Darshan - The International Journal of Commerce and Management ISSN: 2583-1682 (online) Volume - 4, Issue – I, June-2024
Bi-Annual double-blind peer-reviewed International Journal
Paper Submission Date: 1st April 2024 Paper sent back for Revision: 1st April 2024 Paper Acceptance Date: 19th April 2024

# "A Study on Productivity Measurement of Selected Paper Companies in India"

**[1]Ms. Dadhaniya Abhisha Chandulal, [2]Dr. Shailesh N. Ransariya**

[1]Ph.D. Research Scholar, Department of Commerce, Saurashtra University, Rajkot, Gujarat.

[2]Associate Professor, Department of Commerce, Shri Govind Guru University, Godhra, Gujarat.

Email - [1]dadhaniaabhi@gmail.com, [2]snransariya@gmail.com

***Abstract:*** The aim of this research work is to measure, analyze and compare the productivity performance of selected Indian paper companies. This study is totally based on secondary data. In this study five paper companies are selected as samples based on market capitalization as on 30/03/2024. The study period of this research work is five years from 2018-19 to 2022-23. In this work ratio analysis is taken as accounting tool in which four productivity ratios are used and one-way ANOVA technique of parametric test is taken as statistical tool to find the difference among samples mean. The major findings of the work indicate that, the performance of labour productivity & overhead productivity in all the selected companies shows fluctuating trend and the performance of material productivity and total productivity in the selected companies shows minor fluctuating trend. The result of statistical test concludes that drawn null hypothesis is rejected in selected productivity ratios except total productivity ratio. In total productivity ratio null hypothesis is accepted.

***Key Words:*** Productivity, Efficiency, Productivity Ratios, Paper Industry

## INTRODUCTION:

The primary goal of an entity engaged in business is to deliver value and satisfaction to their consumers while making a profit. Maximization of the profit is always attempted by any businesses. But in order to do that business has to be more efficient. Efficiency of any business is measured by their capacity to raise the productivity by using existing resources so that cost per unit is reduced. Since productivity and cost are reciprocal of each other, an increase in productivity implies redemption in cost of production that ends with higher profit.

Productivity refers to the relationship between the output contains quantity produced and the input includes quantity of resources utilized in the production. In other words, productivity is the ratio of the output of goods or services to the input of resources consumed in the process of production. Higher productivity always suggests that the available resources are utilized more efficiently in a business.

$$\textbf{Productivity} = \frac{\textbf{Total output}}{\textbf{Total Input}} = \frac{\textbf{Total results achieved}}{\textbf{Total resources consumed}} = \frac{\textbf{Effectiveness}}{\textbf{Efficiency}}$$

## LITERATURE REVIEW:

**Manik Mazumdar & Meenakshi Rajeev (2009)** have explained output and input efficiency of Indian manufacturing firms with a case of the Indian pharmaceutical sector. The aim of this work was to analyze the competitiveness by calculating the technical efficiency of pharmaceutical sector in India. The DEA model was utilized for the period of 15 years from 1991- 2005. The researchers found that output efficiency level of the pharmaceutical sector shows a declining trend and firms have been capable to use raw material input and labor input efficiently.

**Manish B. Raval & Jyotindra M. Jani (2012)** have carried an analytical study of employee’s productivity in some selected India nationalized banks. The aim of this research work was to check the employee’s productivity in selected five nationalized banks with the help of business per employee and profit per employee for the duration of 5 years from 2006-07 to 2010-11. The researchers have used two-way ANOVA technique of parametric test to test the hypotheses. As per the findings of the work, it is said that there was a significance difference in profit per employee and business per employee between the selected banks, there was no significance difference in profit per employee within the selected banks and there was a significance difference in business per employee within the selected banks.

