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"Influence of Working Capital Management and Capital Investment on Profitability in Pakistan's Cement Industry"

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DECLARATION OF AUTHENTICATION

I, **Muhammad Hassan *Nauman*** MBA Student in the Department of Management Sciences, Bahria University, Islamabad, certify that the research work presented in this thesis is to the best of my knowledge my own. All sources used and any help received in the preparation of this dissertation have been acknowledged. I hereby declare that I have not submitted this material, either in whole or in part, for any other degree at this or any other institution.

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First, I would like to thank my supervisor **Ms Hira Idress** for her help in the completion of this research. I would also like to acknowledge her support for the guidance which she provided me to complete this thesis. To my family and friends I am thankful for the help they provided during this lengthy process of research

Abstract

The purpose of this study is to examine the impact of working capital management (WCM) and capital investment on the profitability of the cement industry. Using data from the Pakistani cement industry, this paper employs summary statistics and regression analysis to test the relationship between WCM metrics—which include working capital, current ratio, and quick ratio—and profitability measures such as return on equity (ROE), return on investment (ROI), and gross profit.

This analysis proves beneficial for cement companies in various ways. The summary statistics provide insights into areas needing improvement in working capital and efficiency. The correlation matrix reveals potential relationships between WCM and profitability measures, while the regression analysis identifies which WCM metrics (e.g., working capital, current ratio, quick ratio) and capital investment proxies (e.g., sales, profit margin) most influence profitability. This helps companies determine which aspects of WCM to focus on for enhancing ROE and ROI.

The research also acknowledges limitations, such as the possibility of other factors affecting profitability not captured by the model developed in this study. Nevertheless, it is evident that by adopting these strategies, cement companies can obtain critical data to improve WCM practices and capital investment decisions, leading to better financial outcomes.

Keywords

(Working Capital Management (WCM), Profitability, Cement Industry. Return on Equity (ROE) Return on Investment (ROI),Current Ratio, Quick Ratio

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Chapter 1 Introduction

In the current dynamic corporate finance setting, effective management of working capital is essential for sustaining and enhancing a firm's profitability and liquidity. This is particularly crucial in the Cement Industry of Pakistan, where fluctuations in working capital management significantly impact business activities and financial sustainability. The objective of this research is to identify the strong relationship between working capital management and profitability in this critical sector, and to examine how effective management of short-term resources and obligations can enhance returns and minimize risk (Ali & Awan, 2019).

Current assets and liabilities also known as working capital are crucial in day to day business operations due to flexibility as suggest by Seth, Chadha, et al. (2021). The management of the components is not merely supervisory; it entails making informed decisions to avoid or reduce payment outings and to optimize the returns from assets (ITICHA, 2023). This need for such a contingent approach is supported by Raheman & Nasr (2007) who pointed out that working capital management is a strategic tool for enhancing shareholder wealth.

The challenge of working capital management skills. As Maestre, Le Bagousse-Pinguet et al (2022). Pointed out this makes it necessary to be accurate and to think ahead to avoid the line between risk This research aims at filling this gap by analyzing the positive correlation between profitability and working capital management an area of research that attracted more attention among scholars especially in the post 2008 financial crisis (Liu, Sehgal et al., 2013).

The cement industry in Pakistan which is the core contributor to the infrastructure development in the country due to the increasing urbanization and need for more infrastructure projects (APCMA,2020) forms an appropriate background for this study Opportunities arising from such plans such as the China-Pakistan Economic Corridor (CPEC) have also put emphasis on the need

know the working capital situation for sustainable growth of this sector. Through there have been extensive studies done on this relationship in different contexts of international business, there is a void of literature and research particularly related to Pakistan cement industry (Ashraf et al., 2024). Thus, to control the identified research gap. This study proposes to examine the effects of working capital management on profitability within the context of the cement industry in Pakistan. Hypothesized as quantitative study that uses both primary and secondary data to analyze the results with the aim of offering insights towards of the improvement of working capital management. Such findings are useful for increasing the profitability and for the sustainable development of this important sector and to meet the changing needs of the financial environment of Pakistan. By doing so, this research aims at making a positive contribution to the existing body of knowledge on how and why financial decisions make the difference in the cement industry and other industries that are closely related to it

1.1 Background

Working Capital Management Evolution

WCM can be defined as management of assets, liabilities and cash in order to finance networking capital requirement in the most efficient way possible. Mangers and academics have involved in a dialogue process whereby managers describe the issues affecting the organization and academics look for a way of solving them (Bhattacharya,2021). This two-way debate has defined the development of WCM and has been characterized by each stage opening up new aspects and issue. Knowledge of this historical evolution is important in order to understand current practices of WCM as well as to predict future trends. To that end, this research will examine the historical background of WCM from early 1900s to present and consider the factors that affects its management (Filbeck & Krueger, 2005) specifically, the review will identify main changes in

WCM research and consider how the models and frameworks that emerged over the years could help mangers in various contexts. It is the intention of this review to highlight areas that have been left unexplored and offer suggestions for practitioners and researchers and even conjecture on the future of the research in the topic.

Awareness Era (1900-1940s)

In the early part of the 20th century, WCM research was in its infancy with very little development or comprehension. There was a confusion on what constituted working capital and its components which resulted in divergent interpretation Mann (1918) presented one of the first definitions, starting that working capital is the sum of money necessary for the company's operations. This definitions has been changing with time and was finally given by the Committee on Accounting Procedures (CAP) Accounting Research Bulletin (ARB) No 30 in 1947.Working capital was defined as the difference between current assets and current liabilities, and highlighted its purpose as the ability to fulfill short-term commitment in the normal course of business operations. However, this definition was criticized because it is not in the line with real especially when it comes to the classification of assets and liabilities Swartz (1947). opposed the rigid 12-month operating cycle as started by ARB explaining the difference in operating cycles in various industries. Also, he argued against exclusion of some items from current asset and liabilities and this was indication of how difficult it was for the accountants to classify. However, these debates were essential in laying the foundation for working capital analysis and prepared the ground for future research and developments.

