

DEVELOPING A FRAMEWORK FOR IMPLEMENTING TQM PRACTICES THROUGH A COMPARATIVE STUDY

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ABSTRACT

This research work is an empirical study that has been done on the implementation of TQM tools and techniques in textile manufacturing firms and factors that were considered to be critical to the adoption of TQM tools and techniques. The prime objective of the use of quality improvement tools and technique is to ensure the quality of a final product to meet the customer's requirements. These tools help in reducing the costs, wastages, and delays in the production process. This research paper aims at studying the quality tools and techniques used by the textile manufacturing firms, followed by comparing the quality practices of two textile manufacturing firms. Various barriers to the effective implementation of TQM tools and techniques are finally studied. The paper concludes with an indicative model for effective TQM implementation with several recommendations for other firms with similar business performances.

KEYWORDS: *Quality Tools, Quality Improvement Techniques, Textile Manufacturing, ISO 9000, ISO 14000*

INTRODUCTION

Quality means the ability of a product or a service to satisfy customer needs and wants. When this definition is met by the organization through management and involvement of all the major internal and external stakeholders, it is referred to Total Quality Management. It has become challenging for the organizations to become adaptable and flexible. Every organization has its own tools and techniques to manage quality. Various quality gurus have laid down the foundation of quality management through basic quality tools which further were succeeded by the quality improvement techniques. The basic tools of quality are (Bhat, 2009):

Cause and Effect Diagram: It is a graphical representation of potential causes of problems.

Flow Chart: all the operations that are required to complete a task are visually represented through flow charts. It helps to show the schematic drawing of the process to measure or improve, potential weakness in the process are made visual and shows the picture of the process as it should be.

Check Sheet: Purpose of using this tool for collecting and organizing measured or counted data and data collected can be used as input data for other quality tools. **Histogram:** it is used to draw the shape of the distribution and thereby compare the specifications.

Pareto Chart: Pareto analysis is a ranked comparison of a factor related to a quality problem. It is a prioritization tool.

Control Chart: the process variations are expressed visually through the charts called as control charts. Benefits of control chart tool are predicting process out of control and out of specification limit and distinguish between a specific, identifiable cause of variations.

Scatter Diagram: the extent of the relationship among the variables is visually represented through a scatter diagram.

Following are Enlisted the Various Techniques of Improvement in Quality Management:

Sixsigma: Six letters may be a disciplined, statistical-based, data-driven approach and continuous improvement methodology to eliminate defects in product, method or service. Six letter populations' represents variance that may be alive of the distinction within the information set collected concerning the method. This methodology uses the data-driven review in limiting the mistakes and defects and within the method. In alternative words, the system may be a methodology of operating quicker with fewer mistakes.

Lean Manufacturing: Lean manufacturing can be a methodology that focuses on reducing waste inside production systems while increasing productivity. Usually, lean production, or just lean, integrated social technology approach depends on the Toyota production system. Crunchy production depends on many specific principles, such as kaizen, or continuous improvement.

Just-in-Time: Just-in-time inventory systems can be a management strategy that directly aligns the staple order with the assembly program from the suppliers. Companies use this inventory strategy to obtain goods and to cut waste because they require them for the assembly method, which reduces inventory costs. This method requires producers to accurately predict demand.

Kaizen: Kaizen is an approach to creating continuous improvement on the premise of this concept that little, in progress positive changes will bring nice improvement. Generally, it's supported collaboration and commitment and stands opposite to those approaches that use radical amendments or top-down edits to realize change.

5S: Sort (Seiri): Seiri is sorting through all items in a location and removing all unnecessary items from the location.

Set In Order (Seiton): Seiton is putting all necessary items in the optimal place for fulfilling their function in the workplace.

Shine (Seiso): Seiso is sweeping or cleaning and inspecting the workplace, tools, and machinery on a regular basis.

Standardize (Seiketsu): Seiketsu is to standardize the processes used to sort, order and clean the workplace.

Sustain/Self-discipline (Shitsuke)Shitsuke or sustain the developed processes by self-discipline of the workers. Also translates as "do without being told".

QFD: Quality Function Deployment (QFD) product requirements translate into user requirements and requests. The aim of QFD is to create a product that does the same to the customer, instead of distributing the product that is already emphasizing the product that the customer wants.

