



A Study Of Lean Manufacturing In Ti Cycle In India

V.BALAJI ELAIYARAJA

Student , Assistant professor

Master of business Administration,
Panimalar Engineering College, Chennai

Abstract: The concept of Lean is extensively utilized and is still being implemented widely in organizations in order to remain competitive and cost-efficient. Even though Lean has proven to increase performance, the expected benefits with using the Lean approach are often absent. Implementing Lean is accompanied by barriers that limits the success of the implementation and many organizations fails to overcome these barriers. Furthermore, the current literature on Lean barriers is dispersed and superficial, which indicates a need for further in-depth investigation on the barriers of Lean implementations. The financial effects of lean manufacturing techniques on organizational performance in the manufacturing industry are investigated in this qualitative study. The research endeavors to ascertain the principal financial consequences linked to the adoption of lean techniques through the execution of comprehensive interviews with industry experts and the examination of pertinent case studies. The results show that lean techniques, like waste minimization, process optimization, and continuous improvement, increase operational effectiveness, boost profit margins, and result.

Keyword: Liquidity, Cash Flow Analysis, Operating Activities, Investing Activities, Financing Activities, Financial Performance, Trend Analysis, Working Capital, Manufacturing Industry.

I. INTRODUCTION

The overall objective of Lean is to create a culture for continuous improvement based on of all employees involved. The core idea of Lean is to maximize customer value while minimizing waste. Thus, lean means creating more value for customers with fewer resources, and has a strong focus on the processes for creating the results and the need to be systematic and to measure and report on results of improvement. Within a Lean organization managers should play the role as facilitators in a learning organization, with clear delegation and open communication.

Lean is a bottom-up approach: this means that those doing the practical work has to be involved in the improvement process and that ideas and actions has to be the ownership of those involved and will have to implement the actions.

The Lean approach builds on a long history of methods for process control and quality management (Womack et al, 2010) dating back to around 1900 with the Henry Ford and the development of the assembly line and including Total Quality Management around 1990 and later on EFQM (European Foundation for Quality Management), ISO, Six Sigma, CAF (Common Assessment Framework), JIT(Just in Time) and QAF (Quality

Assessment Framework) as developed within the European Statistical System (Euro stat, 2011). Important contributions to this development has been Mr. W. Edwards Deming, Mr. Joseph Duran and Mr. Kaoru Ishikawa. Experiences of the Toyota Production System (TPS) is also an element in development of Lean.

II. OBJECTIVE OF THE STUDY

- To study on lean manufacturing which contributes on profitability for the company.
- To identify the financial impact of lean manufacturing in company on TI cycle of India.
- To analyse the cost of reduction.
- To assess improvement in operational and supply chain management process to lean implementation.
- To provide insight into the effectiveness of lean manufacturing (or) methodologies in enhancing financial performance.

III. SCOPE OF THE STUDY

A sample of small and medium sized auto ancillary companies in a specific region or country. Analysis of financial data such as cost of production, inventory level and profit margins before and after lean implementation. Interviews with management and shop workers to understand the challenges and benefits of lean of lean practises comparison of financial performance between lean and non-lean auto ancillary companies. Recommendation for auto ancillary companies cooling to adopt lean manufacturing to improve their financial health.

IV. REVIEW OF LITERATURE

i) **Lee et al. (2024)** investigated the integration of sustainability with lean practices. Their research found that organizations combining these approaches not only improved operational efficiency but also enhanced brand value, leading to improved financial outcomes. This integration was shown to foster customer loyalty and competitive advantage.

ii) **Pacheco and Zhang (2024)** focused on the resilience of lean practices during the COVID-19 pandemic. Their study demonstrated that companies with established lean systems could better adapt to disruptions, maintaining cash flow and minimizing financial losses during unprecedented challenges.

iii) **Duflouetal (2023)** explored the financial performance metrics linked to lean manufacturing. Their findings established a strong correlation between the maturity of lean implementation and increased ROI, as well as substantial cost savings in manufacturing operations.

iv) **Dr. M. Ravichandran (2023)** the financial performance can be measured by using various financial tools such as profitability ratio, solvency ratio, comparative statement, etc. Based on the analysis, findings have been arrived that the company has got enough funds to meet its debts & liabilities, the income statement of the company shows sales of the company increased every year at good rate and profit also increased every year.

v) **Singh and Gupta (2022)** conducted a case study analysis revealing that firms adopting lean methodologies achieved higher profit margins. Their research illustrated the direct financial gains from streamlined processes and minimized waste, reinforcing the economic advantages of lean practices.

