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A study on Total Quality Management and Lean practices in manufacturing companies in Nashik

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Abstract -Total quality management and lean manufacturing are one of the important methodologies used in the manufacturing companies to increase the efficiency, productivity & quality by minimizing the wastage in the organization. Quality management has become one of the important force leading to organizational growth and company success in national and international markets with increased competition and globalization.

TQM can be summarized as a management system for a customer focused organizations that involves all employees in continual improvements. It uses strategy, data and effective communication to integrate the quality discipline into the culture and activities of the organizations. Lean manufacturing is often called as Agile manufacturing which is an operating strategy that seeks to maximize operational effectiveness by creating value in the eyes of end consumer.

The main objective of this paper is to study TQM practices and Lean practices by analyzing the implementation and effectiveness in the manufacturing organizations.

The report is based on both primary as well as secondary data. In Secondary data there is the use of related material, research papers, journals, books etc. for the analysis purpose and primary data has been collected by using a structured questionnaire which is forwarded to 26 manufacturing organizations in Nashik. Major findings of this project arethat TQM Tools and Lean Tools play a key role in manufacturing sector, alsousing the different TQM & Lean tools manufacturing companies maintain Quality and to find out the defect in the processes but due to the complicated nature some tools are not mostly preferred by the organization also different quality strategies are used by the organizations which are beneficial to maintain all the process in an optimum way

Key Words:TQM, Lean, Quality management, Kaizen, Six sigma, quality tools, Lean tools, Quality control.

1.INTRODUCTION

Total quality management (TQM) is the continual process of detecting and reducing or eliminating errors in manufacturing, streamlining supply chain management, improving the customer experience, and ensuring that employees are up to speed with training. Total quality management aims to hold all parties involved in the production process accountable for the overall quality of the final product or service.

TQM was developed by William Deming, a management consultant whose work had a great impact on Japanese manufacturing. While TQM shares much in common with the Six Sigma improvement process, it is not the same as Six Sigma. TQM focuses on ensuring that internal guidelines and process standards reduce errors, while Six Sigma looks to reduce defects.

Today, quality management has become one of the important forces leading to organizational growth and a company's success in national and international markets.

To be successful in the marketplace, each part of the organization must work properly together towards the same goals, recognizing that each person and each activity affects and in turn is affected by others. To improve competitiveness, organizations are looking for a higher level of effectiveness across all functions and processes and are choosing TQM as a strategy to stay in business. The increased awareness of senior executives, who have recognized that quality is an important strategic issue, is reflected as an important focus for all levels of the organization. This requires defining and implementing several factors.

Many companies are frustrated in their effort to improve quality through TQM because these companies have exclusively focused on financial measures instead of quality measures. Other studies, in the recent past also observed the failure of TQM. These failures are due to the too much- too soon effort without proper foundation and focus. Manufacturing firms, therefore, need to understand the TQM CSFs for the successful implementation of TQM. Therefore, there is a pressing need to establish TQM CSFs for manufacturing firms. This paper examines the TQM frameworks developed by scholars and businesses and develops the TQM CSFs for manufacturing firms.

Lean manufacturing is a methodology that focuses on minimizing waste within manufacturing systems while simultaneously maximizing productivity. Also known as lean production, or just lean, the integrated sociotechnical approach is based on the Toyota Production System and is still used by that company, as well as myriad others, including Caterpillar Inc. and Nike. Lean manufacturing is based on a number of specific principles, such as Kaizen, or continuous

improvement. Lean manufacturing was introduced to the Western world via the 1990 publication of *The Machine That Changed the World*, which was based on a five-year, $5 million MIT study of the future of the automobile that detailed Toyota's lean production system. Since that time, the lean principles have profoundly influenced manufacturing concepts throughout the world, as well as industries outside of manufacturing, including healthcare, software development and service industries. The benefits of lean include reduced lead times, reduced operating costs and improved product quality, to name just a few.