**Gupta S. K., Gupta S. & Dhamija P. (2019)** have done an empirical study on productivity analysis of Indian leather industry. The main aim of this study was to analyze the Single Factors Productivity (SFP), Total Factor Productivity (TFP), and Technical Efficiency (TE), of Indian leather industry. Three major states have been selected including Tamil Nadu, Uttar Pradesh and West Bengal to analyze the performance. As the result of the study, the researchers conclude that the performance of West Bengal was higher in SFP and TE compared to Uttar Pradesh and Tamil Nadu. The researchers also conclude that firm size and SFP have positive correlation with TE.

## RESEARCH METHOD:

**Objectives of the study:** The broad objective of the study is to measure and compare productivity performance in selected paper companies. The other objectives are as follows:

- To study Material, Labour, Overhead and Total productivity of the selected paper companies.

- To evaluate which company is performing best among all selected paper companies.

**Period of the Study:** The present study is made for study period of five financial years from 2018-19 to 2022-23.

**Scope of the Study:** The functional scope of this work is to measure and analyze productivity performance of selected paper companies. In this work selected five paper companies are providing paper products in India. So, whole India is considered as geographical scope.

**Sampling Design:** All paper companies listed on BSE are considered as population of the research work. Out of the population, five paper companies are selected as samples based on market capitalization as on 30/03/2024. Judgment or purposive sampling method of non- probability technique is used as sampling method. The companies chosen for the study are as follows:

1. JK Paper Ltd.
2. West Coast Paper Mills Ltd.
3. Andhra Paper Ltd.
4. Seshasayee Paper & Board Ltd.
5. Tamil Nadu Newsprint & Paper Ltd.

**Data Collection:** This research work is based on secondary data. Financial data is collected from published annual of selected companies and other information is taken from books and websites.

**Tools and Techniques of Data Analysis:** In this work tools utilized for analysis of data are as under:

- Tabulation and Classification of Data
- Accounting Tools – Ratio Analysis
- Statistical Tools – One-way ANOVA
- Graphical Representation

## DISCUSSION AND ANALYSIS:

The numerical data is collected from annual reports of selected paper companies. For the data analysis four productivity ratios are taken i.e. material productivity ratio, labour productivity ratio, overhead productivity ratio and overall or total productivity ratio. Which are as follows.

**Material Productivity Ratio:** Material productivity ratio is division of total output to materials input. In cost of production, material productivity plays a very important role. Material productivity relies upon how effectively material is utilized in conversion of finished products. Material productivity is increased by means of skilled staff, sufficient machine tools, proper design of product etc. Symbolically, it is expressed as under.

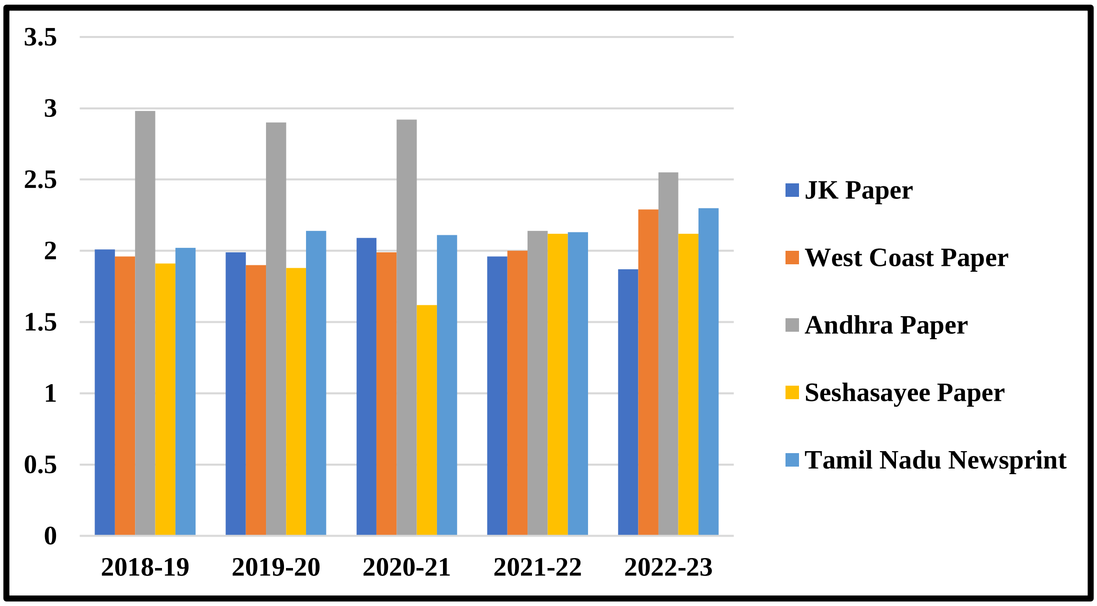
$$\text{Material Productivity Ratio} = \frac{\text{Total Output}}{\text{Material Input}}$$

