An Analysis of Effective Working Capital Management in Rajasthan's Cement Industry

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Abstract

In order to evaluate management performance in this area and consider corrective action, the study's objectives were to examine the practices used in the management of working capital in Rajasthan's cement plants. The working capital to output ratio might be reduced, and the correct financing method could be determined. The goal of the study is to specifically determine how best to use unit resources in order to reduce the draught on banking. Organise and make sure that credit facilities are expanded and diversified as much as possible, and that they are used rationally. Further investigation has been undertaken into the effects of adopting alternative bank funding strategies recommended by various expert panels. The research also makes recommendations for better control of working capital to help a cement unit rely less on commercial financial institutions for financing. The research aims to determine whether switching from bank lending to internal as well as long-term resources will help the industry develop the necessary credit and budget control. In order to prevent the industry from going through the unpleasant experience it did due to inflation and credit constraint measures, the research attempts to create a credit system.

Keywords: Bank funding, working capital, credit control, internal resources, Rajasthan

1. Introduction

The "management of current assets and current liabilities and financing these current assets" is the definition of working capital management. It's crucial for working capital management to generate profit for the stockholders. This study examines how working capital is managed at Rajasthan's cement plants for a sample of four companies, JK Cement, Biyani Cement, Shree Cement, and ACC Ltd, over a five-year period from 2013 to 2018.

In order to assess the management of working capital in these businesses, this study looked at the size of inventories, size of accounts receivable inventory turnover ratio, the ratio of inventories to current assets, and the ratio of receivables to current assets among the Cement Companies under study. The management of working capital plays a significant function in businesses, and the cement units of Rajasthan are a part of this sector.

The remainder of the research is structured as follows. The researchers begin by reading up on relevant studies regarding working capital management strategies. The next section of the study

covers methodology, which includes the study sample and era, and the final section of the study presents recommendations based in part on the current study of study. The problem that has been researched has serious ramifications.

2. Literature Review

The relationship between working capital management and profitability: a case study from Vietnam was the focus of an investigation conducted in 2010 by Huynh Phuong Dong. This paper's goal is to, using secondary data obtained from listed companies on the Vietnam Stock Exchange between 2006 and 2008, Look into the connection between revenue, the cash conversion cycle, and the various components of the cycle for listed companies on the Vietnam stock market. The cash conversion cycle and profitability, as determined by gross operating profit, are strongly inversely related, according to our findings. Accordingly, the financial viability of the company will decrease as the cash conversion cycle lengthens. As a result, the management can add value for the shareholders by managing a sufficient cash conversion cycle and maintaining the optimal amount of each component.

Amarjit Gill 1, Nahum Biger 2, Neil Mathur 3 (2010) conducted a study titled "The Relationship Between Working Capital Management And Profitability: Evidence From The United States" with the goal of determining the association between working capital management and profitability. From 2005 to 2007, an examination of 88 American corporations listed on the New York Stock Exchange was chosen. We discovered a statistically significant link between the cash conversion period and profitability as evaluated by gross operating profit. As a result, managers can generate revenues for their companies by properly managing the process of converting cash and keeping accounts receivable at an ideal level. The study adds to the body of knowledge about the relationship between managing working capital and corporate profitability.

According to a study by Mohammad Alipour (2011) titled "Working Capital Management and Corporate Profitability: Evidence from Iran," working capital management and profitability are significantly correlated in the studied companies. Working capital management has a significant impact on a company's profitability, and managers can increase shareholder value by reducing inventory and receivables.

In a 2011 study titled "The Relationship between Working Capital Management and Profitability: A Case Study of the Cement Industry in Pakistan," Ikram ul Haq, Muhammad Sohail, Khalid Zaman, and Zaheer Alam, The findings suggest a moderate association between managing working capital and achieving profitability in the particular setting of Pakistan's cement sector.

