Major Research Project

on

IMPACT OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY: A STUDY OF NIFTY SMALLCAP 100 MANUFACTURING FIRMS

Submitted by

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23/DMBA/142

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CERTIFICATE

This is to certify that the Major Research Project titled "**Impact of Working Capital Management on Profitability: A Study of Nifty Smallcap 100 Manufacturing Firms**" is submitted by **Mr. Vineet Aggarwal**, Roll Number **23/DMBA/142**, in partial fulfilment of the requirements for the award of the degree of Master of Business Administration at Delhi School of Management, Delhi Technological University, Delhi.

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Place: Delhi
Date:

DECLARATION

I, Vineet Aggarwal, hereby declare that the Major Research Project titled "**Impact of Working Capital Management on Profitability: A Study of Nifty Smallcap 100 Manufacturing Firms**" in partial fulfilment of the requirements for the award of the degree of Master of Business Administration (MBA), is a record of original work carried out by me and submitted to **Dr. Chandan Sharma** at Delhi School of Management, Delhi Technological University.

I further declare that this work has not been submitted previously by me or any other individual for the award of any degree, diploma, or any other similar title in this or any other university or institution.

Signature of the Student
Vineet Aggarwal

Place: Delhi
Date:

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This project has been submitted to esteemed faculty member Dr Chandan Sharma, Assistant Professor of the Delhi School of Management, Delhi Technological University.

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EXECUTIVE SUMMARY

The purpose of this study is to investigate the impact of Working Capital Management (WCM) on the profitability of manufacturing firms listed in Nifty Smallcap 100 Index. Working capital management, which entails managing a firm's short-term assets & liabilities, is essential to sustain daily operations, ensuring liquidity, and driving profitability. In capital-intensive sectors like manufacturing, where significant resources are invested in raw materials, inventory, and receivables, effective WCM becomes not just a financial necessity but a strategic priority. This study focuses on understanding how different elements of working capital—namely inventory, receivables, and payables—affect key profitability indicators such as Return on Assets (ROA), Return on Equity (ROE), and Return on Capital Employed (ROCE) in small-cap manufacturing firms operating in India.

The research adopts a quantitative approach, utilizing a sample of 40 manufacturing companies from the Nifty Smallcap 100 Index, with data collected over a 10-year period (2014–2024). This results in 368 firm-year observations, providing a comprehensive longitudinal dataset to assess the relationship between WCM efficiency and firm profitability. Data were sourced from credible and publicly available databases such as Screener.in, ProwessIQ, Trendlyne.com, and company annual reports. The study applies descriptive statistics, Pearson's correlation, and multiple regression analysis (Ordinary Least Squares) to test the significance, direction, and strength of relationships between independent and dependent variables.

Methodology and Analytical Framework

To analyze the effect of WCM on profitability, the study identifies three dependent variables—ROA, ROE, and ROCE—as indicators of financial performance. The independent variables include the Cash Conversion Cycle (CCC), Debtor Days, Inventory Days, and Days Payables Outstanding, which serve as measures of working capital efficiency. Three control variables—Current Ratio, Debt-to-Equity Ratio, and Revenue—are also included in the regression models to isolate the net effect of working capital practices.

Two distinct sets of regression models are developed:

1. The first model set uses the Cash Conversion Cycle (CCC) as a composite indicator of WCM.
2. The second model set disaggregates CCC into its individual components (Debtor Days, Inventory Days, and Payables) for a more granular analysis.

This dual-model framework enables the study to evaluate both the overall and component-specific effects of WCM on profitability. The statistical analysis is conducted using SPSS and Microsoft Excel, ensuring methodological rigor and replicability.

Summary of Key Findings

The analysis reveals a strong and consistent inverse relationship between working capital efficiency and profitability in small-cap manufacturing firms. Specifically, a shorter Cash Conversion Cycle (CCC) is linked with higher profitability as reflected in Return on Assets (ROA), Return on Equity (ROE), and Return on Capital Employed (ROCE). Among individual working capital components, both Debtor Days and Inventory Days show statistically significant negative impacts on profitability, indicating that delays in collecting receivables and holding excess inventory reduce operational and financial efficiency. These findings underscore the importance of timely receivables collection and streamlined inventory management for enhancing firm performance.

On the other hand, Days Payables Outstanding (DPO) did not show a significant impact on profitability, suggesting that payment delays to suppliers neither harm nor improve financial performance within the sample. Control variables such as the Current Ratio and Revenue demonstrated positive associations with profitability, highlighting the roles of liquidity and firm size in driving returns. In contrast, the Debt-to-Equity Ratio was negatively associated with ROA and ROCE, reinforcing the idea that excessive financial leverage can hinder profitability. Overall, the study confirms that efficient working capital management is a key driver of profitability for resource-constrained manufacturing firms in the small-cap segment.

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1. INTRODUCTION

1.1. Background

Business organizations, regardless of their size or industry, face the constant challenge of balancing profitability and liquidity. At the core of this financial equilibrium lies Working Capital Management (WCM), which refers to the strategic management of a firm's short-term assets and liabilities. Effective WCM ensures that a firm maintains sufficient liquidity to meet its operational needs while optimizing resource utilization to enhance profitability. According to Brigham and Houston (2003), over 60% of a financial manager's time is devoted to managing working capital, underlining its critical role in financial decision-making.

In today's volatile and interconnected global economy, the importance of WCM has become even more pronounced. Events such as the COVID-19 pandemic, global supply chain disruptions, inflationary pressures, and interest rate fluctuations have underscored the necessity for businesses to maintain financial agility. According to a PwC India report (2021), companies that actively manage their working capital—particularly receivables, payables, and inventories—were better positioned to survive disruptions and outperform competitors in terms of profitability.

The manufacturing sector, in particular, demands effective WCM due to its capital-intensive nature and complex supply chains. Firms in this sector often hold significant levels of raw materials, work-in-progress, and finished goods, and are required to extend trade credit to customers while relying on supplier credit to fund operations. These dynamics give rise to the Cash Conversion Cycle (CCC), a crucial indicator that measures how long a firm takes to change its investments in inventory and other resources into cash inflows. Inefficiencies in managing this cycle can lead to liquidity bottlenecks, lost sales, and reduced profitability.

In India, the manufacturing sector serves as the backbone of industrial and economic growth, contributing substantially to GDP, exports, and employment. Within this landscape, firms listed under the Nifty Smallcap 100 Index represent a dynamic and growing subset of the economy. These small-cap firms often face restricted access to large-scale financing and are more vulnerable to liquidity constraints and market fluctuations. The importance of effective WCM is heightened in this context, as even

minor inefficiencies in managing working capital can significantly impact operational sustainability and shareholder value.

India's economic landscape has seen notable changes over the last ten years, driven by policy reforms, digital transformation, and greater emphasis on corporate governance. The aftermath of corporate scandals, non-performing assets in the banking sector, and tighter financial regulations has increased investor focus on liquidity metrics and capital efficiency. As a result, WCM has emerged as a key determinant of financial health and investor confidence, particularly for small and mid-sized enterprises.

Numerous academic studies have emphasized the link between working capital efficiency and firm performance. Deloof (2003), Raheman and Nasr (2007), and Lazaridis and Tryfonidis (2006) found that firms with shorter cash conversion cycles and efficient management of receivables, payables, and inventory tend to achieve higher profitability. These findings hold particular relevance in the Indian context, where variability in firm size, sectoral composition, and access to capital necessitate tailored WCM strategies.

Despite its significance, many Indian manufacturing firms—especially in the small-cap segment—continue to grapple with issues such as excess receivables, inventory mismanagement, and liquidity mismatches. Reports from the Reserve Bank of India (RBI) and the Confederation of Indian Industry (CII) have repeatedly highlighted the need for improved working capital efficiency to enhance competitiveness, reduce reliance on short-term borrowing, and sustain growth.

In light of these dynamics, understanding how WCM practices influence the profitability of small-cap manufacturing firms in India is both timely and essential. Given their operational constraints and exposure to economic volatility, such firms stand to benefit significantly from optimizing their working capital cycles. This study seeks to fill a gap in the existing literature by focusing on firms listed in the Nifty Smallcap 100 Index and analyzing how key WCM variables—such as inventory turnover, receivables and payables periods, and liquidity ratios—affect profitability metrics including Return on Capital Employed (ROCE), Return on Assets (ROA), and Return on Equity (ROE).