**Table No. 1.1: Material Productivity Ratio**

| Years | JK Paper | West Coast Paper | Andhra Paper | Seshasayee Paper | Tamil Nadu Newsprint |
|---|---|---|---|---|---|
| 2018-19 | 2.01 | 1.96 | 2.98 | 1.91 | 2.02 |
| 2019-20 | 1.99 | 1.90 | 2.90 | 1.88 | 2.14 |
| 2020-21 | 2.09 | 1.99 | 2.92 | 1.62 | 2.11 |
| 2021-22 | 1.96 | 2.00 | 2.14 | 2.12 | 2.13 |
| 2022-23 | 1.87 | 2.29 | 2.55 | 2.12 | 2.30 |
| Average | **1.98** | **2.03** | **2.70** | **1.93** | **2.14** |
| Minimum | **1.87** | **1.90** | **2.14** | **1.62** | **2.02** |
| Maximum | **2.09** | **2.29** | **2.98** | **2.12** | **2.30** |

**Source:** *Calculated From Annual Reports of Selected Companies*

**Graph No. 1.1: Material Productivity Ratio**



All of the selected companies show a slight fluctuating trend in the material productivity ratio over a five-year period from 2018-19 to 2022-23. In the year 2020-21, seshasayee paper & board ltd. had a minimum ratio of 1.62, while andhra paper ltd. had a maximum ratio of 2.98 in the year 2018-19. Based on the average ratio over a period of 5 years, seshasayee paper & board ltd. had the lowest ratio of 1.93, while andhra paper ltd. had the highest ratio of 2.70. In JK paper ltd., west coast paper mills ltd., and tmil nadu newsprint & papers ltd., the average ratio was 1.98, 2.03, and 2.14, respectively.

Andhra paper ltd. and tamil nadu newsprint & papers Ltd. had superior overall performance in terms of material productivity ratio. The level of performance in JK paper ltd. and west coast paper mills ltd. was moderate, while in seshasayee paper & board ltd. it was poor compared to the selected companies.

**Labour Productivity Ratio:** Labor productivity ratio is division of output to labour input. Labour productivity depends upon actual utilization of labors. High or low labour productivity depends on factors like work load, material, availability of power, working tools, work efficiency, motivation level, training level, working condition etc. Symbolically, it is expressed as under.