V. RESEARCH METHODOLOGY

RESEARCH MEANING:

According to Clifford Woody, research comprises defining and redefining problems, formulating hypothesis or suggested solutions, collecting, organising and evaluating data, making deductions and reaching conclusions, and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.

Type of Research:

A qualitative study on financial impact of lean manufacturing practices in TI Cycle in India. A qualitative research methodology focuses on exploring the experiences, perception and contextual factors that influence financial decision making, performance or strategies. variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of KSE -100 Index is taken from yahoo finance.

Financial performance:

1. OPERATING PROFIT RATIO:

$$\text{Operating profit ratio} = \frac{\text{Operting profit}}{\text{Net sales}}$$

2. PROFIT RATIO:

$$\text{Net profit ratio} = \frac{\text{Profit after tax}}{\text{sales}}$$

3. RETURN ON TOTAL ASSETS:

$$\text{Return on Assets} = \frac{\text{Net Profit}}{\text{Total Assets}}$$

4. RETURN ON INVESTMENT:

$$\text{Return on Investment} = \frac{\text{Operating profit}}{\text{Capital Employed}}$$

5. RETURN ON SHAREHOLDERS FUNDS:

$$\text{Return on shareholder funds} = \frac{\text{Net Profit After Income \& Tax}}{\text{Shareholders Fund}}$$

6. DEBT-EQUITY RATIO:

$$\text{Debt - Equity Ratio} = \frac{\text{Total Debt}}{\text{shareholders Equity}}$$

7. INTEREST COVERAGE RATIO:

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest expense}}$$

8. CURRENT RATIO:

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

9. QUICK RATIO (ACID-TEST RATIO):

$$\text{Quick ratio} = \frac{\text{Current asset} - \text{Inventory}}{\text{Current liabilities}}$$

TABLE 3.2.1 OPERATING PROFIT RATIO.
OPERATING PROFIT

| Year | Operating profit | Net sales | Ratio |
|-----------|------------------|-----------|-------|
| 2019-2020 | 34.11 | 208.95 | 16.32 |
| 2020-2021 | 22.81 | 205.42 | 11.1 |
| 2021-2022 | 26.81 | 242.33 | 11.06 |
| 2022-2023 | 38.26 | 255.96 | 14.95 |
| 2023-2024 | 38.66 | 217.49 | 17.79 |

Interpretation:

The above table indicates that the operation profit ratio increased to 17.78 in the year of 2023-2024.

CHART 3.2.1 SHOWING OPERATING PROFIT RATIO OF RESPONDENTS.

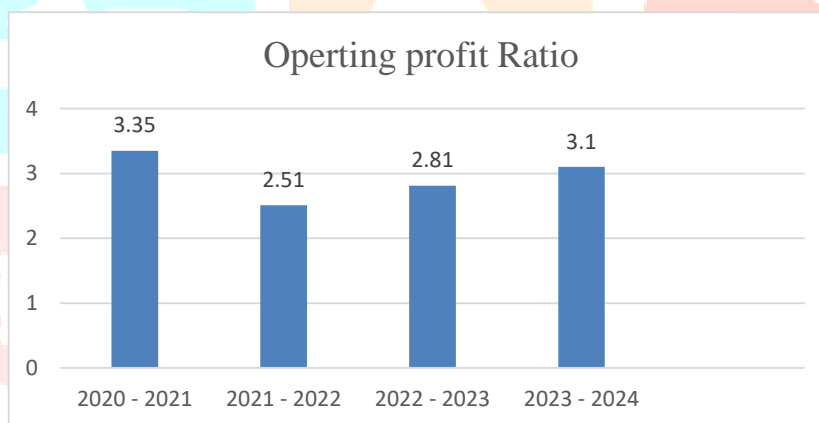


TABLE 3.2.2 NET PROFIT RATIO OF RESPONDENTS.

| OPERATING PROFIT | | | |
|------------------|------------|-----------|-------|
| Year | Net profit | Net sales | Ratio |
| 2019-2020 | 8.15 | 208.95 | 3.9 |
| 2020-2021 | 0.42 | 205.42 | 0.2 |
| 2021-2022 | 3.46 | 242.33 | 1.43 |
| 2022-2023 | 9.37 | 255.96 | 3.66 |
| 2023-2024 | 9.11 | 217.49 | 4.19 |

Interpretation:

The above table indicates that the net profit ratio increased to 4.19 in the year of 2023-2024.