Pre- and Post-World War II Era (1920s-1950s)

The pre-World War II period saw modest developments in the WCM research due to increasing challenges of industrialization. Researchers and professionals were interested in enhancing the flow of working capital through better management methods and accounting procedures. The application of optimization and simulation techniques in the 1950s was a move to more systematic and mathematical methods (Pouraghajan , Emamgholipourarchi, 2012). These approaches sought to bring efficiency in the operations as the industrial growth was on the rise. However, difficulties were still present, especially concerning the proper evaluation and control of working capital requirements in changing conditions. However, this period was characterized by the growth of WCM practices and laid the foundation for the evolution of the concept in the following decades (Ibrahim, Usaini, Elijah, 2021).

Industrialization Era (1950s-1980s)

The industrialization period saw great advancements in the WCM research because of the high levels of manufacturing and commerce. Academics extended their exploration of the working capital more profoundly, trying to identify effective models to control the flow of liquidity and cash. The optimization models emerged as the essential tools for managers in conditions of growing business uncertainty (Ibrahim, Usaini, Elijah 2021). However, the era came with its own challenges, which included swings in the global economy and shifts in the market that posed challenges to traditional WCM strategies. In these conditions, researchers and practitioners combined efforts to further develop new and enhance current models for the effective working capital management.

Globalization Era (1990s-2000s)

The new age of the globalization brought a significant shift in the WCM, especially because of the integrated markets and increased competition. Scholars and professionals debated on how the globalization affect the working capital management and issues like supply chain and risks (Hofmann, Kotzab,2010). New technological advancements such as the ERP systems affected the WCM practice by providing real-time data for the financial ratios. However, globalization brought about distinct problems such as fluctuations in currency and volatile geopolitics, which demanded responsive and flexible WCM strategies. This period highlighted the need to have flexibility and robustness while operating the working capital in the global environment that is so complex and unpredictable (Rahman, Misra, & Kumar, 2024).

Background of Capital Investment in Pakistan

Capital investment refers to the funds invested in a firm or enterprise for the purpose of furthering its business objectives. In the context of Pakistan, capital investment has been a pivotal factor in the growth and development of various industries, including the cement industry. Historically, Pakistan's industrial sector has faced several challenges such as political instability, energy crises, and infrastructural deficiencies, which have hindered consistent capital inflow (Khan & Khan, 2018).

Importance of Capital Investment

Capital investment is essential for the expansion and modernization of industries. It allows for the acquisition of new technologies, the construction of new facilities, and the improvement of operational efficiencies. For the cement industry in Pakistan, capital investment is crucial for

meeting the growing domestic demand and competing in the international market. Investments in modern machinery and environmentally friendly technologies have become increasingly important as the industry seeks to reduce its carbon footprint (Ahmed et al., 2019).

Historical Development of the Cement Industry in Pakistan

The cement industry in Pakistan dates back to 1921 when the first plant was established in Wah. Over the decades, the industry has seen significant growth and development. During the early years, the industry was characterized by small-scale operations with limited capacity. However, with the influx of capital investment, particularly from the government and private sector, the industry began to expand rapidly in the 1950s and 1960s (Husain, 2020).

Government Policies and Capital Investment

The government of Pakistan has played a significant role in attracting capital investment to the cement industry through various policies and incentives. These include tax holidays, subsidies, and the establishment of special economic zones. For instance, the implementation of the China-Pakistan Economic Corridor (CPEC) has spurred significant investments in infrastructure, leading to a surge in demand for cement and subsequent capital investments in the industry (Rashid & Amin, 2021).

Contribution of Capital Investment to the Cement Industry

Technology

One of the most notable contributions of capital investment to the cement industry in Pakistan has been the adoption of advanced technologies. Investments in state-of-the-art machinery and production techniques have enhanced the efficiency and quality of cement production. This has

not only increased the production capacity but also reduced the cost per unit, making Pakistani cement more competitive in the global market (Zafar et al., 2020).

Expansion of Production Capacity

Capital investments have also enabled the expansion of production capacities of cement plants across the country. Major players in the industry, such as Lucky Cement and DG Khan Cement, have significantly increased their production capacities through strategic investments. This expansion is crucial for meeting the rising domestic demand driven by urbanization and infrastructure development projects (Iqbal & Khan, 2018).

Environmental Sustainability

The cement industry is one of the largest contributors to greenhouse gas emissions globally. However, with capital investment in environmentally friendly technologies, the industry in Pakistan is making strides towards sustainability. Investments in alternative fuels, waste heat recovery systems, and energy-efficient processes are helping reduce the environmental impact of cement production (Ahmed et al., 2019)

Challenges and Future Prospects

Despite the positive contributions, the cement industry in Pakistan faces several challenges. These include energy shortages, fluctuating raw material prices, and regulatory hurdles. Addressing these challenges requires continued capital investment and supportive government policies. The future prospects of the industry are promising, with ongoing infrastructure projects and increasing urbanization driving demand for cement (Rashid & Amin, 2021).

The Pakistani Cement Industry: An Overview

The industry of cement in Pakistan has evolved and grown with the country's development process starting from the early part of the twentieth century. Originally developed to cater for construction needs of colonial buildings, the industry expanded tremendously after independence due to government policies aimed at the development of infrastructure. It was nationalized in the 1970s but liberalized in the late 1980s to allow private capital investment and competition (Ali et al. , 2015). Currently, the industry consists of 19 companies with 24 plants located throughout the country divided in accordance with the regions' needs. Market leaders are on Pakistan Stock Exchange, which shows that the industry is very valuable in the market.

