

Working Capital Management Efficiency of the Indian Cement Industry

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Abstract

Efficient management of working capital is a fundamental part of the overall corporate strategy in creating shareholders' value. Today, the management of Working Capital is one of the most important and challenging aspects of overall financial management. Optimization of working capital balance means minimizing working capital requirements and realizing maximum possible revenues. Efficient WCM increases firms' free cash flow, which, in turn, increases the firms' growth opportunities and returns to shareholders. Even though firms are traditionally focused on long term capital budgeting and capital structure, the recent trend is that many companies across different industries focus on WCM efficiency.

The present study analyses the efficiency of working capital management and its components i.e. inventory amount, cash and bank balances and various current liabilities. The study attempts to determine the efficiency and effectiveness of management in each segment of working capital. Since the net concept of working capital has been widely considered in the present study, management of both current assets and current liabilities are also critically reviewed in due course. Thirty Bombay Stock Exchange (BSE) listed cement companies located in different regions of India have been selected as a sample for the study. This study is mainly confined to selected Indian cement companies using CMIE Prowess 4.0 database software. Information about the companies including nature of the company, size, age, state and region, company background, value of total assets and annual financial statements for the period 2006 to 2015 have been obtained from this database. The help of statistical software, SPSS version 21.0, has been taken for various statistical analyses required for this study. An attempt has been made to investigate the existence of the relationship between working capital management and profitability, average receivable period, inventory conversion period, average payment period and cash conversion cycle, which expresses the efficiency of working capital. It is found that there exists a negative relationship between profitability and number of days of accounts payables and number of days of inventory, but a positive relationship between profitability and number of days of accounts receivables. WCM and profitability show a positive relationship (as measured by cash conversion cycle) as against the theoretical foundation. The present analysis of the study reveals that shortening of the cash conversion cycle negatively affects the profitability of the firm.

Key Words: Working Capital, Profitability, Liquidity, Current Assets, Current Liabilities.

JEL Classification: G30, G32.

Introduction

Working capital decisions normally provide a classic example of risk-return trade-off of financial decision making practice. Efforts to increase a firm's net working capital, *i.e.*, current assets less current liabilities, reduce the risk of a firm not being able to pay its outstanding bills on time. This, at the same time, reduces the overall profitability of the firm. Working capital management (WCM) involves a risk-return trade-off: by not taking additional risks unless and until it is well-compensated with additional assured returns. The existence of a firm largely depends on its ability to efficiently and effectively manage its working capital. WCM involves the process of converting investment into inventories and accounts receivables into liquid cash for the firm to use in paying its operational bills. WCM is at the heart of every firm's day-to-day operating environment, and thereby improving corporate profitability.

Decisions relating to working capital involve managing the relationship between a firm's short-term assets and liabilities to ensure that a firm is able to continue its operations with sufficient cash flows to satisfy both maturing short-term debts and upcoming operational expenses at a minimal cost, thereby increasing corporate profitability. Working capital decisions provide a classic example of the risk-return trade-off of financial decision-making. Increasing a firm's net working capital - current assets less current liabilities - reduces the risk of a firm not being able to pay its bills on time. This, at the same time, reduces the overall profitability of the firm. Working capital management involves a risk-return trade-off: not taking additional risk unless compensated with additional returns. The existence of a firm depends on its ability to manage its working capital. Working capital management involves the process of converting investment into inventories and accounts receivables into cash for the firm to use in paying its operational bills. As such, working capital management is, thus, at the very heart of the firm's day-to-day operating environment, and improving corporate profitability.

An important part of managing working capital is maintaining liquidity in day-to-day operations to ensure smooth running of the firm and meeting its obligations, as well as to ensure that the business is earning sufficient profits for its survival and growth. There are chances of mismatch in current assets and current liabilities during this process, which could affect the growth and profitability of the business. A popular measure of working capital management [WCM] is the cash conversion cycle, that is, the time lag between the expenditure for purchase of raw materials and the collection from sales of finished goods. The longer this time lag, the larger the investment in working capital. A longer cash conversion cycle however, might increase profitability because it leads to higher sales. On the other hand, corporate profitability might also decrease with a longer cash conversion cycle if the costs of higher investment in working capital rise faster than the benefits of holding inventory or granting more trade credit to customers. Many research studies like Shin and Soenen [1998] have highlighted the importance of shortening the cash conversion cycle (CCC), as managers can create value for their shareholders by reducing the cycle to a reasonable minimum.

A firm may adopt an aggressive working capital management policy with a low level of current assets or it may use a conservative working capital management policy where it may use working capital to finance a high level of current assets as a percentage of total assets. Wang (2002) points out that if a firm follows an aggressive credit cycle policy and the inventory levels are reduced significantly, the firm risks losing any appreciation in sales. Also, a significant reduction in trade credits granted may provoke a reduction in sales from customers requiring credit. In fact, opportunity costs may rise, depending on the discount percentage and discount period granted. On the other hand, investing heavily in working capital or using a conservative credit cycle policy may also result in higher profitability. Maintaining a high inventory level reduces the cost of possible interruptions and loss of business due to scarcity of products, reduces supply costs and can protect against price fluctuations. However, such benefits have to offset the reduction in profitability due to an increase in investment in current assets.

Most empirical studies relating to working capital management and profitability support the fact that aggressive working capital policies enhance a firm's profitability. There is, however, no empirical evidence available regarding the relationship between working capital management and profitability. In this context, the objective of the current study is to provide empirical evidence about the effect of working capital management on profitability for a sample of 30 companies over 10 years of observation. This study is believed to be among the first few of its kind to trace the relationship between working capital management and profitability of selected Indian cement companies.

Review of Literature

There is sufficient evidence in existing financial literature that presents the significance of WCM. Results of empirical analysis show that there is statistical evidence of a strong relationship between a firm's profitability and its WCM efficiency. However, many earlier studies undertaken on WCM efficiency reveal that measures of WCM efficiency basically differ across different companies. Those studies also clearly emphasize significant evidence that issues of WCM are different for different industries and firms from different industry sectors, as they adopt different approaches to their working capital management. Firms follow an appropriate working capital management approach that is quite favourable to them. A firm that faces lesser competition normally focuses on minimizing receivables to increase future possibilities of cash flows. For firms with large numbers of suppliers of materials, the prime focus is always on maximizing the payables.

Previous studies have, to some extent, studied the correlation between efficient working capital management and profitability during a period of time. These have found a strong and significant correlation between profitability and working capital management, but they don't indicate in which industries the effect is most prevalent. The present research work aims to fulfil such gaps and intends to provide a meaningful and empirical result on the relationship between WCM and profitability.

