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A STUDY ON WORKING CAPITAL MANAGEMENT PRACTICES IN COPPER MANUFACTURING COMPANIES

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ABSTRACT
Working capital management (WCM) is a cornerstone of financial management in manufacturing industries, directly influencing liquidity, profitability, and operational continuity. This study provides a comparative analysis of WCM practices among five selected Indian copper manufacturing companies. Hindalco Industries Limited, Vedanta Limited, Hindustan Copper Limited, Arcotech Limited, and Bhagyanagar India Limited over a five-year period from FY 2019–20 to FY 2023–24. Using financial ratio analysis, vertical and horizontal percentage analysis, and cross-sectional comparative methodology, the study evaluates each firm's liquidity position, inventory efficiency, receivables management, and overall working capital utilization. Findings reveal significant inter-firm variation: Hindustan Copper maintains conservative liquidity buffers, Bhagyanagar India demonstrates superior inventory turnover, Hindalco leads in receivables collection efficiency, Vedanta pursues an aggressive capital deployment strategy, while Arcotech exhibits progressive financial distress. The study contributes industry-specific insights to the broader literature on working capital strategies in capital-intensive manufacturing contexts.

KEYWORDS: *Working Capital Management, Copper Industry, Liquidity, Inventory Turnover, Cash Conversion Cycle, Indian Manufacturing, Financial Ratio Analysis*

INTRODUCTION

Working Capital Management (WCM) is a vital aspect of corporate finance that focuses on managing current assets and current liabilities to maintain liquidity, ensure smooth operations, and improve profitability. In copper manufacturing companies, WCM is particularly important due to the large investments required in inventory, production processes, and receivables. The Indian copper industry plays a crucial role in sectors such as infrastructure, power, telecommunications, and renewable energy. Effective working capital management helps firms balance liquidity and profitability, thereby enhancing operational efficiency and financial stability. Despite its importance, limited research has examined WCM practices in Indian copper manufacturing companies, making this study significant in understanding the sector’s financial management practices.

REVIEW OF LITERATURE

- Ray (2014) examined working capital management and profitability in Hindalco Industries. The study found that efficient inventory and receivables management improves liquidity and profitability.
- Singh and Pandey (2008) analyzed the working capital position of Hindalco Industries. The study concluded that effective management of current assets and liabilities enhances operational efficiency.
- Velvizhi (2024) evaluated working capital management practices in Hindalco Industries. The findings revealed that efficient cash, inventory, and receivables management improves financial stability.
- Lazaridis and Tryfonidis (2006) studied the relationship between working capital management and profitability. The study found that efficient management of working capital components significantly improves profitability.
- Gupta(2020) analyzed the working capital management practices of Vedanta Limited. The study concluded that efficient cash, inventory, and receivables management improves liquidity and operational efficiency.
- Garg and Meentu (2024) examined the impact of working capital management on profitability in Indian manufacturing companies. The study found that efficient management of inventory, receivables, payables, and cash conversion cycles improves profitability, liquidity, and operational performance.

- Parmar (2024) analyzed the influence of working capital management on profitability among Indian listed firms. The findings revealed that efficient inventory, receivables, and payables management enhances profitability, financial stability, and resource utilization.
- The Working Capital in India Survey (2017) examined working capital management practices across various industries in India. The survey highlighted that effective cash, inventory, receivables, and payables management improves liquidity, profitability, and operational efficiency.
- Garg and Meentu (2024) studied the relationship between working capital management and profitability in Indian manufacturing firms. The study concluded that maintaining an optimum level of working capital enhances profitability, liquidity, and long-term business growth.
- The Working Capital in India Survey (2017) analyzed working capital practices followed by Indian companies. The study found that firms with strong working capital policies achieve better operational performance, liquidity, and competitive advantage.
- Jahan (2020) analyzed the impact of the cash conversion cycle on manufacturing firms. The study found that shorter cash conversion cycles improve profitability and liquidity.
- Padachi (2006) examined trends in working capital management and firm performance. The study revealed that effective inventory and receivables management enhances profitability and operational efficiency.
- Appuhami (2008) investigated the impact of capital expenditure on working capital management. The study concluded that capital expenditure significantly influences liquidity and working capital requirements.
- Falope and Ajilore (2009) examined the relationship between working capital management and profitability. The findings showed that firms with shorter cash conversion cycles achieve higher profitability.
- Uyar (2009) analyzed the relationship between cash conversion cycle and profitability. The study found that firms with shorter cash conversion cycles are more profitable and efficient.
- Dong and Su (2010) examined the impact of working capital management on profitability. The study concluded that efficient inventory and receivables management improves financial performance.
- Filbeck and Krueger (2005) analyzed industry differences in working capital management practices. The study found that efficient working capital management improves profitability and liquidity.
- Eljelly (2004) examined the relationship between liquidity and profitability. The study found that maintaining an optimum level of liquidity is essential for maximizing profitability.
- Mathuva (2010) investigated the influence of working capital components on profitability. The findings revealed that efficient receivables and inventory management positively affect profitability.
- Gill, Biger and Mathur (2010) analyzed the relationship between working capital management and profitability. The study concluded that efficient management of current assets and liabilities improves financial performance.