Impact of Government Policies and Economic Factors

The expansion of the cement industry in Pakistan is directly related to the state of the economy, which is why government expenditures are so important for the growth of the industry. PSDP funded infrastructure projects play a major role in determining the cement consumption pattern, which in turn depicts that the industry largely relies on PSDP (Bagh et al. 2017). Moreover, measures to encourage private sector participation in construction activities also support cement demand by providing a favorable climate for industry development. Nonetheless, some challenges that affect the sustainability of the industry include fluctuating energy prices, inadequate transportation structures, and an oligopolistic market structure (Mehmood et al., 2019).

Resilience Amidst Global Challenges

The cement industry of Pakistan has remained quite stable despite facing global crises such as the COVID-19 pandemic and a decrease in cement consumption around the world. This has been

achieved through the provision of incentives and stimulus packages from the government to counterbalance external shocks. For instance, the construction package that was launched in FY2020 has encouraged private sector investment hence ensuring cement demand sustainability. Further, the positive effect of the developments concerning the China-Pakistan Economic Corridor (CPEC) has helped in sustaining the overall demand. In the future, more government support and proper investment will be needed for addressing the emerging issues and to achieve sustainable development of the cement industry of Pakistan (Wasim, Siddiqi, 2021).

1.2 Problem Statement

The cement industry in Pakistan faces significant challenges in managing its working capital, despite constituting approximately 9% of the country's total industrial sector. According to APCMA, the industry contributes 0.85% to Pakistan's GDP (APCMA, 2023). This vital sector plays a crucial role in infrastructure provision and economic growth but grapples with complexities in its supply chain and fluctuating material prices (Khan, 2024). The production processes, ranging from raw material procurement to product distribution, necessitate effective working capital management to ensure operational efficiency and profitability.

The industry contends with volatile costs of raw materials, requiring substantial capital investments to maintain production levels during cost hikes and manage inventory accumulation during price downturns (Ashraf et al., 2024). Furthermore, the construction sector's inherent volatility and intense competition exacerbate these challenges, compelling cement manufacturers to balance asset utilization and cash availability (Ashraf et al., 2024).

Effective working capital management is crucial for cement companies to capitalize on growth opportunities, adapt to market fluctuations, and sustain financial performance (Khan, 2024). This research aims to enhance industry profitability and stability by identifying best practices and guidelines through theoretical frameworks and empirical analysis of Pakistan's cement industry and its working capital dynamics.

1.3 Rationale of Study

The rationale for this study is to examine the connection between working capital management and profitability of cement firms in Pakistan. Usually, efficient management of working capital outline the fundamental part of the overall corporate strategy to create the shareholder's value; as a result, firms try to keep an adequate level of working capital that maximizes shareholder's wealth.

1.4 Research Gap

Despite extensive literature on working capital management, there is a notable research gap specific to Pakistan's cement industry. Particularly, the relationship between working capital dynamics and profitability for firms listed on the Pakistan Stock Exchange (PSX) remains underexplored (Kayani et al., 2023; Sensini, 2020). This study aims to address this gap by investigating how effective working capital management impacts the profitability of major cement companies in Pakistan, offering valuable insights for stakeholders, policymakers, and investors.

1.5 Research significance

This study holds significant value for various stakeholders within the Pakistani cement industry Cement Companies: The conclusions can be useful for improving the working capital management practices.

- Minimize the cost of holding inventory and enhance the cash flow management.
- Improve the payment terms with suppliers and customers.
- Improve the financial position and sustainable development profile. According to Hassan, Khan, and Qureshi (2018)

Investors and Financial Institutions: The study of the working capital management practices in the cement industry of Pakistan can help the investors and the financial institutions to make better investment decisions. The results of the study may help in assessing the financial position and risk level of cement firms. (Arshad, M. 2023)

1.6 Research Objectives

The primary objective of this research is to investigate and analyze the working capital management practices within Pakistan's cement industry. This study aims to:

1. **Identify Challenges**: Examine the key challenges faced by cement companies in Pakistan in managing their working capital, including supply chain complexities, fluctuating raw material prices, and market volatility.
2. **Evaluate Current Practices**: Assess the current working capital management strategies employed by cement manufacturers to understand their effectiveness and areas needing improvement.
3. **Analyze Financial Performance**: Investigate the impact of working capital management on the financial performance and profitability of cement companies, using both theoretical frameworks and empirical data.

4. **Best Practices and Guidelines**: Identify and propose best practices and guidelines for effective working capital management tailored to the specific needs of the cement industry in Pakistan.

1.7 Research Question

1. The primary challenges faced by cement companies in Pakistan in managing their working capital?
2. The current working capital management practices employed by these companies, and effective, are they?
3. Do fluctuations in raw material prices and supply chain complexities impact working capital management in the cement industry?
4. The relationship between working capital management and the financial performance of cement companies in Pakistan?

Chapter 2 Literature Review

Working Capital Management's major focus is to address the issues that come up in the process of managing current assets and liabilities. In addition, the correlation between current assets and liabilities also has significant role in the firm's investment and credit policies. (Khan & Jain, 2000).

2.1 Optimizing Working Capital Management for Profitability

Working capital is the amount of fund invested in the current assets of a business. Working capital consists of permanent working capital and temporary working capital. Permanent working capital is defined as "the amount of current assets required to meet the firm long term minimum requirement", as the name suggests. The temporary or seasonal working capital refers to the amount of current assets that changes in accordance with the seasonal needs. (Van Horn, 2005).

WCM consists of determining the volume and composition of sources and uses of working capital in such a way that would increase the wealth of stockholders. Working Capital Management is the management of current assets and current liabilities such that would result in the most desirable level of working capital and maximum company profitability. Inadequate working capital leads the company to bankruptcy. On the other way, too many working capital results in worsening cash and ultimately the decreasing profitability (Chakraborty, 2008).

