critical factors in optimizing working capital.

Furthermore, the study investigates the challenges faced in aligning supply chain operations with financial objectives, such as demand variability, global supply disruptions, and fluctuating raw material prices. It also evaluates how Tata Steel addresses these challenges through risk management strategies and adaptive supply chain frameworks.

The findings suggest that a well-integrated SCM system plays a vital role in reducing excess inventory, accelerating receivables, and optimizing payables, thereby improving the working capital cycle. The study concludes that organizations can achieve sustainable financial performance by aligning supply chain strategies with working capital management objectives. This research provides valuable insights for manufacturing firms seeking to enhance operational efficiency and financial health through effective supply chain practices.

**Keywords:** Supply Chain Management, Working Capital Optimization, Cash Conversion Cycle (CCC), Inventory Turnover, Debtors Turnover, Creditors Turnover, Correlation Analysis, Financial Performance

## **I. INTRODUCTION**

### *1.1 Background of the Study*

In the modern business environment, organizations focus on improving operational efficiency and financial stability. One of the most crucial aspects is the management of working capital, which ensures smooth day-to-day operations.

Working capital refers to the difference between current assets and current liabilities. It includes funds required for daily operations such as purchasing raw materials, paying salaries, and managing short-term obligations.

### *1.2 Concept of Working Capital*

Working capital acts as the “lifeblood” of an organization. Efficient management ensures liquidity and profitability.

#### **Types:**

- Gross Working Capital
- Net Working Capital
- Permanent Working Capital
- Temporary Working Capital

#### **Components:**

- Cash & Cash Equivalents
- Inventory
- Accounts Receivable
- Accounts Payable

### *1.3 Supply Chain Management (SCM)*

SCM involves the flow of goods from raw materials to final delivery. It includes:

- Planning
- Vendor selection
- Manufacturing
- Inventory management
- Distribution
- Delivery

### *1.4 Link Between SCM and Working Capital*

SCM directly affects:

- Inventory levels
- Receivables & payables
- Cash Conversion Cycle (CCC)

Efficient SCM reduces holding costs and improves liquidity.

### *1.5 Industrial Overview of Tata Steel*

Tata Steel, established in 1907, is one of India's leading steel manufacturers. Its integrated supply chain and strong financial management make it an ideal case study.

## **2. LITERATURE REVIEW**

### *1. Sawarni et al. (2022)*

Sawarni et al. (2022) examined the relationship between working capital management and firm profitability by focusing on the cash conversion cycle. The study found that firms with efficient working capital practices are able to maintain better liquidity positions while also improving profitability. It emphasized that reducing inventory holding periods and improving receivables collection significantly enhances cash flow. The authors also highlighted that firms adopting structured supply chain practices can better manage operational costs. Their findings support the idea that SCM and WCM are interdependent. Thus, efficient coordination between operations and finance is essential for business success.

### *2. Smith (2024)*

Smith (2024) focused on the integration of Supply Chain Management with financial decision-making processes. The study emphasized that organizations must balance liquidity and profitability by aligning supply chain operations with financial strategies. It was observed that firms using advanced SCM techniques such as digital tracking and automated inventory systems perform better financially. The author also discussed the importance of real-time data in improving decision-making. The research concluded that SCM integration helps reduce inefficiencies and enhances overall organizational performance. Hence, modern businesses must adopt integrated frameworks for sustainable growth.

### *3. Suresh & Kumar (2023)*

Suresh and Kumar (2023) analyzed the importance of ratio analysis in evaluating working capital efficiency. Their study highlighted that financial ratios such as current ratio, quick ratio, and inventory turnover are essential tools for measuring liquidity. They found that companies with better ratio performance tend to manage their working capital more efficiently. The authors also emphasized that proper inventory management plays a key role in maintaining financial stability. Furthermore, they suggested that organizations should regularly monitor these ratios to avoid liquidity risks. Their findings reinforce the importance of financial discipline in SCM practices.

### *4. Narayanan et al. (2019)*

Narayanan et al. (2019) explored the role of Supply Chain Management in improving operational and financial performance. The study concluded that integrated supply chain systems enable better coordination between different business functions. It also highlighted that efficient SCM reduces delays, improves delivery performance, and lowers operational costs. The authors found a strong link between supply chain efficiency and financial outcomes such as profitability and liquidity. They emphasized that firms adopting collaborative supply chain practices perform better in competitive markets. Therefore, SCM acts as a strategic tool for enhancing business performance.