FMEA: This is also called potential failure mode and effect analysis; Failure Mode, Effect and Critical Analysis (FMECA) Failure, failure mode and impact analysis (FMEA) in the 1940s is a step-by-step approaches to characteristic all attainable failures during a style, a manufacturing or assembly process., Or a product or service this is a normal process analysis tool.

TPM: Total Productive Maintenance (TPM) equipment is an approach to maintenance, which aims to achieve an ideal production process by increasing productivity, efficiency, and security. Three targets of TPM are zero unplanned failures, zero product defects, and zero accidents.

Poka-Yoke: Poka-Yoke could be a Japanese word sense "fault-proofing" or "inadvertent error prevention". The main word in the second translation, which is often abandoned, is "unknowingly". There is no Poka-Yoke solution that deliberately delivers an operator's subversion. A Poka-Yoke is a mechanism in any process that helps a device operator to avoid (yoke) mistakes (poka). Its aim is to eliminate product defects by preventing human errors, improving or attracting attention to human errors.

TQM: Total quality management is defined as a customer-oriented process and its purpose is to continually improve business operations. This ensures that all related tasks (especially the work of employees) are towards the general goals of improving the quality of the product or the quality of the service, as well as increasing production process or the rendering process of the services.

Process Management: A process is a naturally occurring or designed sequence of changes of properties or attributes of an object or system. The process approach is a management strategy. When managers use a process approach, it means that they manage all the aspects of the processes that make up their organization, the interaction between these processes, and the inputs and outputs that glue these processes together.

Quality tools and techniques are the fundamental components of total quality management. With proper use of these tools and techniques organizations could design their products and processes, identify and solve quality problems leading to better customer value and operational performance. Along with these tools, organizations also have also understood the significance of quality standards and business excellence models that help developing a quality product to satisfy the global requirement. ISO 9000 and ISO 1400 are such standards that help the organization to satisfy global standards in the product and processes. ISO 9000 is a series of international quality standards which serves as a guidance to suppliers and purchasers about the minimum requirements of a quality system. ISO 14000 concerns with environmental management that refer to the steps an organization must take to minimize the harmful effects on the environment.

LITERATURE REVIEW

A literature review was done to identify and study the quality practices prevalent in the textile industry in India and outside.

This paper (Khalid, Irshad, & Mahmood , 2011)aimed at studying the implementation of TQM in textile manufacturing Industry and further studying the factors that are critical to the adoption of TQM in the industry. The

success factors for the implementation of TQM were identified as selective training, having a continuous improvement system, teamwork development, effective and simple framework for implementation and systematic approach.

Total Quality Management has broadly adopted by many firms. At first, TQM was developed in Japan; it was originated from the work of the quality gurus, Juran, Deming, Crosby, Feigenbaum, and Ishikawa and on the rise of the manufacturing industry of Japan in the world. TQM implementation in the organization helps from many ways for improvement of the total organization quality and performance, and novel standard in management. TQM has been analyzed in respect to manufacturing firm and services firm (Santosh Subhashchandra Dubey, feb 2017).

Adnan Kalkan, Ozlem Cetinkaya Bozkurt, 2013 elaborated the framework required for successful implementation of TQM tool and techniques as Strategic Planning, Human Resource Analysis, Total Quality Management, Customer Relationship Management, Outsourcing, Financial Analysis for firm owners, Politics, Economics, Social and Technology Analysis, Financial Analysis for the competitors, Innovation for the new product, Value chain analysis, Communication, Teamwork and Supply Chain Management. These factors are a study to understand the implementation for better improvement in the organization.

A case study (Joshi, 2001) on Environmental management systems for textile industry aimed at describing the series of ISO 14000 as an effective tool for environment systems applied to the textile industries. The results revealed that ISO 14001 was a success at the studied organization. The study concluded that ISO 14000 implementation provided an effective framework for developing environmental-friendly products and services thereby improving environmental performance and reducing costs.

The textile industry is recognizing the need to identify and implement waste minimization and resource recovery and reuse measures (Roy, 2011). Operational alternatives and advanced water treatment technologies are being implemented for water pollution management. The role of the environmental management system is thus becoming proficient. ISO 14000 has gained wide acceptance worldwide that has alarmed the developing nations to include environmental components in the code of conduct to make their suppliers more accountable from an environmental perspective.