2. OBJECTIVE:

1. To study TQM practices used by manufacturing companies in Nashik.
2. To study lean practices followed by manufacturing companies in Nashik.
3. To analyze the implementation and effectiveness of Total Quality Management & Lean practices in manufacturing industries of Nashik.

3. LITERATURE REVIEW:

The aim of this paper is to expose the conceptual model which pretends to reflect the relationship between the use and implementation of quality management principles and lean practices and their impact on the companies' quality performance. Based on the literature review carried out, we have identified the most common and used quality management and lean principles & practices. In order to validate these quality management and lean practices. We conducted several semi-structured interviews with the executives of manufacturing companies.

The concept of lean manufacturing was developed for maximizing the resource utilization through minimization of waste, later on lean was formulated in response to the fluctuating and competitive business environment. Due to rapidly changing business environment the organizations are forced to face challenges and complexities. Any organization whether manufacturing or service oriented to survive may ultimately depend on its ability to systematically and continuously respond to these changes for enhancing the product value. Therefore, value adding process is necessary to achieve this perfection; hence implementing a lean manufacturing system is becoming a core competency for any type of organizations to sustain. The majority of the study focuses on effectiveness of the lean tools in the organization.

4. DATA ANALYSIS:

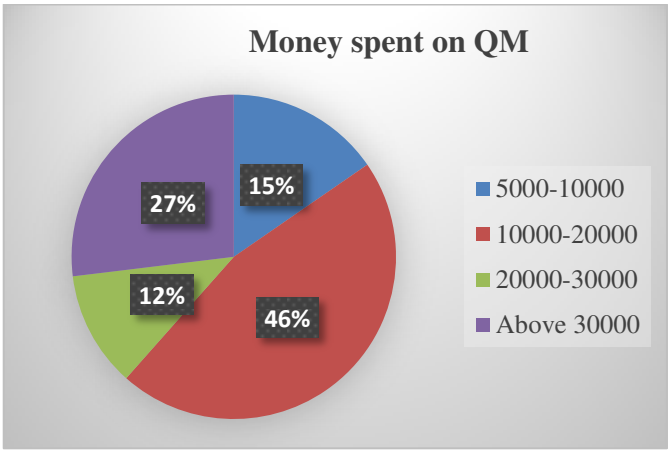
To analyze the implementation and effectiveness of total quality management & lean in manufacturing industries of ashik.

The data is collected through the responses from manufacturing company's executives through well-organized questionnaire

The analysis of the questions are as follows:

1. **The amount spent on Quality management by the companies:**

To analyze the amount spent by the Companies on the quality management was analyzed.

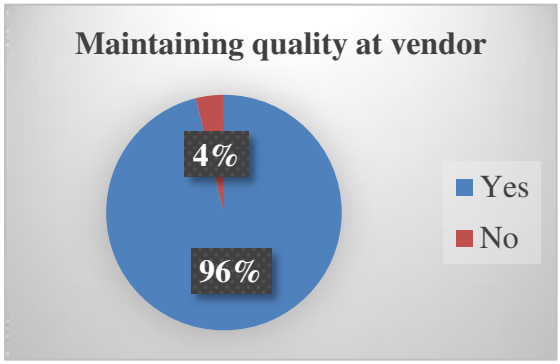


Graph.1. Representation of money spent on Quality management

Interpretation: It can be seen from the above chart that 15% of the respondents said that the organization spends 5000-10000 INR Quality Management on a monthly basis in their organization, while 46 % of the respondents said that the organization spends 10000-20000 INR., 12% of the respondents said that the organization spends 20000-30000 INR and almost 27% of the respondents said that the organization spends above 30000 INR on a monthly basis.

2. **The measures taken for maintaining quality at vendor:**

To know the importance of measures of quality management at vendor a question was posed on it.