Using industry 112 Middle Eastern Finance and Economics - Issue 16 (2012) guidelines as the target level of productivity, Talat Afza and Mian Sajid Nazir (2011) executed a study titled "Working Capital Management Efficiency of Cement Sector of Pakistan" with the intention of determining how quickly individual firms could achieve the focus on stage of efficiency during the study period. According to study findings, the cement industry did fare well overall over the study period.

A 2003 research of the same name by Marc Deloof. Does the management of financial resources affect

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the profitability of Belgian businesses? The purpose of this paper is to make the case that managers can boost corporate profitability by lowering the number of days' worth of inventories and accounts receivable. Journal of Business Finance and Accounting states that less successful businesses put off paying their obligations longer.

The purpose of this study, "Working Capital Management and Profitability: The Case of Industrial Firms in Jordan" by Mamoun M. Al-Debi'e (2011), is to examine the relationship between profitability and working capital management strategies for industrial companies listed on the Amman Stock Exchange in Jordan between 2001 and 2010. The findings indicate that less successful businesses take longer to sell their items, collect credit sales, and pay for their suppliers of goods. Furthermore, the findings demonstrate that Jordanian industrial enterprises pay vendors before recovering sales for credit, despite their state of earnings, according to the European Journal of Economics.

3. The Issue Examined

The issue under investigation has serious repercussions, including massive inventory waste, declining revenues and liquidity, loss of credibility, the loss of consumer goodwill and company, stock-outs, production hold-ups, under-utilization of capacity, over- and under-trading, mal-distribution and diversion of bank credit—a limited national resource—into unapproved and unfavorable channels, and uses that inadequate management of working capital brims.

4. Methodology

The methodology takes these presumptions into account and views them as part of a logical investigation. As part of the proposed study, it also provides the criteria the researcher used to assess the data and draw conclusions. Several primary and secondary data sets are analysed for the purpose of the current study. Most of the core information needed for the study was gathered through in-person visits, interviews, and conversations with high officials of the issue. On the other hand, secondary data have been gathered through periodicals, newspapers, governmental publications, and annual statements and accounts of the firms under Published and Unpublished, along with other reports of the chosen units of the primary cement manufacturing industry.

4.1. Hypotheses

The study sample consists of four cement production facilities in Rajasthan: JK Cement, Shree Cement, Binani Cement, and ACC Ltd. The study's hypotheses are as follows:

H1 The inventory sizes of the chosen cement companies under examination do not significantly differ from one another.

H2 The inventory turnover ratios of the selected cement companies under consideration do not considerably differ from one another and are nearly identical.

H3 There are no appreciable differences between the inventory to current asset ratios of the chosen cement companies under study.

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H4 There are no appreciable differences between the working capital to inventory ratios in the chosen cement companies under consideration.

H5 There are no appreciable differences between the sizes of the receivables held by the study's cement companies.

H6 There are no appreciable differences in the ratio of receivables to current assets among the investigated cement companies.

4.1.1. The size of the inventory at the Chosen Cement Businesses Under Study Does Not Differ Significantly. ANOVA test of hypothesis H0: There is no statistically significant difference between the sizes of the inventories of the chosen cement companies under consideration.

Table 1: Shows the size of the inventories in a few cement companies.

Years	JK Cement		Shree Cement		Binani Cement		ACC Ltd.	
	X_1	X_1^2	X_2	X_2^2	X_3	X_3^2	X_4	X_4^2
2013-14	36.64	1342.49	112.94	12755.44	82.94	6879.04	624.13	389538.26
2014-15	55.82	3115.87	156.08	24360.97	74.60	5565.16	730.86	534156.34
2015-16	62.19	3867.60	176.57	31176.96	154.20	23777.64	793.27	630213.70
2016-17	66.02	4358.64	154.46	23857.89	94.10	8854.81	778.98	606809.84
2017-18	74.77	5590.55	358.13	128257.10	178.45	31844.40	801.23	641969.51
Σ	295.24	18275.15	958.18	220408.36	584.29	76921.02	3728.47	2802687.65

Correction Factor (C.F.):