### 5. Piao et al. (2024)

Piao et al. (2024) examined the impact of the cash conversion cycle on firm performance in modern business environments. The study found that a shorter cash conversion cycle leads to improved profitability and better liquidity management. It emphasized that companies should focus on reducing inventory days and accelerating receivables collection. The authors also highlighted the role of supply chain efficiency in improving financial outcomes. Their research confirmed that effective SCM practices contribute significantly to working capital optimization. Thus, firms must continuously monitor and improve their CCC.

### 6. Shin & Soenen (1998)

Shin and Soenen (1998) conducted one of the most influential studies on working capital management by analyzing the relationship between net trade cycle and profitability. Their findings indicated a strong negative correlation between cash conversion cycle and firm performance. The study suggested that firms can increase profitability by reducing the time taken to convert resources into cash. The authors emphasized efficient management of receivables, inventory, and payables. Their research laid the foundation for future studies on working capital efficiency. It remains a key reference in financial management literature.

### 7. Christopher & Lee (2004)

Christopher and Lee (2004) focused on the importance of coordination and real-time information sharing in supply chain management. They emphasized that lack of visibility in supply chains leads to inefficiencies and increased costs. The study highlighted that technology-driven SCM improves responsiveness and reduces uncertainties. It also discussed the importance of collaboration among supply chain partners. The authors concluded that effective SCM enhances operational efficiency and supports better financial outcomes. Their work is significant in understanding modern supply chain systems.

### 8. Wuttke et al. (2023)

Wuttke et al. (2023) examined the role of supply chain finance in improving working capital efficiency. The study introduced financial tools such as reverse factoring and dynamic discounting to optimize cash flow. It was found that these tools help firms maintain liquidity while strengthening supplier relationships. The authors emphasized that integrating financial solutions with supply chain operations improves overall efficiency. The study also highlighted the growing importance of digital finance in SCM. Their findings suggest that financial innovation is crucial for modern supply chains.

## **3. RESEARCH GAP**

- Lack of industry-specific studies in the steel sector
- Limited research on Tata Steel
- Lack of focus on modern SCM strategies (JIT, digital SCM)
- Insufficient real-world integration of SCM and financial performance

## **4. RESEARCH QUESTIONS**

1. What is the role of modern supply chain strategies for the effectiveness of working capital in Tata Steel?
2. How far the systematic supply chain contributes in the reduction of cash conversion cycle as well as optimizing working capital in Tata Steel?
3. What is the role of inventory management in liquidity and cash flow of Tata Steel industry?

## 5. RESEARCH OBJECTIVES

1. To observe and study the supply chain management practices in Tata Steel.
2. To analyze the impacts of supply chain management on working capital and cash conversion in Tata Steel.
3. To study the components of working capitals like inventory receivables and payables in Tata Steel.

## 6. RESEARCH METHODOLOGY

### *Research Design*

- Descriptive & Analytical
- Case Study Approach

### *Data Collection*

- **Primary:** Questionnaires, interviews
- **Secondary:** Annual reports, journals

### *Tools Used*

- Current Ratio
- Quick Ratio
- Inventory Turnover
- Debtors & Creditors Turnover
- Cash Conversion Cycle
- Correlation Analysis

### *Study Period*

- 5 Years

## 7. DATA ANALYSIS & HYPOTHESIS TESTING

### *Hypothesis*

**H<sub>0</sub>** - There is no integration between supply chain management and working capital for optimization process in Tata Steel

**H<sub>1</sub>** - There is an integration between supply chain management and working capital for optimization process in Tata Steel.