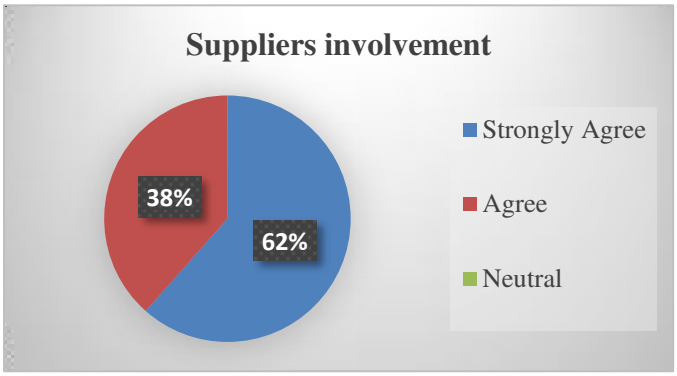


Graph.2. Maintaining quality at vendor

Interpretation: -It was observed from the above chart that almost 96% of the respondents responded Yes and only 4% voted No as the answer. From this graph we can say that most of the manufacturing companies take measures to maintain quality at vendor as a result companies can get benefit to produce quality product by getting quality material from vendor.

3. Suppliers involvement is vital in supporting Quality improvement:

Suppliers involvement in the quality improvement process was analyzed to understand its importance for many manufacturing companies.

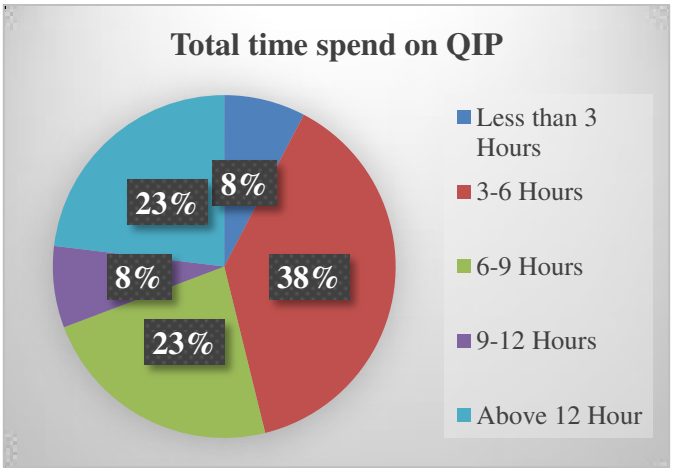


Graph.3. Responses of suppliers' involvement

Interpretation:- It can be seen from the above chart that almost 62% of the respondents Stronglyagree to theSuppliers involvement is vital in supporting Quality improvement. While only 38% just agreed to it. there was 0% response to other options. It means almost all the manufacturing companies involving suppliers in supporting quality improvement.

4. Total time spent on quality improvement program:

An indicative response was collected by knowingthe number of hours per week the teams spend in the quality improvement program:



Graph.4.Total time spend on QIP

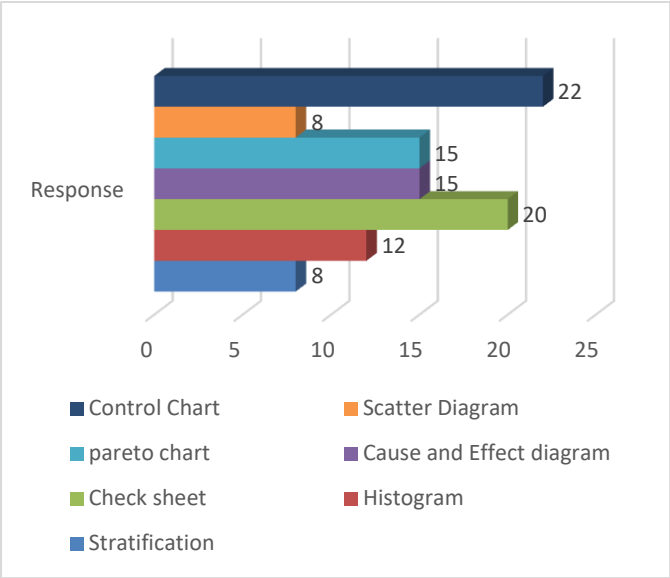
Interpretation*:* - It can be seen from the above chart that almost 8% of the respondents said they spend less than 3 hours' per week spend in the quality improvement program while 36% of the respondents said they spend 3-6 Hours and 23% of the respondents said they spend 6-9 hours and 8% of the respondents said they spend 9-12 hours and 23 % of the respondents said they spend above 12 hours on the program.