.CHART 3.2.2 SHOWING NET PROFIT RATIO OF RESPONDENTS

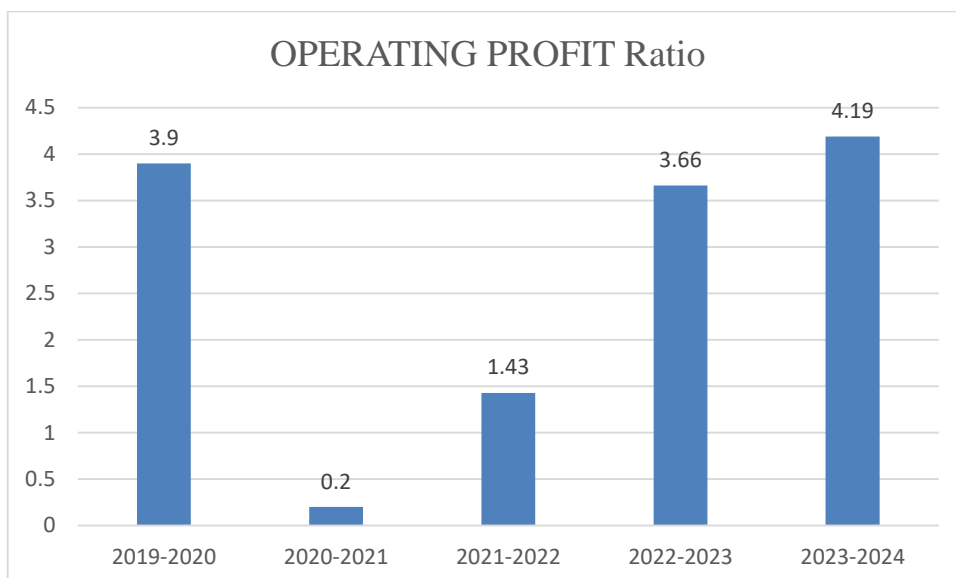


TABLE 3.2.3 RETURN ON TOTAL ASSETS OF RESPONDENTS

| OPERATING PROFIT | | | |
|------------------|------------|--------------|-------|
| Year | Net profit | Total assets | Ratio |
| 2019-2020 | 8.15 | 117.92 | 6.91 |
| 2020-2021 | 0.42 | 127.8 | 0.33 |
| 2021-2022 | 3.46 | 124.38 | 2.78 |
| 2022-2023 | 9.37 | 133.73 | 7.01 |
| 2023-2024 | 9.11 | 132.51 | 6.87 |

Interpretation:

The above indicates that the return on total assets ratio is 6.91 in the year of 2019- 2020.

CHART 3.2.3 SHOWING RETURN ON TOTAL ASSETS OF RESPONDENTS.