1.1.1 Understanding the Concept of Working Capital

Working capital describes the sum a company uses to cover its ordinary expenses. These components are included in it: cash and cash equivalents, inventory, accounts receivable and accounts payable. NWC is usually calculated by taking away current liabilities from current assets (Deloof, 2003). Having a positive NWC reflects that a firm has more short-term assets than liabilities and can handle its obligations in the near term.

Working capital is often categorized into two types:

- Gross Working Capital: The total value of current assets.
- Net Working Capital: The difference between current assets and current liabilities.

The operational cycle of the business, which comprises the inventory conversion phase, the receivables collection period, and the payables deferral period, must be managed in order to effectively manage working capital. The longer it takes to turn resources into cash inflows, the shorter the Cash Conversion Cycle (CCC), the better. Lazaridis and Tryfonidis (2006) realized a substantial inverse link between firm profitability and the CCC, emphasizing the significance of effective credit management and rapid inventory turnover.

Working capital management is the method of managing a company's short-term assets and liabilities to guarantee sufficient liquidity for efficient daily operations. These current liabilities consist of trade payables, short-term loans, and accumulated expenses, whereas these current assets consist of cash and cash equivalents, inventory, trade receivables, and short-term investments.

According to Brigham and Houston (2003), approximately 60% of a financial manager's time is spent managing working capital. This is because inadequate WCM can lead to operational disruptions, strained supplier relationships, and missed growth opportunities. Conversely, overinvestment in current assets can result in lower returns on capital, inefficiencies, and higher holding costs. (Akbar et al., 2022). Yang et al. (2019).

The three primary elements of WCM include:

- Inventory Management: Ensuring optimal inventory levels that meet production and customer demands without incurring excessive holding costs.
- Accounts Receivable Management: Balancing credit sales and timely collection to enhance liquidity.
- Accounts Payable Management: Managing payment terms with suppliers to optimize the cash conversion cycle without damaging vendor relationships.

1.1.2 Significance of Working Capital for Manufacturing Companies

In general, manufacturing firms invest heavily in machinery and work with lots of finished goods. A big share of their assets right now is made up of raw materials, items being produced and goods that are ready to be sold. In addition, firms offer credit to distributors and retailers, so receivables result from that. On the other hand, payables are owed to suppliers. Balancing the complex system of working capital is necessary to prevent disruptions in production and keep cash flowing.

According to Sharma and Kumar (2011), efficient working capital practices in manufacturing firms can lead to significant cost savings and profitability improvements. Poor inventory management, on the other hand, can result in excessive storage costs, obsolescence, and missed sales opportunities. Similarly, inefficient receivables management can lead to bad debts and cash flow problems.

Compared to service-oriented enterprises, manufacturing firms are more dependent on working capital efficiency because they usually run on smaller margins and more operating leverage. This is particularly true for small-cap manufacturing businesses, which could have to deal with more stringent credit requirements and less negotiating leverage with clients and suppliers.

Manufacturing firms are inherently working-capital-intensive due to their need for raw materials, work-in-progress inventory, and finished goods. Additionally, longer production cycles and credit terms to distributors or retailers often extend the working capital cycle.

As noted by Mathuva (2010), firms with efficient inventory turnover and receivables collection cycles tend to exhibit higher profitability. However, manufacturing firms

often encounter a balance challenge between liquidity and profitability, (Yatskiv Jackiva). I as excessive working capital investments reduce the returns generated on capital.

The variability in raw material prices, lead times, and customer demand further necessitates a nuanced and dynamic approach to working capital planning. A slight disruption in inventory or receivables management can lead to stockouts or cash shortages, thereby affecting production and profitability.

1.1.3 Overview of the Nifty Smallcap 100 Index

The Nifty Smallcap 100 Index, administered by NSE Indices Limited, comprises 100 small-cap companies listed on the National Stock Exchange of India (NSE). These companies represent approximately the bottom 5% of the listed equity universe, after excluding constituents of the Nifty 100 and Nifty Midcap 150 indices. Despite their relatively smaller market capitalizations, these firms play a vital role in India's economic framework by contributing significantly to employment generation, industrial output, and regional development (NSE Indices Limited, n.d.).

The small-cap segment is characterized by high growth potential, greater agility, and elevated risk exposure. These firms often exhibit quicker responsiveness to market shifts and innovation opportunities but are simultaneously more vulnerable to liquidity constraints, operational inefficiencies, and market volatility (Business Standard, 2022). Their limited access to financing and narrower resource bases necessitate meticulous Working Capital Management (WCM) to sustain daily operations and long-term viability.

Investor interest in small-cap equities has increased substantially in recent years, primarily due to the anticipation of high returns from under-explored and emerging market segments (Business Standard, 2022). However, this heightened potential is tempered by the significant risks that accompany poor working capital practices—particularly in capital-intensive sectors like manufacturing, where mismanagement of receivables, payables, or inventory can result in liquidity crises and hinder scalability.

This study focuses on 40 manufacturing companies within the Nifty Smallcap 100 Index, selected based on the consistent availability of financial data from 2014 to 2024. These firms operate across diverse sub-sectors, including chemicals, auto ancillaries,

textiles, and engineering goods. By analyzing these companies, the study aims to explore how effective WCM practices contribute to improved financial performance in the resource-constrained yet opportunity-rich environment that defines India's small-cap manufacturing landscape.

1.1.4 Understanding the Manufacturing Sector

The manufacturing sector is widely recognized as a critical engine for industrial and economic development. It involves the conversion of raw materials into finished goods through physical, mechanical, or chemical processes. These goods may be either directly consumed by end-users or used as intermediate inputs in other industries. As such, the sector not only contributes to the gross output of a nation but also stimulates demand across the supply chain, generating employment, fostering innovation, and boosting exports (OECD, 2020).

In India, the manufacturing sector holds substantial strategic importance. According to data from the Ministry of Statistics and Programme Implementation (MoSPI), it accounted for approximately 17% of India's Gross Domestic Product (GDP) in the financial year 2022–2023 (MoSPI, 2023). Recognizing the potential for expansion and the role of manufacturing in job creation and self-reliance, the Government of India launched the "Make in India" initiative in 2014. This initiative aims to increase the manufacturing sector's share in GDP to 25% by 2025, promote foreign direct investment (FDI), and enhance the ease of doing business (Department for Promotion of Industry and Internal Trade [DPIIT], 2023).

India's manufacturing ecosystem is broad and multifaceted, encompassing industries such as textiles and apparel, automotive and auto components, pharmaceuticals, electronics, food processing, and chemicals. While each sub-sector operates with distinct market dynamics and supply chains, they share several common characteristics. These include high capital intensity, dependence on a trained labor force, and susceptibility to fluctuations in commodity prices and foreign exchange rates (PwC India, 2022).

Moreover, manufacturing operations often require large upfront investments in fixed assets like machinery, advanced technology, and infrastructure. In addition to capital expenditure, manufacturers need to manage substantial working capital invested in raw

materials, work-in-progress, and finished goods inventories. This exposure makes the sector highly sensitive to inefficiencies in Working Capital Management (WCM), as

any delays or disruptions in procurement, production, or delivery can significantly impair operational efficiency and profitability (Deloof, 2003).

Furthermore, manufacturers face external challenges such as global competition, changing consumer preferences, energy price volatility, and evolving regulatory requirements. Internally, firms must manage complex production cycles, logistics coordination, and quality control. In this context, effective WCM is crucial for ensuring liquidity, maintaining production schedules, meeting customer demand, and ultimately, sustaining profitability. Firms that optimize their working capital are better positioned to withstand economic uncertainties and leverage growth opportunities (Lazaridis & Tryfonidis, 2006).

Given its pivotal role in economic development and its operational complexities, the manufacturing sector warrants robust financial management, particularly with respect to working capital planning, monitoring, and control.

1.1.5 Profitability and Its Relationship with Working Capital Management

Profitability is a fundamental financial indicator that reflects a company's ability to generate earnings relative to its revenue, operating expenses, assets, or equity over a defined period. It serves as a key measure of a firm's financial health, operational efficiency, and long-term sustainability. Profitability metrics not only guide internal strategic decisions but also serve as critical indicators for investors, creditors, and other stakeholders evaluating a company's performance.

Working Capital Management (WCM) plays an important role in determining a firm's profitability. An optimal level of working capital makes sure that a company maintains sufficient liquidity to meet its short-term obligations while avoiding the inefficiencies of overinvestment in current assets. Efficient WCM leads to improved resource allocation, reduced financing costs, and enhanced overall performance. Conversely, inadequate or excessive investment in current assets such as inventory and receivables may result in liquidity problems, missed growth opportunities, or increased borrowing costs (Deloof, 2003; Raheman & Nasr, 2007).