OBJECTIVES

- To investigate the cash management practices adopted by Hindalco Industries, Vedanta (Sterlite Copper), Hindustan Copper Limited, Arcotech Ltd, and Bhagyanagar India Ltd, and their effectiveness in ensuring liquidity.
- To examine the inventory management strategies employed by these companies and assess their influence on production efficiency and cost control.
- To identify the challenges and constraints faced by these companies in implementing efficient working capital strategies.

RESEARCH DESIGN

The study adopts a descriptive and analytical research design. It relies exclusively on secondary data drawn from audited annual reports and financial statements of the selected companies, supplemented by stock exchange records, company websites, and peer-reviewed academic sources. A convenience sampling approach was used to select companies based on data availability, industry relevance, and suitability for comparative analysis.

SOURCES OF DATA

The study is based entirely on secondary data collected from various reliable sources. The required information has been obtained from annual reports and audited financial statements of the selected copper manufacturing companies. Additional data were collected from company websites, research journals, books, published reports, stock exchange filings, and financial databases related to working capital management.

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Data Collection Sources

The study is based on secondary data collected from various reliable sources. These include annual reports and audited financial statements of the selected companies, official company websites, research journals, books, previous studies related to working capital management, stock exchange records, and published financial databases.

PERIOD OF STUDY

The study covers a period of five financial years from 2019–20 to 2023–24. The selected period helps in analyzing the recent working capital management practices, liquidity position, operational efficiency, and financial performance of the selected copper manufacturing companies.

TOOLS AND TECHNIQUES USED FOR ANALYSIS

The study uses various financial ratios and analytical techniques to evaluate the working capital management practices of selected copper manufacturing companies.

Current Ratio measures the ability of a company to meet its short-term obligations using current assets and indicates its liquidity position.

Quick Ratio evaluates immediate liquidity by excluding inventory from current assets and shows the firm's short-term solvency.

Inventory Turnover Ratio measures the efficiency of inventory management and indicates how quickly inventory is converted into sales.

Debtors Turnover Ratio assesses the effectiveness of receivables collection and reflects the company's credit management efficiency.

Working Capital Turnover Ratio shows how efficiently working capital is utilized to generate sales and improve profitability.

Cash Conversion Cycle (CCC) measures the time required to convert investments in inventory and receivables into cash, indicating overall working capital efficiency.

Percentage Analysis is used to convert financial data into percentage form for easy comparison and trend analysis across different years.

Comparative Analysis helps compare the working capital performance of selected companies and identify differences in liquidity, efficiency, and financial performance.

DATA ANALYSIS AND INTERPRETATION

This chapter presents the analysis of working capital management practices of selected copper manufacturing companies during the period FY 2019-20 to FY 2023-24. The study evaluates the liquidity and operational efficiency of the companies using key financial indicators such as Current Ratio, Quick Ratio, Inventory Turnover Ratio, Debtors Turnover Ratio, and Working Capital Turnover Ratio. The findings provide insights into the effectiveness of working capital utilization and overall financial performance.