RESEARCH METHODOLOGY

Objectives

The main objective of this study is to examine how different manufacturing companies make use of seven different total quality management tools to deliver a high-quality product. The specific objectives are considered:

- To understand the various TQM tools used in the textile manufacturing firms in Nagpur region.
- To compare the implementation of TQM tools and techniques by the textile manufacturing firms.

Research Design Including Sample Design

The study adopted an empirical cross-sectional design. Both qualitative and quantitative were deployed to address the research objectives. The qualitative research was conducted to understand the problem in inventory management by conducting a structured interview. The quantitative research design includes survey research and comparative research. This data would help to address the research to the textile industries.

This study is conducted in two textile manufacturing firms.

Data Collection

This study utilized primary data. Data was obtained using questionnaires developed by the researcher. The questionnaire contains questions and statements based on the research objectives. The questions were structured in such a way that they are easy to administer and analyze as well as aided the researcher to obtain in-depth responses on the survey.

A questionnaire is divided into four sections: Section A deals with general information of respondents and the organization; Section B addresses the implemented inventory tools and techniques; Section C deals with the impact of inventory tools and techniques on firm performance and Section D deals with the advance technology resources used by the firm. The target respondents were operations, procurement, and inventory or store managers or any other person who may have the equivalent position. This was followed by interviewing the respondent from the firm.

DATA ANALYSIS/PRESENT WORK

Experience of using Quality Tools:

Table 1

Quality Tools	Company X	Company Y
Cause and effect diagram	Yes	Yes
Check sheet	Yes	Yes
Control Chart	Yes	Yes
Histogram	No	No
Pareto chart	No	No
Scatter diagram	No	No
Stratification	No	No

Quality Improvement Techniques used by the Company:

Table 2

Quality Improvement Techniques	Company X	Company Y
ISO 9000	Yes	Yes
ISO 14000	Yes	No
Six sigma	No	No
Lean manufacturing	No	No
Just-In-Time	Yes	Yes
Kaizen	No	No
5S	No	Yes
Quality function deployment (QFD)	No	No
FMEA	No	No
Total productive maintenance (TPM)	No	No
Poka-Yoke	No	No
Total quality management (TQM)	Yes	Yes

COMPARATIVE ANALYSIS OF TQM TOOLS AND TECHNIQUES BETWEEN COMPANY X AND COMPANY Y:

Comparison of the Level of Agreement with Statements about Quality Improvement:

In this analysis both Company X and Company Y are 80% agree with the statement leaders are receptive to new ideas for improving company programs, services and outcomes for quality improvement.

Company X is 100% agree while Company Y is 60% agree with the statement director and/or the management team works together for common goals for quality improvement. Company X is 100% agree while Company Y is 80% agree with the statement staff consults with one another to solve problems for quality improvement.