Profitability is most commonly assessed using the following financial ratios:

- Return on Capital Employed (ROCE): This is calculated as EBIT (Earnings Before Interest and Tax) divided by Capital Employed. ROCE measures the efficiency with which a firm uses its total capital (debt + equity) to generate profits. It is particularly useful for assessing firms in capital-intensive industries, such as manufacturing.
- Return on Assets (ROA): ROA is computed as Net Income divided by Total Assets. This ratio highlights how efficiently a company is using its asset base to generate profits. A higher ROA indicates more efficient asset utilization, which is essential for firms with large inventories or fixed assets.
- Return on Equity (ROE): This is calculated as Net Income divided by Shareholder's Equity. ROE reflects the return earned on the equity capital invested by shareholders and is a key indicator of value creation.

The efficiency of WCM significantly influences each of these profitability metrics. For instance, effective management of inventory levels and timely collection of receivables can reduce the volume of tied-up capital, thereby improving asset turnover and enhancing ROA and ROCE. Similarly, minimizing reliance on external borrowing by efficiently managing payables can lower financing costs and boost net income, thus positively affecting ROE.

One of the most widely analyzed indicators connecting WCM and profitability is the Cash Conversion Cycle (CCC)—the time it takes for a company to convert its investments in inventory and other resources into cash flows from sales. A shorter CCC implies faster recovery of capital, lower holding and opportunity costs, and improved liquidity, all of which support enhanced profitability. Empirical studies consistently highlight this relationship. Deloof (2003) analyzed Belgian firms and concluded that a shorter CCC is associated with higher profitability. Lazaridis and Tryfonidis (2006) found a similar inverse relationship in companies listed on the Athens Stock Exchange. Their study suggested that managers can create shareholder value by reducing the number of days in accounts receivable and inventory. Likewise, Falope and Ajilore (2009) observed that Nigerian manufacturing firms with more efficient WCM practices demonstrated better profitability metrics. Mansoor and Muhammad (2012)

also supported these findings in the context of Pakistani firms, reinforcing the universality of this financial relationship.

Working capital components—inventory turnover, receivables collection period, and payables deferral period—each have distinct implications on profitability. High inventory turnover reduces storage costs and prevents obsolescence, enhancing ROA and ROCE. Fast receivables collection improves cash flow and reduces the need for short-term financing, positively impacting ROE. On the other hand, delaying payables without incurring penalties allows firms to optimize their cash position, although this must be balanced with supplier relationships and credit terms.

In summary, the linkage between working capital management and profitability is both strategic and operational. Companies that manage their working capital efficiently are more likely to maintain liquidity, minimize costs, and enhance returns. This underscores the importance of WCM not just as a financial routine, but as a critical determinant of profitability and sustainable growth.

1.2.Problem Statement

The manufacturing sector holds a central position in India's economic development, contributing significantly to GDP, employment generation, industrial output, and exports. Within this broad sector, small-cap manufacturing firms—especially those listed under the Nifty Smallcap 100 index—represent a diverse yet under-researched segment. These firms often face distinct operational and financial challenges, including restricted access to credit, limited market influence, and high vulnerability to economic fluctuations. One of the most persistent issues confronting these firms is inefficient working capital management (WCM), which directly impacts their liquidity, profitability, and long-term sustainability.

Working capital, comprising current assets and current liabilities, is fundamental to ensuring a firm's day-to-day operational continuity. Efficient management of its key components—such as inventory, accounts receivable, and accounts payable—enables firms to strike an optimal balance between liquidity and profitability. However, many small-cap firms suffer from structural inefficiencies, including prolonged receivable cycles, excessive inventory holdings, and delayed payment schedules, all of which hinder the firm's ability to generate sustainable returns. The adverse financial consequences of such inefficiencies can be especially severe in the capital-intensive manufacturing sector, where large portions of resources are tied up in physical and working capital assets.

Although WCM has been extensively studied in financial literature, much of the existing research is focused on large-cap firms or multinational corporations, particularly in developed economies. These studies often generalize findings that may not be applicable to smaller, resource-constrained firms operating in emerging markets like India. Furthermore, many Indian studies aggregate data across various sectors or do not differentiate between firm sizes, resulting in a lack of nuanced understanding of how WCM practices affect small-cap firms specifically. This leaves a critical gap in the literature regarding the relationship between WCM and financial performance in the small-cap manufacturing segment.

The firms in the Nifty Smallcap 100 index, while publicly listed, are often less financially stable and more operationally constrained than their large-cap counterparts. They typically operate with lower profit margins, smaller capital buffers, and higher exposure to supply chain and market risks. These characteristics make effective working capital management not only important but essential for maintaining solvency and profitability. Yet, empirical evidence focusing specifically on this segment remains limited.

This study seeks to address this research gap by analyzing the impact of working capital management on the profitability of manufacturing companies listed in the Nifty Smallcap 100 index. By examining a ten-year dataset from 2014 to 2024, the research aims to identify trends, inefficiencies, and best practices related to WCM. Profitability will be assessed using key financial metrics such as Return on Capital Employed (ROCE), Return on Assets (ROA), and Return on Equity (ROE). Through this focused approach, the study will provide valuable insights for financial managers, investors, policymakers, and academics seeking to enhance financial performance and strategic decision-making in India's small-cap manufacturing sector.

1.3. Objectives of the Study

This study primarily aims to examine the impact of working capital management (WCM) on the financial performance of small-cap manufacturing firms in India, specifically those listed under the Nifty Smallcap 100 index. As these firms operate under tighter financial constraints and heightened exposure to market fluctuations, understanding how efficiently they manage their working capital is critical to ensuring

their long-term profitability and sustainability. The study seeks to fill a significant research gap by addressing the following specific objectives:

1. To analyze the relationship between different components of working capital and profitability in manufacturing companies.

   This objective focuses on evaluating how key elements of working capital—such as inventory levels, trade receivables, and trade payables—affect profitability indicators including Return on Capital Employed (ROCE), Return on Assets (ROA), and Return on Equity (ROE). By examining these relationships, the study aims to provide empirical evidence on whether firms that manage their current assets and liabilities more efficiently achieve better financial outcomes.

2. To evaluate the impact of specific WCM metrics on Return on Capital Employed (ROCE).

   This objective entails a detailed analysis of how quantitative indicators such as inventory turnover ratio, receivables collection period, payables deferral period, current ratio, and quick ratio influence a firm's ROCE. Since ROCE is a widely accepted metric for measuring how effectively a company uses its capital to generate profits, understanding its relationship with working capital variables is essential for financial decision-making and performance optimization.

3. To suggest practical recommendations for improving the working capital strategies of small-cap manufacturing firms in India.

   Drawing on the study's findings, this objective is aimed at developing actionable insights and strategic recommendations for improving working capital practices. These suggestions will be targeted at financial managers and stakeholders in the small-cap manufacturing sector, with the goal of enhancing liquidity management, reducing financing costs, and improving overall operational efficiency.

1.4. Scope of the study

Efficient Working Capital Management (WCM) plays a critical role in determining the financial health and operational success of businesses, particularly in capital-intensive sectors like manufacturing. For small-cap manufacturing firms, which often operate

under resource constraints and fluctuating market conditions, the ability to manage short-term assets and liabilities effectively can significantly influence profitability and long-term sustainability. This study investigates the impact of WCM on the profitability of manufacturing companies listed under the Nifty Smallcap 100 Index in India. By focusing on a specific segment of the market, the research seeks to provide nuanced insights into how WCM practices affect financial performance in small-cap industrial settings.

The sample comprises 40 manufacturing firms selected based on the availability of consistent financial data spanning a ten-year period, from 2014 to 2024. These companies represent a diverse array of manufacturing sub-sectors, including but not limited to textiles, chemicals, engineering, industrial goods, and consumer durables. This sectoral diversity allows the study to capture a comprehensive view of WCM practices across varying operational models. The decade-long scope further strengthens the analysis by enabling the observation of long-term trends and the impact of external factors, such as macroeconomic fluctuations, policy changes, and global events (e.g., COVID-19), on WCM efficiency and profitability outcomes.

Data for the analysis has been sourced from secondary resources, specifically the annual reports of the selected companies and established financial databases such as Screener.in, Trendlyne.com, and ProwessIQ. These sources offer reliable and up-to-date financial information, including detailed balance sheets, income statements, and cash flow reports. The use of multiple data sources enhances the credibility of the study and ensures a high level of data integrity.