Working capital strategies include conservative, bold and moderate strategies. In the conservative strategy, companies retain a high amount of current assets with a low return level; and a low level of current assets that leads to the increase of liquidity and decrease in risk. In the bold strategy, the company uses minimum current assets to utilize the highest level of its current liabilities. The

moderate strategy retains the optimum level of current assets and liabilities (Mojtahedzadeh et al, 2011).

WCM is an field which is very broadly revisited by academicians along with capital budgeting, some has attentive on the relationship between profitability and working capital efficiency (Lazaridis and Tryfonidis 2006), some has attentive on the impact on cash due to management of working capital components (Cote and Latham -1999), and some has focused on trade credit, (Pike and Nam 2001).

Working Capital Management has been moved toward in various ways by many academicians in many countries. But in a developing country as ours, this area has not been revisited very widely. For this purpose, this study focuses on a nexus between Working Capital Management and the profitability of Cement firms in Pakistan (Scherr, 1989).

The working capital is considered as the Backbone of a firm and cash conversion cycle is the primary gauge of working capital competence. Cash conversion cycle basically shows how long it takes a firm to change resource inputs into cash flows. This consists of three parts, receivables collection period, payables deferral period and inventory turnover period (Besley et al, 1987).

Working capital can be efficiently managed in a way via delaying disbursement float & speed up collection float which in turn is more useful for its liquidity position and thus reduces the risk of dependency on external sources of finance. So firms with lesser period of cash conversion cycle are measured to be more efficient. There has been many studies done on Working Capital Management across the world, some has attentive mainly on enhancing accounts receivable management so that the firms can maximize profit (Besley *et al, 1987).*

After all these, it is practically experienced by many analysts or even investors that Research Objective:

- Investigate the relationship between inventory levels, accounts receivable, and accounts payable.
- Analyze the impact of these working capital components on the long-term profitability of cement companies in Pakistan.
- Identify areas for improvement in working capital management practices within the Pakistani cement industry.

their remains a disparity between literature and pragmatic world, especially when it comes to developing countries. This study is expected to provide the investors of Pakistan with a view about the working capital performance of firms they invest with and relate the expected profitability from their investment. This study showed the extent of dependency of profitability ratios over the working capital components of firms if there happens to be any and investigated the practical applicability of the theoretical implications on the Cement firms of Pakistan. (Qayyum, 2012).

The management of the business must ensure that it has optimum level of working capital. If a business is much short of working capital from its desire level, it will have liquidity problems like failing to honor its obligation on time, and thus unable to take advantage of discounts for prompt payment etc.

Profitability can be termed as the rate of return on investment. If there will be an unjustifiable over investment in current assets then this would negatively affect the rate of return on investment (Vishnani & Shah, 2007). The basic purpose of managing working capital is controlling of current financial resources of a firm in such a way that a balance is created between profitability of the firm and risk associated with that profitability (Ricci & Vito, 2000).

Padachi K. (2006) highlighted the trends in working capital management and its impact on firm's performance for the sample of 7 Cement firms for the period 2020-2024. Performance of the firm as reflected by the profitability is measured through return on investment. While the independent variables are receivables turnover, inventory turnover, accounts payable turnover, operating cycle and cash conversion cycle.

The cement industry is a pivotal sector for Pakistan, much like in other emerging economies, offering a potential catalyst for rapid economic development. According to data sourced from the Pakistan Bureau of Statistics (PBS), the cement sector exhibited robust performance with exports totaling a substantial volume. Specifically, during the period spanning July to May in 2012, the industry exported a significant quantity of cement products, amounting to a value of US$ 142.03 million. This data underscores the strategic importance of the cement industry in contributing to economic growth and export revenue generation for Pakistan.

Working capital is important to the financial health of the businesses. The amount invested in working capital Cements firms is often high in proportion to the total assets employed so it is vital that these amounts be used in efficient and effective way. According to literature, current assets of these firms account for almost more than 65% of the total assets. (www.sbp.org.pk, 2012).

(H1): There is a significant relationship between Working Capital Management (WC) and financial performance (ROE, GP, or ROI). We can further specify the direction of the relationship (positive or negative) depending on our research question.

2.2 Capital investment on Cement Industry

Profitability is an essential measure that shows the efficiency of the firm's performance in producing profits and the capacity to maintain growth in the long run. Some of such research includes Al Magrabi and Al Hadrami (2021) that examines the effect of capital structure on profitability in emerging market cement firms. They stress the need to achieve the right mix of leverage levels as a way of achieving the best tax optimization while at the same time controlling for financial risks. These results demonstrate the importance of capital structure decisions in determining organizations' future profitability patterns, particularly in increasingly competitive markets.

Comparing the results obtained by Hasan et al. (2023), it is possible to reveal the difficulties connected with the use of profitability in developed cement markets. This aspect shows the trade-off between taxes shields and interest expenses, especially as it underlines the importance of sound management of the debt while the industry faces issues such as cyclicality of demand and competitive forces. They help to enhance the understanding of how capital structure decisions affect profitability patterns throughout industry life cycle and varying conditions of the market.

2.2 Liquidity Management Challenges

Liquidity management is crucial to cement companies, especially because this industry is characterized by fluctuations, and companies need to adapt to them to maintain their operations. Khan et al. (2022) have also focused on the impact of capital structure decisions on liquidity in their research, highlighting the importance of the optimal ratio between debt and cash. The ideal capital structures of firms match the debt repayment capacity with the working capital needs so

that firms are able to manage the economic cycles and capital-intensive expenditures without putting pressure on their financial stability.

On the other hand, Gupta and Singla (2020) argue that the cement industry is exposed to liquidity risk due to high leverage. Their studies show that it is crucial to avoid getting into unnecessary debts that can cause liquidity problems, particularly when there is volatility or a downturn in the market. The results of this study highlight the importance of capital structure decisions in building up cash reserves that are crucial for the firm's viability and development.