Previous studies in the area have already used either the cash conversion cycle (Deloof 2003) or the net trade cycle (Shin & Soenen 1998) as proxies for efficient working capital management. On the contrary, the main rationale of this research work is to study how efficient working capital management can improve a company's profitability to a greater extent, thereby adding value for its shareholders. The different metrics and working capital management drivers are studied with corporate profitability in mind.

Many previous research studies have indicated the relationship between working capital management and profitability of a company under different changing environments and possibilities. Some of these discussions are as follows:

Rehman (2006) has studied the impact of different variables of WCM including average collection period, inventory turnover in days, average payment period and cash conversion cycle on the net operating profitability of firms, and concluded by indicating that there was a strong negative relationship between these working capital financial ratios and profitability of firms. Furthermore, the study also revealed that managers of the firms can create a positive value for the shareholders by reducing the cash conversion cycle up to an optimal level. Afza and Nazir (2007a) have found a negative relationship between working capital policies and profitability. In line with the study, Afza and Nazir (2007b) further investigated the relationship between aggressive/conservative working capital policies and profitability as well as risk of public limited companies. They have noticed a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies. Firms yield negative returns when they follow an aggressive working capital policy. Chakraborty and Bandopadhyay (2007) have studied strategic working capital management, and its role in corporate strategy development, ultimately ensuring the survival of the firm. They have highlighted how strategic decisions on current assets and current liabilities have a multi-dimensional impact on the performance of a company. Ganesan (2007) has rightly depicted that working capital management efficiency was negatively associated with profitability and liquidity. The study reveals that when WCM efficiency is improved by decreasing days of working capital, there is an improvement in the profitability of telecommunication firms in terms of profit margin. Garcia-Teruel and Martinez-Solano (2007) have studied effects of WCM on the profitability of 8,872 small and medium-sized enterprises (SMEs) from Spain covering the period 1996 - 2002. They have found that managers can create value by reducing inventories and number of days for accounts outstanding. Moreover, shortening the cash conversion cycle also improves the firm's profitability. Raheman and Nasr (2007) have selected a sample of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999-2004 to study the effect of different variables of WCM on the net operating profitability. From the results of the study, they have proven that there is a negative relationship between variables of WCM including the average collection period, inventory turnover (in days), cash conversion cycle and profitability. Besides, they have also indicated that size of the firm measured by natural logarithm of sales has a positive relationship with profitability. Chakraborty (2008) has evaluated the relationship between working capital and profitability of Indian pharmaceutical companies. He has pointed out that there are two distinct schools of thought on this issue: according to one school of thought, size of working capital is not a factor of improving profitability and there may be a negative relationship between profitability and investment in working capital, while according to the other school of thought, investment in working capital plays a vital role to improve corporate profitability, and unless there is a minimum level of investment of working capital, output and sales cannot be maintained; in fact, the inadequacy of working capital keeps fixed assets inoperative. Samiloglu and Demiraunes (2008) have analyzed the effect of working capital management on profitability of firms. The study has depicted that the accounts receivable period, inventory period and leverage affect the profitability of the firm negatively while growth

affects the firm's profitability positively. Singh and Pandey (2008) have made an attempt to study the working capital components and the impact of WCM on profitability of Hindalco Industries Limited for period from 1990 to 2007. Results of the study have shown that current ratio, liquid ratio, receivables turnover ratio and working capital to total assets ratio have a statistically significant impact on the profitability of Hindalco Industries Limited. Singh (2008) has found that the size of inventory directly affects working capital and its management. He has suggested that inventory is the major component of working capital and needs careful attention. Singh and Pandey (2008) have suggested that for the successful working of any business organization, fixed and current assets play vital roles, and the management of working capital is essential as it has a direct impact on profitability and liquidity. Afza and Nazir (2009) have made an attempt to investigate the traditional relationship between working capital management policies and a firm's profitability for a sample of 204 non-financial firms listed on Karachi Stock Exchange (KSE) for the period 1998-2005. The study reveals some significant differences among various working capital needs and financing policies across different industries. Moreover, regression result has also found a negative relationship between the profitability of firms and degree of aggressiveness of working capital investment and working capital financing policies. Ramachandran and Janakiraman (2009) have found a negative relationship between earnings before interest & tax (EBIT) and the CCC. The study reveals that operational EBIT dictates how to manage the working capital of a firm. Further, it is found that lower gross EBIT is associated with an increase in the accounts payable days. Thus, the study concludes by saying that less profitable firms wait longer to pay their bills, taking advantage of credit period granted by suppliers. The positive relationship between average receivable days and a firm's EBIT suggests that less profitable firms pursue a decrease of their accounts receivable days in an attempt to reduce their cash gap in the CCC. Nazir and Afza (2009) have used external and internal factors to explore the determinants of working capital requirements of a firm. Internal factors were operating cycle, operating cash flows, leverage, size, ROA, Tobin's q and growth with industry dummy and level of economic activity as external macroeconomic factors. They have found that operating cycle, leverage, ROA and q had an influence on the working capital requirements significantly. The study further revealed that WCM practices are also related to industry; different industries follow different working capital requirements. Uyar (2009) has examined industry benchmarks for CCC in case of merchandising and manufacturing companies and has found that the merchandising industry has a shorter CCC than manufacturing industries. He has further examined the relationship between the length of the CCC and the size of the firms; the findings indicate a significant negative correlation between the length of CCC and the firm size in terms of both net sales and total assets. The study further shows significant negative correlation between the length of CCC and the profitability. Amarjit Gill, Nahum Biger, Neil Mathur (2010), in their paper, seek to extend Lazaridis and Tryfonidis' findings regarding the relationship between WCM and profitability. A sample of 88 American firms listed on the New York Stock Exchange for a period of 3 years from 2005 to 2007, were selected. They have found a statistically significant relationship existing between the CCC and profitability, measured through gross operating profit. It follows that managers can create profits for their companies by handling the cash conversion cycle correctly and by keeping accounts receivables at an optimal level during a period. Bardia SC, Shweta Kastiya and Garima Bardia (2011) have conducted a study on pharmaceutical companies and used ratio analysis in conjunction with the techniques of inferential statistics to draw inferences regarding short-term solvency of companies. In addition, statistical tools like Mean, Standard Deviation, Coefficient of Variation (CV), Analysis of Variation (ANOVA) and student's t-test of hypothesis testing have been applied. The study offers some meaningful suggestions in order to improve the short-term solvency of pharmaceutical companies selected for this study. Sharma Asha (2013) has examined the impact of working capital on liquidity as well as profitability. The impact of working capital on liquidity and profitability is tested by measuring the fluctuation in fixed assets, current assets and sales. For this purpose, a study of five years' data from 2008 to 2012 of two major companies in the public and private sector of the steel industry - Steel Authority of India and Tata Steel Ltd. - was undertaken. The study has found that there is a significant negative relationship between liquidity and profitability. In this study, efforts are made to find out whether these ratios remain unchanged for any industry or vary from one industry to another. There was perfect correlation between the fixed and current ratio, and with its liquidity and profitability in case of SAIL and Tata Steel. Keeping in view the minimal amount of finance literature, particularly with respect to profitability, liquidity and working capital, the present study investigates the relationship of the aggressive and conservative financial performance analysis and financial policies, and its impact on profitability. It further examines the efficiency of working capital utilization among working capital practices of firms across different industries. Mobeen Ur Rehman and Naveed Anjum (2013) empirically examine the effects of WCM on the profitability of the Pakistan cement industry. Secondary data has been collected from Annual Reports of 10 Pakistan Cement Companies listed on Karachi Stock Exchange from 2003 to 2008. The relationship between WCM and profitability is examined using appropriate statistical tools. The result accepts the hypothesis that there is a positive relationship between WCM and profitability in the cement sector of Pakistan.