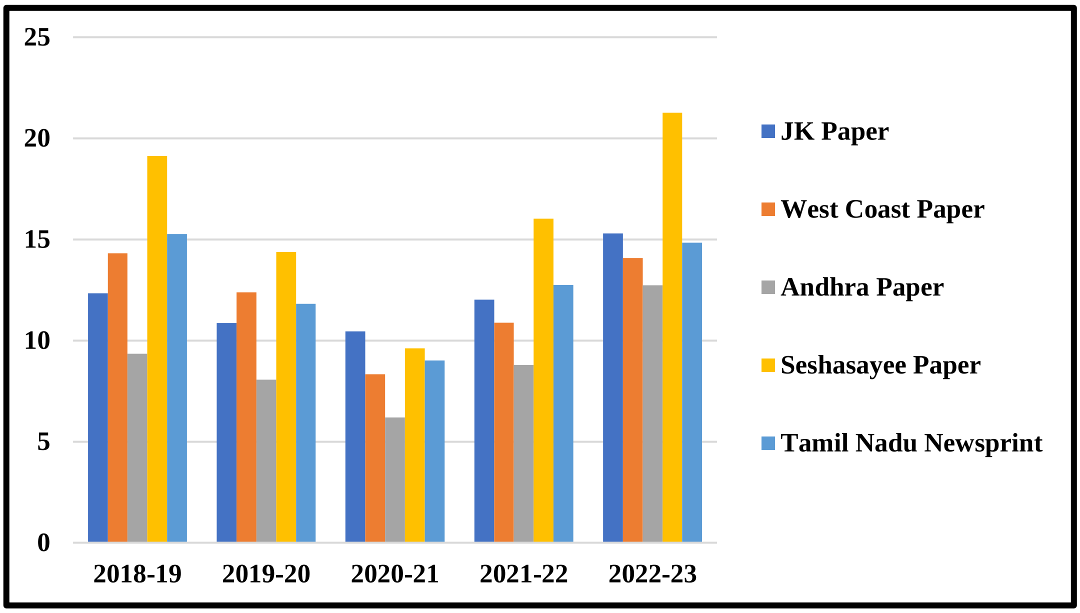
$$\text{Labour Productivity Ratio} = \frac{\text{Total Output}}{\text{Labour Input}}$$

**Table No. 1.2: Labour Productivity Ratio**

| Years | JK Paper | West Coast Paper | Andhra Paper | Seshasayee Paper | Tamil Nadu Newsprint |
|---|---|---|---|---|---|
| 2018-19 | 12.33 | 14.31 | 9.35 | 19.13 | 15.26 |
| 2019-20 | 10.87 | 12.39 | 8.07 | 14.38 | 11.82 |
| 2020-21 | 10.45 | 8.33 | 6.20 | 9.61 | 9.01 |
| 2021-22 | 12.02 | 10.88 | 8.79 | 16.02 | 12.75 |
| 2022-23 | 15.30 | 14.08 | 12.73 | 21.27 | 14.84 |
| Average | **12.19** | **12.00** | **9.03** | **16.08** | **12.74** |
| Minimum | **10.45** | **8.33** | **6.20** | **9.61** | **9.01** |
| Maximum | **15.3** | **14.31** | **12.73** | **21.27** | **15.26** |

**Source:** *Calculated From Annual Reports of Selected Companies*

**Graph No. 1.2: Labour Productivity Ratio**




The labor productivity ratio in all the selected companies had a declining trend during the initial three years from 2018-19 to 2020-21, followed by an increasing trend in the last two years, 2021-22 and 2022-23. In the year 2020-21, andhra paper ltd. demonstrated a minimum ratio of 6.20, while seshasayee paper & board ltd. exhibited the maximum ratio of 21.27 in the year 2022-23. Regarding the average ratio of the sample companies across the period, seshasayee paper & board ltd. displayed a highest ratio of 16.08 and andhra paper ltd. the lowest ratio of 9.03. The average ratios of tamil nadu newsprint & papers ltd., JK paper ltd., and west coast paper mills ltd. were 12.74, 12.19, and 12.00, respectively.

The labor productivity ratio of seshasayee paper & board ltd. exhibited an excellent overall performance. The performance of tamil nadu newsprint & papers ltd., JK paper ltd., and west coast paper mills ltd. was satisfactory. andhra paper ltd. performed poorly compared to all the companies.

**Overhead Productivity Ratio:** Overhead productivity ratio is division of total output to overhead input. Production cost, administrative or office cost, selling and distribution cost are included in overhead costs. It can be known as the other costs than the direct costs. Symbolically, it is expressed as under.