The key variables examined in this study include traditional working capital indicators such as inventory turnover ratio, average collection period (accounts receivable days), average payment period (accounts payable days), current ratio, and quick ratio. These indicators provide a detailed understanding of how companies manage their operational liquidity. On the profitability side, the study emphasizes Return on Capital Employed (ROCE) as the primary metric, given its comprehensive measure of profitability relative to the capital invested. Return on Assets (ROA) and Return on Equity (ROE) are also included as supplementary metrics to provide a broader profitability perspective.

Methodologically, the study employs a quantitative research design, incorporating statistical tools such as correlation analysis, regression modeling, and trend analysis. These techniques are used to evaluate the strength and direction of relationships between WCM components and profitability indicators. By isolating key financial metrics and analyzing their interdependence, the study aims to identify patterns that can inform better financial decision-making in the manufacturing sector.

The findings of this research are anticipated to offer significant value to a range of stakeholders, including financial managers seeking to optimize liquidity, investors assessing the financial soundness of small-cap firms, academic researchers exploring financial management practices, and policymakers interested in enhancing the financial resilience of India's industrial sector. Ultimately, this study aims to contribute meaningfully to the existing literature on financial efficiency, risk management, and value creation in emerging economies.

1.5. Motivation and Research Gap

The motivation for undertaking this study lies in the increasingly vital role that working capital management (WCM) plays in determining the financial health, operational efficiency, and long-term viability of manufacturing firms—particularly those in the small-cap segment. In capital-intensive industries like manufacturing, where significant investments are tied up in inventory, raw materials, and receivables, effective working capital practices can serve as a strategic lever for profitability and growth. Small-cap manufacturing companies, in particular, face distinctive financial constraints such as limited access to external financing, lower bargaining power with suppliers, and heightened exposure to demand fluctuations. These factors make optimal working capital management essential for sustaining day-to-day operations and ensuring competitive advantage.

Despite extensive global research on the relationship between WCM and firm profitability, much of the existing literature focuses either on large corporations or aggregate sectoral data, often overlooking the unique challenges and dynamics of smaller firms. Moreover, studies specific to the Indian manufacturing sector remain limited, especially in the context of listed small-cap companies under indices like the Nifty Smallcap 100. This research aims to fill this gap by providing focused empirical

evidence on how working capital efficiency impacts profitability within this niche yet significant segment of the Indian economy.

2. LITERATURE REVIEW

2.1 Introduction

WCM is an essential component of corporate finance and plays a critical role in maintaining liquidity, operational efficiency, and profitability. The management of short-term assets and liabilities affects not only a firm's risk profile but also its ability to invest in value-creating activities. In a competitive and volatile economic environment, efficient WCM ensures the availability of cash and optimal utilization of current assets. This literature review explores theoretical foundations and empirical evidence on the relationship between working capital management and firm profitability, with a particular focus on manufacturing firms and studies in emerging markets like India.

2.2 Theoretical Framework

Several theories have developed to understand the link between WC and profitability. The theories provide a lens to evaluate firm behavior in managing short-term assets and liabilities.

2.2.1 Trade-off Theory

The trade-off theory states that firms aim to strike a balance between costs and benefits of holding current assets. High levels of working capital improve liquidity and reduce risk of insolvency but involve opportunity costs. Conversely, low working capital may enhance returns but increase financial risk (Van Horne & Wachowicz, 2008).

2.2.2 Pecking Order Theory

According to the pecking order theory (Myers & Majluf, 1984), firms prefer to finance investments first through internal sources, then debt, and lastly equity. Efficient working capital management generates internal funds that can reduce dependence on costly external financing, thereby improving profitability.

2.2.3 Operating Cycle Theory

The operating cycle explains duration required to convert inventory into cash. A shorter operating cycle implies faster recovery of cash and lower working capital requirements, improving firm performance (Gitman, 1974).

2.3 International Evidence on Working Capital Management and Profitability

Empirical research globally has consistently shown that effective WCM practices have a significant influence on firm profitability. Studies differ in sample characteristics, measurement techniques, and sectoral focus.

2.3.1 Studies from Developed Economies

One of the earliest and most cited studies by **Deloof (2003)** examined 1,009 large Belgian firms during 1992–1996 and found a significant negative relationship between gross operating income and the number of days accounts receivable, inventories, and accounts payable. The study concluded that firms can improve profitability by reducing cash conversion cycle.

Lazaridis and Tryfonidis (2006) analyzed data from 131 listed firms in the Athens Stock Market and reported that profitability is negatively associated with receivables, inventory, and cash conversion cycle. The results suggested aggressive working capital policies yield better profitability.

Shin and Soenen (1998) evaluated the relationship between net-trade cycle and firm value for a sample of U.S. firms and concluded that shorter net-trade cycles are positively associated with higher returns on assets and equity.

In another study, **Gill et al. (2010)** analyzed Canadian firms and reaffirmed that the average collection period and CCC significantly affect profitability. The study encouraged better management of receivables and payables for improving financial performance.

2.3.2 Studies from Emerging Markets

Research from emerging economies supports similar findings. **Garcia-Teruel and Martinez-Solano (2007)** examined a sample of 8,872 small and medium-sized Spanish firms during 1996–2002 and found that profitability increases as the number of days accounts receivable and inventory decrease.

Raheman and Nasr (2007) conducted a study of 94 Pakistani firms listed on the Karachi Stock Exchange over 1999–2004 and found a significant negative relationship between working capital variables and net operating profitability. The study emphasized the need for efficient inventory and receivables management.

In a study on Kenyan manufacturing firms, **Mathuva (2010)** reported that longer accounts payable periods positively impact profitability, while higher inventory turnover and better receivables collection reduce liquidity risk and enhance performance.

Afrifa and Padachi (2016) explored the non-linear relationship between working capital and profitability in UK SMEs and highlighted the existence of an optimal level of working capital that maximizes firm profitability.

2.4 Indian Studies on Working Capital Management and Profitability

India, with its diverse industrial structure and unique financing challenges, offers a rich context for WCM studies.

Sharma and Kumar (2011) analyzed the impact of WCM on the profitability of Indian firms listed on the Bombay Stock Exchange. Their findings revealed a negative correlation between working capital components (such as receivables & inventory) and return on assets.

Ghosh and Maji (2003) studied Indian cement companies and observed that better WCM practices, measured through efficiency indices, led to increased profitability. They stressed the importance of dynamic working capital policies.

Pandey and Parmar (1997) examined working capital trends in Indian public sector enterprises and found that excessive current assets tied up funds that could have been used for growth.

Chakraborty (2008) explored WCM in Indian corporate houses and found that firms following aggressive WCM policies reported better returns on capital employed.

Ramachandran and Janakiraman (2009) focused on Indian paper industry firms and confirmed a significant negative relationship between the cash conversion cycle and profitability. Their results encouraged companies to reduce receivables and inventory to improve performance.

Kumar and Sharma (2014) used a panel data approach to evaluate 263 Indian manufacturing firms and found that efficient receivables and inventory management significantly contributed to profitability.

Venkataramana and Sreekantha (2014) observed that cash holding and receivables management are critical factors influencing profitability among Indian manufacturing SMEs.

2.5 Disaggregated Analysis of Working Capital Components

WCM is often measured through aggregate metrics like CCC, but individual components also significantly influence profitability.

2.5.1 Inventory Management

Inventory levels reflect the efficiency of production planning and demand forecasting. High inventory holding costs reduce profits, whereas too little inventory may hamper production.

Deloof (2003) and **Padachi (2006)** reported that firms with lower inventory days tend to have higher profitability. **Venkataramana et al. (2013)** found that Indian SMEs with efficient inventory turnover outperformed others.

2.5.2 Accounts Receivable

Receivables represent the credit extended to customers. Efficient collection reduces the chance of defaults and ensures faster cash inflows.

Raheman and Nasr (2007) and **Gill et al. (2010)** found that a longer average collection period adversely affects profitability. **Sharma and Kumar (2011)** found a similar relationship in Indian firms.

2.5.3 Accounts Payable

Delayed payments to suppliers allow firms to use available cash elsewhere. However, excessive delays might damage supplier relationships or lead to penalties.

Lazaridis and Tryfonidis (2006) suggested that longer accounts payable periods could improve liquidity and thus profitability. In contrast, **Mathuva (2010)** found mixed results in African firms.

2.5.4 Cash Conversion Cycle

It combines inventory, receivables, and payables into a comprehensive metric for liquidity management.