The above summarized review of studies in India and abroad reveals that a large number of studies have been undertaken on national and international levels on the topic of efficiency in working capital management, working capital management and profitability, and working capital management practices. Though some studies have been undertaken on the cement industry of India, no appropriate study has been conducted to evaluate the efficiency and effectiveness of management of working capital. Though working capital is a significant constituent in the efficient functioning of the organization, it has not attracted much attention and consideration of the management. The aforementioned studies which have been undertaken, so far, have exercised philosophical influence on the understanding of working capital management. Hence, there exists some definite research gap; this study is an endeavour to plug this gap to some extent.

Scope of the study

The present study is about working capital management of selected Indian cement companies. The study provides the management of cement companies an idea about the performance of working capital in the selected companies. Management of working capital refers to management of current assets, current liabilities and the relationship between them with the basic goal of maintaining a satisfactory level of working capital. A sound working capital policy ensures higher profitability and proper liquidity of a firm. Every business needs funds for two purposes: for its establishment and to carry out its day-to-day operations. For this purpose, it is important for the company to manage its short term assets and liabilities.

Working capital is essential for the working of any business. A manufacturing company needs some basic capital for producing goods in order to commence sales. It has to take care of production expenses, administration expenses as well as selling expenses. Moreover, since most of the business is usually done on credit, there is a time lag between the date of sale and date of receipt of revenues, which can be as high as 90 days at times. Considering all these aspects, it is essential that a company has sufficient capital to keep it going before it converts its purchases into goods, and then finally into cash.

Each study has its own scope. This study intends to analyse the working capital position of the selected companies. It has identified areas which can be improved. Further, the study has made suggestions to help the management of cement companies to better utilise corporate resources.

The present study analyses the efficiency of working capital management and its components *i.e.* inventory, cash and bank balances, and various current liabilities. The study attempts to determine the efficiency and effectiveness of management in each segment of working capital. Since the net concept of working capital has been widely taken in the present study, the management of both current assets and current liabilities are also critically reviewed in due course.

Need and importance of the study

Today, financial soundness and profitability of business enterprises largely depend upon working capital management by the firm. If there is a shortage of working capital, it affects the day-to-day operations of the firm. Similarly, if there is an excess of working capital, the funds remain idle, which, in turn, affects the financial soundness of the firm. In this perspective, there is need to manage the working capital of a business effectively. The question which comes to mind while reviewing literature is - how Indian cement companies manage their working capital. This study has been undertaken to answer this question.

This study brings out the fact that the manner of administration of current assets and current liabilities determines the success or failure of any business. The efficient and effective management of working capital is of crucial importance for the success of a business, which involves the management of current assets and current liabilities. The business concern has to optimise the use of available resources through efficient and effective management of current assets and current liabilities. This helps increase the profitability of the concern and facilitates the firm meeting its current obligation in time.

Objectives of the study

Since working capital management is one of the most important aspects of finance literature, this study seeks to explore the methods involved in working capital management in detail. It is undoubtedly a fact that the estimation of required working capital very often differs from industry to industry in general, and company to company in particular. The present research work is an earnest endeavour to examine some significant objectives such as:

1. To establish a relationship between WCM and profitability of 30 selected Indian cement companies over a period of ten years from 2006 to 2015.
2. To study the effect of WCM on profitability of sample companies within the Indian cement Industry.
3. To draw concluding remarks on WCM and profitability of selected cement companies by examining the effectiveness of working capital management practices of the sample firms.

Sampling and data collection

The prerequisites followed for the entire process of data collection of the 30 selected companies are as follows:

- a. A sample list of 30 Bombay Stock Exchange (BSE) listed cement companies, located in different regions of India, is selected for the study.
- b. The selected companies have a legal entity of their own and file their annual return with the Registrar of Companies regularly.
- c. This study is mainly confined to selected Indian cement companies using CMIE Prowess 4.0 database software. Information relating to nature of company, size, age, state and region, company background, value of total assets and annual financial statements of these companies for the period 2006 to 2015 have been obtained from this database.
- d. Statistical software, SPSS version 21.0, has been taken for various statistical analyses required for this study.
- e. Other financial facts and figures of the selected companies have been obtained from reliable sources such as books, periodicals, newspapers, government reports, SEBI database, BSE database and RBI Bulletins. Some data has been obtained from the corporate websites of the sample companies.

Table – 1: List of Selected Indian Cement Companies

Sl. No.	Company Name	Year of Incorporation	State	Region
1	Ambuja Cements	1981	Gujarat	West
2	ACC	1936	Maharashtra	West
3	India Cements	1946	Tamil Nadu	South
4	Madras Cements	1957	Tamil Nadu	South
5	Shree Cements	1979	Rajasthan	West
6	Birla Corp	1919	West Bengal	East
7	Prism Cement	1992	Andhra Pradesh	South
8	JK Lakshmi Cements	1938	Rajasthan	West
9	Binani Cement	1969	West Bengal	East

10	Chettinad Cements	1962	Tamil Nadu	South
11	OCL India	1949	Orissa	East
12	Heidelberg Cements	1958	Haryana	North
13	Rain Commodities	1974	Andhra Pradesh	South
14	Andhra Cements	1936	Andhra Pradesh	South
15	KCP	1941	Tamil Nadu	South
16	Deccan Cements	1979	Andhra Pradesh	South
17	NCL Industries	1979	Andhra Pradesh	South
18	Sagar Cement	1981	Andhra Pradesh	South
19	Bheema Cements	1976	Andhra Pradesh	South
20	Mangalam Cement	1976	Rajasthan	West
21	Anjani Cements	1983	Andhra Pradesh	South
22	Saurashtra Cements	1956	Gujarat	West
23	Shree Digvijay Cements	1944	Gujarat	West
24	Keerthi Industries	1982	Andhra Pradesh	South
25	Kakatiya Cement	1979	Andhra Pradesh	South
26	Panyam Cements	1955	Andhra Pradesh	South
27	GujSidhee Cements	1973	Gujarat	West
28	Kalyanpur Cements	1937	West Bengal	East
29	Katwa Udyog	1993	Karnataka	South
30	Garuda Clays	1993	New Delhi	North

Research Variables and Techniques

The entire study has been undertaken by using widely acknowledged techniques of Descriptive Statistics Analysis. Explanatory variables of the selected companies have been considered from reliable sources without any attempt of diluting their individual importance.