## Analysis (Conceptual)

## DATA COLLECTED

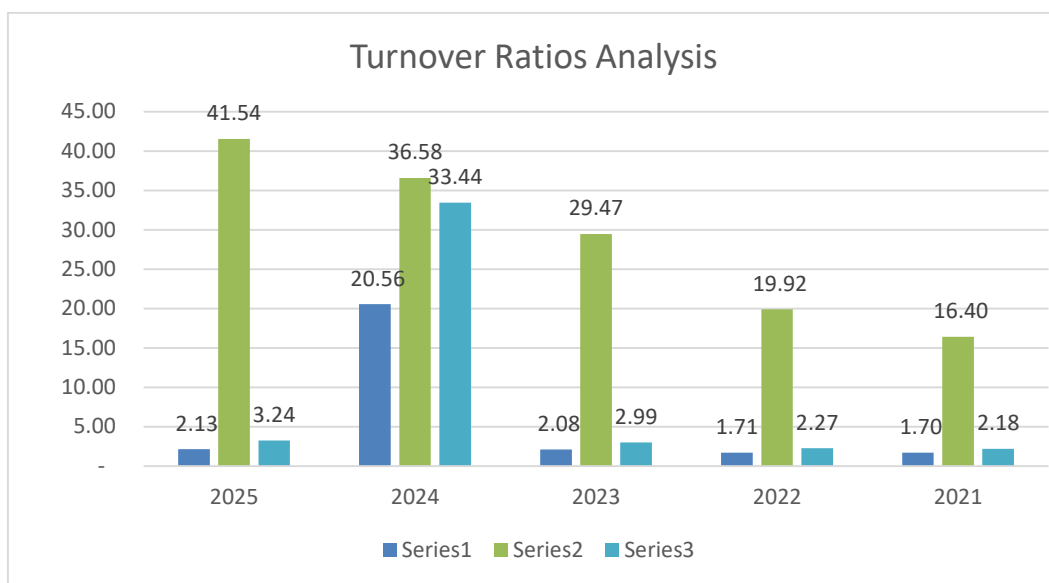
| YEAR | SALES       | COGS     | INVENTORY | DEBTORS  | CREDITORS |
|------|-------------|----------|-----------|----------|-----------|
| 2025 | 2,18,542.51 | 95000.65 | 44589.94  | 5260.06  | 29314.38  |
| 2024 | 2,29,170.78 | 1010916  | 49157.51  | 6263.53  | 30227.64  |
| 2023 | 2,43,352.69 | 113238.3 | 54415.33  | 8257.24  | 37832.54  |
| 2022 | 2,43,959.17 | 83478.74 | 48824.39  | 12246.43 | 36764.87  |
| 2021 | 1,56,477.40 | 56617.58 | 33276.38  | 9539.84  | 25967.49  |

## RATIO ANALYSIS

| INV<br>TURN. | DEB.<br>TURN. | CRED.<br>TURN. | INV.<br>DAYS | DEB.<br>DAYS | CRED.<br>DAYS | CCC   |
|--------------|---------------|----------------|--------------|--------------|---------------|-------|
| 2.13         | 41.54         | 3.24           | 171.31       | 8.78         | 112.62        | 67.47 |
| 20.56        | 36.58         | 33.44          | 17.74        | 9.97         | 10.91         | 16.81 |
| 2.08         | 29.47         | 2.99           | 175.39       | 12.38        | 121.94        | 65.83 |
| 1.70         | 19.92         | 2.27           | 213.47       | 18.32        | 160.74        | 71.05 |
| 1.70         | 16.4          | 2.18           | 214.52       | 22.25        | 167.40        | 69.37 |