C.F. = (T2)/N

Where T = 295.24 + 958.18 + 584.29 + 3728.47 = 5566.18

N = 20

Therefore, C.F. = $(5566.18)^2/20$ = 1549117.99

Total Sum of Squares (TSS) = $\Sigma X_1^2 + \Sigma X_2^2 + \Sigma X_3^2 + \Sigma X_4^2 - (T^2)/N$

= 18275.15 + 220408.36 + 76921.02 + 280268.65 – 1549117.99

= 1569174.19

The sum of Squares between Companies (SSC)

= $(\Sigma X_1^2)/N_1 + (\Sigma X_2^2)/N_2 + (\Sigma X_3^2)/N_3 + (\Sigma X_4^2)/N_4 - (T^2)/N$

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$= (295.24)^2/5 + (958.18)^2/5 + (584.29)^2/5 + (3728.47)^2/5 - 1549117.99$

$= 17433.33 + 183621.78 + 68278.96 + 2780297.71 - 1549117.99$

$= 1500513.79$

$SSR = TSS - SSC = 1569174.19 - 1500513.79 = 68660.4$

Table 2: Analysis of ANOVA

Source of Sum	Sum	Degree of Freedom	Mean Square	F Ratio = Higher Variance / Smaller Variance
SSC	1500513.79	K-1=4-1=3	500171.26	500171.26/ 4291.275 =116.56
SSR	68660.40	N-K = 20-4 = 16	4291.275	

At a 5% level of significance, the critical value of F ($v_1 = 3$, $v_2 = 16$) is equal to 3.2389.

The null hypothesis is ruled out since the calculated F-ratio (116.56) is higher than the critical amount of F at the 5% level of significance, which leads to a conclusion that there are indeed significant variations in the sizes of inventories between the cement companies under investigation.

Ratio of Inventory Turnover According to Table 1, Binani Cement had the greatest average replacement of inventory ratio at 37.20 times, followed by Shree Cement at 24.97 times, ACC Cement at 22.14 times, and JK Cement at 11.04 times. The profitability of a business is directly impacted by the turnover of its inventory; the higher the turnover, the higher the business's profit. An organisation with more turnover is also likely to have stocks, which saves money on inventory costs. Therefore, it may be claimed that Binani Cement was in a better situation than the other three cement manufacturers. Shree Cement scored the highest standard deviation at 20.84 times, followed by Binani Cement at 20.80 times, ACC Cement at 6.51 times, and J K Cement at an absolute lowest of 1.79 times. Shree Cement recorded The highest variation coefficient of variation was recorded by Shree Cement at 83.46 percent, followed by Binani Cement at 76.47 percent, showing that the inventory turnover ratio for these companies fluctuates significantly coefficient of variation recorded by Shree Cement at 83.46 percent, followed by Binani Cement at 76.47 percent, showing that the inventory turnover ratio for these companies fluctuates a lot. Then, it was 29.40 percent for ACC Cement and at least 16.21 percent for JK Cement, demonstrating greater and more consistent achievements by these two businesses in comparison.

4.1.2. The Inventory Turnover Ratio of the Study's Selected Cement Companies Does Not Significantly Differ and Is Almost the Same

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ANOVA-based hypothesis testing

H0, the null hypothesis: The study's chosen cement companies' inventory turnover ratios are nearly identical and do not considerably differ from one another. The study's chosen cement companies' inventory turnover ratios do not considerably differ from one another and are nearly identical.

Table 3: Inventory turnover ratio for a selection of cement companies

Years	JK Cement		Shree Cement		Binani Cement		ACC Ltd.	
	X_1	X_1^2	X_2	X_2^2	X_3	X_3^2	X_4	X_4^2
2013-14	11.30	127.69	6.18	38.19	70.97	5036.74	9.33	87.05
2014-15	12.46	155.25	9.12	83.17	48.50	2352.25	24.85	617.52
2015-16	12.73	162.05	28.34	803.16	15.86	251.54	27.51	756.80
2016-17	11.00	121.00	63.70	4057.69	16.44	270.27	25.22	636.05
2017-18	7.69	59.14	17.50	306.25	34.25	1173.06	23.78	565.48
Σ	55.18	625.13	124.84	5288.46	186.02	9083.86	110.69	2662.90