Descriptive statistics analysis is based on statistical tools like Mean, Median, Maximum & Minimum Values, Standard Deviation, Correlation Matrix and Ordinary Least Square (OLS) Regression Equation, which are based on 9 (nine) explanatory variables like Return on Assets (ROA), Number of Days of Accounts Receivables (AR), Number of Days of Inventory (INV), Number of Days of Accounts Payables (AP), Cash Conversion Cycle (CCC), Size of the Firm being expressed in terms of Natural Logarithm of Assets (SIZE), Sales Growth (GROWTH), Leverage (LEV), and Current Ratio (CR). For descriptive statistics, a list of explanatory variables has been considered to match with the research objectives; these are indicated in Table – 2.

Table – 2: List of Variables for Descriptive Statistics

Variable (Interpretations)	Variable Code	Variable Treatment	Variables explained
Return on Assets (A better measure relating to profitability of the company to the asset base)	ROA	Dependent Variables	Ratio of EBIT to Total Assets
Number of days Accounts Receivables (The higher the value, the more the investment in accounts receivables)	AR	Independent Explanatory Variable	$(\text{Accounts Receivables} / \text{Sales}) \times 365$
Number of days of Inventory (Longer values indicate greater investment in inventory for a particular level of business activity)	INV	Independent Explanatory Variable	$(\text{Inventories} / \text{Purchases}) \times 365$
Number of days of accounts Payables (The higher the value, the longer the firm takes to settle the payment to creditors)	AP	Independent Explanatory Variable	$(\text{Accounts Payable} / \text{Purchases}) \times 365$
Cash Conversion Cycle (A lower value of CCC is better as it indicates less investment in CA and also signifies high liquidity; a higher value of CCC signifies greater investment in CA, thereby showing greater need for financing of CA)	CCC	Independent Explanatory Variable	$AR + INV - AP$

Size of the Firm (A control variable with regard to size in total assets as compared to capital and liability)	SIZE	Independent Explanatory Variable	Measured as a natural logarithm of assets i.e., $(\ln_{\text{total assets}})$
Sales Growth (A control variable to explain successive growth rate to ensure high liquidity)	GROWTH	Independent Explanatory Variable	$(\text{Sales}_1 - \text{Sales}_0) / \text{Sales}_0$
Leverage (A control variable to justify degree of impact of total debt on total assets, thereby ensuring solvency)	LEV	Independent Explanatory Variable	Ratio of Total Debt to Total Assets
Current Ratio (A control variable bridging inter-relationship between current assets and current liability)	CR	Independent Explanatory Variable	Ratio of Current Assets (CA) to Current Liability (CL)

In descriptive statistics analysis, a major tool used is the OLS regression equation. In this case, in order to check the presence of *auto-correlation* and *multi-collinearity* in the data, Durbin Watson (D – W) and Variance Inflation Factor (VIF) statistics are analysed to ensure that statistics are within the limit, leading to a logical conclusion that there exists no *auto-correlation* and *multi-collinearity* in the data.

Statistical interpretation with regard to Durbin Watson (D – W) statistics is that it ranges from 0 to 4 in value with an ideal value of 2 which simply indicates that existing errors are not auto-correlated, although values from 1.75 to 2.25 may also be considered as acceptable. But, some statisticians consider its value in between 1.5 and 2.5 as an acceptable level indicating no presence of multi-collinearity. On the other hand, with regard to VIF statistics, a commonly accepted rule of thumb is that VIFs of 10 or higher may be a significant reason for concern and is in need of high attention for researchers during interpretation. These two statistical tools are felt to be unique in their applications in the present research work to ensure the authenticity of the data-set for analytical observations.

The following OLS Regression Equation models are designed to obtain the result estimates:

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 INV_{it} + .!_{it} \dots (1)$$

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 AR_{it} + .!_{it} \dots (2)$$

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 AP_{it} + .!_{it} \dots (3)$$

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 CCC_{it} + .!_{it} \dots (4)$$

Where ROA = Return on Assets

GROWTH = Sales Growth

LEV = Leverage

SIZE = Company size as measured by natural Logarithm of Sales

INV = Number of Days of Inventories

AR = Number of Days of Accounts Receivables

AP = Number of Days of Accounts Payable

CR = Current Ratio

CCC = Cash Conversion Cycle

i = Firms (Cross Section Dimension) ranging from 1 – 30

t = Years (Time Series Dimension) ranging from 2006 – 2015

e = Epsilon, a constant, whose mathematical value is 2.7183

Empirical Analysis

Now, to start with the analysis on the basis of descriptive statistical tools, the very first job is to get the descriptive statistical results by using common statistical tools (Table – 3) and thereafter, deriving their results from a structured correlation matrix and finally from designed regression models. Such testing is necessary to trace the assumed inter-relationship, called as *multi-collinearity*, among the selected variables, to arrive at a logical conclusion. First, 9 selected explanatory variables (financial ratios) are taken into consideration for this purpose. These explanatory variables include Return on Assets (*ROA*), Number of Days of Accounts Receivables (*AR*), Number of Days of Inventory (*INV*), Number of Days of Accounts Payables (*AP*), Cash Conversion Cycle (*CCC*), Size of the Firm being expressed in terms of Natural Logarithm of Assets (*SIZE*), Sales Growth (*GROWTH*), Leverage (*LEV*), and Current Ratio (*CR*) for analysis and interpretations.

Table - 3 lists the observations (Obs), which are extracted from the use of descriptive statistical tools such as Mean, Median, Maximum and Minimum Value, and Standard deviation (SD).