## CORRELATION TABLE

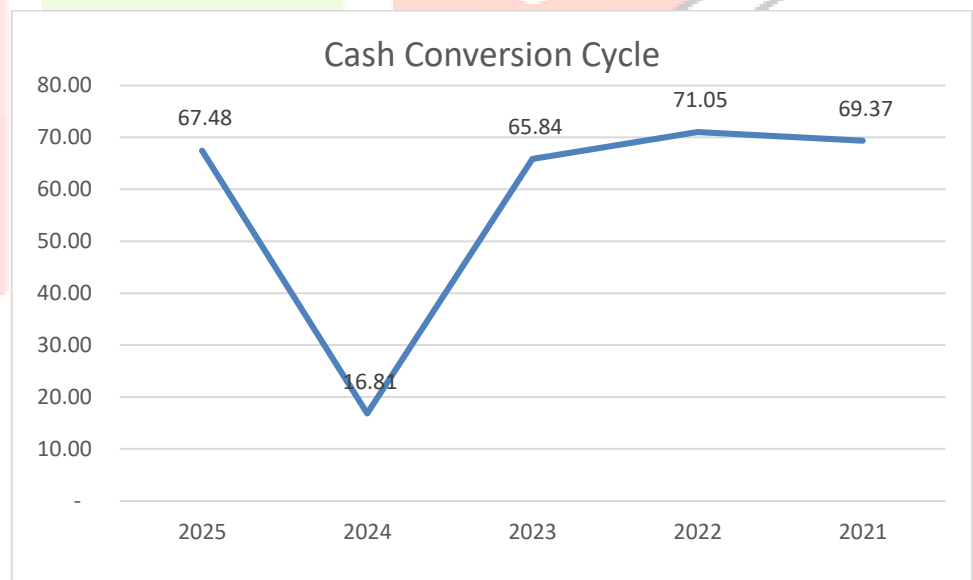
|         | 2.13054 | 20.5648 | 2.081   | 1.70978 | 1.70143 |
|---------|---------|---------|---------|---------|---------|
| 2.13054 | 1       |         |         |         |         |
| 20.5648 | -0.7092 | 1       |         |         |         |
| 2.081   | 0.97981 | -0.8358 | 1       |         |         |
| 1.70978 | 0.92693 | -0.9219 | 0.98323 | 1       |         |
| 1.70143 | 0.90809 | -0.9393 | 0.97348 | 0.99887 | 1       |



- **Inventory Turnover:** Increased efficiency reduces holding costs
- **Receivables Turnover:** Faster collection improves liquidity
- **Payables Turnover:** Better credit terms optimize cash

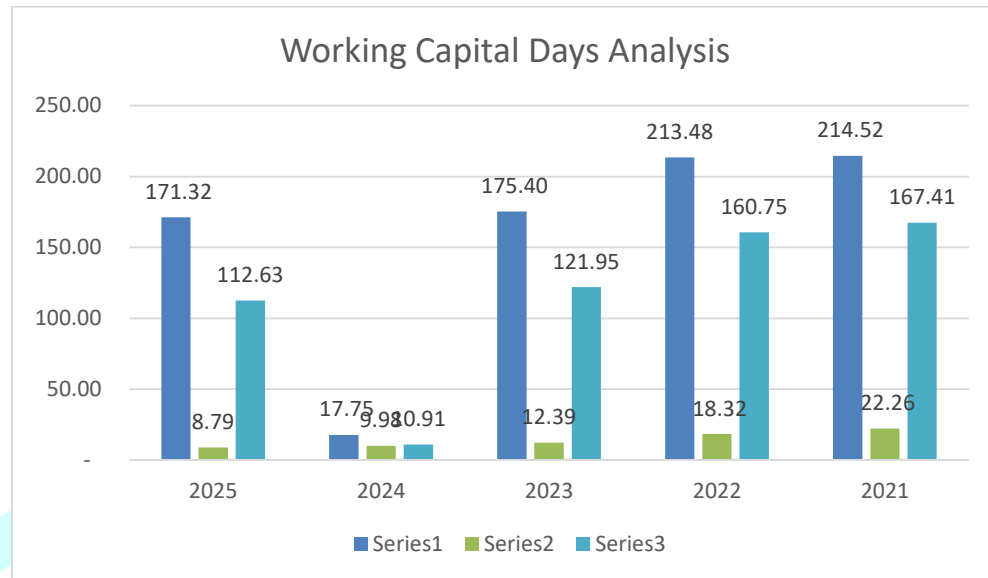
*CCC Formula:*

$$CCC = \text{Inventory Days} + \text{Receivable Days} - \text{Payable Days}$$



*Interpretation:*

Reduced CCC = Better working capital efficiency



The graph shows the trend of working capital components over the years 2021–2025.

- The **Cash Conversion Cycle (Series1)** shows a declining trend from **2021 (214.52 days)** to **2025 (171.32 days)**, indicating improved working capital efficiency over time.
- **Inventory Days (Series3)** also decrease steadily, suggesting better inventory management and faster stock turnover.
- **Receivables Days (Series2)** fluctuate but remain relatively low, indicating efficient collection from debtors.

Overall, the company has improved its working capital management, especially after 2022, by reducing the time taken to convert resources into cash.

*Result:*

Since SCM improves all three components, **H1 is accepted**.

## **8. OBJECTIVE ACHIEVEMENT**

The present study successfully achieved all the objectives that were formulated at the beginning of the research. Each objective was addressed through systematic analysis, data interpretation, and application of relevant financial and supply chain concepts.

