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"A STUDY OF FINANCIAL EFFICIENCY OF CEMENT INDUSTRY OF INDIA USING DEA MODEL"

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ABSTRACT:

The simple meaning of Efficiency means performing each and every task in a cost effective and timely manner. The study of Efficiency plays a very important role, the reason behind it is one can come to know the unproductive cost and wastage of time. In present paper the researcher has taken top four cement companies based on Net Sales and reached to a conclusion using DEA Model.

KEYWORDS:DEA Model, Financial Efficiency, Profitability]

INTRODUCTION:

Basically, Data Envelopment Analysis (DEA) is a technique that has been based on linear programming. With the help of DEA model the performance of organizational units can be measured by comparing the inputs and the outputs.

RESULTS WEIGHTING VARIABLES OF DATA ENVELOPMENT ANALYSIS

		Weight	INPUT 1
Liquidity Ratio	**Current Ratio**	**0.50**	
	Quick Ratio	**0.30**	
	Working Capital Ratio	**0.20**	
	Total	**1.00**	
Activity Ratio	**Account Receivable turnover ratio**	**0.20**	**INPUT 2**
	Inventory Turnover Ratio	**0.25**	
	Assets Turnover Ratio	**0.35**	
	Collection Period Ratio	**0.20**	

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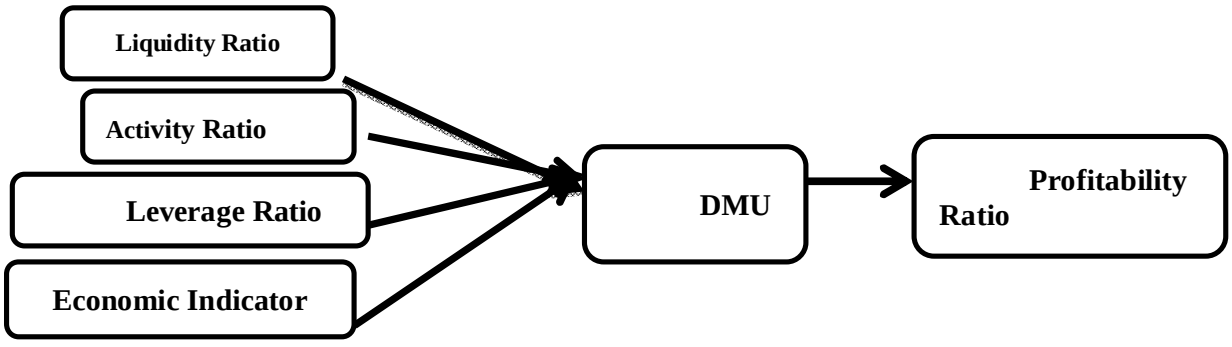
	Total	**1.00**	
Leverage Ratio	**Debt Equity**	**0.50**	**INPUT 3**
	Interest Coverage Ratio	**0.30**	
	Equity Ratio	**0.20**	
	Total	**1.00**	
Economic Indicator	**EVA**	**1.00**	**INPUT 4**
Profitability Ratio	**Return on Assets (ROA)**	**0.35**	**OUTPUT**
	Return on Equity (ROE)	**0.22**	
	Return on Current Assets	**0.10**	
	Return on Equity	**0.18**	
	Operating Profit to sales	**0.15**	
	Total	**1.00**	

(Source: Reza Tehrani, Mohammad Reza Mehragan& Mohammad Reza Golkani)

FINAL MODEL



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PROBLEM STATEMENT:

The statement of the problem is "A study of Financial Efficiency of Cement Industry of India (using DEA Model)"

OBJECTIVES OF THE STUDY:

Each and every task undertaken must have some specific objectives. Without objectives the result obtained will be of no use. The objectives of the current research are as follows:

1. To study the financial ratios of selected cement companies of India.
2. To learn about the important benchmark of financial performance of selected cement companies of India.
3. To compare the financial performance of selected cement companies of India using DEA model.
4. To rank selected cement companies taking into account the input and output through efficiency measurement in DEA model.
5. To give useful suggestions for improving performance based on findings.

SIGNIFICANCE OF THE STUDY:

The proper evaluation of the cement industry is a major concern for shareholders, managers, creditors, employees etc, therefore the outcome of the study would play a major role in enhancing economy.

LITERATURE REVIEW:

- **Hari Krishna Tata &Vijaya Sai Nimmagadda (2016)**

They both have presented a research article on 'Performance Evaluation of Banks through four phased DEA – A case study.' The overall performance of all 26 public sector banks in India were analysed using four phase DEA in the present paper. The data required for the period 2009-14 were gathered from IBA bulletin, statistics published by RBI and annual reports of the concerned banks. The evaluation factors are classified as inputs and outputs to get the overall efficiency of the banks. The main focus of this paper is to boost the performance of the banks to come up to desired grades. DEA is a approach for calculating the relative efficiencies of a set of DMUs that use multiple inputs to build multiple outputs. DEA has been widely used to measure the performance of the banks due to its vast application to the real life problems. In this paper the idea of TOPSIS is racially balanced into a 4 phase

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DEA framework to measure the efficiencies of a set of DMUs and rank them with input-output levels.

