Critical Success Factors for Effective Implementation of TQM & TPM

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Abstract

According to the literature, quality management consists of a set of components: critical factors, tools, techniques and practices. To facilitate the implementation of Total quality management (TQM) and Total Productive Maintenance (TPM), practitioners and researchers have suggested large number of critical success factors. However, despite a broad consensus about what needs to be done, companies still struggle to implement these initiatives. Over the years, both academicians and professionals are emphasizing on the point of quality improvement of goods and services. Two of the eminent quality management philosophies are TQM and TPM. Quality management, by means of TQM, is considered to promote organizational performance characterized by competitiveness and long-term profitability. The benefits of quality management cannot be achieved without the sustained performance of equipment affecting product quality, hence TPM has become important. TQM and TPM approaches are generated in developed countries. It is found that TQM and TPM have similar background, some common factors, which have positive impact on the organizational performance. This paper includes a comparative study of literature focusing on factors of TQM and TPM implementation which have positive impact on the organizational performance. The study found some factors are common categories of activities when implementing TQM and TPM as combined strategy. The purpose of this paper is to identify the Critical Success Factors of TQM and TPM, in order to make them known to managers and thus facilitate successful quality management implementation.

Keywords: Quality Management, Critical Success Factors, TQM, TPM, Implementation

I. INTRODUCTION

Quality management has been recognized as giving edge for quality and long term profitability. Various popular approaches are employed in manufacturing organizations for performance improvement. [1] Provides detailed list of improvement philosophies and outline of the six improvement approaches is addressed [2]. TQM and TPM share many threads of commonality; the comparative analysis of these two approaches is presented [3].

A. Total Quality Management

Different definitions of TQM have been presented over the years. [4] Claims that “attempting to define TQM is like shooting at a moving target”. Some argue that TQM as a corporate culture characterized by increased customer satisfaction through continuous improvement, in which all employees in the companies participate actively. Total Quality Management focuses on control of business processes and customer satisfaction. Activities such as improvement, statistical control, supply control and quality engineering are ingredients of TQM. TQM as a concept emanates from the academic field and has contributors such as Feigenbaum, Juran and Deming.

The understanding of TQM is through different quality awards such as Deming Price, European Foundation of Quality Management, Malcolm Baldrige and so on. As TQM became popular around the world, the concepts of TQM were embodied in various national quality awards. Thus a comparison of different quality awards can provide insight into the similarities and differences in the understanding of TQM across the world. These quality awards are today looked upon as models of excellence. The basis for considering a quality award framework as a model of business excellence is that now it usually contains a set of quality criteria that encompass all areas of an organization’s operation.

B. Total Productive Maintenance

The Japanese evolved the concept of TPM based on preventive maintenance [5]. TPM is a waste reducing approach to stabilize utilization of machining resources. TPM is considered as an additional driver, which is complementary to TQM [6]. TPM focuses on improving machine availability and includes monitoring of machine equipment called overall equipment efficiency to visualize losses of utilization. The main focus of TPM is on the condition of the equipment and its influence on quality of output. TPM offers both measurement aid and improvement schemes. The ideal goal of TPM is to make the availability time equal to the value adding time. TPM is an extensive approach, which involves mainly two parts of an organisation, i.e., production and maintenance. It is therefore crucial that TPM work involves leaders of organisational level, also emphasized in TPM as leader
Further, the implementation is supported by defined implementation steps, both for production and maintenance. TPM can also be benchmarked via a TPM award application. This procedure is similar to the awards in TQM. The companies applying for TPM should establish a report, which is evaluated by a prize committee. If the report gets a good score, the company can be subjected to an onsite evaluation by TPM experts to be further evaluated for the TPM prize.

TPM is an extensive, resource and competence demanding approach with risk for conflicts among the involved departments. Further, TPM implementation is time consuming and according to standardized implementation schemes it can take as long as five years to implement to its full extent. TPM is suited to companies, which have a lower degree of improvement maturity, as TPM starts at a basic level, namely 5S.

II. LITERATURE REVIEW

Based on comprehensive review of literature, following implementation factors of TQM and TPM have been identified which have positive impact on the organizational performance. Various recent researches across the globe have also focused on identification of factors, which are critical to success of TQM [7][8] in country specific scenario. The study by [9] is perhaps the first comprehensive empirical study of quality practices in the Indian context. The studies are available between TQM practices and business performance [10]-[15]. The relationship of TPM with business performance has also been addressed [16]-[18].