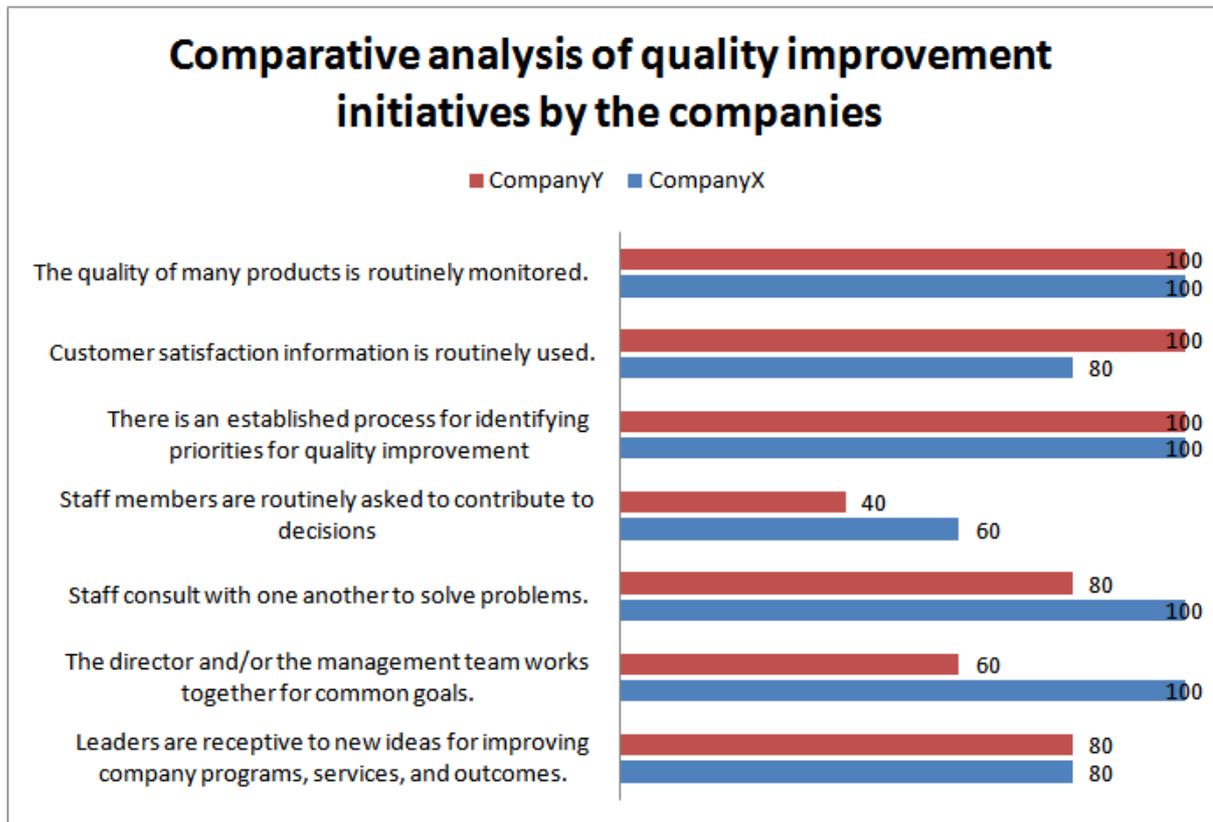


Figure 1: Statements of Quality Improvements of Company X and Company Y

Company X is 60% agree while Company Y is 40% agree with the statement staff members are routinely asked to contribute to decisions for quality improvement.

Both Company X and Company Y are 100% agree with the statement there is an established process for identifying priorities for quality improvement.

Company X is 80% while Company Y is 100% agree with the statement customer satisfaction information is routinely used for quality improvement.

Both Company X and Company Y are 100% agree with the statement the quality of products is routinely monitored for quality improvement.

The overall average of the level of agreement with the statement which is shown in the graph about quality improvement in Company X is 88.57%, and in Company Y is 80%.

Comparison of Benefits of using Quality Improvement Techniques in Operation Performance

In this analysis Company X and company Y 100% benefits by improving product quality using quality improvement techniques in operations performance. 100% benefits taken by Company X is customer satisfaction, improved

quality of product and increase in production while 100% benefit achieved by Company Y is improved quality of the product.