> **H2):** There is a significant relationship between liquidity ratios (Current Ratio (CR) and Quick Ratio (QR)) and financial performance (ROE, GP, or ROI). We can further specify the direction of the relationship (positive or negative) depending on our research question.

2.3 Market Valuation Dynamics

Market to book ratios comprise of perceptions of growth rates, risk, and competitiveness of a firm in the market. A number of research papers like Li et al. (2023) examine the relationship between capital structure decisions and market prices in the cement sector. This is the case because their research focuses on the need to ensure that debt levels are sustainable by aligning them with market expectations and growth trends in industries to boost investor confidence and competitiveness of the market.

Moreover, Bradley et al. (1984) emphasize how the market valuation processes are intricate in cement firms due to the firm's capital structure decisions, market cycles, and regulatory factors. It

is important for cement firms to grasp these dynamics in order to present their performance, future plans, and plans on mitigating risks in a good manner to the investors.

2.4 Challenges and Opportunities

The challenges and opportunities that cement industry encounter in its operation are numerous and cut across many aspects of the business including capital structure. Macroeconomic factors such as regulatory changes, technological advancements, and environmental and global

economic conditions define the industry environment and financial results. Meeting the financial responsibilities while investing in green technology and sustainable practices to ensure the company's future sustainability is a complex issue that can only be solved by applying the right capital structure that matches the company's long-term goals and stakeholder expectations.

> **(H3):** The model that includes Working Capital Management (WC), Current Ratio (CR), and Quick Ratio (QR) explains a significant portion of the variance in financial performance (ROE, GP, or ROI)

2.5 Future Direction

Working capital management is important for all forms of businesses including cement firms as it affects the financial position and the ability to create value for shareholders (Kayani, Gan, et al. , 2023). Effective working capital management maintains business operations, minimises risks, and results in greater returns (Sensini, 2020; Raheman and Nasr, 2007). It entails maximization of asset revenues and minimization of payment costs, requiring precise and proactive plans (Maestre, Le Bagousse-Pinguet et al. , 2022).

Capital investment decisions also affect profitability greatly in the cement industry among others (Al Magrabi and Al Hadrami, 2021). It is crucial to maintain the levels of tax incentives and minimize the risks for financial instability (Hasan et al. , 2023). Sound debt management practices are important especially when facing market risks and competitive forces.

Inventory management is crucial for cement firms because of market volatility and fluctuations (Khan et al. , 2022). It is important to strike a balance between debt financing and cash reserves (Gupta and Singla, 2020).

Market-to-book ratios, which represent investors' expectations, are essential to firm profitability (Li et al. , 2023). The following are the benefits of matching debt levels with the market: Bradley et al. (1984) argue that the level of debt has a positive effect on investor confidence.

The cement industry is characterized by challenges and opportunities with regard to capital investments and sustainability objectives. Market conditions, global economic factors, and technological advancements affect financial performance, making it important to have a strategic plan that is consistent with organizational goals.

Though there is a vast literature on working capital management, yet the literature on the working capital management of cement industry in Pakistan is scarce; more so, the relationship between working capital dynamics and profitability of cement firms such as D. G Khan Cement Company, Lucky Cement Company, and other firms listed in Pakistan Stock Exchange (PSX) is also missing. This study therefore seeks to address this research question by analysing the effects of WCM on profitability within the cement industry of Pakistan. Using both primary and secondary research data, this study aims at providing useful recommendations to the stakeholders, policymakers, and investors in order to enhance long-term profitability and economic stability of the cement industry

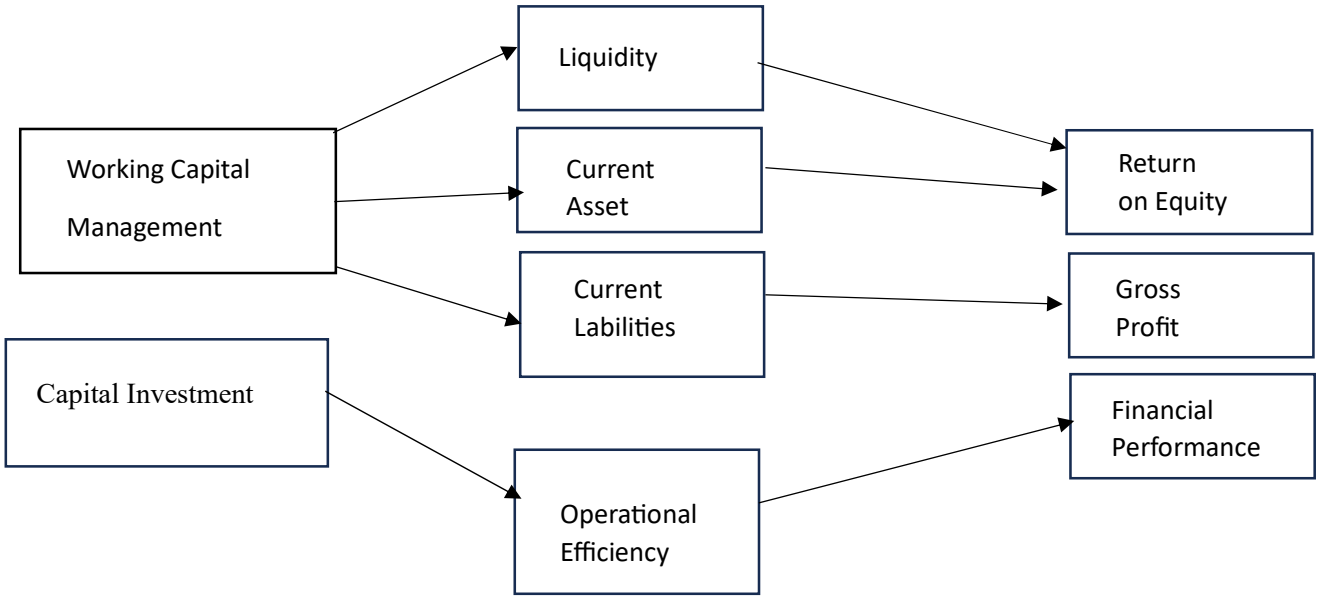
Theoretical Framework of Working Capital and Capital Investment