Multiple studies including **Shin and Soenen (1998)**, **Deloof (2003)**, and **Ramachandran and Janakiraman (2009)** confirm that shorter CCC is strongly associated with higher profitability.

2.6 Working Capital Management in the Manufacturing Sector

Manufacturing firms are typically working capital-intensive due to their reliance on raw materials, labor, and production cycles. These firms need to maintain optimal levels of inventory and receivables while managing payables efficiently.

Padachi (2006) highlighted that manufacturing SMEs often face challenges in financing working capital due to delayed receivables and unsold inventories. **Ghosh and Maji (2003)** and **Chakraborty (2008)** observed that WCM practices vary widely across Indian manufacturing sectors.

In a sector-specific study, **Singh and Pandey (2008)** found that pharmaceutical firms with better working capital control showed significantly higher returns on investment. **Ramachandran and Janakiraman (2009)** recommended sector-wise policy formulation for WCM.

2.7 Literature Gaps and Research Motivation

While literature supports a clear relationship between working capital and profitability, certain gaps remain:

- **Time-span limitations**: Many studies use short-term data, ignoring long-term financial cycles.
- **Sectoral focus**: Few studies specifically address small-cap manufacturing firms in India.
- **Granularity**: Most analyses are at aggregate index levels or focus on large-cap firms.
- **Changing macroeconomic environment**: Few studies factor in recent economic shocks, such as the pandemic or global supply chain disruptions.

This research addresses these gaps by analyzing 40 manufacturing firms in the Nifty Smallcap 100 index across a 10-year period (2014–2024), using firm-level data sourced from annual reports, ProwessIQ, Screener.in, and Trendlyne. It seeks to

understand the nuanced impact of WC practices on profitability in Indian small-cap firms.

2.8 Summary of Reviewed Literature

The literature surveyed across global and Indian contexts consistently supports a negative relationship between working capital variables (inventory, receivables, CCC) and profitability, and a potentially positive relationship with accounts payable. Manufacturing firms, particularly in emerging economies, face distinct challenges and opportunities in managing working capital efficiently.

This study builds upon existing research by focusing on underexplored small-cap manufacturing companies in India and providing a decade-long, sector-specific empirical analysis. The findings will inform not only financial managers but also investors and policymakers interested in operational efficiency and financial performance in emerging markets.

3. RESEARCH METHODOLOGY

3.1. Research Design

The research design forms the backbone of any research, guiding the logical structure and analytical pathway of the study. This research adopts a quantitative, descriptive-correlational research design to see the impact of working capital management on firm profitability. The quantitative nature allows for numerical measurement and statistical testing, while the correlational and regression approaches help explore and establish the relationships between variables.

The descriptive component of the research aims to summarize and illustrate the patterns in data across the 40 selected manufacturing companies over a period of ten years. This includes calculating the mean, standard deviation, and range of profitability indicators and working capital variables. It helps in understanding general trends in the industry.

The correlational aspect evaluates the strength and direction of the relationship between working capital components and profitability measures. It checks for linear relationships and potential multicollinearity among independent variables using Pearson's correlation.

The causal-comparative (ex post facto) dimension is evident in the use of multiple regression analysis to identify the impact of independent variables on the dependent variables. Since the data are historical and no manipulation is performed, this method is appropriate to infer causality based on statistical significance and predictive power.

This design is particularly relevant for financial research where data is historical, quantitative, and publicly available. The cross-sectional component allows comparisons across firms, while the longitudinal data captures performance trends over time. By integrating both, the design strengthens the validity of the findings and provides nuanced insights into how short-term financial decisions impact long-term firm performance.

3.2. Population and Sample Selection

The population for this study consists of all manufacturing companies listed under the Nifty Smallcap 100 Index on the NSE of India. This index includes 100 small-cap

companies based on market capitalization and liquidity, and represents a vital segment of India's industrial and financial landscape. From this universe, a sample of 40 manufacturing companies has been carefully selected using purposive sampling, a non-probability technique based on specific criteria aligned with the research objectives.

The inclusion criteria were as follows:

- The company must be primarily engaged in manufacturing activities (as classified under NSE industry codes).
- Availability of continuous, complete financial data from 2014 to 2024.
- Consistent listing within or majority presence in the Nifty Smallcap 100 Index during the study period.

Firms that lacked complete financial records, were delisted, or belonged to non-manufacturing sectors such as IT services, banking, or logistics were excluded to maintain sectoral consistency and eliminate structural biases. This ensures a homogenous sample, making the analysis more reliable for drawing conclusions about manufacturing firms specifically.

The rationale for selecting small-cap manufacturing companies lies in their unique working capital dynamics. Unlike large-cap firms, small-cap manufacturers often face greater challenges in accessing finance, optimizing inventory, and managing receivables and payables. Therefore, understanding WCM in this segment holds practical value for financial managers, policymakers, and investors.

By examining 40 companies across a 10-year horizon, the research achieves a rich panel dataset (i.e., 400 firm-year observations), enabling robust statistical analysis and more confident generalizations within the defined sector and size group.

3.3. Data Collection

The research relies entirely on secondary data, which offers both authenticity and reliability due to its verifiable nature. Financial data for the selected 40 manufacturing firms were extracted from a combination of the following credible and widely-used sources:

- Annual Reports: These include audited financial statements, management discussion & analysis, and director reports available from each company's investor relations website.
- CMIE ProwessIQ: A comprehensive database that provides detailed financial and performance metrics of Indian companies.
- Screener.in and Trendlyne.com: Public financial data aggregators that provide historical time-series financials, ratio analysis, and peer comparisons.

The time period considered spans from 2014 to 2024, providing a longitudinal view that includes stable, volatile, and recovery phases of the economy. This decade-long scope ensures that the analysis captures cyclical financial behavior, structural reforms (e.g., GST implementation), and exceptional disruptions like COVID-19.

Data were manually verified and cleaned to ensure consistency. Non-recurring items, abnormal values, or accounting restatements were carefully handled to avoid distortion in financial ratios. Currency was normalized to INR crore where required.

Variables like ROA, ROE, ROCE, Debtor Days, Inventory Days, Days Payable, Current Ratio, and Debt-to-Equity Ratio were either directly obtained or calculated using standard financial formulae. The data was organized in Microsoft Excel and analysed using SPSS and MS Excel for statistical computations and regression modelling.

This structured, multi-source approach to data collection enhances the robustness, transparency, and reproducibility of the research findings.

3.4.Variables Used in the Study

In financial research, the accurate selection and definition of variables are crucial for understanding the underlying relationships being tested. This study employs a structured classification of variables into dependent, independent, and control variables, which together form the foundation of the analytical framework.

Dependent Variables (Profitability Indicators)

To assess profitability, three core financial performance indicators are used:

1. Return on Assets (ROA) = Net Income / Total Assets

   Reflects how efficiently a company uses its assets to generate profit.

2. Return on Equity (ROE)= Net Income / Shareholder's Equity

   Indicates return on shareholder investments, critical for equity holders.

3. Return on Capital Employed (ROCE) = EBIT / (Total Assets – Current Liabilities)

   Measures how effectively capital employed is being utilized to generate profits.

These indicators are chosen for their broad acceptance in profitability analysis and their ability to provide diverse perspectives—asset efficiency, equity returns, and capital productivity.

Independent Variables (Working Capital Metrics)

These variables represent core elements of WCM, the focus of this study:

1. Debtor Days (DD): (Accounts Receivable / Credit Sales) × 365

   Represents the average time taken by firms to collect payment from customers.

2. Inventory Days (ID): (Inventory / Cost of Good Sold) × 365

   Measures the average duration inventory is held before being sold.

3. Days Payable (DP): (Accounts Payable / Cost of Good Sold) × 365

   Indicates the average time taken to pay suppliers.

4. Cash Conversion Cycle (CCC): DD + ID – DP

   A holistic measure in how much time a company's cash is involved in operations.

Control Variables

To isolate the effect of working capital on profitability, three control variables are introduced:

1. Current Ratio (CR): Current Assets / Current Liabilities

   Captures short-term liquidity, which may impact firm performance.

2. Debt-to-Equity Ratio (D/E): Total Debt / Shareholder's Equity

   Indicates capital structure and financial risk level.

3. Revenue: Net annual sales

   A proxy for firm size, which can influence economies of scale and profitability.

By using this variable structure, the model effectively isolates the impact of WCM on profitability while accounting for firm-specific operational and financial conditions.

3.5. Tools and Techniques for Data Analysis

The methodology involved both exploratory and inferential statistical methods, applied using SPSS and Microsoft Excel.