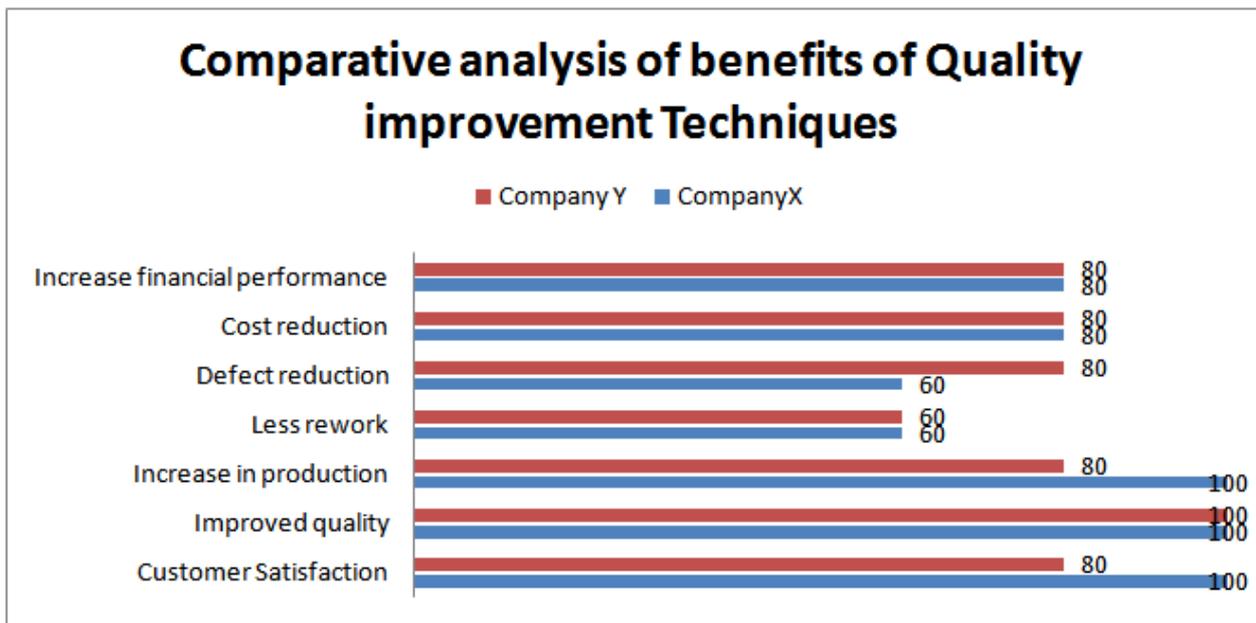


Figure 2: Benefits of using Quality Improvement Techniques in Company X and Company Y

On the other hand, again 100% of benefits achieved by Company X are cost reduction and increase the financial performance of the company.

Where 100% of benefits achieved by Company Y are customer satisfaction, increase in production of the product, defect reduction, cost reduction and increase financial performance of the company.

In Company X and Company Y, less rework is also which is 60% beneficial when both companies use quality improvement techniques in operation performance.

The overall average of benefits of using quality improvement techniques on operation performance of Company X is 82.85%, and Company Y is 80%.

Barriers in Company X and Company Y while using Quality Improvement Techniques

In Company X, main barriers which affects 60% on operation performance while using quality improvement techniques are lack of empowerment and accountability to drive improvements, lack of desire to change or improve and having the wrong perspective of quality as a short term initiative, wrong people in wrong position, no teamwork or no team development, lack of motivation system, lack of education and training program and lack of communication.

In Company Y, main barriers which affect 80% on operation performance while using quality improvement techniques are lack of empowerment and accountability to drive improvements, lack of desire to change or improve, and having the wrong perspective of quality as a short term initiative. And barriers which affect 60% on operation performance are lack of expert person, lack of communication, lack of strategic planning need to identify improvements, lack of education and training program, lack of top management commitment, involvement, leadership and support, lack of motivation system, no team work or noteam development.