Table – 3: Descriptive Statistics of Selected Variables of Selected Indian Cement Companies

Variables	Mean	Median	Minimum	Maximum	SD
ROA	197.6065	171.97	-26.83	1,029.96	127.9268
AR	471.7452	366	3	5,318	492.9124
INV	660.3573	460.2942	2.125802	10,175.65	973.2349
AP	683.0038	428	22	27,244	1877.761
CCC	449.0988	454.5967	-20,420.7	10,184.65	1830.095
SIZE	57.9015	57.01709	27.40183	98.0267	11.96735
GROWTH	2.4879	1.816482	-0.87779	40	3.121791
LEV	2.6646	3.575471	-194.978	12.87057	12.39536
CR	14.5354	12.58	4.4	94.86	7.884705

Note: Total Number of Observations = 30 (Sample company size)

Source: SPSS output

The above table shows descriptive statistics about the variables used in the study. The mean value of return on assets is around 197 percent with a standard deviation of 128 percent (approx.); the number of days of accounts receivables is 472 (approx.) and number of days of accounts payables is 683. The table further shows that mean value of cash conversion cycle of all the firms taken together is 450 days (approx.). Together with this, the firms have seen their sales grow by almost 2.50 (approx.) percent annually on an average, while the mean values of current ratio is 14.54 (approx.) during the study period. The above observation from 30 selected cement companies is purely statistical in nature and bears true resemblance to their day-to-day operations and firms' management excellence.

The second part of descriptive statistical tool analysis deals with a structured Correlation Matrix of selected variables (financial ratios) of selected Indian cement companies during the period of 10 years of observation by taking the same 9 (nine) explanatory variables with the fair intention of establishing multi-collinearity amongst them.

Table – 4: Correlation Matrix of Selected Variables of Selected Indian Cement Companies

Variables	ROA	AR	INV	AP	CCC	SIZE	GROWTH	LEV	CR
ROA	1								
AR	0.143*	1							
INV	-0.022	0.233**	1						
AP	-0.073	0.390**	0.238**	1					
CCC	0.101	-0.007	0.351**	-0.795**	1				
SIZE	-0.121	-0.144*	-0.085	0.044	-0.129*	1			
GROWTH	-0.033	0.223**	0.183**	0.158*	-0.004	-0.216*	1		
LEV	-0.056	-0.029	-0.011	0.004	-0.018	-0.076	-0.047	1	
CR	0.031	0.280**	0.124*	-0.015	0.157*	-0.172**	0.305**	-0.068	1

Note: Total Number of Observations = 30 (Sample company size)

* Significance at 95 percent level of significance

** Significance at 90 percent level of significance

Source: SPSS output

Table – 4 offers findings of the correlation matrix of the variables to assess the impact of working capital management on profitability, being measured by return on total assets. A close observation reveals that there is a negative correlation between return on assets and the number of days of accounts payables as well as number of days of inventory, but a positive correlation with cash conversion cycle (CCC) and number of days of accounts receivables (AR). The positive relation for CCC is consistent with the view that resources are blocked at different stages of the supply chain, thus prolonging the operating cycle. This may increase profits due to increase in sales, especially where the costs of tied-up capital is lower than the benefits of holding more inventories and granting more trade credit to customers. Further, ROA is negatively correlated with Growth, Size of the Firm (being expressed in terms of Natural Logarithm of Assets) and Leverage, but positively correlated with Current Ratio, which measures the short-term liquidity of the company.

With regard to correlation between the independent or control variables, maximum values are found only between number of days of accounts payables and account receivables (0.39) and number of days of inventory (0.24). There is a positive correlation between cash conversion cycle and number of days of inventory (0.35). Since there exists no high value of correlation coefficient amongst the variables used in the present study, a lesser chance of potential multi-collinearity problem within is found, which is further analysed with variance inflation factor (VIE) values.

Now, the third part of descriptive statistical tool analysis deals with the Ordinary Least Squares (OLS) Regression Analysis, being extracted from 4 (four) regression models by taking the same explanatory variables. Examining the simple bivariate correlation in a conventional matrix normally never takes account of each variable correlation with all other selected explanatory variables. So, the main analysis is conducted from appropriate multivariate models, estimated using fixed effects framework and pooled OLS. Here, models used in the present study differ from the rest, first by using ROA as a comprehensive measure of profitability by including asset management and financing policies as control variables.

The data set used for this part is pooled across firms and years, given an unbalanced panel dataset of 30 sample companies of 10-year observations, since not all firms provide data for all years, and after controlling for outlying values. OLS estimation ignores firm specific differences in profitability. Needless to say, ordinary least-squares (OLS) regression is a generalized linear modelling technique that is used to identify a single response variable which is recorded on at least an interval scale. The technique is applied to single or multiple explanatory variables and also categorical explanatory variables that are appropriately coded. Thus, the regression models explain a much higher proportion of the variable in profitability within firms than between firms. The results of this technique confirm the multi-collinearity existing between profitability and working capital measurement.

OLS regression is one of the major techniques used to analyse data and forms the basis of many other techniques. The usefulness of the technique can be greatly extended with the use of dummy variable coding to include grouped explanatory variables and data transformation methods. OLS regression is particularly powerful as it is relatively easy to check the model assumptions such as linearity, constant variance and the effect. Here, Return on Assets (*ROA*) is taken as a dependent variable, while others like Number of Days of Accounts Receivables (*AR*), Number of Days of Inventory (*INV*), Number of Days of Accounts Payables (*AP*), and Cash Conversion Cycle (*CCC*) are considered as independent variables. Again, Size of the Firm (*SIZE*), Sales Growth (*GROWTH*), Leverage (*LEV*), and Current Ratio (*CR*) are taken as control variables. Accordingly, four OLS Regression Equations are developed as models, such as:

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 INV_{it} + \epsilon_{it} \dots (1)$$

Here, Return on Assets is taken as a dependent variable in the presence of Sales Growth, Leverage, Current Ratio and Size of the Firm as control variables and Number of Days of Inventory as an independent variable.

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 AR_{it} + \epsilon_{it} \dots (2)$$

Here, Return on Assets is taken as a dependent variable in the presence of Sales Growth, Leverage, Current Ratio and Size of the Firm as control variables and Number of Days of Accounts Receivables as an independent variable.

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 AP_{it} + \epsilon_{it} \dots (3)$$

Here, Return on Assets is taken as a dependent variable in the presence of Sales Growth, Leverage, Current Ratio and Size of the Firm as control variables and Number of Days of Accounts Payables as independent variables.

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 CCC_{it} + \epsilon_{it} \dots (4)$$

Here, Return on Assets is taken as a dependent variable in the presence of Sales Growth, Leverage, Current Ratio and Size of the Firm as control variables and Cash Conversion Cycle as independent variables.