Descriptive Statistics

The first step in data analysis was to generate descriptive statistics for all variables. This includes the mean, median, standard deviation, minimum, and maximum values. These measures provided a foundational understanding of the central tendency, dispersion, and range of values across the 400 firm-year observations. Descriptive analysis helped in identifying data abnormalities, trends, and outliers.

Correlation Analysis

Pearson's correlation coefficient was used to assess the linear relationship b/w independent and dependent variables. This analysis helped in understanding whether multicollinearity exists among variables, which could bias regression estimates. For example, a high correlation between CCC and Debtor Days might indicate redundancy in the model.

Regression Analysis

Regression analysis is a powerful statistical tool used to check the relationship between a dependent variable and one or more independent variables. It allows researchers to model and quantify how changes in the predictors affect the outcome variable. In this study, regression analysis is applied to understand how components of working capital management (e.g., debtor days, inventory days, days payable, CCC) influence firm profitability, measured through ROA, ROE, and ROCE.

Theoretical Foundation of Regression

The foundation of regression lies in the classical linear regression model (CLRM), which assumes a linear relationship between the independent variables (X) and the dependent variable (Y). It is derived from the general linear model and is used to predict or explain outcomes based on explanatory variables.

The general form of a Multiple Linear Regression Model is given as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \varepsilon$$

Where:

- Y: Dependent variable
- $X_1, X_2, ..., X_k$: Independent variables
- β_0: Intercept term
- $\beta_1, ..., \beta_k$: Coefficients (slopes) for independent variables
- ε: Error term (random disturbance)

The Ordinary Least Squares method is used to estimate the coefficients by minimizing the sum of squared residuals (differences between actual and predicted values of Y). OLS is preferred for its simplicity, efficiency, and unbiasedness under CLRM assumptions.

Justification for Using Multiple Linear Regression

Multiple regression is suitable for this study as it allows for the simultaneous inclusion of multiple independent and control variables, enabling a comprehensive analysis of the relationship between working capital management components and profitability. It

facilitates the estimation of marginal effect of each WCM variable while controlling for key firm-level financial factors such as size, liquidity, and leverage. Additionally, the model can be extended to a panel data framework to account for both firm-specific and time-specific variations across the 40 companies over a 10-year period.

The regression models were designed to:

- Quantify the magnitude and direction of the relationship between WCM components and profitability.
- Evaluate statistical significance through p-values and t-tests.
- Identify the most influential predictors among the WCM variables.

By controlling for firm size, capital structure, and liquidity, the models effectively isolate the net impact of working capital efficiency on firm profitability.

Model Specification for the Study

A total of six regression models were developed in two distinct sets.

In the first set, three models were constructed with ROA, ROE, and ROCE as dependent variables, using the CCC as the primary independent variable. Current Ratio, Debt-to-Equity Ratio, and Revenue were included as control variables in all models.

To gain a deeper understanding of the individual impact of each part of the Cash Conversion Cycle, a second set of three models was developed by decomposing CCC into its constituent parts: Debtor Days, Inventory Days, and Days Payables These variables were used as independent variables in place of CCC, while the dependent variables (ROA, ROE, ROCE) and control variables (CR, D/E, Revenue) remained consistent. This model design allowed for a more granular analysis of how specific aspects of working capital influence profitability in manufacturing firms.

1. Return on Assets (ROA)

$$ROA = \beta_0 + \beta_1 CCC + \beta_2 CR + \beta_3 DE + \beta_4 REV + \varepsilon$$

2. Return on Equity (ROE)

$$ROE = \beta_0 + \beta_1 CCC + \beta_2 CR + \beta_3 DE + \beta_4 REV + \varepsilon$$

3. Return on Capital Employed (ROCE)

$$ROCE = \beta_0 + \beta_1 CCC + \beta_2 CR + \beta_3 DE + \beta_4 REV + \varepsilon$$

4. Return on Assets (ROA)

$$ROA = \beta_0 + \beta_1 DD + \beta_2 ID + \beta_3 DP + \beta_4 CR + \beta_5 DE + \beta_6 REV + \varepsilon$$

5. Return on Equity (ROE)

$$ROE = \beta_0 + \beta_1 DD + \beta_2 ID + \beta_3 DP + \beta_4 CR + \beta_5 DE + \beta_6 REV + \varepsilon$$

6. Return on Capital Employed (ROCE)

$$ROCE = \beta_0 + \beta_1 DD + \beta_2 ID + \beta_3 DP + \beta_4 CR + \beta_5 DE + \beta_6 REV + \varepsilon$$

Where: CCC = Cash Conversion Cycle

DD = Debtor Days

ID = Inventory Days

DP = Days Payable

CR = Current Ratio (liquidity control)

DE = Debt-to-Equity Ratio (leverage control)

REV = Log of Revenue (size control)

ε = error term capturing unobserved influences

Panel Data Consideration

Since the dataset includes multiple firms over multiple years, a panel data structure is implied. Panel regression models can capture both:

Cross-sectional heterogeneity (differences between firms)

Time-series dynamics (changes over years)

Advanced methods such as fixed effects or random effects could be used to control for unobserved heterogeneity, though in this study, a pooled OLS model is initially applied.

Interpretation of Coefficients

- A negative and significant coefficient (e.g., for CCC or Debtor Days) would imply that longer working capital cycles reduce profitability.
- A positive coefficient for Inventory Days might suggest the beneficial effect of adequate inventory levels in manufacturing firms.
- Control variable coefficients will explain the role of firm liquidity, leverage, and size in profitability outcomes.

Evaluation of Model Fit

Each regression model is evaluated using following metrics:

- R^2: It shows the proportion of variance in profitability explained by the model.
- p-values and t-values: Assess statistical significance of individual predictors.

Assumptions of the Model

For regression analysis to yield valid, unbiased, and efficient estimators, several classical linear regression assumptions must hold. Prior to model interpretation, these assumptions were tested using statistical diagnostics:

1. Linearity

The relationship b/w independent and dependent variables is linear.

2. Independence of Errors

The residuals should be independent across time and firms.

3. Normality of Residuals

This is necessary for valid hypothesis testing and p-value accuracy.

4. Homoscedasticity

The variance of error terms remain constant on all levels of independent variables.

5. No Multicollinearity

High correlation between independent variables inflates standard errors and leads to unreliable coefficient estimates.

4. FINDINGS AND DISCUSSIONS

4.1. Descriptive Statistics

Table 4.1 is a summary of descriptive statistics for the dependent, independent, and control variables used in this study. The dataset includes 368 firm-year observations derived from 40 manufacturing companies listed in the Nifty Smallcap 100 Index over the period from 2014 to 2024.

Table 4.1 shows that the average value of ROA is approximately 6.7%, with a standard deviation of 6.2%. This suggests that firm profitability, in terms of asset utilization, tends to vary moderately across the sample, potentially due to operational and structural heterogeneity in the manufacturing sector. The maximum observed ROA is 51.1%, while the minimum is -6.67%, indicating that while some firms are highly efficient in converting assets into earnings, others may be incurring losses or operating under sub-optimal asset utilization.

The average Return on Equity (ROE) is 12.3% with a standard deviation of 10.7%. The minimum ROE is -20.8%, and the maximum is 102.1%, reflecting significant variation in shareholder returns. These wide fluctuations may be attributed to differing capital structures, margins, and revenue growth profiles across the sampled firms.

Return on Capital Employed (ROCE) shows an average of 16.3%, with a standard deviation of 9.8%. The maximum value of ROCE is 55.7%, and the minimum is -10.8%, suggesting that while some firms generate strong returns on their employed capital, others are not able to cover the cost of capital, possibly due to operational inefficiencies or excessive debt.

The CCC has an average value of 180 days and a standard deviation of 235 days. This large variation suggests significant differences in how companies manage their working capital components. The maximum CCC is 2,263 days, and the minimum is -252 days, with negative values indicating cases where companies are receiving cash from customers before they need to pay their suppliers—a highly favorable working capital condition.

On average, firms collect their receivables in 92 days (Debtor Days), with a standard deviation of 95 days. The fastest collection period recorded is 4 days, and the slowest

is 1,051 days. This wide dispersion reflects major differences in credit policies and collection effectiveness.

Inventory Days average 223 days, with a standard deviation of 258 days. The shortest inventory turnover period is 16 days, while the longest is 2,865 days. For manufacturing firms, these values suggest that while some firms operate with highly efficient inventory cycles, others may be struggling with stock obsolescence, overproduction, or poor demand forecasting.