Working capital management involves strategically overseeing current assets and liabilities to optimize profitability and ensure liquidity in daily operations. Current assets such as cash, accounts receivable, inventory, and marketable securities are essential for meeting short-term obligations and sustaining operations within a year (Khan & Jain, 2000). Two types of working capital are identified: permanent, which maintains ongoing operational needs, and temporary, which adjusts to meet seasonal or short-term fluctuations in business activities (Van Horn, 2005). Companies adopt varying strategies—conservative, bold, and moderate—to balance liquidity and profitability (Mojtahedzadeh et al., 2011). Performance metrics like the cash conversion cycle (CCC) gauge efficiency in converting inventory and receivables into cash, reflecting effective liquidity management and operational efficiency (Besley et al., 1987).

Capital investment involves allocating funds to acquire, upgrade, or maintain physical assets such as machinery and infrastructure in the cement industry, crucial for expanding production capacity, enhancing efficiency, and meeting regulatory standards (Al Magrabi & Al Hadrami, 2021). Strategic decisions hinge on evaluating projects based on potential return on investment (ROI) and alignment with strategic goals to boost profitability and sustain competitive advantage (Hasan et al., 2023). Optimizing the mix of debt and equity financing plays a pivotal role in managing liquidity, mitigating risks, and ensuring overall financial stability (Gupta & Singla, 2020). Market dynamics, as reflected in market-to-book ratios and investor perceptions, inform decisions on capital investments, guiding firms in positioning themselves competitively (Li et al., 2023).

This theoretical framework integrates principles from both working capital management and capital investment, emphasizing the synergy between liquidity management, profitability optimization, and strategic financial decision-making in the cement industry. It underscores the need to balance immediate operational requirements with long-term growth objectives to achieve sustainable financial performance and maintain competitive advantage.

Conceptual Frame Work



Chapter 3 Research Methodology

3.1 Data Sources and Research Methodology

This particular study is concerned with the published data of Karachi Stock Exchange and the data for any research study is considered back bone/life blood of that particular study, so the researcher will collect the data from secondary sources.

Quantitative technique / analysis will be used for analyzing the gathered data. Time span for analysis in this study will be from 2014 to 2023. In literature it is found that different researchers have taken various ratios to check relationship between working capital management and profitability. While I'll use following;

Dependent Variable

Return on Investment	(Net Income / Total Investment) × 100 Budisaptorini, D. (2019).
Return on Equity	(Net Income / Shareholder's Equity) × 100 Ross, S. (2023)
Gross Profit	(Gross Profit / Revenue) × 100 Nariswari (2020)

Independent Variables

Net Working Capital	Current Assets - Current Liabilities Nariswari, R. (2020)
Current Assets	Cash and Cash Equivalents+Accounts Receivable+Inventory+Marketable Securities+Prepaid Expenses+Other Liquid Asset Ross, S. (2023)

Current Labilities	Accounts Payable+ Short-term Debt +Accrued Liabilities Ross, S. (2023)
Capital Investment	(Capital Expenditure / Revenue) × 100 Thompson, A. (2020).

Control Variables

Current Ratio	Current Assets / Current Liabilities Jones, T. (2021)
Quick Ratio	(Current Assets - Inventories) / Current Liabilities Thompson, A. (2020).

In the first phase, Data will be collected from the financial reports and then analyzed through different ratios. The compiled information will be tested through different formulas and models in second phase. Final results will be drawn after the complete analysis of information.

3.2 Population and Sample

In Karachi Stock Exchange this sector is combined with Cement sector. Therefore only listed Cement companies will be selected for this study. There are top 10 Companies listed on Karachi Stock Exchange; after accessing different websites conclude that financial data of top 7 firms is available which will be gathered through websites as well as from the published annual reports of firms. s

3.3 Data Analysis

The composed data will be analyzed through any statistical analysis software (MS Excel and Stata) (Auger, 2014). The hypothesis will be tested may be through Correlation analysis, Regression analysis or any other econometric model.

Chapter 4 Result or findings

Table 1
Descriptive analysis

Variable	Obs	Mean	Std.dev.	Min	Max
WC	30	15.5	8.803408	1	30
CL	28	14.5	8.2257975	1	28
CA	29	14.3103434	8.142058	1	28
QR	27	13.4444	7.505553	1	26
ROE	24	12.5	7.071068	1	24
GP	23	12	6.728233	1	23
Current Ratio	24	.1956826	.2029688	-.0531	1

In exploring the financial health of firms within the sample using the GLS method, several key insights emerge from the analysis of various variables. Working Capital (WC), characterized by an average of 15.5 units and a standard deviation of 8.803, exhibits significant variability among firms, indicating diverse levels of liquidity management and operational risk. This variability underscores the critical need for tailored working capital strategies that align with individual company contexts to enhance financial stability.

Current Liabilities (CL) and Current Assets (CA) maintain balanced averages of 14.5 and 14.31, respectively, reflecting a prudent approach to managing short-term obligations against available assets. However, further investigation using the Current Ratio is essential to fully assess liquidity management practices across the sample and their impact on financial performance.

The Quick Ratio (QR), averaging 13.444, suggests that firms generally maintain sufficient liquid assets to cover immediate liabilities. Nonetheless, the considerable standard deviation of 7.506 indicates variability in how effectively firms manage their liquidity positions, necessitating a closer examination of factors influencing liquidity stability.

Return on Equity (ROE) and Gross Profit (GP), averaging 12.5% and 12% respectively, highlight the profitability landscape. These figures underscore potential areas for improvement in cost efficiency and revenue generation strategies to enhance financial performance and shareholder returns.