Other abbreviations are as follows:

- ROA = Return on Assets
- GROWTH = Sales Growth
- LEV = Leverage
- SIZE = Company size as measured by natural Logarithm of Sales
- INV = Number of Days of Inventories
- AR = Number of Days of Accounts Receivables
- AP = Number of Days of Accounts Payable
- CR = Current Ratio
- CCC = Cash Conversion Cycle
- i* = Firms (Cross Section Dimension) ranging from 1 – 30
- t* = Years (Time Series Dimension) ranging from 2006 – 2015
- ϵ_{it} = Epsilon, a constant, whose mathematical value is 2.7183

The above four regression equations are analysed as per the pre-determined status independently, one after the other, in Table 5 to 8 that present the results obtained after the regressing equations (1), (2), (3), and (4). The 1st regression strictly highlights the inter-relationship (multi-collinearity) of firm profitability and number of days of inventory. The 2nd regression equation truly exhibits the multi-collinearity of firm profitability and number of days of accounts receivables. The 3rd regression equation rightly states the multi-collinearity of firm profitability and number of days of accounts payables. The last and 4th regression equation focuses on multi-collinearity of firm profitability and cash conversion cycle. Such a sequence is maintained in dealing with analysis and interpretation on regression equation model testing.

In order to check the presence of autocorrelation and multi-collinearity in the data, Durbin Watson ($D - W$) and Variance Inflation Factor (VIF) statistics are analysed. The Durbin–Watson statistic is a test statistic used to detect the presence of autocorrelation (a relationship between values separated from each other by a given time lag) in the residuals (prediction errors) from a regression analysis. $D - W$ statistic ranges in value from 0 to 4 with an ideal value of 2 indicating that errors are not correlated, although values from 1.75 to 2.25 may be considered acceptable. Further some statisticians have a standard belief on the notion that $D - W$ value between 1.5 and 2.5 can also be an acceptable level indicating no presence of collinearity. On the other hand, the variance inflation factor quantifies the severity of multi-collinearity in an OLS regression analysis. It provides an index that measures how much the variance (the square of the estimate’s standard deviation) of an estimated regression coefficient is increased because of collinearity.

It is found from the analysis that the statistics are within the limit, leading to the empirical conclusion that there exists no presence of autocorrelation and multi-collinearity in the dataset. The highest value of VIF statistics obtained is 1.18 in the Equation (3) whereas a common rule of thumb is that VIF of 10 (ten) or higher may be a definite reason for high concern. $D - W$ statistics value of t is at 1.66 in the Equation (1), which is the highest in all four equations. This also establishes the general rule of acceptance level of analytical remark. Both findings clearly leave no room for any possible ambiguity to proceed further with the individual observation in the present research work. After careful observation of VIF and $D - W$ statistics value from all the four equations, an effort is thereafter made to deal with all OLS regression equations independently for meaningful and purposeful findings. Here are the detailed explanations:

Interpretation of results

Firm Profitability and Number of Days of Inventory

Table – 5 reveals the summary statistics of regression equation (1) that explains the relationship between firm profitability and number of days of inventory. Regression results reveal that there is an existence of a negative relationship between Size, Leverage, Growth and Inventory with the dependent variable, *i.e.*, Return on Assets. Again, Size and Growth, which are commonly considered as important indicators of firm performance, are fortunately found to be positively correlated with profitability as per the standard belief. It emerges from the view that higher the growth more is the possibility of profitability, and greater the size of the company, greater is the possibility of profitability of a concern.

Table – 5: Summary of Polled OLS Regression Result of Equation (1)

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 INV_{it} + \epsilon_{it}$$

of Selected Indian Cement Companies for the period 2006 to 2015

Parameters	<i>CR</i>	<i>SIZE</i>	<i>LEV</i>	<i>GROWTH</i>	<i>INV</i>
Coefficient	0.439	-1.480	-0.731	-2.869	-0.003
t-value	0.413	-2.168	-1.103	-1.046	-0.398
Significance	0.680	0.031	0.271	0.296	0.691
<i>VIF</i>	1.127	1.074	1.015	1.164	1.042
Adj. R^2	0.005				
<i>F</i> -value	1.227				
<i>F</i> -Significance	0.274				
<i>D - W</i> Scores	1.656				

Source: SPSS output

The table clearly indicates that in case of the selected Indian cement companies, Growth and Size are negatively correlated with profitability, which is contrary to many international findings referred to in literature review on such variables, and also to the theory of corporate finance. Only Return on Assets (*ROA*) and Current Ratio (*CR*) have a strong and positive relationship with each other. The regression coefficient of number of days of inventory (*INV*) is found to be negative (-0.003) which implies that an increase in the number of days by one day is associated with the decrease in profitability (measured by return on assets) by 0.003 percent.

As per the corporate finance theory, lesser the number of days of inventory holding, higher is the profitability of the firm. This implies that the firm's profitability can be increased by reducing the number of days of inventory held in the firm. The regression result reveals that in Indian cement companies, reduction in number of days of inventory contributes to the profitability of the companies. The results in the present study are consistent with the results of studies conducted by Padachi (2006), Garcia-Teruel and Martinez-Solano (2007), Deloof (2003) and Rehman and Nasr (2007) in their respective study of relationship between profitability and number of days of inventory.

Another significant observation from this table is that the conventional measure of liquidity, *i.e.*, Current Ratio, is somewhat positively related with Return on Assets, which is a positive sign for selected Indian cement companies. Such results are highly consistent with earlier studies of Zariyawati (2009). However, this is contrary to the earlier studies of Shin and Soenen (1998). Further, coefficients about Size and Growth are negatively correlated with profitability of the firm, which is a very strange finding and against the basic paradigm of the theory of corporate finance. It is also contrary to other studies such as that of Padachi (2006), Zariyawati (2009), Deloof (2003), Nazir and Afza (2009) and Rehman and Nasr (2007).

Firm Profitability and Number of Days of Accounts Receivables

Table – 6 represents the result of regression equation (2) for the period 2006 to 2015 that explains the relationship between firm profitability and number of days of accounts receivables. A positive relationship is clearly found between profitability and number of days of accounts receivables during the period of observation under the regression equation as a part of discrete statistical tool analysis. In corporate finance theory, lesser the number of days of accounts receivables, more it adds to the profitability of the firm. But, the coefficient value of the number of days of accounts receivables (*AR*) of selected Indian cement companies shows that an increase in the number of days of accounts receivables by one day is allied with an increase in return on assets (*ROA*) by 0.038 percent. This finding largely contradicts the theory of efficient management of working capital. The results of the present study significantly differ from those conducted by Deloof (2003), Lazardis and Tryfonidis (2006), Rehman and Nasr (2007) and Garcia-Teruel and Martinez-Solano (2007). This rightly reveals that in selected Indian cement companies, managers actually need to improve their profitability standard by increasing credit period, granted to their esteemed customers.