Firms take an average of 135 days to pay their payables (Days Payables Outstanding), with a standard deviation of 174 days. The minimum payables period is 18 days and the maximum is 1,922 days. These variations suggest different credit arrangements with suppliers and differing levels of bargaining power.

As a control for firm size, the total revenue is used. The average revenue is ₹2,973.66 crores with a standard deviation of ₹2,841.95 crores. The maximum annual revenue reported is ₹28,031.9 crores, and the minimum is ₹43.4 crores, highlighting the broad spectrum of company sizes within the sample.

To assess liquidity, the Current Ratio is considered. The average current ratio is 1.80, with a standard deviation of 1.18. The maximum observed ratio is 13.4, while the minimum is 0.5. This indicates that while some firms maintain significant short-term liquidity buffers, others may operate with tight liquidity.

Finally, leverage is measured using the Debt-to-Equity (D/E) ratio. The average D/E ratio is 0.47, with a standard deviation of 0.48. The minimum D/E ratio is 0, and the maximum is 2.5. These values suggest that while some firms are entirely equity-financed, others use a significant amount of debt, which can influence risk and return.

Table 4.1: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Dev.
ROA	368	-0.0667	0.5106	0.0669	0.0619
ROE	368	-0.208	1.0208	0.1234	0.1073
ROCE	368	-0.1089	0.5567	0.1631	0.0985
CCC	368	-252	2263	180.40	235.51
Debtor Days	368	4	1051	92.03	94.75
Inventory Days	368	16	2865	222.99	257.71
Payables Days	368	18	1922	134.67	173.62
Current Ratio	368	0.5	13.4	1.8024	1.1829
Debt-to-Equity	368	0.0	2.5	0.4709	0.4810
Revenue (₹ Cr.)	368	43.4	28031.9	2973.66	2841.95

Source: Own Analysis

4.2. Correlation Analysis

Table 4.2 presents the correlation coefficients for the variables included in the regression models. Pearson's correlation analysis is employed to examine the strength and direction of linear relationships between working capital management components and profitability indicators, namely ROA, ROE, and ROCE.

The table demonstrates how various working capital components interact with profitability as well as with each other in determining the financial performance of manufacturing companies.

The Cash Conversion Cycle (CCC) is negatively correlated with ROA (r = -0.216), ROE (r = -0.237), and ROCE (r = -0.207), indicating that firms with longer cash cycles tend to be less profitable. This negative relationship suggests that when the time taken to convert investments in inventory and receivables into cash increases, overall profitability declines.

Table 4.2: Pearson Correlation Coefficients

	ROA	*ROE*	*ROCE*	*CR*	*D/E*	*REV*	*DD*	*ID*	*DP*	*CCC*
ROA	1									
ROE	0.880	1								
ROCE	0.652	0.738	1							
CR	0.236	0.010	-0.053	1						
D/E	-0.311	-0.070	-0.064	-0.389	1					
REV	0.135	0.152	0.140	-0.121	0.133	1				
DD	-0.284	-0.295	-0.251	0.068	0.082	-0.219	1			
ID	-0.229	-0.236	-0.240	0.149	-0.156	-0.248	0.607	1		
DP	-0.202	-0.189	-0.212	-0.055	-0.090	-0.175	0.566	0.683	1	
CCC	-0.216	-0.237	-0.207	0.231	-0.072	-0.231	0.649	0.835	0.237	1

Source: Own Analysis

Debtor Days (DD) also shows a negative correlation with ROA and ROE, implying that delayed collections from customers can negatively impact asset and equity returns. In contrast, DD is positively associated with Inventory Days (ID) and Payables Days (DP), indicating that firms which offer longer credit to customers may also take longer to manage inventory and delay payments to suppliers.

Inventory Days (ID) are strongly positively correlated with CCC ($r = 0.835$), revealing that longer inventory holding periods are a primary driver of extended cash conversion cycles. ID also positively correlates with Debtor Days and Payables, reflecting interconnected operational timing in procurement and sales cycles.

Payables Days (DP) have a modest positive relationship with CCC (r = 0.237), indicating that while delaying payments may slightly extend CCC, it is less influential compared to inventory or receivables. Interestingly, DP shows a weaker direct relationship with profitability metrics, suggesting that the benefits of delayed payments may not translate into better financial performance.

Current Ratio (CR), a proxy for liquidity, exhibits a positive correlation with ROA and ROCE, and is also positively related to CCC (r = 0.231). This suggests that firms with higher liquidity might also have longer working capital cycles, possibly due to holding excess inventory or maintaining generous credit policies.

Debt-to-Equity (D/E) ratio is weakly negatively correlated with profitability measures, especially ROA and ROCE, reflecting the typical inverse relationship between financial leverage and operational efficiency.

Revenue, which proxies for firm size, has a positive correlation with profitability, indicating that larger firms tend to be more profitable. However, its negative correlation with CCC (r = -0.231) suggests that as firm size increases, companies are likely to manage their working capital cycles more efficiently.

Overall, the correlation analysis supports the theoretical expectation that efficient working capital management (i.e., lower CCC, DD, and ID) is associated with improved profitability

4.3. Regression Analysis

Two sets of regression models were developed:

- **Model Set A**: CCC as independent variable with CR, D/E, and Revenue as controls.
- **Model Set B**: Debtor Days (DD), Inventory Days (ID), Days Payable (DP) as independent variables replacing CCC.

The results of the multiple linear regression analysis are presented in Table 4.3. The following sub-sections interpret the effect of working capital variables and selected control variables on firm profitability, using Return on Assets (ROA), Return on Equity (ROE), and Return on Capital Employed (ROCE) as the primary dependent variables.

Table 4.3: Summary of Regression Results

Model	Dep. Var	R^2	Adj. R^2	Key Predictors	Coefficients (β)	p-value	Direction of Impact
A1	ROA	0.205	0.196	CCC	-0.252	0.000*	Negative
				CR	0.207	0.000*	Positive
				D/E	-0.267	0.000*	Negative
				Revenue	0.137	0.005	Positive
A2	ROE	0.078	0.068	CCC	-0.226	0.000*	Negative
				Revenue	0.117	0.026	Positive
A3	ROCE	0.062	0.051	CCC	-0.181	0.001	Negative
				Revenue	0.107	0.042	Positive
B1	ROA	0.225	0.213	Debtor Days	-0.138	0.028	Negative
				Inv. Days	-0.199	0.005	Negative
				CR	0.184	0.000*	Positive
				D/E	-0.273	0.000*	Negative
				Revenue	0.117	0.016	Positive
B2	ROE	0.105	0.090	Debtor Days	-0.214	0.002	Negative
B3	ROCE	0.093	0.078	D/E	-0.117	0.040	Negative

*Significance: *p < 0.001*
Source: Own Analysis

4.3.1 CCC and Profitability

The CCC shows a statistically significant negative relationship with all three-profitability metrics: ROA (β=-0.252, p<0.001), ROE (β=-0.226, p<0.001), and ROCE (β=-0.181, p=0.001). This indicates that firms with longer cash conversion cycles—i.e., those taking more time to convert investments in inventory and receivables into cash, experience lower profitability.

From a financial standpoint, this suggests that inefficiencies in managing inventory, receivables, or payables lead to prolonged capital lock-in, reducing liquidity and increasing reliance on external financing. Operationally, longer CCCs imply that firms may be overstocking inventory or facing delayed collections, which can strain cash flow and working capital reserves. For manufacturing firms with capital-intensive cycles, such inefficiencies disrupt production scheduling, constrain re-investment capacity, and ultimately lower returns on deployed assets.

Therefore, improving CCC through better inventory turnover, stricter credit policies, or renegotiated payment terms can enhance internal cash flows, reduce working capital needs, and boost profitability.

4.3.2 Component-wise Analysis

The disaggregated model provides a deeper understanding of how individual WCM components impact profitability.

Debtor Days (DD)

Debtor Days significantly negatively affect ROA (β=-0.138, p=0.028) and ROE (β=-0.214, p=0.002). This underscores that firms allowing longer credit periods to customers face lower efficiency in asset utilization and shareholder returns.

In operational terms, extended debtor periods imply slow-moving receivables, tying up funds in accounts that could otherwise finance operations or growth initiatives. For manufacturing firms, this increases working capital pressure, especially when high raw material and labor costs must be covered in advance. Moreover, the risk of bad debts rises with time, posing a threat to financial stability.