Correction Factor (C.F.):

C.F. = $(T^2)/N$

Therefore, C.F. = $(476.73)^2/20 = 11363.57$

Total Sum of Squares (TSS)

= $\Sigma X_1^2 + \Sigma X_2^2 + \Sigma X_3^2 + \Sigma X_4^2 - (T^2)/N$

= 625.13 + 5288.46 + 9083.86 + 2662.90 – 11363.57

= 6296.78

The sum of Squares between Companies (SSC)

= $(\Sigma X1)^2 /N1 + (\Sigma X2)^2 /N2 + (\Sigma X3)^2 /N3 + (\Sigma X4)^2 /N4 - (T^2)/N$

= $(55.18)^2 /5 + (124.84)^2 /5 + (186.02)^2 /5 + (110.69)^2 /5 – 11363.57$

= 608.97 + 3117.01 + 6920.69 + 2450.46 – 11363.57

= 1733.56

SSR = TSS – SSC = 6296.78 - 1733.56 = 4563.22

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Table 4: Analyses of ANOVA

Source of Sum	Sum	Degree of Freedom	Mean Square	F Ratio = Higher Variance / Smaller Variance
SSC	1733.56	K-1=4-1=3	577.85	577.85/ 285.20 =2.03
SSR	4563.22	N-K = 20-4 = 16	285.20	

At a 5% level of significance, the critical value of F (v_1 = 3, v_2 = 16) is 3.2389; the calculated value is 2.03 3.2389.

Because the calculated F-ratio (2.03) is smaller than the critical value of F at the 5% level of significance, the null hypothesis is considered valid, and it can be deduced that there are no significant differences in the inventory turnover ratio among the study's cement companies.

Holding Period for Stock

As can be observed from Table 3, the average inventory-holding period for JK Cement was 34.18 days, followed by Shree Cement with 27.71 days, ACC Cement with 19.38 days, and Binani Cement with a minimum of 13.71 days. For the study period, which ran from 2005-06 to 2009-10, Shree Cement's standard deviation was the greatest at 19.42 days, followed by Binani Cement's 11.14 days, ACC Cement's 9.89 days, and JK Cement's minimum of 6.86 days. Binani Cement has the largest coefficient of variation (81.25%), followed by Shree Cement (70.08%), ACC Cement (51.03%), and JK Cement (20.07%). Based on this data, it was determined that JK and Shree Cement had a larger holding duration average than Binani and ACC Cement. Thus, it is recommended that the latter two corporations aim to shorten their holding term. According to the coefficient of variation, Shree Cement and Binani Cement demonstrated greater fluctuations, ACC moderate, and JK Cement demonstrated appropriate fluctuations; hence, Shree and Binani Cement specifically work to preserve consistency in the future. Shree Cement and Binani Cement had the most volatility in inventory size during the study period, which should be managed going forward for better management of inventory. ACC Cement had the largest inventory size and experienced the least fluctuation during that time.

Ratio of stock to current assets

Table 4 shows that the average stock-to-current assets ratio was highest for ACC Cement at 68.23%, followed by Binani Cement at 63.73%, JK Cement at 61.26%, and Shree Cement at a minimum of 58.04%. For the time period under consideration, 2005-2006 to 2009-2010, the standard deviation was highest for Shree Cement at 8.04 percent, followed by 6.24 percent for Binani Cement, 3.66 percent for ACC Cement, and a minimum of 3.52 percent for JK Cement. Shree Cement had the largest coefficient of variation, at 13.85%, followed by Binani Cement with 9.79%, JK Cement with 5.75%, and ACC Cement with 5.36%. This analysis demonstrated that ACC had an upward trajectory, and at

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the end of the study period, the company was in a stronger position than the other three because it had the highest inventory levels and the highest current assets, which gave the management more business possibilities.