In fact, with the advent of LPG (Liberalisation, Privatisation and Globalisation), in the Indian economy in the 1990s, the consequent influx of MNCs has put forward multiple challenges to their Indian counterparts to a greater extent. Due to MNCs' global quality-oriented standard products and need-based services being superior to those of Indian companies, it has become necessary for Indian companies to grant longer credit periods to sustain in the market and respond to the cut-throat competition from their counterparts. A close observation of the analysis depicted in the table reveals a significant negative relationship exhibited by leverage with the dependent variable *ROA*. It clearly explains that when leverage of the firm increases to an extent, it adversely affects the profitability of the firm accordingly, which is quite contrary to the standard theoretical framework. Again, coefficients of Size and Growth are negatively correlated significantly with the profitability of the firm, which is similar to the results in Equation (1). These results match with the earlier results of Padachi (2006), Zariyawati (2009), Deloof (2003), Nazir and Afza (2009) and Rehman and Nasr (2007).

Table – 6 : Summary of Polled OLS Regression Result of Equation (2)

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 AR_{it} + \cdot !_{it}$$

of Selected Indian Cement Companies for the period 2006 to 2015

Parameters	CR	SIZE	LEV	GROWTH	AR
Coefficient	-0.118	-1.350	-0.711	-3.850	0.038
t-value	-0.110	-1.991	-1.082	-1.420	2.257
Significance	0.912	0.048	0.280	0.157	0.025
VIF	1.078	1.079	1.015	1.161	1.117
Adj. R^2	0.024				
F-value	2.287				
F-significance	0.047				
D–W Scores	1.627				

Source: SPSS output

Further, the table reveals a negative relationship between current ratio and profitability of the firms. A lower current ratio of the company adds to its profitability. This is consistent with the theory that lesser the money blocked in current assets, more is the profitability of the firm. Value of adjusted R^2 (also called coefficient of multiple determinations) is very low at 0.024, which implies that variation in the profitability of the firm, due to independent variables selected for the present study, is very low.

Firm Profitability and Number of Days of Accounts Payables

Table – 7 reveals results of regression equation (3) after replacing number of days of accounts receivables with number of days of accounts payables. It attempts to find the inter-relationship between firm profitability and the number of days of accounts payables. The number of days a firm takes to pay its suppliers (creditors) depends upon its profitability. More profitable firms meet their commitment to creditors early as compared to less profitable ones, which in turn, affects the profitability of the firm. The regression results show a negative relationship between number of days of accounts payables (AP) and firm profitability as measured by return on assets.

The coefficient for number of days of accounts payables is negative and it confirms the negative correlation between profitability and number of days of accounts payables. Deloof (2003) justifies similar results by arguing that less profitable firms tend to delay payments. This implies that less profitable firms take a longer time to settle payments to creditors due to their inability to pay dues on time.

Table – 7 : Summary of Polled OLS Regression Result of Equation (3)

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 AP_{it} + \epsilon_{it}$$

of Selected Indian Cement Companies for the period 2006 to 2015

Parameters	CR	SIZE	LEV	GROWTH	AP
Coefficient	0.356	-1.423	-0.721	-2.577	-0.004
t-value	336	-2.083	-1.090	-0.935	-0.901
Significance	(0.737)	(0.038)	(0.277)	(0.351)	(0.369)
VIF	1.13	1.08	1.02	1.18	1.04
Adj. R ²	0.008				
F-value	1.410				
F-significance	0.221				
D–W Scores	1.66				

Source: SPSS output

Descriptive statistics as presented in earlier Table – 3 confirm the same results indicating that selected Indian cement companies, on an average, take a longer time of 683 days to pay their respective suppliers. It is a fact that when profitability decreases, less cash is generated from operations and companies are able to survive by delaying payments to creditors. The results make some economic sense since the longer the period of payment taken by the firm, more funds are reserved to carry on its operations and earn reasonable profits.

Firm Profitability and Cash Conversion Cycle

The combined effect of all the three explanatory variables used in equations (1), (2) and (3) is analysed to focus on the relationship between profitability with that of the number of days of inventories, the number of days of accounts receivables and the number of days of accounts payables respectively. Table – 8 enumerates the relationship of profitability with the cash conversion cycle (CCC). Here, the coefficient value of CCC is found to be positive at 0.006, which implies that a decrease in the CCC generates lesser profit for a company. This is in contrast with the theory that states a lower CCC generates more profit for a company. In theory, shortening of CCC adds to the profitability of the company whereas longer CCC negatively affects the profitability of the company. In case of selected Indian cement companies, regression results are contrary revealing that longer the duration of CCC, more profitable the firm is. The results are not significant at a given level of significance with F-value at 0.159.

Moreover, the regression results show that Size, Leverage and Growth have negative correlation coefficient values. These results depart from the earlier studies by Deloof (2003) which include that there is a negative relationship between CCC and profitability of the firm. Further, negative relationship is proved by Samiloglu and Demirgunes (2008), Lazaridis and Tryfonidis (2006), Zariyawati (2009) and Rehman and Nasr (2007), concluding that the increase or decrease in CCC significantly affects profitability of the firm to the same extent. But a positive relationship between CCC and profitability is concluded in the present study, which is similar to the study by Padachi (2006) with correlation coefficient value of 0.006.

Table – 8: Summary of Polled OLS Regression Result of Equation (4)

$$ROA_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 LEV_{it} + \beta_3 CR_{it} + \beta_4 SIZE_{it} + \beta_5 CCC_{it} + \epsilon_{it}$$

of Selected Indian Cement Companies for the period 2006 to 2015

Parameters	<i>CR</i>	<i>SIZE</i>	<i>LEV</i>	<i>GROWTH</i>	<i>CCC</i>
Coefficient	0.200	-1.364	-0.713	-2.758	0.006
t-value	0.187	-1.992	-1.078	-1.016	1.300
Significance	(0.851)	(0.047)	(0.282)	(0.310)	(0.195)
VIF	1.15	1.09	1.02	1.15	1.04
Adj. R^2	0.012				
F-value	1.590				
F-significance	0.163				
D–W Scores	1.66				

Source: SPSS output

Further, the regression result, like in all other equations, is not significant due to the result of a minimum adjusted coefficient of multiple determinants (i.e., R^2) value of 0.012. The overall result clearly indicates that in selected Indian cement companies, shortening of cash conversion cycle period strongly and negatively affects the profitability of the companies to a greater extent; accordingly, these values are not significant (Table – 8). One possible explanation of such results about selected Indian cement companies is that if a company has a higher level of accounts receivables due to its generous trade policy in the ordinary course of its business operations, it can fairly result in a longer cash conversion cycle. In this case, needless to say, a longer cash conversion cycle has a greater chance of increasing the degree of possibility of attaining a desired level of higher profitability by default. This definitely ensures that every opportunity in enhancing the profitability of the firm is taken, as the firm is capable of maintaining a safe level of cash conversion cycle.