Hence, firms must implement more robust credit appraisal mechanisms and enhance collection processes. Digital invoicing, early payment discounts, and closer monitoring of receivables can lead to a reduction in debtor days, improving asset turnover and ultimately strengthening profitability.

Inventory Days (ID)

Inventory Days also show a significant negative impact on ROA (β=-0.199, p=0.005), suggesting that higher inventory holding periods reduce operational efficiency and asset productivity.

From an operational lens, excessive inventory levels increase storage costs, obsolescence risk, and potential write-downs. Particularly in manufacturing, where raw materials and work-in-progress items represent a substantial proportion of inventory, poor inventory turnover leads to inefficiencies and suboptimal capacity utilization.

A lean inventory strategy—leveraging demand forecasting, just-in-time (JIT) models, and automated replenishment systems—can streamline operations, reduce wastage, and enhance overall financial returns.

Days Payables Outstanding (DP)

Interestingly, DP did not have a statistically significant effect in any model, indicating that delayed payments to suppliers neither harm nor benefit firm profitability in the observed sample.

This may be because Indian manufacturing firms tend to maintain conservative payment practices due to supplier dependency or industry norms. It's also possible that suppliers adjust pricing or delivery terms based on payment behavior, nullifying the financial advantage of extended payment periods.

Nonetheless, managers should aim for a balance—maximizing the free credit period without damaging supplier relationships or missing early payment discounts.

4.3.3 Impact of Control Variables

Current Ratio (CR)

CR positively affects ROA in both CCC-based ($\beta=0.207$, $p<0.001$) and decomposed models ($\beta=0.184$, $p<0.001$), indicating that better liquidity enhances asset performance.

A healthy liquidity position ensures smoother operations, reduces borrowing dependency, and allows firms to capitalize on strategic opportunities. However, extremely high current ratios may indicate idle assets or over-investment in non-productive short-term assets, which could drag down returns. Thus, firms should aim for optimal liquidity, not maximal.

Debt-to-Equity Ratio (D/E)

D/E shows a consistent negative relationship with ROA (β=-0.267, p<0.001) and ROCE (β=-0.117, p=0.040), signifying that higher leverage reduces profitability. This finding aligns with the traditional pecking order theory, where excessive reliance on debt introduces fixed interest obligations, increasing financial risk and reducing net returns. In manufacturing firms, where capital expenditure and operating leverage are high, prudent debt management is crucial. Firms should evaluate their capital structure and consider equity or retained earnings for financing to mitigate interest burdens and safeguard profit margins.

Revenue

Revenue exhibits a positive influence on ROA and ROE, although its impact on ROCE is slightly weaker. Larger firms likely benefit from economies of scale, better supplier terms, and more bargaining power with customers, which collectively improve efficiency.

This result reinforces the need for manufacturing firms to focus on sustainable growth, scale expansion, and market diversification as avenues for boosting profitability.

4.3.4 Model Variation

The adjusted R^2 for the ROA model using CCC is 19.6%, while the R^2 is 20.5%, indicates that approx 20.5% of the variation in profitability (ROA) is explained by the independent and control variables in the model. The remaining 79.5% is attributed to other external or firm-specific factors not included in the model. The adjusted R^2 values for ROE and ROCE in the CCC model are 6.8% and 5.1%, respectively, which still offer useful insights though they reflect modest explanatory power—common in firm-level financial models.

This moderate R^2 is consistent with prior empirical studies in corporate finance and accounting, especially those dealing with firm-level panel data across diverse industries and operational conditions (Deloof, 2003; García-Teruel & Martínez-Solano, 2007). Financial performance metrics like ROA, ROE, and ROCE are inherently influenced by a wide array of variables—such as management quality, competitive dynamics, market volatility, innovation strategy, and regulatory factors—which may not be directly observable or easily quantifiable in a model of this scale.

Despite the modest R^2 values, the models retain strong practical relevance because of the statistical significance and economic interpretability of key coefficients. For example, the negative association between the cash conversion cycle and profitability indicators suggests actionable financial management strategies. Additionally, the use of control variables like current ratio, debt-to-equity ratio, and revenue allows for partial adjustment of firm-level heterogeneity, offering a more nuanced view of how working capital decisions affect returns.

From a policy and managerial standpoint, these findings reinforce the notion that improvements in working capital management can have a measurable and meaningful impact on profitability, even if they do not account for the entirety of performance variations. As such, manufacturing firms can benefit from focusing on short-term financial efficiency while concurrently addressing broader strategic and operational factors.

5. CONCLUSION

5.1. Conclusion

This study aims to analyze the relationship b/w working capital management and the profitability of manufacturing firms listed in the Nifty Smallcap 100 Index over the 10-year period from 2014 to 2024. With a sample of 40 manufacturing firms, the research adopted a robust quantitative approach using descriptive statistics, correlation, and multiple regression models to test the effects of core working capital components—such as the CCC, Debtor Days, Inventory Days, and Payables Days on key profitability indicators including ROA, ROE, and ROCE.

The findings reveal a consistent and statistically significant inverse relationship between working capital measures (especially CCC, Debtor Days, and Inventory Days) and profitability metrics. Firms that efficiently manage their receivables and inventory cycles while maintaining optimal liquidity levels are found to perform better in terms of asset utilization and shareholder returns. Interestingly, Days Payables Outstanding showed no significant relationship with profitability, suggesting that extended payment practices neither harm nor benefit financial performance in this sample.

The study also emphasize the importance of financial discipline in areas such as liquidity (via current ratio) and capital structure (via debt-to-equity ratio), with both variables influencing profitability outcomes significantly. Revenue, a proxy for firm size, showed a positive relationship with returns, indicating that larger firms potentially benefit from economies of scale and stronger operational controls.

These results are both theoretically consistent and practically relevant. They highlight the pivotal role of working capital efficiency in enhancing the financial resilience and competitiveness of small-cap manufacturing firms that are often resource-constrained but strategically vital to India’s industrial landscape.

5.2 Summary of Key Findings

- Cash Conversion Cycle (CCC) is negatively associated with all profitability metrics (ROA, ROE, and ROCE), implying that shorter CCC enhances firm performance.

- Debtor Days (Receivables Period) have a significant negative effect on ROA and ROE, indicating that delayed collections reduce profitability.
- Inventory Days are negatively correlated with ROA, suggesting that excessive inventory levels impair asset efficiency.
- Days Payables Outstanding do not have a statistically significant impact on profitability, potentially reflecting industry norms or supplier relationship management.
- Current Ratio is positively associated with ROA, suggesting that maintaining adequate liquidity enhances operational performance.
- Debt-to-Equity Ratio is negatively linked to both ROA and ROCE, indicating that higher leverage lowers profitability.
- Revenue has a positive impact on ROA and ROE, indicating that larger firms generally achieve higher profitability owing to economies of scale.
- The Adjusted R^2 values in the regression models, though moderate (ranging from ~5% to 21%), confirm that working capital variables explain a meaningful portion of the variance in profitability.

5.3 Limitations of the Study

- **Limited to Manufacturing Sector**: The study only covers small-cap manufacturing companies and may not generalize to other sectors such as IT, services, or retail.
- **Sample Size and Index Restriction**: Only 40 firms from the Nifty Smallcap 100 Index were considered, which, while focused, may omit relevant data from non-indexed or delisted firms.
- **Use of Secondary Data**: The study relies entirely on secondary data from annual reports and financial databases, which may be subject to reporting lags or accounting inconsistencies.
- **Static Financial Ratios**: Key variables like ROA, ROE, and CCC are point-in-time measures and may not fully capture operational dynamics or strategic shifts.

- **Exclusion of Qualitative Factors**: Managerial decisions, industry competition, regulatory changes, or technological innovation are not captured in the quantitative model but may influence profitability.

5.4 Future Scope of the Study

- **Sectoral Expansion**: Future research can extend the analysis to include mid-cap and large-cap firms or cross-sector comparisons to validate whether the findings hold across different industries.
- **Use of Panel Regression Models**: Incorporating fixed effects or random effects models could account for unobserved firm-level heterogeneity and improve explanatory power.
- **Macroeconomic Controls**: Future studies could include variables such as interest rates, inflation, or GDP growth to account for external economic influences.
- **Comparative International Analysis**: A cross-country study could assess how working capital efficiency varies across developed and emerging economies.
- **Qualitative Case Studies**: Combining quantitative analysis with managerial interviews or case studies could offer deeper insights into strategic WCM practices.
- **Impact of Digital Tools on WCM**: With increasing digitalization in supply chain and finance, future studies could explore the role of ERP systems or fintech platforms in optimizing working capital.

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