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The Nexus Between Working Capital Management and Profitability in the Cement Industry of Bangladesh

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Abstract: Working capital is a financial parameter often considered to be one of the critical financing and investment decisions. An analysis of the relationship between working capital management and profitability can help managers to make better decisions. Therefore, this study intends to analyze the impact of working capital management on profitability. This study is conducted on companies of cement industry listed in the Dhaka Stock Exchange (DSE). The study refers to Days Inventory Outstanding (DIO), Days Sales Outstanding (DSO), and payables outstanding with the current ratio and quick ratio as proxies for working capital. The net profit margin ratio is used as the measure of profitability as well as dependent variable of the study. The analysis is based on five years of financial datafrom the published financial statements of all the cement companies listed by DSE. A regression model is developed and applied to fulfill the intended purpose of the study. The findings reveal a very significant relationship between independent variables (DIO, DSO, DPO, CR, and QR) and Dependent Variable (NPM). The study indicates a strong negative relationship between the working capital and profitability position over the study period. The study finds that DSO and profitability have a considerable negative relationship whereas DIO has a weak positive relationship with profitability. However, it is evident from the POLS model that all the variables of working capital have a statistically significant impact in explaining profitability as the dependent variable. The study suggests that organizations need to be aware of their management of working capital to boost their earning capacity.

Keywords: Working capital, days sales outstanding, days inventory outstanding, profitability, current assets

1. Introduction

Working capital is one of the pivotal parameters for manufacturing companies to determine a company's financial performance. Over the years, researchers have emphasized the importance of analyzing how firms utilize their current assets. An excessive investment in current assets reduces profitability whereas a low investment in current assets produces the risk of a liquidity crisis as well as production stoppage (Ogutu,

2022). Working capital management is considered as a challenging task for finance managers because it requires balancing the organization's liquidity and profitability simultaneously (Panigrahi, 2020). Lazaridis and Tryfonidis (2006) argued that effective management of working capital is a complex task where a trade-off has to be made between profitability and risk. The difference between current assets and current liabilities is termed as net working capital, affects a company's growth and sustainability. Thus, a firm needs to understand the impact of cash, inventory, accounts receivable, and short-term payable on its profitability. Hence, Days Inventory Outstanding (DIO), Days Sales Outstanding (DSO), and Days Payable Outstanding (DPO) serve as the indicators, used by firms to manage the working capital (Abdullah & Ahmed Siddiqui, 2018). Besides, traditional variables like Current Ratio (CR) and Quick Ratio (QR) are used to assess the efficacy of a firm's profit margin (Naz et al., 2016). The optimization of these variables increases the free cash flow of firms and subsequently returns to shareholders (Parveen et al., 2014). This study intends to investigate the impact of working capital on the profitability of sample companies listed in DSE.

Previous studies provided strong evidence that the practical implication and impact of WCM on profitability and risk are ignored in corporate decision-making (Panigrahi, 2013b; Panigrahi, 2014). This proposition is very pertinent regarding companies operating in the cement industry in Bangladesh. Moreover, some of the firms are very inefficient in receivable and payable management.

Researchers have intentionally chosen the cement industry because firms operating in the chosen industry have to deal with huge investments in inventory and accounts payable. As per the data of the Bangladesh Bureau of Statistics (BBS), the cement industry has shown record growth of 9% in the year 2020-21 and is predicted to produce 9.2% growth in the following year. In 2022-23, the government has allocated Taka 2,460.6 billion for the Annual Development Project (ADP) which is approximately 17.2% higher than the ADP allocation of the previous fiscal year. It is evident that the cement industry of Bangladesh has experienced stable growth over the last few years. Firms must place strong emphasis on Working Capital Management (WCM) to ensure optimum utilization of their funds and maximize profitability. The practice and management of working capital in the cement industry of Bangladesh are not emphasized in the financial decision-making (Hoque et al., 2015; Quayyum, 2012). On the other hand, the use of working capital ratios, and liquidity ratios in financial decision-making has been studied by several researchers but couldn't produce concrete evidence on the influence of working capital management on the firms' financial decisions and profitability (Garg, 2013; Al-Debi' & Al-Debi', 2011) Thus, it is high time to identify the relationship between working capital management and the profitability of the cement companies listed on the Dhaka Stock Exchange (DSE), in order to generate empirical evidence as well as to emphasize practicing proper working capital management.