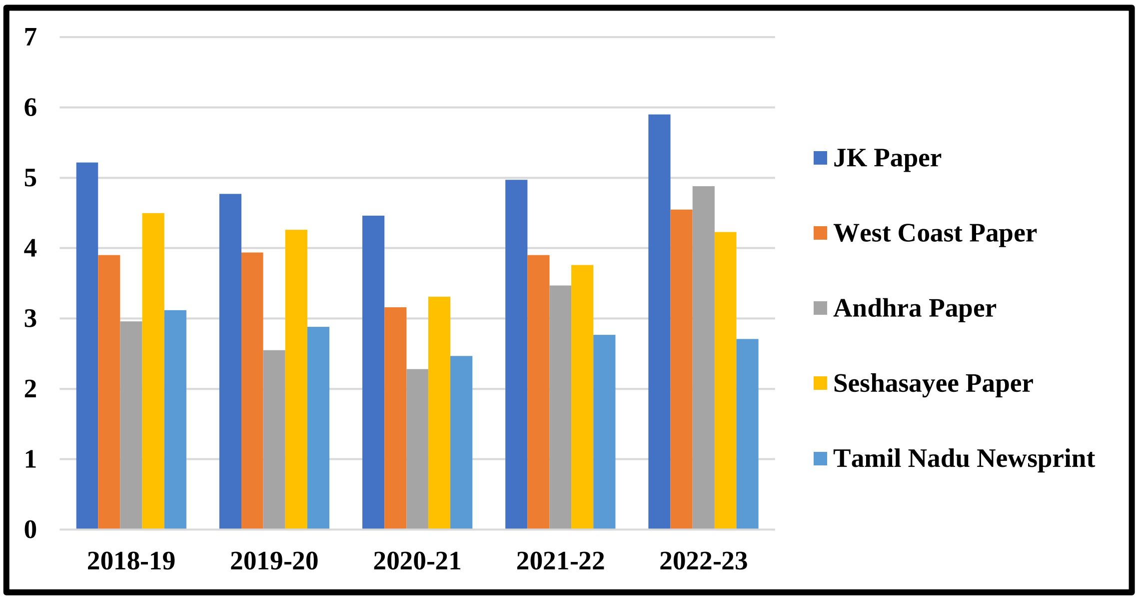
$$\text{Overhead Productivity Ratio} = \frac{\text{Total Output}}{\text{Overhead Input}}$$

**Table No. 1.3: Overhead Productivity Ratio**

| Years | JK Paper | West Coast Paper | Andhra Paper | Seshasayee Paper | Tamil Nadu Newsprint |
|---|---|---|---|---|---|
| 2018-19 | 5.22 | 3.90 | 2.96 | 4.50 | 3.12 |
| 2019-20 | 4.77 | 3.94 | 2.55 | 4.26 | 2.88 |
| 2020-21 | 4.46 | 3.16 | 2.28 | 3.31 | 2.47 |
| 2021-22 | 4.97 | 3.90 | 3.47 | 3.76 | 2.77 |
| 2022-23 | 5.90 | 4.55 | 4.88 | 4.23 | 2.71 |
| Average | **5.06** | **3.89** | **3.23** | **4.01** | **2.79** |
| Minimum | **4.46** | **3.16** | **2.28** | **3.31** | **2.47** |
| Maximum | **5.90** | **4.55** | **4.88** | **4.50** | **3.12** |

**Source:** *Calculated From Annual Reports of Selected Companies*

**Graph No. 1.3: Overhead Productivity Ratio**




The overhead productivity ratio exhibited a fluctuating pattern across all selected companies for the study period of 2018-19 to 2022-23. JK paper ltd. showed the highest ratio of 5.90 in the financial year 2022-23, while andhra paper ltd. had the lowest ratio of 2.28 in the financial year 2020-21. Regarding the five-year average ratio, tamil nadu newsprint & papers ltd. reported the lowest ratio (2.79), and JK paper ltd. the highest (5.06). The average ratio in seshasayee paper & board ltd., west coast paper mills ltd., and andhra paper ltd. was 4.01, 3.89, and 3.23, respectively.