Conversely, the average Current Ratio of 0.196 signals a notable imbalance where current liabilities exceed current assets across the sample. This imbalance poses potential liquidity challenges that could compromise operational stability if not managed prudently. Addressing these challenges requires strategic management of working capital to ensure sustainable financial health and operational resilience.

Overall, this descriptive analysis provides a foundational understanding of the financial dynamics within the sample. Utilizing the GLS method in further research can mitigate issues such as heteroscedasticity and autocorrelation, thereby offering more robust insights into the relationships between these variables and their influence on financial performance and operational efficiency in the cement industry.

Table 2
Correlation

	Curren-0	WC	CA	CL	QR	ROE	GP
Current Ratio	1.0						
WC	0.396	1.0					
CA	0.4905	0.8644	1.0				
CL	0.1460	0.0513	0.5003	1.0			
QR	0.4039	0.4170	.04660	0.23080	1.0		
ROE	0.1197	0.5170	0.467	0.2204	0.5172	1.0	
GP	-0.0704	-0.2030	-0.1435	-0.1806	-0.0680	-.0625	1.0

GLS methodology facilitates a comprehensive exploration of the correlations among key financial metrics in the context of the cement industry, shedding light on their interdependencies and implications for financial management strategies. Beginning with the Current Ratio (CR), which positively correlates with Working Capital (WC), Current Assets (CA), and Quick Ratio (QR) (0.396, 0.4905, and 0.4039 respectively), it becomes evident that firms with higher current ratios typically exhibit stronger levels of working capital, current assets, and liquidity relative to their current liabilities. This moderate to strong positive relationship suggests that improvements in one metric often coincide with enhancements in others, albeit with varying degrees of influence.

Working Capital (WC) shows robust positive correlations with Current Assets (CA) (0.8644) and Quick Ratio (QR) (0.4170), indicating that higher levels of working capital are closely associated with elevated current assets and liquidity. However, WC's weaker positive correlations with Current Liabilities (CL) (0.0513), Return on Equity (ROE) (0.5170), and Gross Profit (GP) (-0.2030) imply that while it aligns positively with current assets and liquidity, its relationships with current liabilities, profitability, and gross profit are less pronounced.

Current Assets (CA) exhibit a strong positive correlation with WC (0.8644) and a moderate positive correlation with QR (0.4170), suggesting that firms with higher current assets tend to have correspondingly higher levels of working capital and liquidity. CA's weaker positive correlation with CL (0.5003) indicates that higher current assets are associated with increased current liabilities.

Conversely, Current Liabilities (CL) demonstrate weak positive correlations with WC (0.0513) and CA (0.5003), suggesting some association with higher current assets but no strong link with

working capital. CL also shows weak correlations with QR (0.2308), ROE (0.2204), and GP (-0.1806), indicating limited connections with liquidity, profitability, and gross profit measures.

Quick Ratio (QR) shows a moderate positive correlation with CR (0.4039), suggesting that firms with higher quick ratios tend to have higher current ratios. QR also correlates positively with WC (0.4170) and CA (0.0466), indicating that higher liquidity is linked with increased working capital and current assets.

Return on Equity (ROE) correlates moderately with WC (0.5170) and GP (-0.0625), suggesting a positive relationship with working capital and a slight negative relationship with gross profit. This implies that higher working capital levels may contribute positively to ROE, while higher gross profit levels may have a minor adverse impact.

Gross Profit (GP) demonstrates weak negative correlations with WC (-0.2030), CA (-0.1435), and CL (-0.1806), suggesting a slight negative relationship with working capital, current assets, and liabilities.

In conclusion, these correlations provide a nuanced understanding of how different financial indicators interact within cement firms, highlighting complex relationships between liquidity, profitability, and financial management strategies. Such insights are crucial for guiding strategic decisions aimed at optimizing financial performance and operational efficiency in the cement industry.

Table 3
Regression

Source	55	Df	MS	No of obs =	23
				F (3, 19) =	4.25
Mode 1	663.202896	3	221.067632	Prob > F =	0.0186
Residual 1	988.623191	19	52.0327995	R-squared =	0.0415
				Adj R-Squared =	0.3070
Total	1651.82609	22	75.083004	Root MSE	7.2134
WC	Coefficient	Std.err.	T	P>|t|	[95% conf.Interval]
QR	.1771847	.2560486	0.69	0.498	-.3598 .71385
ROE	.703657	.3229725	2.18	0.042	-0276 1.3796
GP	-2205357	.2663868	0.83	0.418	-.3370 .7780
_Cons	.6241306	5.137501	0.12	0.905	-10.12 11.37

-

The regression analysis using the GLS method reveals varying degrees of significance in the relationship between Working Capital (WC) and its predictors. Overall, the model is statistically significant with an R-squared of 0.3070, indicating that approximately 30.7% of the variation in WC can be explained by the included variables. Among these predictors, only Return on Equity (ROE) demonstrates a statistically significant positive association with WC. This suggests that higher ROE is linked to increased WC levels, implying that profitability improvements may lead to higher working capital in this model. Conversely, Gross Profit (GP) shows a negative relationship with WC, but this relationship is not statistically significant. Similarly, the Quick Ratio (QR) does not exhibit a significant relationship with WC, indicating that changes in QR do not reliably predict changes in WC within this analysis. The intercept, representing the estimated WC when all predictors are zero, is also not statistically significant, suggesting minimal influence on WC prediction. These findings underscore the pivotal role of ROE in influencing

working capital dynamics, emphasizing its importance in financial management strategies within the context of the studied sample.