The focus is to produce a comprehensive overview about WCM practices of Bangladeshi cement companies as well as to identify whether these practices contribute to the firm's profit-earning capacity. Based on the view of Muhammad et al. (2016), WCM needs precise attention from the financial managers as it affects the financial performance of an organization irrespective of its sector and size. Financial managers must treat WCM with concern, irrespective of the organization's size or sector they belong to, because it

greatly affects the performance of a firm. Regardless of the mission and vision of an organization, WCM is a significant element in determining the profitability of the organization (Quayyum, 2011). It is often said that the working capital policy has a significant influence on the decision of liquid assets, and current liabilities as well as on the profitability (Megaladevi, 2018). The failure to manage working capital stakeholders, such as debtors, suppliers, and creditors would create severe trouble in managing liquidity and generating profit (Rehman & Anjum, 2013). Managing working capital requires intensive care and accuracy in day-to-day business operations to achieve a broader financial target of the company. It is a must for the corporation to dedicate the delicacy and effort in systematically managing the working capital. Poor efforts in managing working capital can produce liquidity stress which in turn decreases creditworthiness as well as the credit rating of the firm (Jacob, 2013). Moreover, inefficient management of working capital ties up funds and causes problems in regular operations.

The continuity of operations in a business is of utmost priority and cannot be achieved without effective management of cash and accounts receivable. Inventory management plays a crucial role in maintaining a balanced production process by managing the purchase of raw materials, efficiently handling the work in process, and finished goods. Additionally, accounts payable is the liability that must be managed seamlessly; failure to do so can increase financing costs for the organization. These three elements—cash, inventory, and accounts payable—define the strategies adopted by an organization in managing its working capital. These elements determine the cash conversion cycle of the corporation. Cash conversion cycle denotes length of time a business needs to convert its raw materials into usable cash in the working capital management process. Those variables also signify the efficiency in managing accounts receivable, inventory, and payables. Managing accounts receivable and inventory determines the optimization of current assets to enhance the marginal return on investment (Zahid et al., 2023). Thus, it is apparent that accounts receivable, inventory, and accounts payable are the key variables in determining the management of working capital. Previous researchers have used the current ratio and quick ratio in measuring the effectiveness of WCM (Hoque et al., 2015; Panigrahi, 2023; Quayyum, 2012a) The current ratio illustrates the ability of a firm to pay its short-term obligation which includes all payables. The quick ratio is a more conservative approach which is similar to the current ratio excluding the investment in inventory.

In general, the impact of WCM has been assessed by using operating profit, net profit as well as return on investment (Panigrahi, 2020; Dhar, 2018). Hoque et al., (2015) concluded that WCM negatively affects profitability whereas Alrjoub et al., (2012), Raheman and Nasr (2007), and Oweis (2020) have reported a positive impact. Mazumder (2015) in his analysis of Bangladesh cement companies revealed that only the accounts payable period has a positive effect on the gross profit ratio. Quayyum (2012b) concludes that the accounts receivable and accounts payable period has a positive impact on return on assets (ROA) and net profit margin (NPR) but the inventory turnover period and cash conversion cycle (CCC) produce a negative impact. Therefore, similar differing results produce a need for further development in this area.

Effective working capital management (WCM) is vital for manufacturing firms, including the cement industry in Bangladesh, as it impacts both liquidity and profitability.

Managing working capital involves balancing current assets and liabilities to avoid excess investment, which can reduce profitability, or insufficient investment, which can cause liquidity issues and production delays. Key indicators for assessing WCM include Days Inventory Outstanding (DIO), Days Sales Outstanding (DSO), and Days Payable Outstanding (DPO), alongside traditional ratios like the current and quick ratios. These metrics enable firms to optimize their cash flow and financial stability. The cement industry in Bangladesh, experiencing significant growth, faces challenges in WCM, with current research showing mixed results on its impact on profitability. Some studies suggest that poor WCM can impact profitability, while others indicate that effective management improves financial performance. There is a noted gap in the emphasis placed on WCM practices within the industry. Therefore, the paper aims to examine the nexus between WCM and profitability of the cement industry in Bangladesh. The structure of this paper is as follows: Section two provides references of the literature and formulates the conceptual framework; Section three outlines the methodology employed; Section four presents the analysis and findings; and Section five provides concluding remarks with a summary, limitations, and suggestions for future research.