- **Sohn and Kim (2012)**

In their research article, they have mainly examined two major problems of existing promotional systems in academics using an example of a professor evaluation system, which do not take into account the input aspects and focus on short-term operations. Considering the use of super-efficiency DEA and multi-period output, it shows that the timing attitudes of input factors and results need to include professors' fair evaluation and display for their research.

HYPOTHESIS OF THE STUDY:

Following hypothesis were framed to study the financial efficiency of selected cement companies.

H_0: There is no significant difference in the financial ratios of DEA Model.

H_1: There is significant difference in the financial ratios of DEA Model.

RESEARCH METHODOLOGY:

Selection of Sample: On the basis of Net Sales highest to lowest top four companies are selected, namely Ultra Tech Cement, JK Cement, Ramco Cement and India Cement.

Source of Data: The study is purely based on secondary data for which the data was collected from annual reports and websites of selected companies.

Period of the Study: The present study was conducted for five years i.e. from 2014-15 to 2018-19.

Tools of Analysis: Accounting Tool: Ratio Statistical Tool: ANOVA and Average

ANALYSIS AND INTERPRETATION:

The researcher first have calculated all the sixteen ratios of DEA Model and then the researcher has determined Decision Making Unit by doing calculation of input and output as determined in the model.

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WEIGHTED OUTPUT, INPUT AND RANK (2015)

Company	Weighted Output	Weighted Input	Efficiency	Rank
Ultra Tech	148.73	13834.99	0.01	3
JK Cement	38.70	1319.07	0.03	2
Ramco Cement	196.39	2030.32	0.10	1
India Cement	10.54	3050.27	0.003	4

(Source: Calculated by putting values in DEA Model)

WEIGHTED OUTPUT, INPUT AND RANK (2016)

Company	Weighted Output	Weighted Input	Efficiency	Rank
Ultra Tech	172.24	13773.75	0.013	2
JK Cement	8.96	1595.98	0.006	4
Ramco Cement	442.99	1757.46	0.25	1
India Cement	19.16	2745.32	0.007	3

(Source: Calculated by putting values in DEA Model)

WEIGHTED OUTPUT, INPUT AND RANK (2017)

Company	Weighted Output	Weighted Input	Efficiency	Rank
Ultra Tech	190.78	13544.83	0.014	3
JK Cement	36.04	1695.57	0.02	2
Ramco Cement	512.90	1867.77	0.27	1
India Cement	29.55	3974.34	0.007	4

(Source: Calculated by putting values in DEA Model)

WEIGHTED OUTPUT, INPUT AND RANK (2018)

Company	Weighted Output	Weighted Input	Efficiency	Rank
Ultra Tech	160.53	17633.39	0.009	3
JK Cement	38.12	2136.68	0.018	2
Ramco Cement	443.86	2341.83	0.190	1
India Cement	12.57	3675.87	0.003	4

(Source: Calculated by putting values in DEA Model)

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WEIGHTED OUTPUT, INPUT AND RANK (2019)

Company	Weighted Output	Weighted Input	Efficiency	Rank
Ultra Tech	170.24	24154.32	0.007	3
JK Cement	37.54	2402.85	0.016	2
Ramco Cement	402.03	3015.53	0.133	1
India Cement	9.95	3932.32	0.003	4

(Source: Calculated by putting values in DEA Model)

OVERALL ASSIGNING OF RANK AS PER DEA MODEL TO THE SELECTED CEMENT COMPANIES:

Company	2014-15	2015-16	2016-17	2017-18	2018-19	Avg.	Overall Rank
Ultra Tech	3	2	3	3	3	2.8	**3**
JK Cement	2	4	2	2	2	2.4	**2**
Ramco	1	1	1	1	1	1	**1**
India	4	3	4	4	4	3.8	**4**

(Source: Calculated by putting values in DEA Model)

FINDINGS:

The above shows the ranks of the selected cement companies for the year 2014-15 to 2018-19. The researcher concluded that Ramco Cement is having the lowest average rank which is 1, hence overall rank of Ramco Cement will be 1, followed by JK Cement, Ultra Tech Cement and at last India Cement. Here, India Cement having last rank can be determined as inefficient unit.

FINDINGS RELATED TO ANOVA:

Ratio	Calculated Value	Table Value	H_0 Accepted / Rejected
Current Ratio	**38.72**	**3.24**	**Rejected**
Quick Ratio		**3.24**	**Rejected**
W.C.Ratio	**3.99**	**3.24**	**Rejected**
Debtors T.O.Ratio	**98.28**	**3.24**	**Rejected**
Inventory T.O. Ratio	**16.40**	**3.24**	**Rejected**
Assets T.O. Ratio	**5.19**	**3.24**	**Rejected**
Collection Period Ratio	**30.88**	**3.24**	**Rejected**
Debt Ratio	**11.50**	**3.24**	**Rejected**
Int.Cov.Ratio	**8.26**	**3.24**	**Rejected**
Equity Ratio	**10.75**	**3.24**	**Rejected**

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EVA	**46.53**	**3.24**	**Rejected**
ROA	**12.88**	**3.24**	**Rejected**
ROCE	**6.06**	**3.24**	**Rejected**
ROCA	**16.68**	**3.24**	**Rejected**
ROE	**42.95**	**3.24**	**Rejected**
Op.Profit to Sales	**16.64**	**3.24**	**Rejected**

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