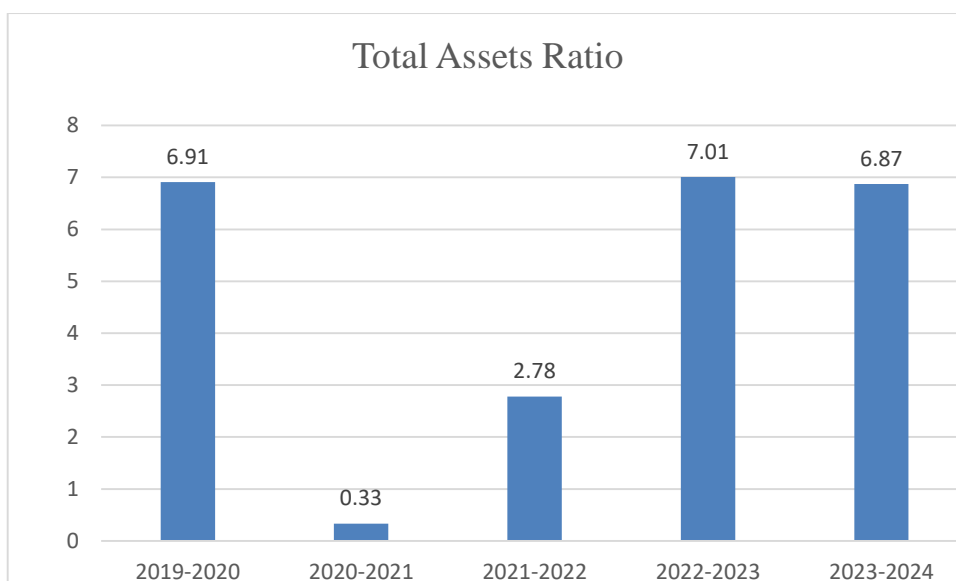
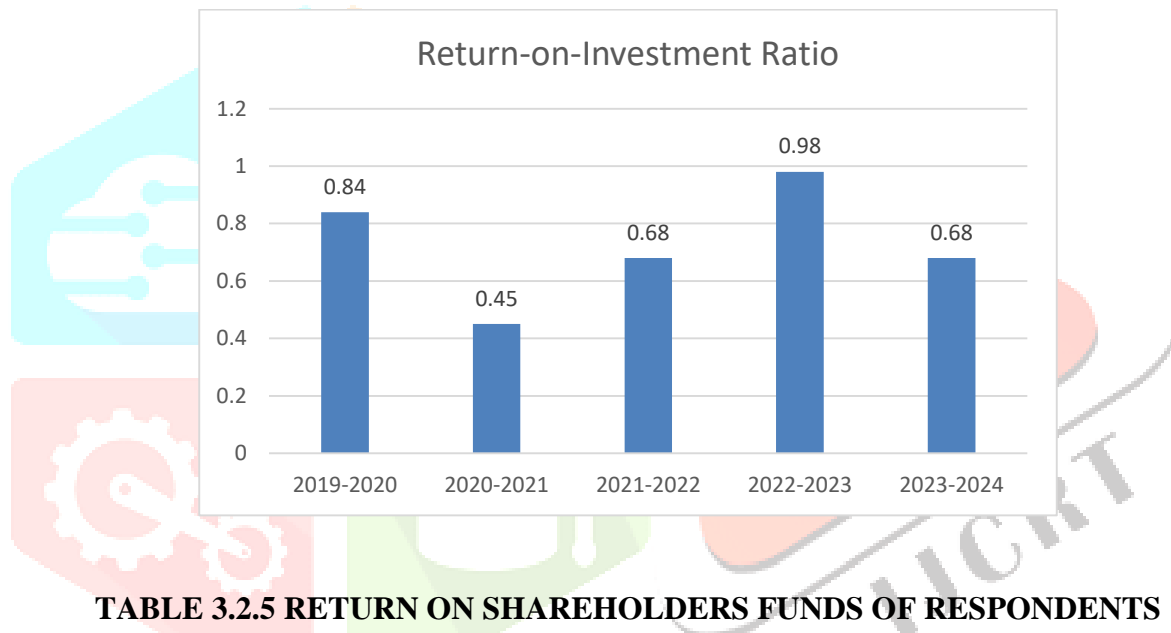


TABLE 3.2.4 RETURN ON INVESTMENT OF RESPONDENTS.

| OPERATING PROFIT | | | |
|------------------|------------------|------------------|-------|
| Year | operating profit | Capital employed | Ratio |
| 2019-2020 | 34.11 | 40.85 | 0.84 |
| 2020-2021 | 22.81 | 50.77 | 0.45 |
| 2021-2022 | 26.81 | 39.27 | 0.68 |
| 2022-2023 | 38.26 | 38.91 | 0.98 |
| 2023-2024 | 38.66 | 57.11 | 0.68 |

Interpretation:

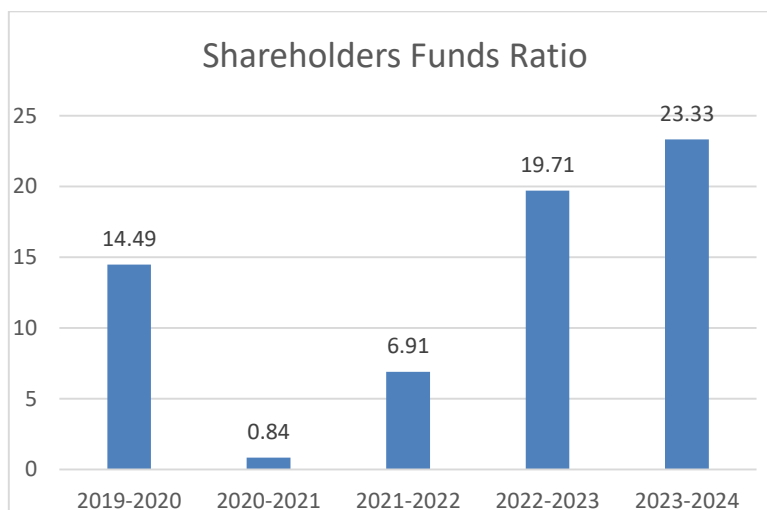
The above table indicates that the return-on-investment ratio increased to 0.98 in the year of 2022-2023.

CHART 3.2.4 SHOWING RETURN ON INVESTMENT OF RESPONDENTS.**TABLE 3.2.5 RETURN ON SHAREHOLDERS FUNDS OF RESPONDENTS**

| OPERATING PROFIT | | | |
|------------------|---------------------------------|----------------------|-------|
| Year | Net profit after interest & tax | Shareholder' s funds | Ratio |
| 2019-2020 | 8.15 | 56.23 | 14.49 |
| 2020-2021 | 0.42 | 49.79 | 0.84 |
| 2021-2022 | 3.46 | 50.05 | 6.91 |
| 2022-2023 | 9.37 | 47.55 | 19.71 |
| 2023-2024 | 9.11 | 39.55 | 23.33 |

INTERPRETATION:

The above table indicates that the return on shareholders' funds increased to 23.33 in the year of 2023-2024.

CHART 3.2.5 SHOWING RETURN ON SHAREHOLDERS FUNDS OF RESPONDENTS**TABLE 3.2.6: DEBT-EQUITY RATIO OF RESPONDENTS:**

| YEAR | Total Debt (₹ Cr) | Equity (₹ Cr) | Debt-Equity Ratio |
|-------------|-------------------|---------------|-------------------|
| 2019 - 2020 | 61.69 | 4.28 | 14.41 |
| 2020 - 2021 | 78.01 | 4.28 | 18.23 |
| 2021 - 2022 | 74.33 | 4.28 | 17.37 |
| 2022 - 2023 | 86.18 | 4.28 | 20.14 |
| 2023 - 2024 | 93.29 | 4.28 | 21.80 |

INFERENCE:

The above table indicates that the debt-equity ratio increased to 21.80 in the year of 2023-2024.

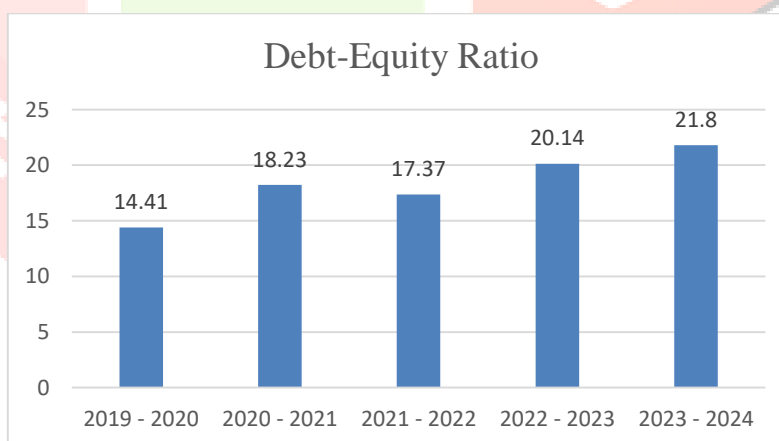
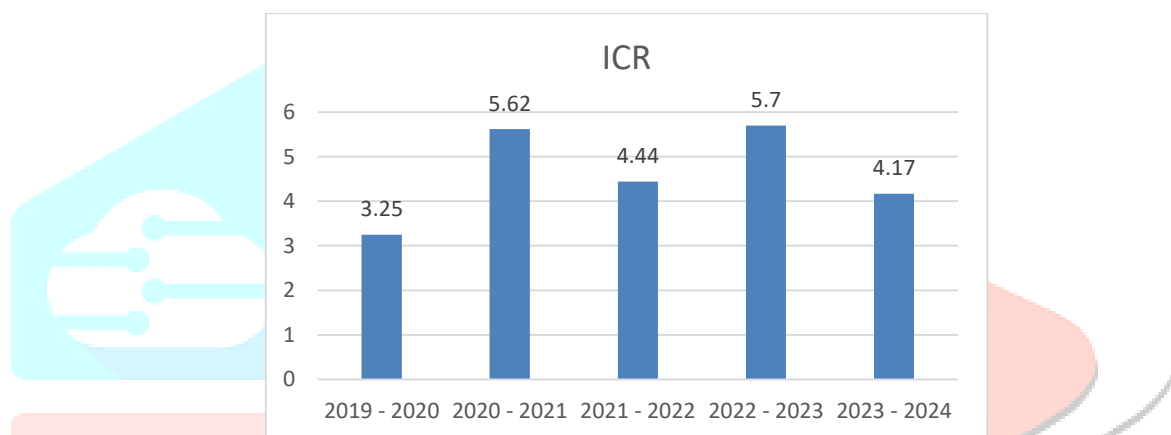
CHART 3.2.6 SHOWING DEBT-EQUITY RATIO OF RESPONDENTS