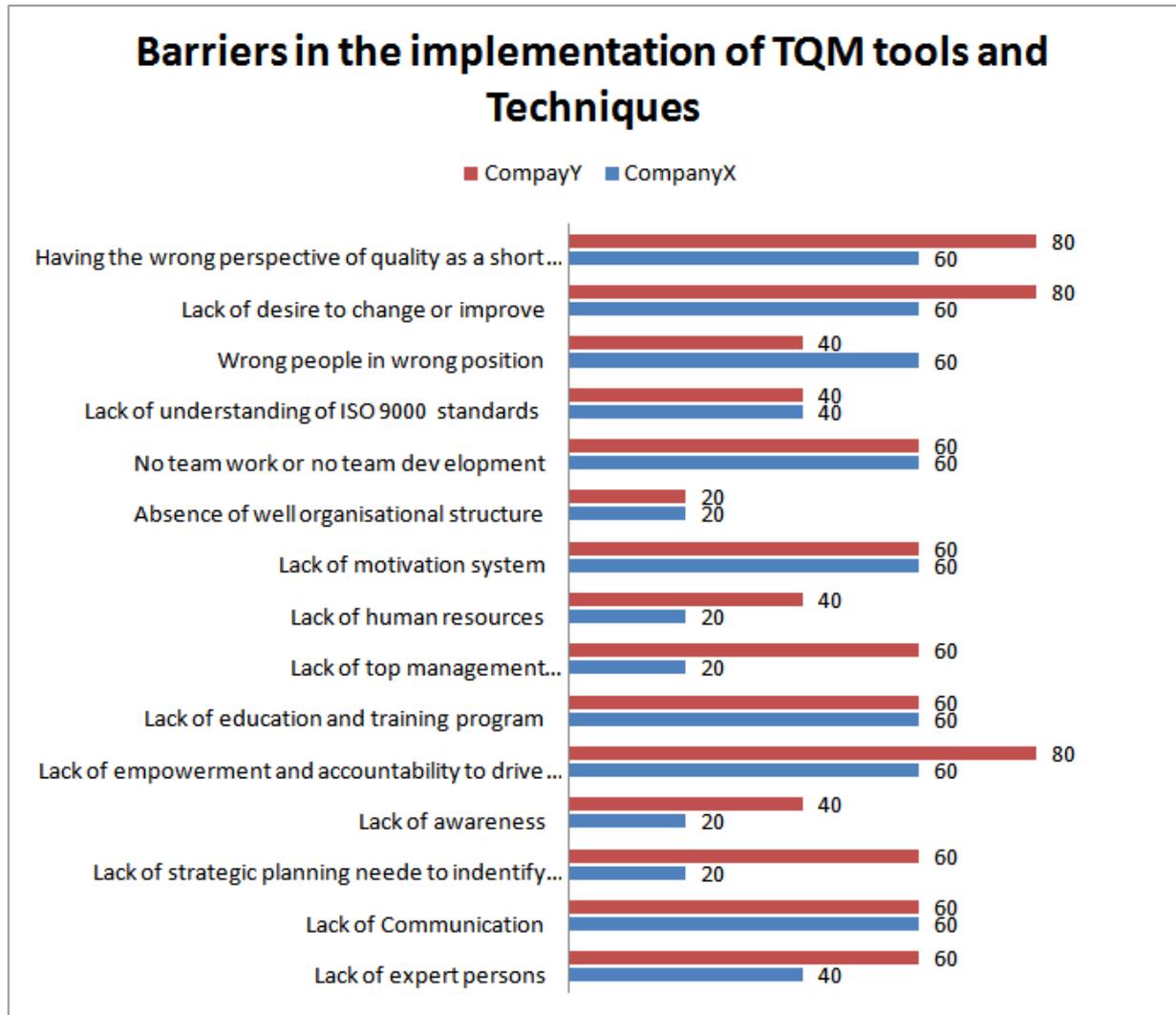


Figure 3: Comparisons of Barriers between Company X and Company Y

The overall average of barriers while using quality improvement techniques in Company X is 44%, and the average of Company Y is 56%.

CONCLUSIONS

Organizations always try to improve the various techniques and tools that are invented to meet customer's expectations. Therefore, the definition of quality always develops. With the introduction of the concept of 'intense competition and total quality', it appears that the firms working according to the concept of acceptable quality standards have no choice but to adopt 'zero defects' policy.

From the study, it was concluded that TQM tools and techniques were used in both firms and employees were aware of TQM tools and techniques. There are some similarities in using quality practices in both firms and there are some differences also. Both companies consider some factors important in the selection of raw materials suppliers. Firms indicated the level of agreement with some statements about quality improvement. Benefits of using TQM tools and techniques are customer satisfaction, improved quality, increase production, cost reduction and increased financial performance of the organizations.

And finally, in the result, it has been seen that both companies use almost same TQM tools and techniques to improve product quality. Tools Such as for cause and effect diagram check sheet, control chart and techniques like ISO 9000, ISO 14000, Just-in-time, TQM and process management system.

RECOMMENDATIONS

Figure 4 shows the suggestive model which was developed after comparing seven total quality tools and techniques used in both manufacturing firms in Nagpur region.