2. Literature Review and Conceptual Framework

Corporate firms allocate their financial resources for two primary purposes: long-term investments and short-term operational needs, such as the purchase of raw materials, payment for wages and salaries, and regular financial commitments. So, the continuation of business activities depends on the usage of short-term funds to meet short-term commitments. This short-term fund is defined as revolving capital or working capital (WC). Theoretically, WC has two dimensions: gross working capital and net working capital. Gross working capital is simply the investment in current assets, which includes cash, short-term investment, accounts receivable, and inventory. Net working capital, on the other hand, refers to the residual value of current assets after deducing current liability. It is the value of the current asset after eliminating the outsiders' claim which is mainly accounts payable. Net working capital can be either positive or negative. The positive net working capital indicates that current assets exceed current liability whereas negative net working capital indicates current liability is greater than current assets. In brief, net working capital illustrates the position of liquidity to support the regular operation of a business and the challenges of meeting the needs of liquidity by optimizing the current assets. On the contrary, investment in current assets reduces the long-term funds of the corporation. The more time and volume of current assets the less the long-term assets, the assets which generate income for the business. Therefore, an organization has to make a balance between current assets and long-term assets to maintain the balance between profitability and risk (Makori & Jagongo, 2013). Thus, management of current assets and liabilities is essential for corporate firms to ensure control over their income and risk. Consequently, WCM evolves, which focuses on the optimization of accounts receivable, accounts payable, inventory as well as cash management to affect the income capacity of the firm. The paper is dedicated to assessing the relationship between working capital

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management and profitability as well as assessing the impact of different working capital measures on profitability.

2.1 Accounts Receivable Management

Account receivables is one of the major short-term assets that affect the profitability and risk of an organization. Proper management of accounts receivables is mandatory for the survival of a firm. The longer it takes to collect cash from accounts receivable the higher opportunity cost incurred by the firm will be, which may eventually lead to bad debt (Alipour, 2011). The smooth and timely collection of working capital makes the cash available for further production and sales, which ultimately hit the overall organizational income. For accounts receivable management, the days in sales outstanding ratio is commonly used. The day sales outstanding ratio is the average collection period for credit sales (Afza, 2011). DSO is one of the current assets whose enhancement will increase the working capital volumes (Hameed & Ali, 2014). This metric calculates the number of days takes a company to collect its payment after the credit sales. The greater number of days indicates that the company is suffering a liquidity crunch to support its regular business operations. On the contrary, the smaller number of sales outstanding days provides sufficient cash flow to support prompt production but can demotivate the buyer to purchase from the company and may reduce revenue. According to Almazari (2014)**,** the accounts receivable period is one of the clear indicators of a cash flow pattern that signifies the value of a company. Le et al. (2018) utilize the receivable turnover days to determine the influence of WC on the firms' profitability and the earning power of its assets. Moreover, Tanveer et al., (2016) show the significance of accounts receivable management concerning the fluctuations of net profit margin. Thus, the choice of accounts receivable management as a proxy of WCM is an obvious take for the researcher.

2.2 Inventory Management

Inventory is one of the core current assets of any manufacturing corporation. It is significant for the construction industry as they significantly rely on heavy investment in inventory (Dong & Su, 2010). The DIO metric tells the number of days the company holds inventory before it turns into a sale (Nabi et al., 2016). It indicates efficient management of inventory in converting them into sales. The fewer days in inventory indicate better management of current assets, which leads to more production and sales (Mansoori et al., 2019). The metric of inventory management is a component of the cash conversion cycle too. Better management of inventory or a smaller number of days in inventory certainly reduces the cost of storage and enhances the number of production cycles per period. However, scarcity in inventory may damage the smooth production cycle, which also reduces the revenue as well as the overall profitability. Consequently, many researchers have investigated the influence of working capital on the earning ability of the firm (Panigrahi, 2013a; Malik & Bukhari, 2014). Mabandla and Makoni (2019) show the importance of inventory management as part of WCM in the South African manufacturing industry. How inventory shapes the financial performances of listed companies in Jordan is illustrated by Almomani et al., (2021) in their paper on the relationship between working capital management and financial performance.

2.3 Accounts Payable Management

Managing only current assets is termed gross working capital management. But to produce the net impact of working capital in profitability and risk, an organization should focus on account payable management also (Akoto, 2013). Accounts payable represents liabilities that must be settled using current assets. Therefore, it is the value that reduces the amount of current assets or net working capital. Days in payable outstanding (DPO) is a metric that researchers used to measure payable management in this paper (Uyar, 2009). DPO is the average payment time for the credit purchase of raw materials (Sarwat et al., 2017). It is a measure that indicates the number of days the organization gets to pay its short-term liability. Payable outstanding is a form of credit without interest for the organization (Ullah et al., 2023). So, it is better for the indebted organizations if they get longer time. This measure is also suggested by several researchers in their paper as an indicator of working capital's influence on profitability (Khaksarian, 2014; Shahzad et al., 2015). As a fast-growing industry, accounts payable is a major indicator of the cement industry's viability and revenue estimation. Mabandla and Makoni (2019) and Dhar (2018) provide numerical evidence of positive accounts payable management significance on net profit margin and gross profit margin. On the contrary, Panigrahy (2020) highlights the negative influence of accounts payable management on the return on assets. There is a clear indication that comes from the literature on the significance of accounts payable management which clarifies why researchers consider accounts payable management would be an essential fit for this study.