5. Quality tools used by the organisations:

List of Quality tools were provided to the managers and asked for tools used in the company:

Table.5. Responses of quality tools used

Options	Respondents
Stratification	8
Histogram	12
Check sheet	20
Cause and Effect Diagram	15
Pareto Chart	15
Scatter Diagram	8
Control Chart	22

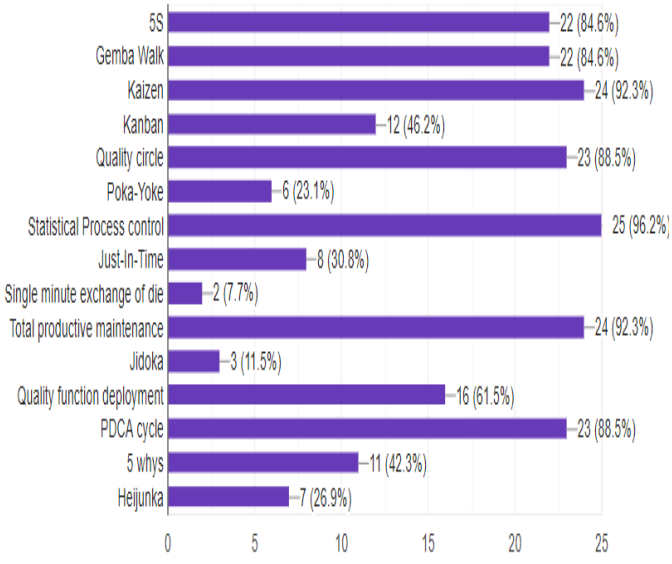


Graph.5. Responses of quality tools used

Interpretation – From the above chart it can be seen that cause and effect diagram & pareto charts are mostly used in the organization while stratification and scatter diagram are moderately preferable by the companies. Control charts are mostly used by companies followed by it, check sheet, pareto chart, fishbone diagram, histogram, stratification and scatter diagram are used.

6.Which of the following Lean tools are used in your Organization?

Similarly, from the list of lean tools which is the tool implemented by the organization was analysed.



Graph.6. Responses of Lean tools used in the organization

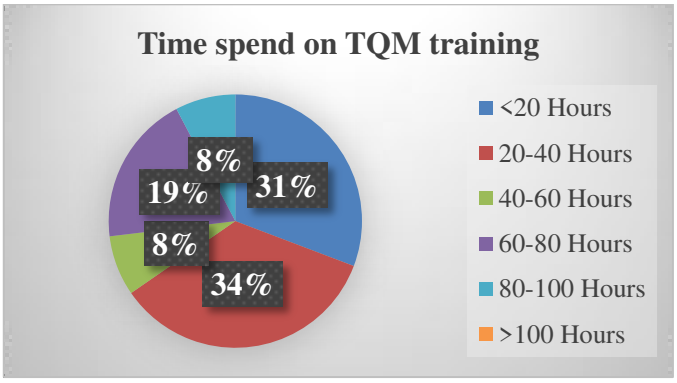
Interpretation-

From the above chart it can be seen that most of the manufacturing companies adopted the lean tools in the organization. From the chart we can say that 25 respondent uses statistical process control while SMED is the used in only 2 companies. Jidoka and SMED are the tools which are not generally preferred by the manufacturing companies. So we can say that SPC is the most effective tool in the company and SMED is the tool which is not much effective as compared to other tools.