CURRENT RATIO

Table 4.1: Comparative Current Ratio (FY 2019-20 to FY 2023-24)

Company Name	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Mean
Hindalco Industries	1.35	1.42	1.38	1.45	1.51	**1.42**
Vedanta Ltd	1.02	1.12	1.08	0.98	1.05	**1.05**
Hindustan Copper	1.85	2.10	2.25	1.95	2.05	**2.04**
Arcotech Ltd	0.98	0.85	0.78	0.72	0.65	**0.80**
Bhagyanagar India	1.48	1.55	1.62	1.50	1.58	**1.55**

Source: Compiled and calculated from corporate annual reports.

Interpretation: Hindustan Copper leads with mean CR 2.04, meeting the 2:1 benchmark. Bhagyanagar India (1.55) and Hindalco (1.42) maintain lean but stable liquidity. Vedanta (1.05) runs an aggressive model with minimal cushion. Arcotech deteriorated critically to 0.65 by FY24, indicating severe financial distress.

QUICK RATIO

Table 4.2: Comparative Quick Ratio (FY 2019-20 to FY 2023-24)

Company Name	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Mean
Hindalco Industries	0.88	0.98	0.89	0.95	1.02	**0.94**
Vedanta Ltd	0.55	0.65	0.58	0.51	0.55	**0.57**
Hindustan Copper	1.10	1.34	1.41	1.15	1.28	**1.26**
Arcotech Ltd	0.52	0.42	0.38	0.33	0.28	**0.39**
Bhagyanagar India	0.96	1.05	1.12	0.98	1.04	**1.03**

Source: Compiled and calculated from corporate annual reports.

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Interpretation: Hindustan Copper (1.26) and Bhagyanagar India (1.03) meet the 1:1 benchmark. Hindalco (0.94) is near-ideal. Vedanta (0.57) and Arcotech (0.39) show critical immediate liquidity shortfalls.

INVENTORY TURNOVER RATIO

Table 4.3: Comparative Inventory Turnover Ratio — Times (FY 2019-20 to FY 2023-24)

Company Name	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Mean
Hindalco Industries	4.15	4.68	4.45	4.29	4.56	**4.43**
Vedanta Ltd	5.21	5.89	5.62	5.37	5.98	**5.61**
Hindustan Copper	2.52	2.92	2.64	2.57	2.81	**2.69**
Arcotech Ltd	2.28	1.97	1.74	1.49	1.35	**1.77**
Bhagyanagar India	6.08	7.02	6.64	6.29	7.30	**6.67**

Source: Compiled and calculated from corporate annual reports.

Interpretation: Bhagyanagar India leads at 6.67x (downstream fabricator). Vedanta (5.61x) and Hindalco (4.43x) show healthy turnover. Hindustan Copper (2.69x) has slower stock movement typical of integrated miners. Arcotech's continuous decline to 1.35x in FY24 signals operational logjams.

DEBTORS TURNOVER RATIO

Table 4.4: Comparative Debtors Turnover Ratio — Times (FY 2019-20 to FY 2023-24)

Company Name	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Mean
Hindalco Industries	12.15	14.50	13.80	12.90	14.10	**13.49**
Vedanta Ltd	10.50	11.80	11.20	10.90	12.30	**11.34**
Hindustan Copper	8.45	9.80	9.20	8.75	9.50	**9.14**
Arcotech Ltd	4.10	3.55	3.10	2.65	2.15	**3.11**
Bhagyanagar India	8.10	9.25	8.80	8.40	9.15	**8.74**

Source: Compiled and calculated from corporate annual reports.

Interpretation: Hindalco leads with 13.49x mean (collection every ~27 days), showing strong credit discipline. Vedanta (11.34x) and Hindustan Copper (9.14x) maintain stable collection. Arcotech's drop to 2.15x in FY24 indicates severely delayed customer payments.

WORKING CAPITAL TURNOVER RATIO

Table 4.5: Comparative Working Capital Turnover Ratio Times (FY 2019-20 to FY 2023-24)

Company Name	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Mean
Hindalco Industries	6.85	7.42	7.10	6.95	7.55	**7.17**
Vedanta Ltd	15.20	18.50	16.80	22.10	19.45	**18.41**
Hindustan Copper	1.85	2.15	2.30	1.98	2.10	**2.08**
Arcotech Ltd	12.50	-25.30	-14.20	-8.50	-5.10	**-8.12**
Bhagyanagar India	5.12	5.85	5.50	5.25	5.95	**5.53**

Source: Compiled and calculated from corporate annual reports.