2.4 Current Ratio and Quick Ratio

To understand the earning capacity and profitability of an organization, the current ratio (CR) and quick ratio (QR) are commonly used metrics. Both CR and QR are significantly correlated with asset return and profitability (Janjua et al., 2016; Khan et al., 2016; Rahman & Ahmed, 2021). These two measures also reflect the utilization of the overall current assets in line with the profitability and risk. The current ratio expresses the ability of a firm to meet its short-term obligation which in other ways is a parameter to understand the impact of working capital. The quick ratio is a similar but more conservative approach that only considers liquid and near-liquid assets in the current asset portion to understand the capability to fulfill its short-term financial commitment. The purpose of analyzing working capital can be served by using these metrics which test the influence of current ratio and quick ratio as WC parameters on ROA as well as profitability (Vaidya & Paudel, 2022). According to Afza (2011), CR and QR are better measures of WCM which are highlighted in his paper as they have a positive influence on NPM. Niresh (2012) produced a negative significance of CR in his study to find the relationship between CR and NPM. A study from Garanina and Belova (2015) based on Russian companies shows that CR and QR can have positive impact on the financial performances. Shahzad et al., (2015) defines the necessity of current asset and quick asset management by finding their influences on the financial performances of selected Pakistan’s companies.

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2.5 Profitability

Based on previous studies, the current research considers financial performance as the dependent variable. In different studies related to WC, ROA, gross profit margin (GPM), net profit margin (NPM), and return on investment (ROI) are used as proxy variables. Panigrahi (2023) used ROA as a proxy variable for financial performance; Dhar (2018) utilized gross profit as the measure of financial performance; and Quayyum (2012) applied net profit ratio and ROA as proxies of financial performance. The summary of prior studies on working capital's influence on firms' financial performances is presented in Table 1, which shows a comprehensive view of the determinants of working capital and financial performances. Studies from Almazari (2014), Almomani et al., (2021), and Angahar and Alematu (2014) choose to use ROA as the indicator of financial performance. However, as we select profitability as a proxy of financial performance, it is better to net profit margin (NPM) which is the most direct indicator of profits (Afza, 2011; Mabandla and Makoni, 2019). Besides, there is an argument that other proxies such as ROA, ROE, and ROI are not direct indicators of profitability but rather can be treated as financial performance indicators (Le et al., 2018; Niresh, 2012). As a result, the researchers choose to use NPM as the proxy of profitability to maintain the validity of the objective of the study.

Through the review of existing studies as summarized in Table 1, it is evident that ROA is a commonly used proxy of financial performance. The use of profitability can illustrate the significance in more direct ways for the cement industry of Bangladesh. Also, the prior studies open the scope of an elaborative study that focuses on net profit margin as the proxy variable of financial performance. Further, the review of empirical studies has found that most of the existing research is based on OLS regression, descriptive statistics, and correlation analysis (Dhar, 2018b). Even most of the studies run with very limited variables to determine the impact. In this scenario, the current study focuses on panel data analysis with all the available companies listed under the cement sector in DSE. The study provides an extensive number of proxies for WCM to determine the impact more sophistically on the net profit margin. Considering all these variables and their impact and relationship with profitability, the following set of hypotheses have been developed for the current study:

H_{01}: There is no significant relationship between DIO and NPM
H_{02}: There is no significant relationship between DSO and NPM
H_{03}: There is no significant relationship between DPO and NPM
H_{04}: There is no significant relationship between CR and NPM
H_{05}: There is no significant relationship between QR and NPM

Among the other factors that determine profitability and earnings, working capital is the significant one to study. Management of working capital is a catalyst for the growth and survival of the manufacturing industry. In the case of the cement industry, a huge portion of assets are invested in working capital as it is considered a heavy materials industry (Javid & Zita, 2014). Working capital is blood circulation for a firm which needs to be focused very often. But, in an emerging country like Bangladesh, the analysis of the cement industry is not so extensive (Hoque et al., 2015b). Therefore, this paper takes the opportunity to cover the industry in terms of earning and working capital in the 21st century.

