International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 187-196
Published Online October 2021 in IJEAST (http://www.ijeast.com)

COMPARATIVE FINANCIAL ANALYSIS OF CEMENT MANUFACTURING COMPANY AND RELATIONSHIP BETWEEN INVENTORY MANAGEMENT AND PROFITABILITY RATIO

Dr. Hemant Parmar
Associate Professor, Department of Mechanical Engineering,
Ujjain Engineering College, Ujjain-456010 (M.P), India

Dhanesh Shukla
Research Scholar, Ujjain Engineering College,
Ujjain-456010 (MP), India

Abstract— **In a competitive environment to sustain the business in the global market, it is essential to control the quality and cost of goods also provide goods to the customer within a stipulated time. In such a scenario Inventory Management is one of the important tools to improve the company performance. Every business activity from the shop floor to the finished goods warehouse holds inventory in an organization.**
Ratio analysis of financial statements is performed to know the profitability performance of the Indian cement industry by using descriptive statistics. Also, this paper analyzed and discusses the impact of inventory management practices on profitability performance by correlation analysis. The required data has been collected from the annual reports of the respective cement companies for the period of 2011 to 2020. The result helps the investor in the investment decision. Correlation analysis was used to determine the nature and magnitude of the relationship between Inventory Turnover Ratio and Gross Profit Margin. The results indicate that there exists a positive correlation between the variables. Computation is made using 'MICROSOFT EXEL' software.

Keywords— **Inventory, Inventory Management, Ratio Analysis**

I. INTRODUCTION

In the working capital structure of most trading companies, inventory is the most strategic place. In most manufacturing companies, it is the largest component of working capital. As far as working capital is concerned, effective inventory control has transferred the most serious problems to the cement plant, because about two-thirds of the plant's current assets have been included in inventory. The turnover rate of working capital is mainly determined by the inventory turnover rate. Therefore, it is natural that the inventory that can maximize profits should occupy the most important position in current assets.

However, in the production organization, in addition to the finished product inventory, there will be some semi-finished products, raw materials; the common name for this is inventory. The term "inventory" refers to the manufacturing inventory that the company wants to sell and the components that make up the production.

Inventory management needs to strike a balance between too much and too little inventory. Effective inventory management and control will help industry achieve better operational results and reduce your working capital investment. It has a significant impact on business profitability.

Financial analysis is done by evaluating the relationship between the various components of the balance sheet and the income statement. Financial analysis includes liquidity analysis, solvency analysis, profitability analysis, and performance analysis. Different types of stakeholders are interested in this analysis to make appropriate decisions. Each type of analysis requires three steps; namely the selection of components, the location of the selected components, and evaluation and interpretation.

II. LITERATURE REVIEW

A. **RATIO ANALYSIS** —

Ratio analysis involves studying the company's profitability indicators over a period of time and looking for positive and negative trends. Same industry ratio analysis is a widely used tool for analyzing transactions. The coefficient is the mathematical relationship between one number and another. This ratio is used as an indicator to assess the company's financial status. The accounting index shows the relationship between two numbers that have an important relationship with each other.

B. **Gross Profit Margin** —

The gross profit margin reflects the management's efficiency in producing each production unit. This ratio represents sales-related profits after deducting production costs and indicates the relationship between production costs and sales prices. Compared with the industry average, the high gross profit margin means that the company can produce at a relatively low cost. A high gross margin is a sign of good management.

$$Gross\ Profit\ Ratio = \frac{Gross\ Profit}{Net\ Sale} \times 100$$

C. **Net Profit Margin** —
This ratio is used to understand the financial status of the company. Companies with higher revenue per unit of sales are more efficient. When the product line fails to meet expectations or the economic downturn hits the overall economy, this efficiency improves the company's chances of survival.

$$Net\ Profit\ Mrgin = \frac{Net\ Income}{Net\ Sale} \times 100$$

D. **Inventory Turnover Ratio** —
This ratio is an accounting indicator used to establish the relationship between the value of goods sold over a period of time and the average production inventory. Inventory turnover rate indicates how much of the company's inventory has been converted into sales. A higher value ratio is a positive sign for any company and has effective inventory management practices and strong sales policies.

$$Inventory\ Turnover\ Ratio = \frac{Cost\ of\ Goods\ Sold}{Average\ Inventory} \times 100$$