The overhead productivity ratio of JK paper ltd. showed a remarkable overall performance. The performance of seshasayee paper & board ltd. and west coast paper mills ltd. was satisfactory. The performance of andhra paper ltd. and tamil nadu newsprint & papers ltd. was weaker compared to all the other selected companies.

**Total productivity Ratio:** Total productivity is the method of calculating productivity that considers all the resources as whole. It can be known as 'overall productivity'. A single figure gives an idea about the efficiency of an entire organization is called total productivity. It is qualitative and systematic approach that completes the products with consideration of quality, price and time.

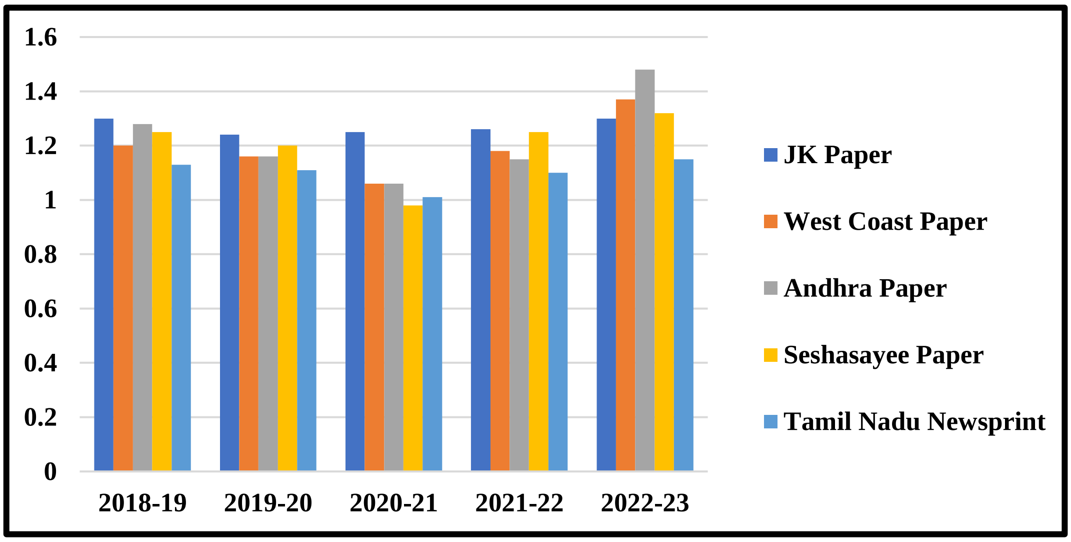
$$\text{Total Productivity Ratio} = \frac{\text{Total Output}}{\text{Total Input}}$$

**Table No. 1.4: Total Productivity Ratio**

| Years | JK Paper | West Coast Paper | Andhra Paper | Seshasayee Paper | Tamil Nadu Newsprint |
|---|---|---|---|---|---|
| 2018-19 | 1.30 | 1.20 | 1.28 | 1.25 | 1.13 |
| 2019-20 | 1.24 | 1.16 | 1.16 | 1.20 | 1.11 |
| 2020-21 | 1.25 | 1.06 | 1.06 | 0.98 | 1.01 |
| 2021-22 | 1.26 | 1.18 | 1.15 | 1.25 | 1.10 |
| 2022-23 | 1.30 | 1.37 | 1.48 | 1.32 | 1.15 |
| Average | **1.27** | **1.19** | **1.23** | **1.20** | **1.10** |
| Minimum | **1.24** | **1.06** | **1.06** | **0.98** | **1.01** |
| Maximum | **1.30** | **1.37** | **1.48** | **1.32** | **1.15** |