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Table 1
Summary of Prior Studies on the Relationship between Working Capital and Financial Performances

Author	Country	Firms	Timeline	DIO	DSO	DPO	CR	QR	CCC	DV
Afza (2011)	Pakistan	22	1988-2008				+	+	+	NPM
Almazari (2014)	Saudi Arab	8	2008-2012	+						ROA
Almomani et al. (2021)	Jordan	42	2010-2018	+	-					ROA
Angahar and Alematu (2014)	Nigeria	4	2002-2009	-	-				+	ROA
Dhar (2018)	Bangladesh	7	2007-2015	-	-	+			-	GPR
Garanina and Belova (2015)	Russia	72	2001-2012				+	+	-	ROA
Hoque et al. (2015)	Bangladesh	6	2010-2012		-					NPR
Le et al. (2018)	Vietnam	69	2014-16	+	+	-			+	ROA, NPM
Mabandla and Makoni (2019)	South Africa	12	2007-2016	+	-	+				NPM
Niresh (2012)	Srilanka	30	2008-2011		-		-		-	ROA, ROE, NPM
Nobanee et al. (2011)	Japan	34771	1990-2004						-	NPM
Panigrahy (2020)	India	30	2006-2015	-	+	-			-	ROA
Quayyum (2011)	Bangladesh	6	2005-2009	-	+	+		+	-	NPR
Shahzad et al. (2015)	Pakistan	7	2007-2013				+	-		ROA
Tanveer et al. (2016)	Pakistan	50	2005-2014	-	+					NPM
Yasir et al. (2014)	Pakistan	16	2007-2012	-	-	-			-	ROA

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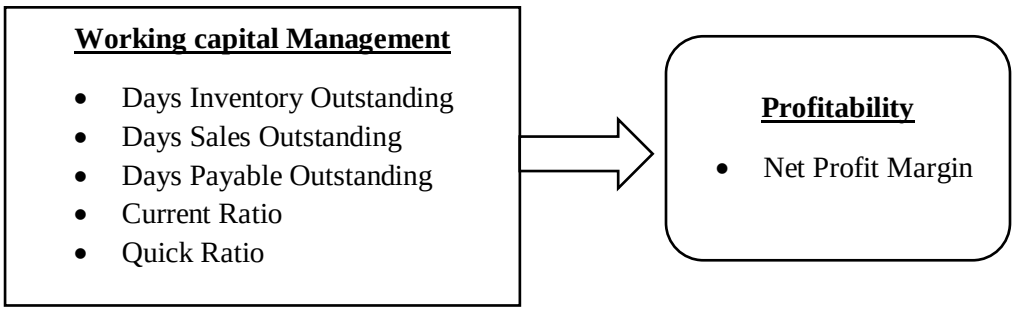
2.6 WCM and Profitability

A corporation is established to generate a return on its investments. All the activities of the firm are directed to earn profit. Thus, it is essential to understand the relationship between managing the working capital to understand its impact on profitability and investments. The whole process of managing raw materials, optimizing different credit policies, and paying strategies can bring changes in the organization's financial performance. Implementation of stringent or lenient credit terms, different inventory management methods, or different techniques of payable management can influence the financial objective of the corporation is the ultimate question, that will be addressed in this paper. So, the relationship of proxy variables between WCM and profitability is the key element of this study to figure out the existence of WCM influence on firms' profitability in the cement industry of Bangladesh.

Figure 1
Conceptual Framework



3. Research Methodology

3.1 Sample Size and Data Collection

This quantitative study includes all seven cement companies listed on the DSE, covering the period of 2019-2022. The selection of these companies is based primarily on (1) the availability of financial information for the listed firms and (2) the reliability of their information. The data were collected directly from the published financial statements of the sample companies. So, the data is secondary in nature. Moreover, the choice of this sector is motivated by the homogeneity of the company size. The choice is also affected by the age of the firm which is distributed identically.

Figure 2
Firms Age

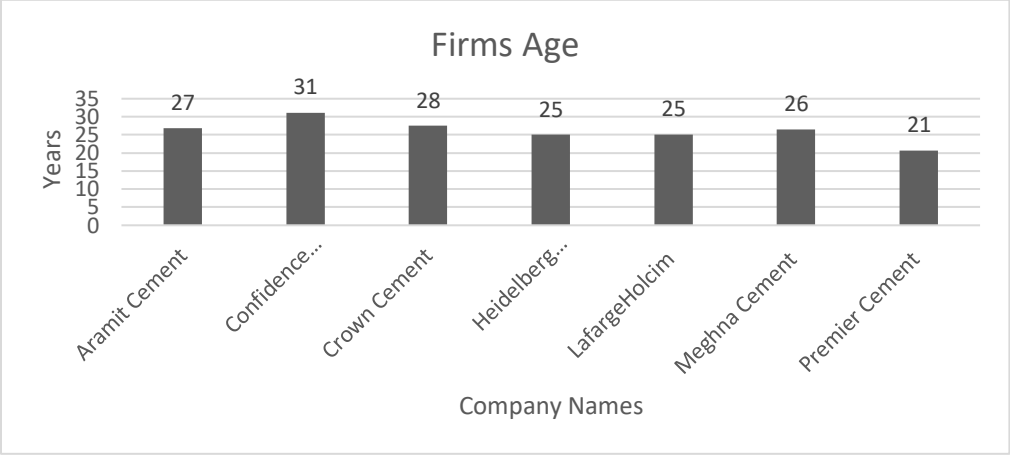


Figure 3
Firms Size (based on asset size)