E. **Return on Investment** —
The return on assets index is a measure of the profitability of the performance or potential performance of a company or investment. The ROI formula looks at the rate of return on investment or the rate of return on investment divided by the initial investment value. The higher the investment rate, the more efficient a company can use its asset base to increase sales.

$$ROI = \frac{Net\ Return\ on\ investment}{Cost\ of\ investment} \times 100$$

F. **Return on Equity**—
The return on equity compares a company's net income with its equity. Investors use this indicator to determine the profit an organization makes relative to its investment. A company that can achieve a higher return on equity is considered a good investment, and it will increase the stock price of investors.

$$Return\ on\ Equity = \frac{Net\ Income}{Average\ Shareholders'\ Equity} \times 100$$

Table-1 Findings from various research papers

S.No.	Author (year)	Title	Contribution
1.	Lyndon M. Etale, Ayaundu E. Sawyerr. (2020)[1]	Inventory Management and Financial Performance of NSE Listed GLAXOSMITHKLINE Consumer Nigeria PLC	Inventory management is critical and has a positive impact on financial results. Management must maintain the existing inventory management system to support growth and long-term business success, while taking steps to mitigate the effects of inflation.
2.	Musaab Al Rushood, Dr. Fred Rahbar, Dr. Fikri T. Dweiri. (2020)[2]	Benchmarking Key Performance Indicators and Metrics on Inventory Turnaround Practices in Middle East Petroleum Projects	Define indicators and key performance indicators (KPIs) to compare with the industry
3.	Jan Horas Veryady Purba, Muhammad Rayno Septian.(2019)[3]	Analysis of Short Term Financial Performance: A Case Study of an Energy Service Provider	Assessed that the company did not increase its EBIT to the maximum. The company has been trying to maximize gross profit margins, and if managed properly, this will lead to higher profitability in the future.
4.	Dr. G. Kanagavalli, R. Saroja Devi. (2018)[4]	Financial Performance of selected Automobile Company	Suggested that the liquidity ratio has a strong positive correlation. Effective inventory management continues to evolve, and the transition phase will increase the company's liquidity.

International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 187-196
Published Online October 2021 in IJEAST (http://www.ijeast.com)

5.	Idris Adegboyega, Emmanuel Akinsanmi, Solomon, Catherin Oluyemi. (2017)[5]	Effect of Inventory Management Practices on Financial Performance of Larfage Wapco Plc. Nigeria.	Found that a significant correlation between the value of transported inventory and the value of goods sold over the years and a positive correlation between inventory management policies and Larfage Wapco Plc's profitability.
6.	Jean Nepo Mulindabigwi, Dr. Patrick Mulyungi. (2015)[6]	Effect of Inventor Management on Financial Performance of Manufacturing Firms in Rwanda, A Case Study of Bralirwa	Discussed that the lean inventory management system, information technology, delivery time and supply demand are closely related to the financial performance of the manufacturing company.
7.	Dr. Biswanath Sukul. (2016)[7]	A Comparative Financial Analysis of TATA Steel Ltd. and SAIL	Measures liquidity, solvency, profitability and overall management efficiency of both the companies
8.	Vipulesh Shardeo (2015)[8]	Impact of Inventory Management on the Financial Performance of the firm	Analyze some parameter of Financial ratios which directly show the impact of inventory management in Steel Manufacturing company.

Research Objectives
The main purpose of this study is to evaluate the performance of chosen cement industries in India. Specifically, these goals are:

- By using the widely used financial indicators of the selected organization to analyze profitability.
- By using statistical tools to assess the inventory management practices based on Financial Performance.

Scope of the study
The research is limited to five Indian cement companies Prism Cement, Ultratech Cement, Birla Cement, ACC, and Ambuja Cement**.** This study covers ten years from 2010 to 2020. Ten years seems to be enough to conclude the company's financial situation.

III. METHODOLOGY

We have taken five major cement manufacturing companies of India. These companies are Ultratech, Prism, Birla, ACC and Ambuja Cement. After collecting data from the sources such as Company's Annual Report and Internet (www.moneycontrol.com) we correlate the inventory turnover with profitability of the firm using correlation concept. We will find the Pearson correlation coefficient and analyze it to show the impact of inventory management on the profitability of the firm.