Summary of Findings

The study set out to provide empirical evidence about the effects of working capital management on profitability for a sample of 30 listed Indian cement manufacturing companies for the period 2006-2015. The results of this paper contradict the results of earlier studies such as Shin and Soenen (1998) and Deloof (2003) which conclude that there is a negative relationship between *CCC* and profitability of the firm. Further, negative relationship is proved by Samiloglu and Demirgunes (2008), Lazaridis and Tryfonidis (2006), Zariyawati (2009) and Rehman and Nasr (2007), concluding that the increase or decrease in *CCC* significantly affects profitability of the firm to the same extent. But a positive relationship between *CCC* and profitability is concluded in the present study, which is similar to the conclusion arrived at by Padachi (2006) with a correlation coefficient value of 0.006. There exists a negative relationship between profitability and number of days of accounts payables and number of days of inventory, but a positive relationship between profitability and number of days of accounts receivables. With regard to the number of days of accounts receivables, days of inventory and days of accounts payables as measured by cash conversion period, the study conveys different results from many other studies conducted in different countries in the past. However, the results related to relationship between a firm's profitability and number of days of accounts payables and numbers of days of inventory are similar to those found in previous studies. WCM and profitability show a positive relationship (as measured by cash conversion cycle,) as against the theoretical foundation. The present analysis of the study reveals that shortening of the cash conversion cycle negatively affects the profitability of the firm. Analysis related to relationship between *CCC* and profitability significantly departs from previous studies. The Current Ratio is positively related with the Return on Assets, which is a positive sign for selected Indian cement companies, and the results are consistent with earlier studies.

Limitation of the study

- a. The study is restricted to a sample size of 30 selected cement companies in India and is confined to analysis of only 10 years of data from 2006 to 2015.
- b. The effect of inflation has not been considered in the present study.
- c. The result of analysis is subject to the same constraints as are applicable to statistical tools.
- d. Since the report is exclusively made from data from secondary sources, direct observation is not possible; limitations of secondary data are applicable.
- e. There was no scope for gathering sufficient financial information since such information is, by default, confidential.
- f. The data collected for the study was historic in nature, so the suggestions might be irrelevant to certain situations.
- g. As continuity and homogeneity in the available data is a prerequisite for studying the trend of capital formation in the corporate sector, we had to exclude those companies whose data was not available for the entire study period or whose financial years were not uniform.
- h. In India, companies adopt different years for closing their books of accounts. Some companies close their books of accounts on 31st March, some on 30th June, some on 30th September and some on 31st December as per the records shown in the database of BSE listed companies. So far as selection of dependent and independent variables are concerned, selected companies are made uniform as per their year-ending practices.
- i. Important financial explanatory variables are taken into account which are extracted from the most reliable and authentic data source for arriving at a logical conclusion.
- j. Analysis of this study is based on historical data, which has got its own limitations.
- k. Some other important explanatory variables like management style, labour problem, kind of product and service, etc. have been kept out of purview of the present work in spite of their significance. Due to the non-availability of data regarding labour hours lost in each company, this explanatory variable is also excluded in the present work. The parameter of nature of product is also not included because the market potential of a product depends on many factors like government policy, economic viability, consumers' tastes and preference etc. Hence, in spite of the importance of these variables, these are not taken into account. But, utmost care is taken to obtain findings from the analysis in the presence of various limitations.

Scope for further study

The present study was conducted for only thirty Indian cement companies for a period of ten years. There may be significant scope for further studies considering a greater number of years and including more firms in the sample so that problems of managing working capital and its solutions can be identified more efficiently. The study can also be extended to other sectors and the results can be compared to see the differences. Every segment in the manufacturing sector should be studied at the micro level for efficient working capital management in order to assess which factors of working capital management influence profitability more and how working capital management can increase productivity and profitability in different sectors of our country. The influence of interest rate risk, foreign exchange risk, business risk, political risk and competitor risk on working capital management could be analysed in future research. A further possibility for research is the development of a risk-adjusted working capital rating. The conventional working capital ratio can be promoted to a risk-adjusted working capital ratio. The scope for further research may be extended to working capital management components including cash, marketable securities, receivables and inventory management.

Conclusion and recommendations

Working capital management (WCM) is the functional area of finance that covers all current accounts of the firm. It involves the relationship between a firm's short-term assets and its short-term liabilities. A firm is required to maintain a balance between liquidity and profitability while conducting its day-to-day operations. Liquidity is a prerequisite condition to ensure that a firm is able to meet its short-term obligations and its continued flow can also be guaranteed from a profitable venture. The importance of cash as an indicator of continuing financial health should not be surprising in view of its crucial role within the business organisation. The goal of working capital management is to ensure that a firm is able to continue its operations and that it has the ability to satisfy both maturing short-term debt and upcoming operational expenses. So, the management of working capital involves managing inventories, accounts receivable, accounts payable and cash.

A firm can be very profitable if it translates the cash from operations within the same operating cycle. If this is not possible, the firm may need to borrow to support its continued working capital needs. Thus, the twin objectives of profitability and liquidity must be well-synchronized. Investments in current assets are inevitable to ensure delivery of goods or services to the ultimate customers, and proper management of the same fulfils the desired impact on either profitability or liquidity. If resources are blocked at different stages of the supply chain, this will prolong the cash operating cycle. Although this might increase profitability (due to increase in sales), it may also adversely affect the profitability if the costs tied up in working capital exceed the benefits of holding more inventory and/or granting more trade credit to customers.

We also recommend that firms in the cement sector should forecast their sales and hold enough cash according to their projected sales level, so that they are able to take advantage of the bargaining position while making cash purchases, and thus cut their cost. It is very clear that efficient management of working capital and liquidity has a positive effect on the firm's profitability. This study clearly affirms that firms in the cement industry in India have sufficient scope to improve their profitability by managing their working capital in more efficient ways. The inventory, if handled proficiently, can produce a significant positive impact on profitability of the firm. Consequently, this study finds sufficient proof that a firm is likely to enjoy better profitability if it manages its working capital with better efficiency and focuses on inventory and cash position with greater care. To conclude the study, it can be said that adopting the above measures will doubtlessly help the selected companies to improve their overall performance in the management of working capital. With efficient management of working capital, the selected companies can utilize their capacity optimally and accelerate economic growth of India by increasing the production of cement at a reasonable cost.

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