4.1.3. The Selected Cement Companies Under Study's Inventory to Current Assets Ratio Does Not Significantly Differ From That of Other Cement Companies.

ANOVA-based hypothesis testing

The null hypothesis (H0) states that there is no discernible difference between the inventory to current asset ratios of the chosen cement companies for the investigation.

Table 5: Ratio of stocks to current assets in a few cement companies

Years	JK Cement		Shree Cement		Binani Cement		ACC Ltd.	
	X_1	X_1^2	X_2	X_2^2	X_3	X_3^2	X_4	X_4^2
2013-14	61.56	3789.63	60.29	3634.88	59.80	3576.04	62.98	3966.48
2014-15	66.55	4428.90	67.94	4615.84	70.94	5032.48	66.50	4422.25
2015-16	63.25	4000.56	63.54	4037.33	70.64	4990.01	66.60	4435.56
2016-17	58.46	3417.57	53.81	2895.52	62.29	3880.04	72.24	5218.62
2017-18	56.47	3188.86	44.63	1991.84	54.98	3022.80	72.81	5301.30
Σ	306.29	20825.52	290.21	17175.41	318.65	20501.37	341.13	23344.21

Correction Factor (C.F.) :

C.F. = $(T^2)/N$

Where T = 306.29 + 290.21 + 318.65 + 341.13 = 1256.28

N = 20

Therefore, C.F. = $(1256.28)^2 /20$ = 78911.97

Total Sum of Squares (TSS)

= $\Sigma X_1^2 + \Sigma X_2^2 + \Sigma X_3^2 + \Sigma X_4^2 - (T^2)/N$

= 20825.52 + 7175.41 + 20501.37 + 23344.21 – 78911.97

= 2934.54

The sum of Squares between Companies (SSC)

= $(\Sigma X_1)^2/N_1 + (\Sigma X_2)^2/N_2 + (\Sigma X_3)^2/N_3 + (\Sigma X_4)^2/N_4 - (T^2)/N$

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= $(306.29)^2$ /5 + $(290.21)^2$ /5 + $(318.65)^2$ /5 + $(341.13)^2$ /5 – 78911.97

= 18762.71 + 16844.37 + 20307.56 + 23273.94 – 78911.97

= 276.61

SSR = TSS – SSC = 2934.54 – 276.61 = 2657.93

Table 6: Analyses of ANOVA

Source of Sum	Sum	Degree of Freedom	Mean Square	F Ratio = Higher Variance / Smaller Variance
SSC	276.61	K-1=4-1=3	92.20	166.12/ 92.20 =1.80
SSR	2657.93	N-K = 20-4 = 16	166.12	

The critical value of F (v_1 = 3, v_2 = 16) is 3.2389 at the 5% level of significance.

The null hypothesis is accepted and it can be deduced that the inventory to current assets ratio does not differ significantly within the cement companies under consideration because the computed value of the F-ratio (1.80) is smaller than the critical value of F at the 5% level of significance.

Ratio of Working Capital to Inventory

Table 5 shows that the inventory-to-working capital ratio was consistently greater than 100% for all four companies. This means that inventory outweighed working capital over the study period.

Shree Cement had the highest average ratio, at 319.88%, followed by Binani Cement at 293.28%, JK Cement at 226.68%, and ACC Cement at 198.30%. The standard deviation was highest for Binani Cement at 156.57%, followed by Shree Cement at 112.26%, JK Cement at 39.57%, and ACC Cement at 18.87%. Binani Cement also had the largest coefficient of variation, at 53.39%, followed by Shree Cement at 35.09%, JK Cement at 17.46%, and ACC Cement at 9.52%. This analysis shows that ACC had the lowest inventory-to-working capital ratio and the lowest standard deviation and coefficient of variation. This indicates that ACC managed its inventory well and that there were few fluctuations in inventory levels over the study period. The other three companies had higher inventory-to-working capital ratios and higher standard deviations and coefficients of variation. This indicates that these companies may have had difficulty managing their inventory levels.