Also will compare profitability performance among cement companies by statistical data analysis method and rank them on the basis of Motaal Rank Techniques

.

IV. DATA ANALYSIS AND INTERPRETATION

i. Gross Profit Margin (%) or PBDIT Margin

Year	ACC	Ambuja	Birla	Shree	Ultratech
2011	21.86	26	1.96	29.24	21.19
2012	21.66	29	5.11	30.66	24.67
2013	16.58	22.31	11.53	31.29	24.68

International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 187-196
Published Online October 2021 in IJEAST (http://www.ijeast.com)

2014	15.12	23.62	12.72	26.74	20.44
2015	14.04	19.97	12.4	22.95	19.91
2016	13.7	23.94	11.63	37.71	21.54
2017	15.36	21.98	7.91	33.45	23.56
2018	14.74	19.95	11.02	29.1	21.74
2019	17.37	22.07	16.25	24.72	18.94
2020	18.54	26.54	8.6	33.14	23.07
Mean	16.897	23.538	9.913	29.9	21.974
Median	15.97	22.965	11.275	29.95	21.64
S.D.	2.960803	2.920616	4.123984	4.381806	1.971566
C.V.	17.52266	12.40809	41.60178	14.65487	8.972266

Table-2 Gross Profit Margin

Among the companies selected based on PBDIT, Shree Cement had the highest average score (29.9), and Birla Cement had the lowest average score (9.91). On the basis of consistency, performance of Ultratech Cement Limited (8.97) is best as the CV of this company is lowest; on the other hand Birla Cement (41.60) was the most inconsistent company among the selected companies.

ii. Net Profit Margin

Year	ACC	Ambuja	Birla	Shree	Ultratech
2011	13.71	14.36	-6.45	6.07	10.54
2012	9.34	13.33	-6.42	10.48	13.35
2013	9.81	14.13	4.59	17.95	13.15
2014	9.95	14.99	6.62	13.37	10.57
2015	5.01	8.53	4.73	6.6	8.78
2016	5.39	10.13	3.39	20.73	9.99
2017	6.89	11.94	1.57	15.58	10.99
2018	10.17	13.09	4.96	14.07	7.49
2019	8.67	13.1	9.36	8.11	6.03
2020	10.26	15.74	0.45	13.19	13.42
Mean	8.92	12.934	2.28	12.615	10.431
Median	9.575	13.215	3.99	13.28	10.555
S.D.	2.587663	2.211562	5.211856	4.8304	2.497329
C.V.	29.00968	17.09882	228.5902	38.29092	23.94142

Table-3 Net Profit Margin

Among the companies selected based on the net income ratio, Ambuja Cement had the highest average score (12.934), and Prism Cement had the worst score (2.28). In terms of stability, Ambuja Cement (09/17) is the best because the company has the lowest resume. Among the selected companies, Birla Cement Limited (228.5902) is the most inconsistent company.

iii. Inventory Turnover Ratio

International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 187-196
Published Online October 2021 in IJEAST (http://www.ijeast.com)

Year	ACC	Ambuja	Birla	Shree	Ultratech
2011	8.97	9.25	4.59	8.54	6.8
2012	10.02	9.89	4.28	11.72	8.99
2013	9.96	9.81	4.17	10.54	8.59
2014	9.35	11.23	5.44	7.27	8.56
2015	9.92	10.57	6.03	7.02	8.34
2016	9.12	9.81	5.6	6.76	10.41
2017	9.46	9.94	4.27	6.54	10.74
2018	8.82	8.89	4.89	6.27	9.61
2019	13.72	12.23	6.91	7.38	10.56
2020	15.31	15.23	3.12	8.34	10.6
Mean	10.465	10.685	4.93	8.038	9.32
Median	9.69	9.915	4.74	7.325	9.3
S.D.	2.206618	1.866484	1.088751	1.80193	1.290771
C.V.	21.08569	17.46826	22.08419	22.41764	13.84947

Table-4 Inventory Turnover Ratio

Ambuja Cement's median (10,685) is the highest among companies selected based on Inventory Turnover Ratio, while Birla Cement's (4.93) performance was the worst. Based on consistency, the performance of Ultratech Cement Limited (13.84) is best as the CV of this company is lowest; on the other hand, Shree Cement (22.41) was the most inconsistent company among the selected companies.