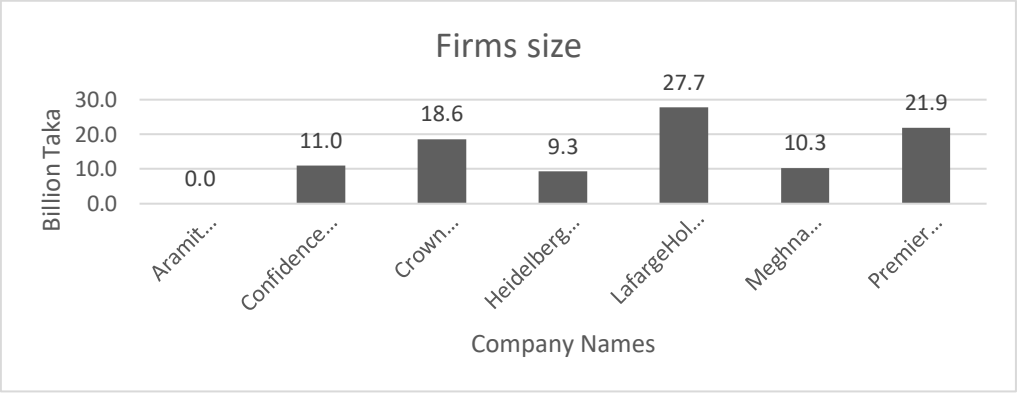


Figure 2 shows that the selected firms have been in business for an average of 26 years. Additionally, Figure 3 indicates that the average business size in the cement industry is 16.5 billion taka.These factors affect the choice of cement industry as the data set to analyze the impact of working capital on their net profit margin.

3.2 Variables and Estimation

The selection of NPM as the dependent variable and DIO, DPO, DSO, CR, and QR as independent variables aligns with previous studies in this domain. To investigate the relationship between WCM and financial performances some industry-specific parameters are used as variables. Most of the previous studies take Gross profit, Net profit, ROA, ROI, and ROCE (return on capital employed) as the dependent variable proxies of firms' financial performances Among them, ROA and profit parameters are the most used proxy variable for financial performance. This study has taken NPM as the dependent variable.

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Net profit margin is selected as it comprises the overall situation of the firm's earnings to find the relationship of WCM with profitability (Addin Al-Mawsheki, 2022).

Table 2
List of Variables and Estimation Formula

Variables	Full Form	Estimation
	Dependent Variables	
NPM	Net Profit margin	Net Profit/ Total Revenue
	Independent Variables	
DIO	Days Inventory Outstanding	(Inventory/COGS) * 365
DSO	Days Sales Outstanding	(Accounts Receivable/Revenues) * 365
DPO	Days Payable Outstanding	(Accounts Payable/COGS) * 365
CR	Current Ratio	Current Assets/Current Liabilities
QR	Quick Ratio	(Current Assets-Inventory)/Current Liabilities

3.2 Estimation Model

The following model was incorporated to analyze the data which was used by many academicians in this field of research. In the model DIO, DSO, DPO, CR, and QR have been treated as exogenous variables and NPM as endogenous variables. The last parameter of the model expresses the error term in our estimation.

Model: $NPM_{it} = \alpha + \beta_1 DIO_{it} + \beta_2 DSO_{it} + \beta_3 DPO_{it} + \beta_4 CR_{it} + \beta_5 QR_{it} + \varepsilon_{it}$

Here, dataset contains cross-sectional information across different time periods. The characteristics of the dataset define it as panel data that have time and space variation. So, panel data analysis would be more suitable to obtaining reliable output. Because the time and space dimensions of data are present in this analysis, the Breusch-Pagan test is conducted to find the suitability of either pooled or panel regression test will be applicable. These are the classical tests in panel data regression analysis. EViews and SPSS were used to perform the analysis of this paper.

4. Analysis and Findings

Several statistical tools were employed to analyze the data characteristics and their internal relationship. Descriptive statistics and correlation were used for the above purposes. Additionally, the Breusch-Pagan test was used to assess the suitability of the POLS model.

4.1 Descriptive Statistics

Table 3 summarizes the basic statistical parameter of the data set known as descriptive statistics. The analysis includes measures of central tendency such as mean, standard deviation, skewness, kurtosis, minimum and maximum value, etc. The analysis includes the dependent variable NPM along with all other independent variables that express the overall working capital management.