Overall, this analysis suggests that ACC had the best inventory management practices of the four companies.

4.1.4. The Selected Cement Companies Under Study Do Not Significantly Differ in Their Inventory to Working Capital Ratio.

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ANOVA-based hypothesis testing

The working capital to inventory ratio among the study's chosen cement companies is not statistically different, according to the null hypothesis (H0).

Table 7: Ratio of inventory to working capital in a few cement companies.

Years	JK Cement		Shree Cement		Binani Cement		ACC Ltd.	
	X_1	X_1^2	X_3	X_3^2	X_2	X_2^2	X_4	X_4^2
2013-14	264.20	69801.64	367.50	135056.25	226.06	51103.12	201.43	40574.04
2014-15	224.70	50490.09	231.61	53643.19	175.13	30670.52	224.70	50490.09
2015-16	168.60	28425.96	277.70	77117.29	255.65	65356.92	167.92	28197.13
2016-17	274.00	75076.00	206.80	42766.24	207.54	43072.85	189.98	36092.40
2017-18	201.90	40763.61	515.79	266039.32	602.02	362428.08	207.45	43035.50
Σ	1133.40	264557.30	1599.40	574622.29	1466.40	552631.49	991.48	198389.16

Correction Factor (C.F.):

C.F. = (T2)/N

Where T = 1133.40 + 1599.40 + 1466.40 + 991.48 = 5190.68

N = 20

Therefore, C.F. = $(5190.68)^2$ /20 = 1347157.94

Total Sum of Squares (TSS)

= $\Sigma X_1^2 + \Sigma X_2^2 + \Sigma X_3^2 + \Sigma X_4^2 - (T^2)/N$

= 264557.30 + 574622.29 + 552631.49 + 198389.16 – 1347157.94

= 243042.30

The sum of Squares between Companies (SSC)

= $(\Sigma X_1)^2/N_1 + (\Sigma X_2)^2/N_2 + (\Sigma X_3)^2/N_3 + (\Sigma X_4)^2/N_4 - (T^2)/N$

= (1133.40)2 /5 + (1599.40)2 /5 + (1466.40)2 /5 + (991.48)2 /5 – 1347157.94

= 256919.11 + 511616.07 + 430065.79 + 196606.50 – 1347157.94

= 48049.53

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SSR = TSS – SSC = 243042.30 – 48049.53 = 194992.7

Table 8: Analyses of ANOVA

Source of Sum	Sum	Degree of Freedom	Mean Square	F Ratio = Higher Variance / Smaller Variance
SSC	48049.53	K-1=4-1=3	16016.51	16016.51/ 12187.05=1.31
SSR	194992.77	N-K = 20-4 = 16	12187.05	

F's critical value (v1 = 3, v2 = 16) at the 5% level of significance is 3.2389.

1.31 is less than 3.2389, the calculated value

Since the estimated F-ratio (1.31), at the 5% level of significance, is less than the critical value of F, the null hypothesis is accepted, and it can be deduced that there is no significant difference in the inventory-to-working capital ratio among the enterprises under investigation.

Dimensions of Receivables

From Table 7, it is obvious that ACC Cement had the largest average size of receivables, which was Rs. 257.51 crores. ACC Cement was then followed by Binani Cement, Shree Cement, and JK Cement, each of which had Rs. 84.33 crore, Rs. 46.93 crore, and Rs. 21.93 crore. The company with the largest standard deviation was ACC Cement, which cost Rs. 41.81 crore. Binani Cement came in second with Rs. 36.17 crores, Shree Cement came in at Rs. 23 crore, and JK Cement came in at Rs. 3.97 crore. The Shree Cement's 49.01 percent coefficient of variation was the greatest, followed by Binani Cement's 42.89 percent, JK Cement's 18.10 percent, and ACC Cement's minimum 16.24 percent.