Interpretation: Vedanta records the highest mean (18.41x), maximizing revenue per rupee of working capital at elevated risk. Hindalco (7.17x) and Bhagyanagar India (5.53x) are balanced. Hindustan Copper (2.08x) shows conservative deployment. Arcotech's negative mean (−8.12x) confirms structural deficit where operations are funded by delayed vendor payments.

PERCENTAGE ANALYSIS

Table 4.6: Vertical Analysis Current Asset Components (5-Year Average Allocation)

Company	Inventory (%)	Debtors (%)	Cash & Bank (%)	Other Assets (%)	Total (%)
Hindalco industries	42.5	28.0	18.5	11.0	**100**
Vedanta Ltd	38.0	32.5	14.0	15.5	**100**
Hindustan Copper	56.5	22.0	15.0	6.5	**100**
Arcotech Ltd	68.5	24.5	2.0	5.0	**100**
Bhagyanagar India	32.0	38.5	21.0	8.5	**100**

Source: Calculated from audited balance sheets (FY 2019-20 to FY 2023-24).

Interpretation: Arcotech locks 68.5% of current assets in inventory with only 2.0% in cash — highly illiquid. Bhagyanagar India holds just 32% in inventory and 21% in cash, giving maximum operational flexibility. Hindalco maintains a balanced 42.5% inventory allocation.

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Table 4.7: Horizontal Trend Analysis — Net Working Capital (Base Year FY19-20 = 100%)

Company	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Net Growth
Hindalco Industries	100%	92.5%	112.4%	128.6%	135.2%	**+35.2%**
Vedanta Ltd	100%	88.0%	105.5%	94.2%	101.5%	**+1.5%**
Hindustan Copper	100%	104.5%	118.2%	124.0%	121.8%	**+21.8%**
Arcotech Ltd	100%	74.2%	58.0%	42.5%	31.0%	**-69.0%**
Bhagyanagar India	100%	95.0%	108.5%	119.4%	126.8%	**+26.8%**

Source: Compiled and indexed from financial reports.

Interpretation: Hindalco (+35.2%) and Bhagyanagar India (+26.8%) show strong post-pandemic expansion. All companies contracted in FY21 during pandemic lockdowns, normalizing by FY22. Arcotech suffered a severe −69% contraction by FY24, signaling escalating financial distress.

FINDINGS

- Hindustan Copper maintained the strongest liquidity (Mean CR: 2.04; QR: 1.26), comfortably meeting short-term obligations.
- Hindalco Industries and Bhagyanagar India maintained stable, balanced working capital structures throughout the study period.
- Vedanta Limited operated with an aggressive WCM policy — lower liquidity but the highest working capital turnover (18.41x).
- Bhagyanagar India recorded the highest inventory turnover (6.67x), reflecting efficient stock management as a downstream fabricator.
- Hindalco Industries achieved the highest debtors turnover (13.49x), reflecting strong receivables collection discipline.
- Arcotech Limited experienced continuous deterioration across all ratios — CR fell to 0.65 and WCTR to −8.12, indicating severe financial stress.

SUGGESTIONS

- Arcotech should restructure its current liabilities, liquidate slow-moving inventory, and implement stricter credit collection policies.
- Vedanta should maintain a slightly higher liquidity cushion to reduce vulnerability to sudden market disruptions.
- Hindustan Copper should optimize deployment of excess current assets to improve profitability.
- All companies should adopt advanced inventory control techniques (JIT, ABC analysis) and digital cash management systems.
- A proper balance between liquidity and profitability must be maintained for sustainable long-term growth.

CONCLUSION

This study analyzed WCM practices of five Indian copper manufacturers over FY 2019-24. Hindustan Copper maintained the strongest liquidity, Bhagyanagar India demonstrated the most efficient inventory management, and Hindalco Industries showed outstanding receivables discipline. Vedanta achieved high capital utilization but at elevated liquidity risk, while Arcotech faced critical financial distress requiring urgent structural intervention. The findings confirm that maintaining an optimum balance between liquidity and profitability is essential for long-term sustainability in capital-intensive copper manufacturing.

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