7. An analysis on average hours of training (per year) employee receive on the TQM tools was done as below:.

Table.7. Time spend on training of TQM tools by company

Hours	Percentage
<20 Hours	31%
20-40 Hours	34%
40-60 Hours	08%
60-80 Hours	19%
80-100 Hours	08%
Total	**100%**



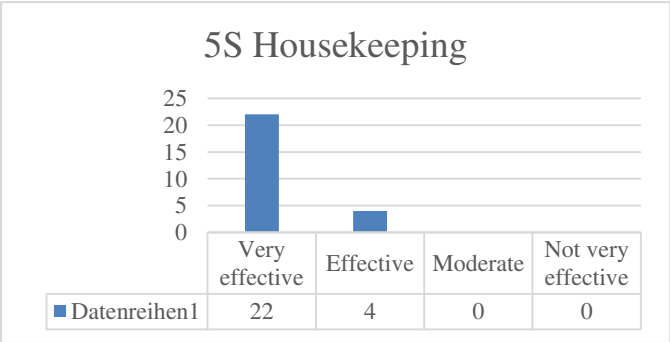
Graph.7. Time spend on training of TQM tools by company

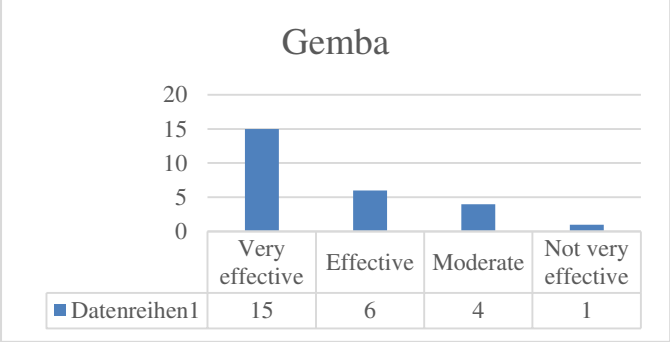
Interpretation-

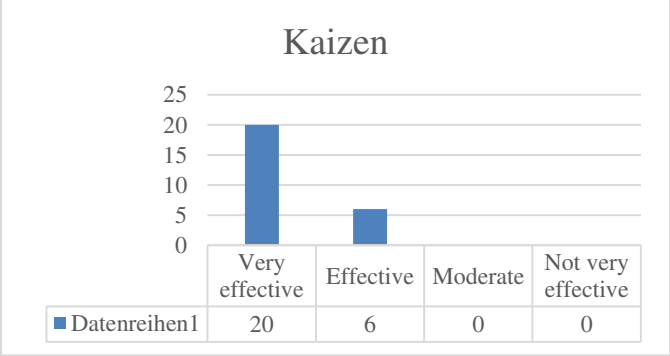
From the above pie chart, it can be seen that 34% of respondent companies gives 20-40 hours of training on TQM tools to the employees per year while 31% spend less than 20 hours of training, 19% spend 60-80 hours of training and 8% of respondents said that they spend 40-60 hours of training and remaining 8% respondents spends 80-100 hours of training on TQM tools per year.

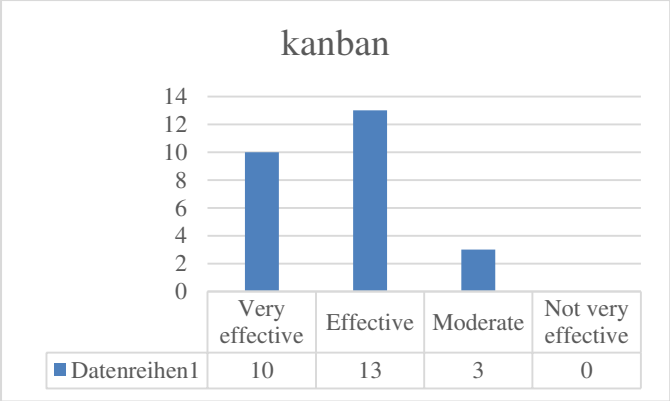
8.Following are the charts of perception about using lean tools in the organization and their effectiveness in the organization.