iv. **Return on Investment (%)**

Year	ACC	Ambuja	Birla	Shree	Ultratech
2011	15.21	14	-6.77	5.47	9.47
2012	12.45	13.77	-8.18	15.7	13.31
2013	12.41	12.79	8.96	21.16	12.54
2014	13.14	13.91	19.69	13.5	8.92
2015	6.54	7.38	11.82	6.5	7.62
2016	6.44	4.67	7.37	13.77	8.78
2017	13.93	8.42	2.94	14.59	13.96
2018	13.97	8	19.88	11.36	10.88
2019	17.08	9.01	37.71	11.4	9.6
2020	14.4	11.92	4.09	13.92	12.03
Mean	12.557	10.387	9.751	12.737	10.711
Median	13.535	10.465	8.165	13.635	10.24
S.D.	3.476416	3.303594	13.60785	4.491991	2.152247
C.V.	27.68508	31.80508	139.5534	35.26726	20.0938

Table-5 Return on Investment

Among the companies selected based on the rate of return on investment, Shree Cement Limited's mean (12,737) is the highest, while Birla Cement Limited's mean (9.75) was worst. Due to consistency, if the company has the lowest CV, Ultratech Cement Limited (20.09) will perform better, and among the selected companies, Birla Cement Limited (139.55) has the most unstable performance.

v. Return on Equity (%)

Year	ACC	Ambuja	Birla	Shree	Ultratech
2011	18.42	15.22	-7.12	10.55	13.16
2012	14.37	14.73	-8.52	22.62	19.02
2013	14	13.64	9.13	26.12	17.43
2014	14.18	14.81	24.67	16.71	12.54
2015	7	7.83	14.38	8.07	10.68
2016	6.95	4.81	9.34	16.69	10.95
2017	9.77	6.25	3.46	17.39	10.97
2018	14.31	7.07	13.28	15.55	8.6
2019	11.79	6.88	27.38	9.9	8.64
2020	11.17	8.81	0.65	12.13	14.24
Mean	12.196	10.005	8.665	15.573	12.623
Median	12.895	8.32	9.235	16.12	11.755
S.D.	3.601636	4.102163	12.00401	5.698973	3.468817
C.V.	29.53129	41.00113	138.5344	36.59521	27.48013

Table-6 Return on Equity

Shree Cement's mean value (15.57) is the highest among companies selected based on Return on Equity, while Birla Cement's (8.66) performance was the worst. Based on consistency, the performance of Ultratech Cement Limited (27.48) is best as the CV of this company is lowest; on the other hand, Birla Cement (138.53) was the most inconsistent company among the selected companies.

[IV. A] **Finding the RANK**

The rank Test was performed by considering all the above ratios to compare the company performance. The calculated rate of return is based on a simple average of 10 consecutive fiscal years from 2010-11 to 2019-20**.** The final rating of the cement company is based on the average profitability during the study period. The industry shows significant differences in all profit margins between companies.

a. Financial Performance on the basis of mean

Company	Net Profit Margin	Gross Profit Margin	ITR	ROI	ROE	Total	Ultimate Rank
ACC	4	4	2	2	3	15	4
Ambuja	1	2	1	4	4	12	2
Birla	5	5	5	5	5	25	5
Shree	2	1	4	1	1	9	1
Ultratech	3	3	3	3	2	14	3

Table-7 Rank based on mean of financial ratio

Result: Table-7 provides the final ranking of cement companies based on average profitability over the period.

b. Financial Performance on the basis of Consistency

Company	Net Profit Margin	Gross Profit Margin	ITR	ROI	ROE	Total	Ultimate Rank
ACC	3	4	3	2	2	14	3
Ambuja	1	2	2	3	4	12	2
Birla	5	5	4	5	5	24	5
Shree	4	3	5	4	3	19	4
Ultratech	2	1	1	1	1	6	1

Table-8 Rank based on consistency of financial ratio

Result: Table-8 contains the final ranking of the cement companies based on the average consistency during the study period**.** The final rank has been calculated with the aggregate of each rank being lower.