According to this analysis, Shree Cement had low receivables and the size of its receivables fluctuated most, which should be under control. Among the four cement businesses that had the most receivables with the fewest variations, JK Cement, Binani Cement, and ACC were in satisfactory condition, with JK Cement and Binani Cement being in the best shape.

4.1.5. There are no appreciable differences in the size of the receivables held by the study's cement companies.

ANOVA-based hypothesis testing

The null hypothesis (H0) states that there are no appreciable differences between the receivables sizes of the investigated cement companies.

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Table 9: Receivables Size in a Sample of Cement Companies

Years	JK Cement		Binani Cement		Shree Cement		ACC Ltd.	
	X_1	X_1^2	X_3	X_3^2	X_2	X_2^2	X_4	X_4^2
2013-14	17.76	315.42	18.26	333.43	50.44	2544.19	289.29	83688.70
2014-15	23.32	543.82	49.39	2439.37	81.45	6634.10	203.70	41493.69
2015-16	20.99	440.58	26.27	690.11	57.78	3338.53	213.96	45778.88
2016-17	18.61	346.33	58.32	3401.22	79.28	6285.32	310.17	96205.43
2017-18	28.98	839.84	82.42	6793.05	152.68	23311.18	270.45	73143.20
Σ	109.66	2485.99	234.66	13657.18	421.63	42113.32	1287.57	340309.90

Correction Factor (C.F.):

C.F. = $(T^2)/N$

Where T = 109.66 + 234.66 + 421.63 + 1287.57 = 2053.52

N = 20

Therefore, C.F. = $(2053.52)^2 /20$ = 210847.22

Total Sum of Squares (TSS)

= $\Sigma X_1^2 + \Sigma X_2^2 + \Sigma X_3^2 + \Sigma X_4^2 - (T^2)/N$

= 2485.99 + 13657.18 + 42113.32 + 340309.90 – 210847.22

= 187719.17

The sum of Squares between the Companies (SSC)

= $(\Sigma X_1)^2/N_1 + (\Sigma X_2)^2/N_2 + (\Sigma X_3)^2/N_3 + (\Sigma X_4)^2/N_4 - (T^2)/N$

= $(109.66)^2 /5 + (234.66)^2 /5 + (421.63)^2 /5 + (1287.57)^2 /5$ – 210847.22

= 2405.06 + 11013.06 + 35554.37 + 331567.30 – 210847.22

= 169692.57

SSR = TSS – SSC = 187719.17 – 169692.57 = 18026.60

Table 10: Analyses of ANOVA

Source of Sum	Sum	Degree of Freedom	Mean Square	F Ratio = Higher Variance / Smaller Variance
SSC	169692.57	K-1=4-1=3	56564.19	56564.19/ 1126.66=50.21
SSR	18026.60	N-K = 20-4 = 16	1126.66	

At 5% level of significance, the table value of F (v_1 = 3, v_2 = 16) is equal to 3.2389.

There is no evidence to support the null hypothesis because the computed F-ratio (50.21) is higher than the crucial value of F at the 5% level of significance. The null hypothesis is therefore disproved, and it may be inferred that there are considerable differences in the selected cement companies under study's receivable sizes.

Ratio of Receivables to Current Assets

According to Table 9, ACC Cement had the greatest average receivables to current assets ratio at 23.49 percent, followed by Binani Cement with 18.28 percent, JK Cement with 5.44 percent, and Shree Cement with a minimum of 5.11 percent. The largest standard deviation was recorded by JK Cement at 2.76 percent, followed by ACC Cement at 2.68 percent, Binani Cement at 2.14 percent, and Shree Cement at a minimum of 1.73 percent. JK Cement had the largest coefficient of variation, at 50.74 percent, followed by Shree Cement, at 33.86 percent, Binani Cement, at 11.71 percent, and ACC Cement, at 11.41 percent, which was the lowest. According to this data, ACC and Binani Cement had a higher percentage of receivables than JK and Shree Cement, which had less variability. Therefore, it is advised that JK Cement and Shree Cement make an effort to lessen variation going forward.