Table 3
Descriptive Statistics

Variables	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
NPM	-0.785492	0.268422	0.016322	0.158588	-3.81	20.012
DIO	20.891161	212.7438	58.50711	45.84281	2.649	6.597
DSO	8.0212857	163.1662	61.50158	31.08364	0.542	2.242
DPO	6.3748766	418.3284	95.74193	104.8357	2.174	4.267
CR	0.5079696	1.497305	0.88172	0.235353	0.747	0.717
QR	0.2005183	1.091346	0.700008	0.210774	-0.443	-0.277

Note: NPM =Net Profit margin, DIO =Days Inventory Outstanding, DSO= Days Sales Outstanding, DPO: Days Payable Outstanding, CR= Current Ratio, QR= Quick Ratio

The measure of inventory outstanding has a mean value of 58.51 days with a standard deviation of 45.84 days which illustrates that the inventory management among the selected firms is very fluctuating with severe variability. Among the dependent variables, payable outstanding has the most variability in the cement industry with a standard deviation of 104.84 days. Sales outstanding range from 8 days to 163 days. The mean value of the current ratio is 0.88 which tells that the firm does have not equal or more current assets than their current liability. The quick ratio among the selected firms ranges from 0.2 to 1.09 days. NPM, DIO, and DPO show that these variables are highly skewed either positive or negative depending on their sign. The skewness value of variables of DSO and QR shows that they are almost symmetrical. CR has a skewness below +1 indicating that it is positively skewed. The observation of NPM has higher in peakness as per the result of kurtosis. DPO and DSO also exhibit almost symmetric distribution. Only a quick ratio portrays negative kurtosis which means low peakness of the observation.

4.2 Correlation

Table 4 shows Pearson's correlation coefficient for the dependent and independent variables. The coefficient of correlation illustrates the relationship, degree of relationship, and direction of relationship among the variables (Al-abass, 2018). It is observed that NPM has a moderate negative relationship with sales outstanding. DIO and DPO have a weak positive relationship with NPM. It is found that CR has a weak positive relationship with NPM. Moreover, QR has a very weak negative relationship with NPM.

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Table 4
Correlation Matrix

Variables	NPM	DIO	DSO	DPO	CR	QR
NPM	1					
DIO	0.185	1				
DSO	-0.629	-0.275	1			
DPO	0.137	0.904	-0.359	1		
CR	0.107	0.186	-0.217	0.225	1	
QR	-0.086	0.005	0.273	0.069	0.769	1

4.3 ANOVA

One-way ANOVA tests whether the variability between the different groups is because of the independent variable. The test compares the variability between the different groups believed to be due to the independent variable. This test highlights the significant differences across different dependent variables incorporated in the regression model. Here the null hypothesis is no significant difference between the groups. That is there are no significant differences in NPM across the DIO, DSO, DPO, CR, and QR.

Table 5
ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.495	5	0.099	7.974	.000
Residual	0.36	29	0.012		
Total	0.855	34			

a Dependent Variable: NPM
b Predictors: (Constant), QR, DIO, DSO, CR, DPO

The test of ANOVA yields a probability of 0.000 which is less than the significance value of 5%. This result leads to the rejection of the null hypothesis. Alternatively, it established that there is a significant difference of influence in net profit margin across the days in inventory outstanding, days in sales outstanding, days in payable outstanding, current ratio, and quick ratio. In simpler terms, there is a significant relationship between the dependent and independent variables.

4.4 Breusch-Pagan Test

It is observed that the data set has cross-section and time series data. For this reason, panel data analysis will be more efficient to execute. For panel data analysis, the researcher can go for either pooled estimation or panel estimation (Ponsian et al., 2014).

The Breusch-Pagan test is applied to find which regression to run. As the p-value is greater than 0.05, POLS is the choice for the estimation of the model.

Table 6
Breusch-Pagan Test

Breusch-Pagan Test	Cross-section	Time	Both	Selected Estimation
Breusch-Pagan	2.605678	0.003338	2.609016	POLS
P-Value	0.1065	0.9539	0.1063	

4.4 Pooled Ordinary Least Square Model

From the Breusch-Pagan test, it can be assumed that all the observations in the data set have the same underlying characteristics. Table 7 shows the Pooled Ordinary Least Square regression model where NPM is the dependent variable. DIO, DPO, DSO, CR, and QR regress the dependent variable.