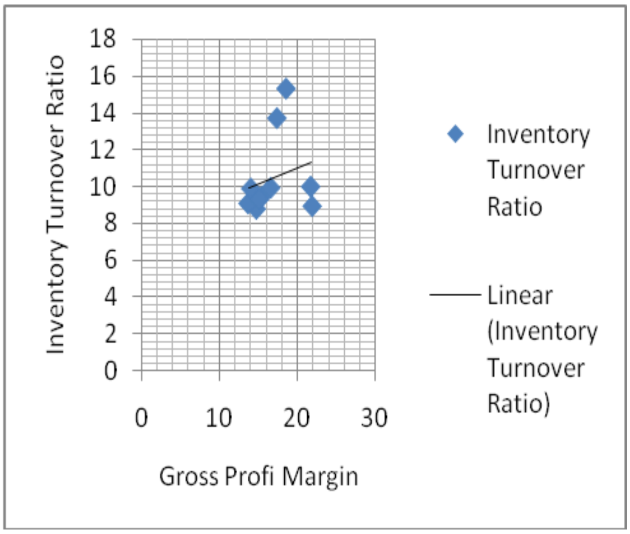
[IV. B] Relationship between Gross Profit and Inventory Turnover Ratio

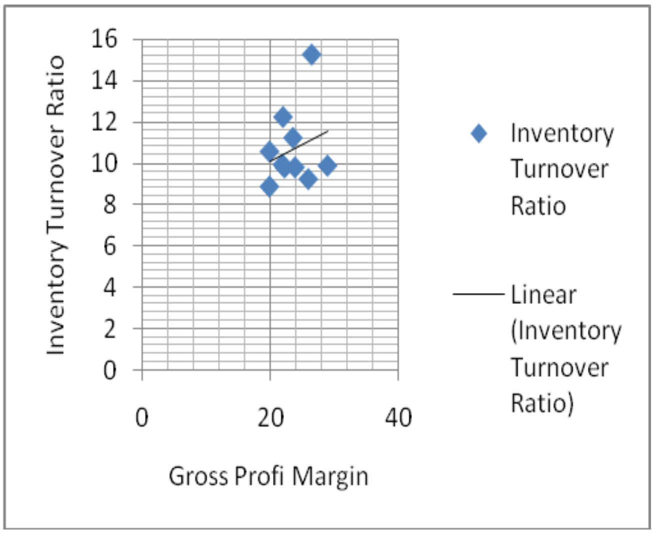
Correlation examination is a measurable strategy used to assess the strength of the connection between two quantitative factors. A high correlation coefficient implies that at least two factors have a solid relationship with one another. It is the process of using available statistics to study the strength of this relationship. The measurement range of the correlation coefficient is +1 to 0 to -1. The complete correlation between two variables is expressed between the range of +1 or -1. If one variable increases with another, the correlation is positive. If one variable is losing and the other is increasing, the correlation is negative, and there is no correlation if the correlation coefficient is 0.

By interpreting the data, we found that there is a certain correlation between the inventory turnover ratio and the company's financial status. Now, analyze the data of all companies one by one.

S. No.	Company Name	Correlation value
1	ACC	0.221974408
2	Ambuja	0.250291823
3	Birla	0.646282051
4	Shree	0.083716383
5	Ultratech	0.072089256

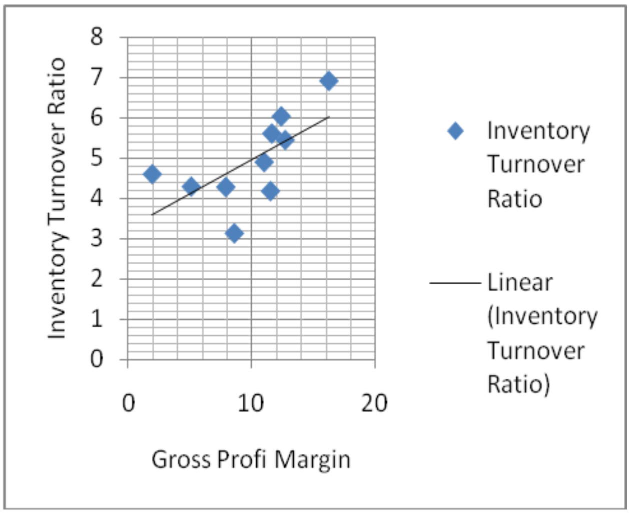
Table-9 Correlation coefficient between ITR and PBIT