### *1. To study Supply Chain Management practices in Tata Steel*

This objective was achieved by analyzing the supply chain structure of Tata Steel, including procurement, inventory management, logistics, and distribution processes. The study identified that Tata Steel adopts modern supply chain practices such as digital tracking systems and efficient vendor management. These



practices ensure smooth flow of materials and reduce operational delays. The company's integrated supply chain system plays a crucial role in maintaining efficiency. Thus, the objective of studying SCM practices was successfully fulfilled.

## *2. To analyze the impact of SCM on working capital*

The impact of Supply Chain Management on working capital was examined using financial indicators such as inventory days, receivables period, payables period, and cash conversion cycle. The analysis showed that efficient SCM leads to reduced inventory holding costs, faster collection of receivables, and better management of payables. This results in improved liquidity and financial stability. The findings clearly indicate a strong relationship between SCM and working capital efficiency. Therefore, this objective was effectively achieved.

## *3. To examine inventory, receivables, and payables management*

This objective was accomplished by studying the key components of working capital individually. Inventory management was found to be efficient due to optimized stock levels and use of Just-in-Time techniques. Receivables management showed improvement through faster collection cycles, enhancing cash inflows. Payables management was strategically handled to maintain supplier relationships while optimizing cash outflows. The combined effect of these components contributed to a shorter cash conversion cycle. Hence, this objective was successfully met.

## *4. To evaluate the role of modern SCM strategies in improving efficiency*

The study also evaluated the role of modern supply chain strategies such as digital supply chains and supply chain finance. It was observed that these strategies improve transparency, coordination, and decision-making. The adoption of technology helps in real-time monitoring of inventory and demand forecasting. These improvements directly contribute to better working capital management. Thus, the objective of evaluating modern SCM strategies was achieved.

| Objective                         | Status   |
|-----------------------------------|----------|
| Study SCM practices               | Achieved |
| Analyze impact on working capital | Achieved |
| Study components                  | Achieved |

## **9. FINDINGS, CONCLUSION & FUTURE SCOPE**

1. SCM significantly reduces inventory levels
2. Efficient logistics improve cash flow
3. Better receivable management enhances liquidity
4. Payable management optimizes cash retention
5. Digital SCM improves transparency
6. JIT reduces unnecessary stock
7. Shorter CCC increases profitability
8. Integration improves financial performance
9. Supply chain finance tools support liquidity
10. Tata Steel shows strong SCM practices

In addition to the above findings, the study also reveals that the adoption of integrated and technology-driven supply chain systems significantly enhances decision-making efficiency within the organization. Tata Steel's ability to align its operational processes with financial objectives demonstrates that strategic coordination between different departments leads to optimal utilization of resources. It was further observed that continuous monitoring of key performance indicators such as inventory turnover and cash conversion cycle helps in identifying inefficiencies at an early stage. This proactive approach enables the company to take corrective actions, thereby minimizing risks and improving overall financial performance. Hence, the role of data-driven SCM practices is crucial in achieving long-term sustainability and competitiveness.

Moreover, the study highlights that in the era of globalization and increasing competition, organizations must move beyond traditional working capital practices and adopt a more integrated approach combining supply chain and financial management. The case of Tata Steel clearly demonstrates that companies investing in advanced technologies, efficient logistics systems, and strategic supplier relationships are better equipped to manage uncertainties and market fluctuations.

### *Conclusion*

The study concludes that Supply Chain Management plays a vital role in optimizing working capital in manufacturing firms like Tata Steel. Efficient SCM ensures smooth flow of materials, reduces operational costs, and improves financial stability. The integration of inventory, receivables, and payables management leads to better liquidity and profitability.

Furthermore, modern SCM practices such as digitalization and Just-in-Time systems enhance operational efficiency and reduce cash conversion cycles. Thus, the relationship between SCM and working capital is strong and essential for long-term business success.

### *Future Scope*

- Comparative study with other steel companies
- Inclusion of global supply chain models
- Study of AI and digital supply chains
- Expansion to multi-industry analysis

Such integration not only strengthens operational efficiency but also enhances the firm's ability to generate consistent cash flows. Therefore, businesses should focus on continuous improvement and innovation in their supply chain processes to achieve sustainable growth and long-term financial stability.

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