**Source:** *Calculated From Annual Reports of Selected Companies*

**Graph No. 1.4: Total Productivity Ratio**



In all selected companies minor fluctuating trend is indicates for the total productivity ratio to the time span of five years from 2018-19 to 2022-23. andhra paper ltd. showed maximum ratio of 1.48 in the year 2022-23 and seshasayee paper & board ltd. shows minimum ratio of 0.98 in the year 2020-21. In context to average ratio of sample companies during the time period highest ratio i.e. 1.27 showed by JK paper ltd. and lowest ratio i.e. 1.10 showed by tamil nadu newsprint & papers ltd. In andhra paper ltd., seshasayee paper & board ltd. and west coast paper mills ltd. the average ratio was 1.23, 1.20 and 1.19 respectively.

In all the selected companies, total productivity performance was near to each other. So precisely it cannot be said that which selected company is performing good or poor.

**One- Way ANOVA for Hypothesis Testing:**

**Null Hypothesis [$H_0$]:** There is no significant difference in different productivity ratios among selected Indian paper companies during the study period.
**Alternative Hypothesis [$H_1$]:** There is a significant difference in different productivity ratios among selected Indian paper companies during the study period.

**Table No 1.5: One-Way ANOVA Test**

| Sr. No. | Productivity Ratios | Calculated Value | Table Value | Level of Significance | Results of $H_0$ |
|---|---|---|---|---|---|
| 1. | Material Productivity Ratio | 11.7439 | 2.8660 | 5% | Rejected |
| 2. | Labour Productivity Ratio | 3.7494 | 2.8660 | 5% | Rejected |
| 3. | Overhead Productivity Ratio | 9.9905 | 2.8660 | 5% | Rejected |
| 4. | Total Productivity Ratio | 1.6375 | 2.8660 | 5% | Accepted |

The above table indicates that in all selected productivity ratios except total productivity ratio null hypothesis has been rejected and alternative hypothesis has been accepted. This means there is a difference in different productivity ratios among selected companies during study period. While, in total productivity ratio, null hypothesis has been accepted and alternative hypothesis has been rejected. This means there is no difference in total productivity ratio among selected companies during study period.

**CONCLUSION:**

Productivity shows the efficiency of production of goods or services by a ratio of output to a single input or combined inputs used in production process. Higher productivity describes production of extra output from given inputs or production of same amount with lesser inputs. In the present research work attempts to measure and analyze the performance of productivity in selected paper companies through material productivity, labour productivity, overhead productivity and total productivity. After examination of all these productivity ratios the result is found that, performance of labour productivity & overhead productivity in all the selected companies shows fluctuating trend and the performance of material productivity and total productivity in all the selected companies shows minor fluctuating trend. As per the result of statistical test drawn null hypothesis is rejected in selected productivity ratios except total productivity ratio. In total productivity ratio null hypothesis is accepted.

**REFERENCES:**

**Journal Papers:**

1. Gupta, S. K., G. S. (2019). An Empirical Study on Productivity Analysis of Indian Leather Industry. *Benchmarking: An International Journal , 26* (3), 815-835.
2. Mainak Mazumdar, M. R. (2009). Output and Input Efficiency of Manufacturing Firms in India: A Case of the Indian Pharmaceutical Sector. *Institute for Social and Economic Change* , 1-36
3. Manish B. Raval, J. M. (2012). An Analytical Study on Empoyee's Productivity in Some Selected Nationalized Banks of India. *Indian Journal of Applied Research , 1* (9), 19-20.
4. Meenu Maheshwari, T. P. (2019). Measurement of Material Productivity: A Case Study of Pharmaceutical Sector Companies included in Nifty 50. *Productivity , 60* (2), 175-194.

**Books:**

5. Gupta, R. P. (1992). *Productivity Accounting.* Jaipur: RBSA Publishers.
6. Kothari, C. R. (2014). *Research Methodology*. New Delhi: New Age International Publishers.
7. Shrinivas Gondhalekar, D. U. (2002). *Productivity Techniques.* (1st ed.). Mumbai: Himalaya Publishing House..