4.1.6. There are no appreciable differences in the ratio of receivables to current assets among the cement companies under study.

ANOVA test of the hypothesis H0: There are no significant differences in the ratio of receivables to current assets among the cement companies under consideration.

Table 11: Ratio of Current Assets to Receivables Selected Cement Companies

Years	JK Cement		Binani Cement		Shree Cement		ACC Ltd.	
	X_1	X_1^2	X_3	X_3^2	X_2	X_2^2	X_4	X_4^2
2013-14	5.19	26.94	3.39	11.49	17.72	313.99	26.32	692.74
2014-15	3.69	13.62	4.08	16.65	16.81	282.58	18.89	356.83
2015-16	10.82	117.07	8.37	70.06	19.92	396.81	21.59	466.13
2016-17	3.15	9.92	4.51	20.34	15.79	249.32	26.04	678.08
2017-18	4.35	18.92	5.20	27.04	21.17	448.17	24.59	604.67
Σ	27.20	186.47	25.55	145.58	91.41	1690.87	117.43	2798.45

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Correction Factor (C.F.):

C.F. = $(T^2)/N$

Where T = 27.20 + 25.55 + 91.41 + 117.43 = 261.59

N = 20

Therefore, C.F. = $(261.59)^2/20$ = 3421.67

Total Sum of Squares (TSS)

= $\Sigma X_1^2 + \Sigma X_2^2 + \Sigma X_3^2 + \Sigma X_4^2 - (T^2)/N$

= 186.47 + 145.58 + 1690.87 + 2798.45 – 3421.67

= 1399.70

Sum of Squares between the Companies (SSC)

= $(\Sigma X_1)^2/N1 + (\Sigma X_2)^2/N_2 + (\Sigma X_3)^2/N_3 + (\Sigma X_4)^2/N_4 - (T^2)/N$

= 147.97 + 130.56 + 1671.16 + 2757.96 – 3421.67

= 1285.98

SSR = TSS – SSC = 1399.70 – 1285.98 = 113.72

Table 12: Analyses of ANOVA

Source of Sum	Sum	Degree of Freedom	Mean Square	F Ratio = Higher Variance / Smaller Variance
SSC	1285.98	K-1=4-1=3	428.66	428.66 / 7.11=60.31
SSR	113.72	N-K = 20-4 = 16	7.11	

At 5% level of significance, the table value of F (v_1 = 3, v_2 = 16) is equal to 3.2389.

The null hypothesis is rejected because the calculated value of the F-ratio (60.31) exceeds the table value of F at the 5% level of significance, and it can thus be said that there are significant differences between the selected cement companies under study's receivables to current assets ratios.

5. Recommendations

Following are some recommendations based on the current study:

1. The selected cement companies have a large amount of cash on hand, which can be used for further expansion.

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2. The working capital of these companies has increased significantly, which indicates that working capital management should be improved.

3. The current ratio of the companies is more than twice their current liabilities, so they should not be afraid to expand their operations.

4. The increasing inventory turnover ratio for the selected cement companies is a good sign, and it can be improved with effective handling and reorder time.

5. The inventory structure of these cement companies is good, as they maintain high levels of stores and spares, which is essential for any manufacturing company.

6. Proper storage of fuel and raw materials is crucial and becomes more difficult as sales increase. All the selected cement companies should take steps to ensure proper storage in the future.

7. Economic order quantity (EOQ) is specific for each item, and orders must be placed systematically and on time.

8. Although there are enough quality checks in place, experts should be deployed to handle consumer complaints and identify any discrepancies in each company.

9. The stock of finished and semi-finished goods should be maintained according to market demand, and sufficient precautions should be taken when predicting demand.

Here are some additional suggestions that may be helpful for cement companies:

1. Invest in research and development to develop new products and improve existing ones.

2. Expand into new markets to increase sales.

3. Partner with other companies to create synergies and reduce costs.

4. Implement sustainability initiatives to reduce environmental impact and improve public image.

5. Attract and retain top talent to ensure a competitive advantage.

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