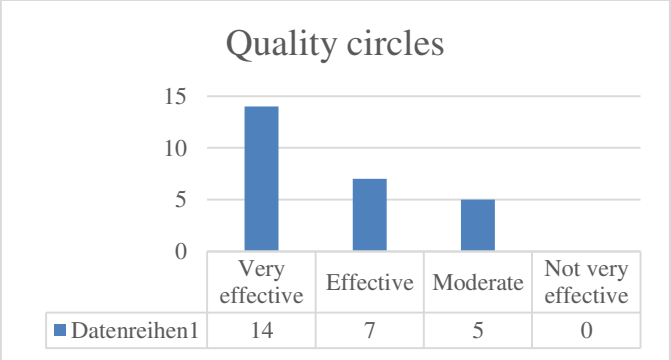
Lean tools mostly used in the organization was analyzed below:

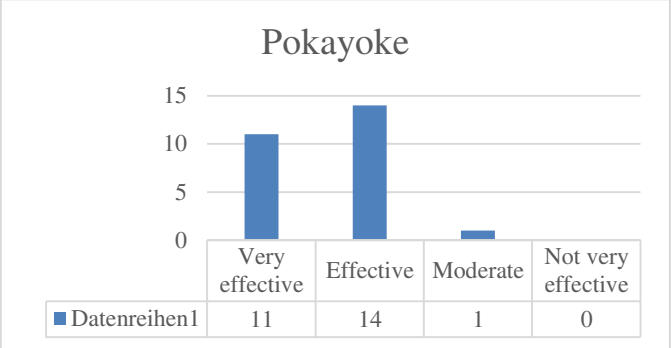


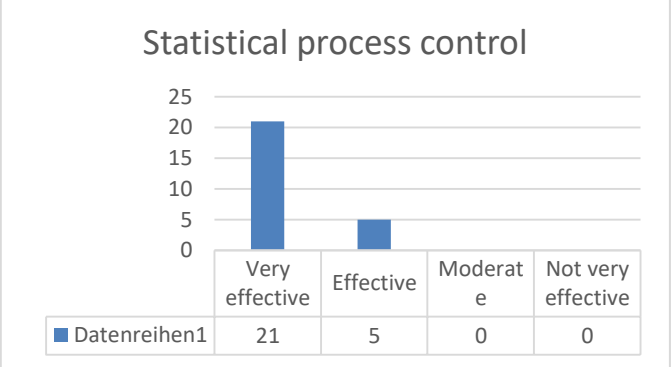


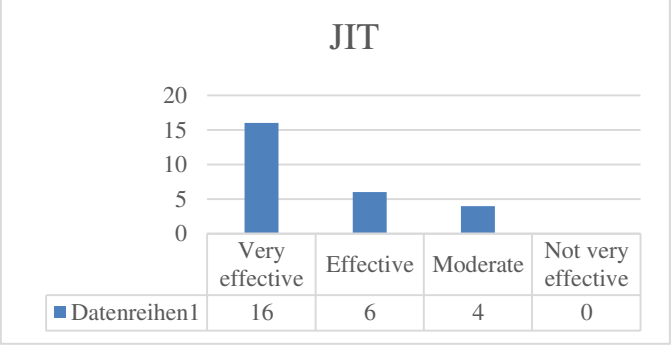


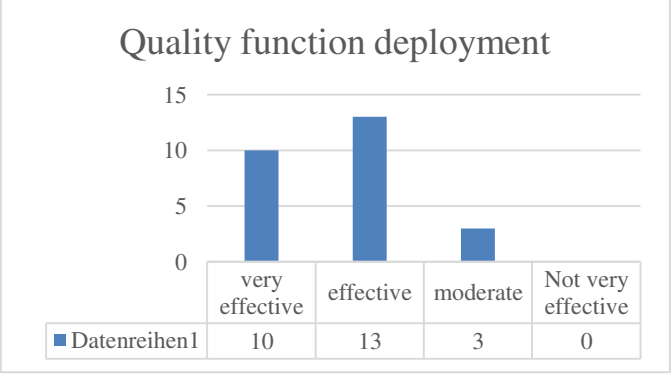


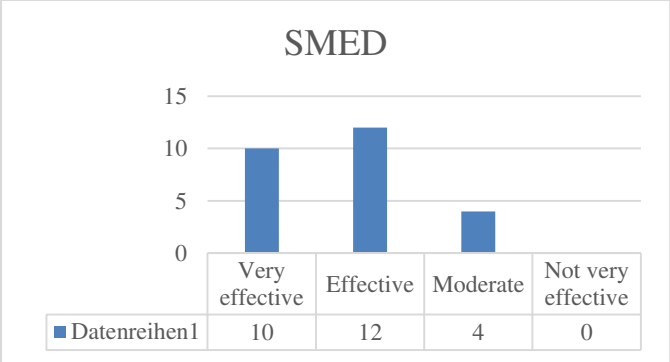


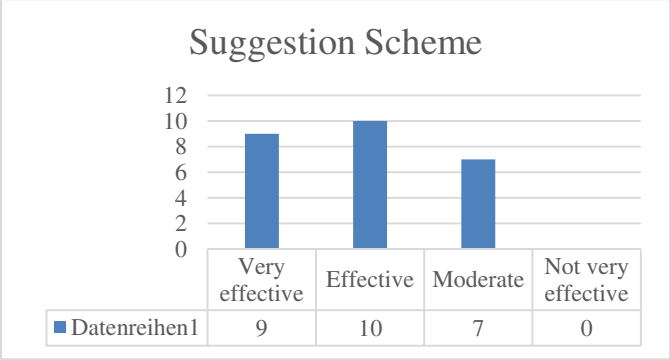


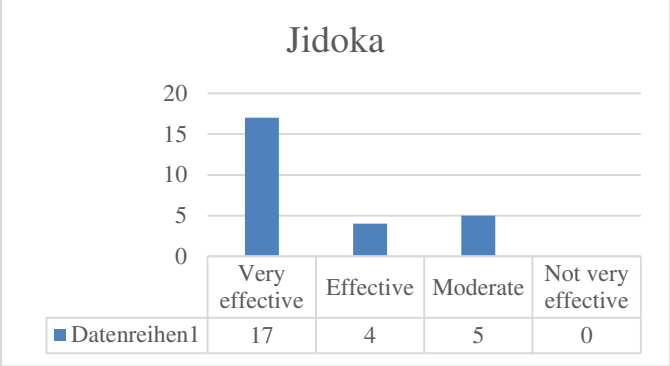


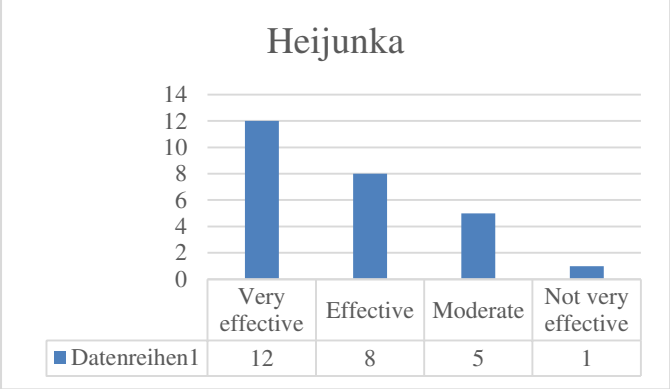


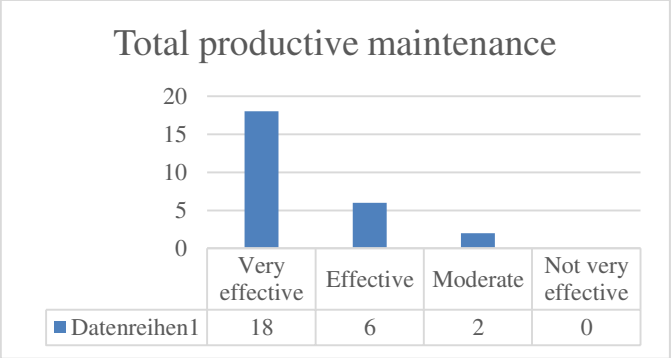


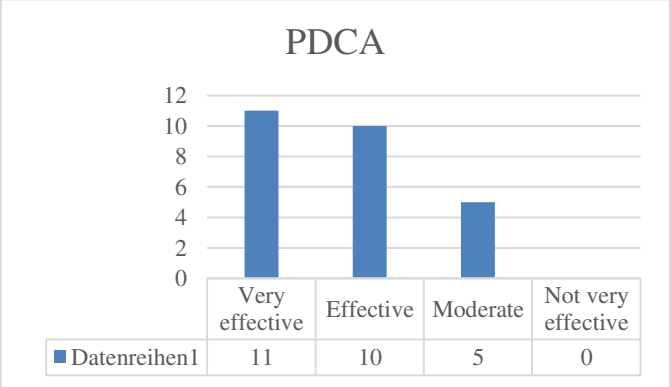


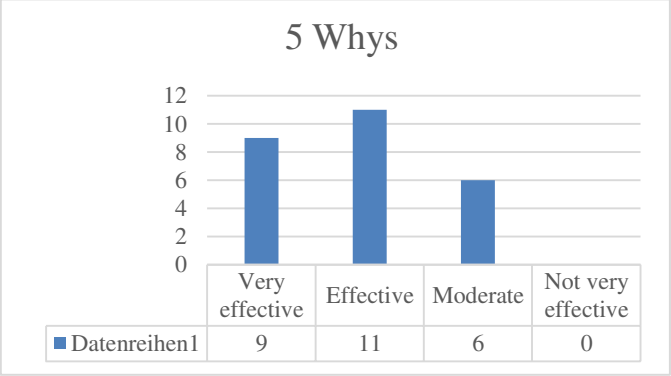












9.Quality strategies used by the organizations:

Quality strategies are the essential part of the organizational quality functions. Every organization must maintain the quality in production as well as in services by adopting different quality strategies. These quality strategies should be help full in many different ways to help them to increase organization profit, its value and help it grow. According to the project research, the data related to the quality strategies has been collected as shown below for example

First time Right: - it is explained as every operation performed in the org is to be executed in a correct manner so that it will succeed in the first attempt itself

Rejection control: - It helps in reducing waste which leads to increase in profit as well as reduction in time consumption