TABLE 3.2.7 INTEREST COVERAGE RATIO OF RESPONDENTS.

| Year | Current Assets | Current Liabilities | Current Ratio |
|-------------|----------------|---------------------|---------------|
| 2019 - 2020 | 72.58 | 117.92 | 0.62 |
| 2020 - 2021 | 73.73 | 127.8 | 0.58 |
| 2021 - 2022 | 81.99 | 124.38 | 0.66 |
| 2022 - 2023 | 91.82 | 133.78 | 0.69 |
| 2023 - 2024 | 73.47 | 132.51 | 0.55 |

INFERENCE:

The above table indicates that the interest coverage ratio increased to 5.7 in the year of 2022-23.

CHART 3.2.7 SHOWING INTEREST COVERAGE RATIO OF RESPONDENTS**TABLE 3.2.8 CURRENT RATIO OF RESPONDENTS**

| YEAR | EBIT (₹ Cr) | Interest (₹ Cr) | ICR |
|-------------|-------------|-----------------|------|
| 2019 - 2020 | 48.9 | 11.11 | 3.25 |
| 2020 - 2021 | 65.39 | 11.37 | 5.62 |
| 2021 - 2022 | 66.22 | 11.74 | 4.44 |
| 2022 - 2023 | 67.97 | 13.57 | 5.70 |
| 2023 - 2024 | 61.78 | 14.12 | 4.17 |

INFERENCE:

The above table indicates that the current ratio increased to 5.7 in the year of 2022-23.