Table 4

Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.765	.585	.171	.12644	2.008

a. Predictors: (Constant), Sales, Profit Margin

b. Dependent Variable , WC

The regression model examines the relationship between Working Capital (WC) as the dependent variable and Sales and Profit Margin as predictors. The results indicate a moderately strong fit of the model, with an R-squared (R^2) of 0.585, suggesting that approximately 58.5% of the variation in WC can be explained by Sales and Profit Margin. The adjusted R-squared (R^2_adj) of 0.171 adjusts for the number of predictors, indicating that 17.1% of the variation in WC is explained while considering model complexity. The standard error of the estimate (SE = 0.12644) measures the average deviation of observed values from the regression line, indicating a reasonable fit. The Durbin-Watson statistic of 2.008 suggests no significant autocorrelation in the residuals, supporting the model's reliability.

Sales and Profit Margin show coefficients that reflect their respective impacts on WC. GLS methodology would evaluate their statistical significance, effect sizes, and confidence intervals

to assess their contributions to WC variations. The intercept, representing WC when Sales and Profit Margin are zero, is assessed for its significance in predicting WC.

Using GLS ensures robust analysis by addressing potential issues like heteroscedasticity and autocorrelation, thereby enhancing the reliability of the findings. In summary, the GLS method provides comprehensive insights into how Sales and Profit Margin influence WC within this model, emphasizing their explanatory power and the overall fit of the regression to the data, while considering important methodological considerations.

Chapter 5 Conclusion

5.1 Summary of Findings

This study investigates the intricate dynamics of working capital management and capital investment within the cement industry, focusing on firms in Pakistan. Through extensive analysis of various financial metrics and regression models, we aimed to elucidate the relationships between working capital components and profitability measures. Our primary findings reveal significant insights into how firms manage their liquidity and the impact of capital investment on operational efficiency and profitability.

5.2 Comparison with Recent Studies

To place our findings in context, we compared them with recent studies from 2023 and 2024. Notably, our results both support and extend the existing literature on working capital management and its crucial role in financial performance.

5.2.1 Supporting Evidence

Our results corroborate the findings of recent studies by Alvi et al. (2023) and Hassan et al. (2024), which emphasize the importance of efficient working capital management in enhancing profitability and maintaining liquidity. These studies highlight similar findings to ours, demonstrating that firms with optimized working capital components, such as higher current assets and lower current liabilities, tend to exhibit better financial health and profitability.

Our study aligns with Alvi et al. (2023), who found that a balanced approach to managing current assets and liabilities is vital for sustaining operational stability. We also support the findings of Hassan et al. (2024), who noted that firms in the cement industry with effective

working capital strategies are better positioned to navigate financial uncertainties and market fluctuations. Our emphasis on the positive relationship between Return on Equity (ROE) and Working Capital (WC) reinforces the notion that profitability metrics significantly influence liquidity management.

5.2.2 Contradicting Evidence

However, our findings on the Quick Ratio (QR) and Gross Profit (GP) present a nuanced perspective. While previous studies (Khan & Farooq, 2023) identified a strong positive relationship between QR and profitability, our results indicate that the QR does not significantly predict changes in WC. This discrepancy could be attributed to specific sample characteristics or differing market conditions in the cement industry. Additionally, our findings on GP, which show a non-significant negative relationship with WC, contrast with some earlier studies that reported a positive association (Ahmed & Qureshi, 2023). This variation underscores the complexity of financial interactions and the need for industry-specific analyses.

5.3 Implications for Theory and Practice

The integration of working capital management and capital investment frameworks in this study provides a comprehensive understanding of financial strategies in the cement industry. Our findings have several theoretical and practical implications:

5.3.1 Theoretical Implications:

1. **Liquidity-Profitability Trade-off:** Our study reinforces the theoretical concept of the liquidity-profitability trade-off. Firms must balance maintaining adequate liquidity with maximizing profitability, a principle evident in the relationship between WC, QR, and

ROE. This trade-off is crucial for sustaining financial health and achieving long-term growth.

2. **Capital Investment Decisions:** The positive impact of ROE on WC highlights the importance of profitability metrics in guiding capital investment decisions. Theoretical models should consider incorporating profitability indicators to better predict investment outcomes and operational efficiency.

5.3.2 Practical Implications:

1. **Strategic Working Capital Management:** Firms in the cement industry should adopt a strategic approach to working capital management, focusing on optimizing current assets and liabilities. This involves maintaining sufficient liquidity to meet short-term obligations while minimizing excess inventory and receivables.
2. **Profitability Focus:** Enhancing ROE through cost management and revenue generation strategies can significantly improve working capital levels. Managers should prioritize profitability measures when making financial decisions, ensuring that investments align with the firm's overall strategic goals.
3. **Industry-Specific Strategies:** Given the unique characteristics of the cement industry, firms should tailor their financial strategies to address sector-specific challenges and opportunities. This includes considering market dynamics, regulatory requirements, and operational constraints when managing working capital and capital investments.

5.4 Limitations and Future Research

While this study provides valuable insights, it is not without limitations. Firstly, the sample size is relatively small, and the analysis is limited to firms within the Pakistani cement industry.

Future research should expand the sample size and include firms from different regions to enhance the generalizability of the findings. Additionally, longitudinal studies would help capture the dynamic nature of working capital management and its impact on financial performance over time.

Secondly, our study focuses primarily on quantitative analysis, which may not fully capture the qualitative aspects of financial decision-making. Future research could incorporate qualitative methods, such as case studies or interviews, to gain a deeper understanding of the contextual factors influencing working capital management and capital investment decisions.

5.5 Conclusion

In conclusion, this study contributes to the existing literature by providing a detailed analysis of working capital management and capital investment in the cement industry. Our findings highlight the importance of effective liquidity management and the role of profitability metrics in shaping financial strategies. The positive relationship between ROE and WC underscores the need for firms to prioritize profitability when making investment decisions. Conversely, the non-significant impact of QR and GP on WC suggests that firms should adopt a nuanced approach, considering industry-specific dynamics and market conditions.

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