Control on supplier performance: - the standard should be set by the organization for its raw material which

tents to make the supplier follow a strict way of maintaining quality

QIP (quality improvement projects): - which helps to perform better in the activities related to quality.

100% inspection at every stage of product being made: - in such way the products are checked for quality in online and offline inspection.

6.FINDINGS:

The research shows that the TQM tools and Lean tools plays a key role in manufacturing sector. From the collected data, it can be observed that check sheet, fishbone diagram, pareto charts and control charts are mostly used by all manufacturing companies to maintain quality and to find out the defects in the processes It is also observed that quality should be imparted in each employee as a daily practice and empower them to use it and that all the organizations follow quality strategies and these strategies are the essential part of the organizational quality functions and these should be helpful in many different ways to help them to increase organization profit, its value and help it grow.

7.CONCLUSIONS

Quality means ensuring competitiveness and thus securing our future, by continuous maintenance of our growing organizational knowledge. Consistent application of a quality management system results in flawless products and a high level of user benefit from components. It creates excellent quality of logistics and services and guarantees attractive price/ performance ratios. The quality management system is always in line with the most stringent international standards.

TQM is a holistic and ethical approach of the firms to continuously improve their products/services or processes involving all stakeholders in order to satisfy their customers and to improve performance and sustainability. The results give that overall TQM practices improve all performance measures. Successful training improves operational performance, employee performance, and customer results. It has been found that successful supplier quality management enhances social responsibility. Effective customer focus efforts increase operational performance customer results, and market and financial performance. Effective strategic quality planning efforts improve employee performance and social responsibility of the firm. It can be concluded that TQM and Lean practices improve various performance measures in the firms. All aspects of TQM and Lean practices should be effectively managed in a firm because each factor improves different aspects of firm performance. The synergy among the factors brings about exceptional or crucial improvements in the firm performances. Firms should improve employee involvement/ skill and firm structure and allocate sufficient resources to implement TQM and lean successfully.

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