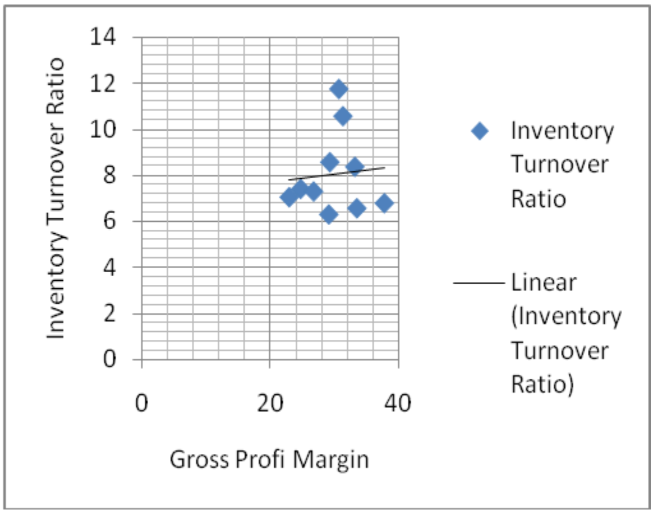


International Journal of Engineering Applied Sciences and Technology, 2021
Vol. 6, Issue 6, ISSN No. 2455-2143, Pages 187-196
Published Online October 2021 in IJEAST (http://www.ijeast.com)

Graph-1: Graph between ITR and PBIT for ACC Cement

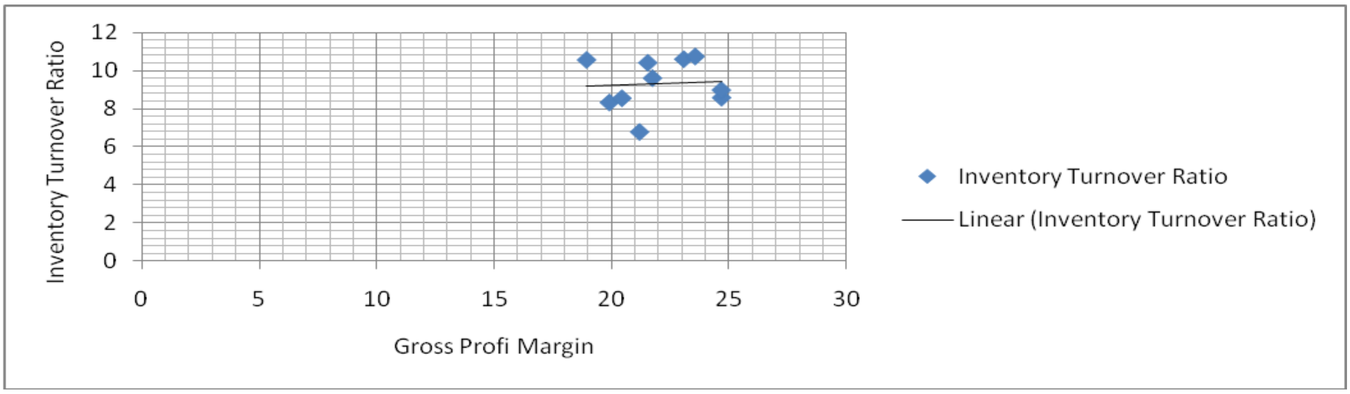


Graph-2: Graph between ITR and PBIT for Ambuja Cement



Graph-3: Graph between ITR and PBIT for Birla Cement

Graph-4: Graph between ITR and PBIT for Shree Cement



Graph-5: Graph between ITR and PBIT for Ultratech Cemen

[IV. C] **Findings**

[a]

- In terms of net profit Margin, Ambuja Cement performed the best because it has the highest average net profit margin of 12.93%, which gives it a chance to obtain higher profits, followed by Shree Cement got the second position with 12.61%.

- In terms of gross profit margin, Ambuja Cement got the first position with an average of 14.69%, which means that the company was generating huge gross margins to cover operating and other costs. Ultratech got Second place, with an average PBIT of 21.97%. In terms of inventory turnover, Ambuja Cement performed best among the selected cement manufacturers because it grew at a strong rate of 10.68% on a 10-year average, making it a more effective organization for inventory management. ACC Cement was in second place with an Inventory Turnover Ratio of 10.46%.

- The Return on Investment was highest for Shree Cement with a 10-year average of 12.73%. Thus, Shree Cement shows the highest soundness among the top five companies. ACC Cement closed a lot with Shree Cement with an average return of 12.55%.