Table 7
Pooled Ordinary Least Square Model

Variable	Coefficient	Std. Error	t-statistics	*P*-value	*Statistics VIF*
C	0.321725	0.101644	3.165208	0.0036	
DIO	0.002861	0.001046	2.735932	0.0105	6.239
DSO	-0.005680	0.000986	-5.759302	0.0000	2.573
DPO	-0.001367	0.000474	-2.883353	0.0073	6.670
CR	-0.491623	0.184919	-2.658587	0.0126	5.187
QR	0.629784	0.214106	2.941453	0.0064	5.577
R-Squared			0.5789		
Adjusted R-Squared			0.5063		
F-statistic			7.9735		
Prob (F-statistic)			0.000079		
Durbin-Watson stat			1.399151		

The result of the model shows that a significant positive relationship existed between NPM and DIO. In addition, there is a significant positive relationship between QR and NPM. DSO, DPO, and QR have a statistically significant positive relationship with the dependent variable. The coefficient values for DIO, DSO, and DPO are 0.0029, -0.0057, and -0.0014 as per the POLS model. Both CR and QR exhibit contrasting predicting abilities for NPM. At a 5% level of significance, all the dependent variable produces a significant coefficient of beta to predict the NPM. This model shows that the selected dependent variable can explain the dependent variable up to 58% as per R-Square value, greater than 50%, which is satisfactory.

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The Model exhibits the score of Variance Inflation Factor (VIF) or multicollinearity. The value tells the amount of variance of regression coefficients is inflated due to multicollinearity. The results are around the score of 5 which estimates that variables are moderately correlated. It is justified for our model as DIO and DSO have the same denominator. Current and quick ratio considers the same variable in their defined formula. So, the VIF score for the model is not so surprising as well as alarming too.

4.5 Findings

From the correlation analysis, it is evident that, among the five independent variables of working capital management, four have significant relationship (either positive or negative) with the NPM of the selected cement companies in Bangladesh from 2018 to 2022. Correlation analysis shows that except for DSO and QR, all other variables have a positive relationship with the NPM during the study period. Regression analysis found that each independent variable is statistically significant for the estimation of NPM, as the independent variable. DSO, DPO, and CR exhibit a negative influence over the NPM at a 5% level of significance. DIO and QR have positive coefficients in the model to explain the dependent variable at a 5% level of significance. The adjusted R square indicates that the independent variable can explain the dependent variable up to 51%. The POLS model shows that DIO is significantly positively related to the NPM of the selected firms at a 5% significance level which rejects the null hypothesis H_{01}. That means there is a significant relationship exists between NPM and DIO. Similarly, QR also shows a significant positive influence over the NPM of the cement companies at a 5% level of significance which also rejects the null hypothesis H_{05}. Alternatively, DSO, DPO, and CR exhibit a significant negative relationship at a 5% level of significance which concludes as the rejection of null hypotheses H_{02}, H_{03}, and H_{04}.

5. Conclusion

The study aims to measure the degree and dimension of WCM's influence on the profitability of the cement industry throughout 2018-2022. The analysis of secondary data from the financial statement reveals that DIO has very little positive influence on NPM which is statistically significant. It means inventory turnover in days of Bangladesh cement industry produced a positive impact on the net profit margin. QR exhibits a moderate impact on the profitability of the cement companies in Bangladesh. DSO, DPO, and CR show a negative impact over the study period on the NPM. DSO provides evidence that the profit of the cement industry gets hurt as the number of days increases for accounts receivables collection. However, the study also found that DPO has a negative impression of the profitability over the study period, meaning that expansion on the due payment also reduces the profitability of the cement industry. But, the impact of both variables is very little on the profitability. QR has a moderate degree of positive influence on the selected companies indicating that more liquid assets are essential for the cement industry to maintain smooth production, sales, as well as profits. The empirical analysis confirms that

all the selected variables have a statistically significant impression on the net profit margin of the Bangladesh cement industry.

The findings of this paper regarding WCM provide valuable insights for improving operational efficiency. The metrics of working capital enable the organization to have an idea of the receivables and payables. This paper will help the cement industry to manage its negative day sales outstanding to improve its liquidity management which is crucial in a capital-intensive industry like cement manufacturing. The negative current ratio in the cement industry allows the scope of optimization on their supply chain management. Moreover, the paper shows positive QR which enhances the firm's capacity in debt management, risk mitigation as well strategic financial planning. The findings of positive inventory outstanding will help the firms in maintaining better supplier-customer relationships as well as market competitiveness. The paper will deliver insight into CCC which may improve cost management, smooth investment decision-making, and profitability enhancement. Ultimately, the findings contribute to a deeper financial understanding that directly supports the stability and growth of cement companies.

One limitation of this study is its five-year time frame, which may affect the generalizability of the findings. The distribution of data would be more normal if there were an extension of the study period. The study only considers linear relationships among the variables. However, the use of different advanced statistical models may produce a more precise conclusion. This research only considers the listed cement companies but further research can be conducted by adding non-listed companies. Moreover, the research can be elaborated by incorporating other industries such as manufacturing, pharmaceuticals, textiles, etc. Also, it is possible to study further by considering companies listed in India, Pakistan, Sri Lanka, and so on. In addition, the use of primary data can be a new dimension of this existing research.

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