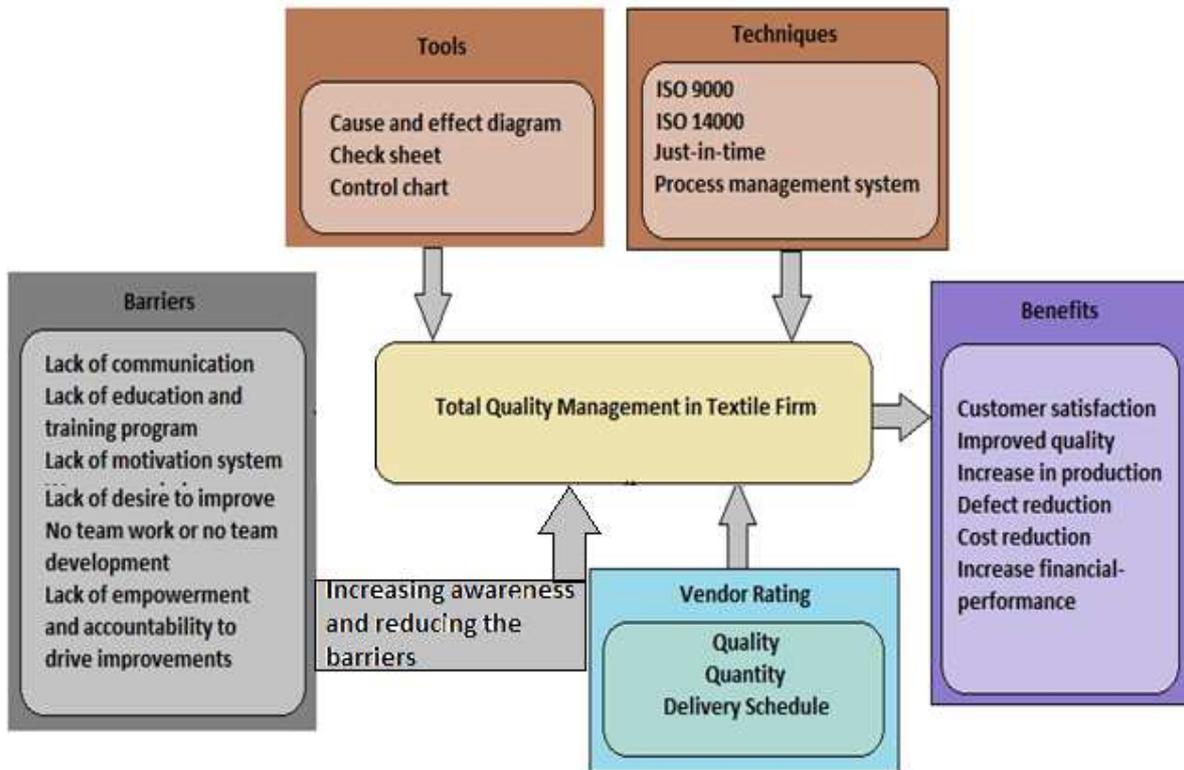


Figure 4: TQM Model for Textile Manufacturing Firms

It was observed that out of seven basic quality tools only three tools such as for cause and effect diagram, check sheet and control chart was used in both the firms. And with respect to quality improvement techniques, five techniques such as ISO 9000, ISO 14000, Just-in-time, TQM and process management system were prominently used. ISO 9000 is defined as a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements needed to maintain an efficient quality system. They are not specific to any one industry and could be applied to organizations of any size. ISO 14000 is defined as a series of international environmental management standards, guides, and technical reports. The standards specify requirements for establishing an environmental management policy, determining environmental impacts of products or services, planning environmental objectives, implementing programs to meet objectives, and conducting corrective action and management review. Just in time (JIT) is an inventory management method whereby materials, goods, and labors were scheduled to arrive or be replenished exactly when needed in the production process. Total quality management (TQM) describes a management approach to long-term success through customer satisfaction. In a TQM effort, all members of an organization participate in improving processes, products, services, and the culture in which they work. Manufacturing process management is a

collection of technologies and methods used to define how products are to be manufactured. Vendor rating was considered as one of the important parameters because the quantity of raw material provided by vendors defined the quality of the finished product. Hence vendor rating was an important activity at their organizations. Three vendor rating criterion was used by the organizations. Quality, quantity, and delivery schedule were the major criteria for rating the vendors.

Benefits that were observed by using TQM tools and techniques by the firms were customer satisfaction, improve quality of the product, and increase in production, defect reduction, cost reduction and increase financial performance of the organization.

There were certain barriers to improve quality like lack of communication, lack of empowerment and accountability to drive improvements, lack of education and training program, lack of motivation system, wrong people in the wrong position, lack of desire to change or improve and having the wrong perspective of quality as a short term initiative.

To overcome the above barriers, there should be good communication between top management and employees, empowerment of employees, education and training program should be conducted. An organization should motivate the employees to work properly and suitably by offering them better facilities and good salary. People must be on proper position according to their education and experience, higher authority people and employees must be a desire to change the methods and to improve quality. People in the organization should not have the wrong perspective of quality as a short term initiative. Because quality is a long term initiative which helps to satisfy customer need.

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