CHART 3.2.8 SHOWING CURRENT RATIO OF RESPONDENTS

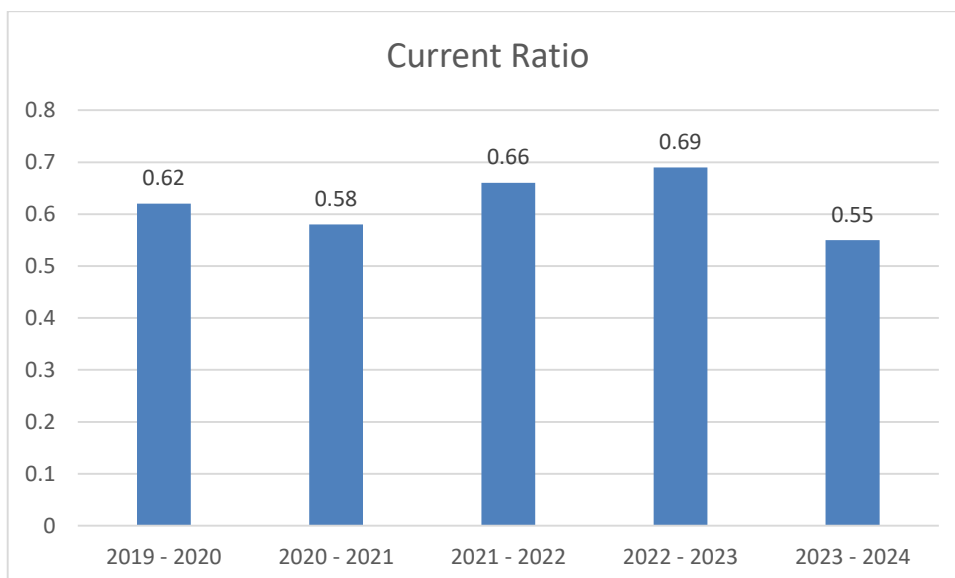


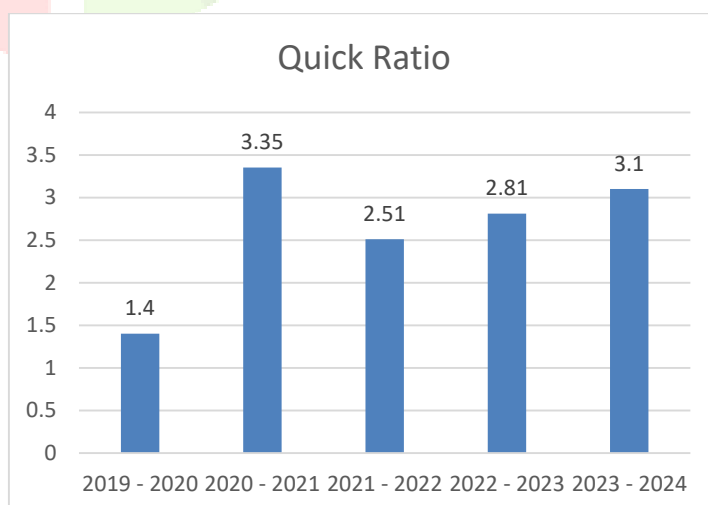
TABLE NO: 3.2.9 QUICK RATIO OF RESPONDENTS

| Year | Current Assets | Inventories | Current Liabilities | Quick Ratio |
|-------------|----------------|-------------|---------------------|-------------|
| 2019 - 2020 | 72.58 | 38.93 | 117.92 | 1.4 |
| 2020 - 2021 | 73.73 | 35.51 | 127.8 | 3.35 |
| 2021 - 2022 | 81.99 | 34.42 | 124.38 | 2.51 |
| 2022 - 2023 | 91.82 | 53.43 | 133.78 | 2.81 |
| 2023 - 2024 | 73.47 | 33.33 | 132.51 | 3.1 |

INFERENCE:

The above table indicates that the quick ratio increased to 3.35 in the year of 2020-21.

CHART 3.2.9 SHOWING QUICK RATIO OF RESPONDENTS



VI.FINDINGS

- The operation profit ratio has increased to 14.95 in the year of 2023 and it has increased to 17.78 in the year of 2024.
- The net profit ratio has decreased to 0.20 in the year of 2021 and it has increased to 1.43 in the year of 2022.
- The return on total assets ratio is 6.91 in the year of 2020 and it has decreased to 0.33 in the year of 2021.
- The return on investment ratio has increased to 0.68 in the year of 2022 and it has increased to 0.98 in the year of 2023.
- The return on shareholders ratio has increased to 19.71 in the year of 2023 and it has increased to 0.79 in the year of 2024
- The above table indicates that the debt-equity ratio increased to 21.80 in the year of 2023-2024.
- The above table indicates that the interest coverage ratio increased to 5.7 in the year of 2022-23.
- The above table indicates that the current ratio increased to 5.7 in the year of 2022-23.
- The above table indicates that the quick ratio increased to 3.35 in the year of 2020-21

VII.CONCLUSION

The main objective of this research was to determine the relationship and effect of Lean Manufacturing and financial performance in the TI cycle of India. The concept of this study has been developed upon detecting a gap in the literature regarding the enhancement of the financial performance in the manufacturing firms in TI cycle of India. Being integrated in an regular culture of principles, it seems to be difficult for companies to enhance and boost their financial performance and solving the problems and reducing the wastes at workplace, especially when there is lack of applying such tools and principle like Lean. The evidence provides also a strong support that the higher extent of lean practices implementation will bring to the manufacturing companies better financial performance since lean practices leads to better quality, flexibility, lead-time reduction, and cost reduction. In other words, the study findings led to the conclusion that an improvement in lean production practices such as having a constant improvement programs in terms of production, mechanization and use of just-in-time tools in production to remove all non-value added activities in their companies.

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