- Shree Cement was the best performer among the leading cement manufacturers in terms of Return of Equity, as it had grown strongly with a 10-year average of 15.57%. Thus, it had a potential return on the money the investors have put into the company. UltraTech Cement was in second place with Return on Equity margin of 12.62%.

- The study found that Shree Cement was within the highest gain position throughout the study amount compared to different business players. Ambuja Cement was next to Shree Cement during the chosen period of study.

- Table-8 shows that Ultratech Cement is the most stable company surveyed, and Ambuja Cement got the second position. Birla Cement performed badly and ranked 5 in most of the parameters.

[b]

- Table-9 shows that the Inventory Turnover Ratio has a linear relationship with gross profit margin because the correlation coefficient value for all the companies is greater than zero.

V. CONCLUSION

Effective financial management is essential to the company's success. In the study, we found that Ambuja cement and Ultratech cement are the best among all the cement industry. Birla cement showed poor results, ranking fifth in most parameters. Among the companies surveyed, Ultratech Cement is undoubtedly the most stable, while Shree Cement and Birla Cement performed the worst, ranking fourth and fifth in consistency ratings.

The study also concluded that the inventory turnover rate is related to the cement company's gross profit margin and had a positive correlation between both the parameter for all selected cement companies.

VI. REFERENCE

Articles:

[1] Lyndon M. Etale, Ayaundu E. Sawyerr. (2020) "Inventory Management and Financial Performance of NSE Listed GLAXOSMITHKLINE Consumer Nigeria PLC"; United Kingdom ISSN 2348 0386 Vol. VIII, Issue 6, June 2020.

[2] Musaab Al Rushood, Dr. Fred Rahbar, Dr. Fikri T. Dweiri. (2020) "Benchmarking Key Performance Indicators and Metrics on Inventory Turnaround Practices in Middle East Petroleum Projects"; Proceedings of the 5th NA International Conference on Industrial Engineering and Operations Management, Detroit, Michigan, USA, August 10 - 14, 2020.

[3] Jan Horas Veryady Purba, Muhammad Rayno Septian. (2019) "Analysis of Short Term Financial Performance: A Case Study of an Energy Service Provider"; www/http/jurnal.unsyiah.ac.id/JAROE.

[4] Dr. G. Kanagavalli, R. Saroja Devi. (2018) "Financial Performance of selected Automobile Company"; International Journal of Management (IJM), Volume 9, Issue 4, July–August 2018, pp. 14–23, Article IIJM_09_04_003.

[5] Idris Adegboyega, Emmanuel Akinsanmi, Solomon, Catherin Oluyemi. (2017) "Effect of Inventory Management Practices on Financial Performance of Larfage Wapco Plc. Nigeria"; European Journal of Business and Management www.iiste.org ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.9, No.8, 2017, Page no:14-23.

[6] Jean Nepo Mulindabigwi, Dr. Patrick Mulyungi. (2015) "Effect of Inventor Management on Financial Performance of Manufacturing Firms in Rwanda, a Case Study of Bralirwa" International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064, Volume 6 Issue 10, October 2017, page no: 1366-1371.

[7] Dr. Biswanath Sukul. (2016) "A Comparative Financial Analysis of TATA Steel Ltd. and SAIL"; IOSR Journal of Economics and Finance (IOSR-JEF) e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 7, Issue 6 Ver. IV (Nov. - Dec. 2016), PP 01-05 www.iosrjournals.org

[8] Vipulesh Shardeo (2015) "Impact of Inventory Management on the Financial Performance of the firm"; IOSR Journal of Business and Management (IOSR-JBM) e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 17, Issue 4.Ver. VI (Apr. 2015), PP 01-12.

[9] www.moneycontrol.com

Books:

[1] **Kothari, C.R.,** "Research Methodology- Methods and Techniques" 2nd edition, New Age International Publishers, 2004, pp138-141.

[2] **Khan, M. Y. and Jain, P.K., "**Financial Management: Text, Problems and Cases", Tata

Mcgraw Hill, New Delhi, 7th Edition, 2014, pp165-179.

[3] **L M Panday,** **“**Financial Management”, VIKAS PUBLISHING HOUSE PVT LTD, Eleventh Edition 2015, pp581-600.