A. Leadership

Senior management’s personal involvement, guidance, support and setting directions for improving efforts supporting importance of leadership in TQM is highlighted as a critical factor by several empirical studies [10][11][19][20]. The role of top management’s commitment and leadership has been frequently emphasized in many literatures to have the decisive influence over successful TPM implementation [17][21]. TPM requires a drastic change in the traditional mindset of work culture and maintenance approaches. [22] stated that the top management’s primary responsibility is to establish a favorable environment where the work environment can support autonomous activities.

B. Customer Satisfaction

The emphasis on customer satisfaction is considered by many gurus and writers as a major success of the quality management effort [23]-[25]. A strategic concept, customer satisfaction is concerned with such achievements as customer retention and market penetration. Researcher considers measuring customer satisfaction as a cornerstone of TQM. The highest percentages of the awards scores relate to customer focus and satisfaction. TPM literature highlights effective customer relationship and ensuring customer satisfaction [22].

C. Continuous Improvement

Continuous improvement has been considered to be strategic significant variable in production and operation management literature, [26][27]. Alternative views and strategies exist how continuous improvement can be managed in organisations. Practicing managers seems to favor one approach over another while empirical studies indicate no clear direction. TPM is considered as an application of TQM.

D. Process Management

To achieve customer satisfaction, [16] emphasizes the importance of managing the internal-supplier relationship as the first step to support the process management. Through a process of translating the customer-supplier chain at all levels, better focus can be achieved and ultimately all work carried out will be of value [25][28][29]. The importance of customer focus is also evident from the fact that it is assigned the highest weight among the Malcolm Baldrige Award criteria and the European Quality Award.

E. Strategic Planning

Strategic planning, which implies activities which link TQM and TPM to the company mission, vision and defined business strategy, and strategic priorities and goals [20][30]. This gives a clear picture of how the improvement will benefit the organisation and promote desired achievements such as management and employee understanding.

F. Training and Education

It deals with training in tools and techniques of TQM and TPM, communication and training in small group problem solving. [20] Consider investment in education and training vitally important for TQM success. Several recent empirical studies revealed that training and education are critical to successful TQM and TPM implementation [17] [20] [21] [31].

G. House-keeping

The concepts that compromise house-keeping activities tend to be overly didactic. This is because the activities are not centered on results, but rather they emphasize people’s behavioral patterns, such as the elimination of unnecessary items from the work environment or the cleaning and neating of equipment. Consequently, the activities are of a kind that makes quantitative assessment of their effectiveness difficult [5].
H. Teamwork
Teamwork delivers synergistic enhancement of quality efforts. Employees must demonstrate cooperative behavior and positive attitude towards working in a team. One of the most publicized aspects of the Japanese approach to quality has been the quality circles or kaizen teams. Reviewing the literature reveals that teamwork is a critical factor in Total Quality Management [24]. One of the major elements of the human resource focus that has been identified as a critical success factor to the success of TQM programs is teamwork. TPM demands active participation from the shop floor operators in the continuous improvements activities, cross-functional teamwork, and work suggestion schemes [22].

I. Result and Recognition
TQM is user-driven. [14] Consider the recognition procedure as basic to increasing the involvement of all employees in the operation of the business. Many other authors highlight the importance of results and recognition in the TQM process [15]. Also JIPM TPM award highlight the importance of results and recognition which is supported by literature.

J. Equipment Management
Equipment management is critical factor for quality and productivity of process. It is related to maintenance and planning of equipment. Studies support these findings for TQM [30] and TPM [5].

K. Supplier Quality Management
Supplier quality management is an important aspect of TQM and TPM since materials and purchased parts are often a major source of quality problems [20]. Many authors advocate that companies must establish supply chain partnerships to motivate suppliers to provide materials needed to meet customer expectations [28][31]. Other recent studies support these findings [5][29].

L. People management
[27] Proposes people management including ”team work” and people make quality, as one of the four principles of TQM. Employee involvement and commitment to the goals of the TQM process is a condition to its successful implementation. Studies identified employee empowerment as a critical factor of TQM implementation [20].

M. Total Employee Involvement
The importance of Total Employee Involvement is highlighted in TQM literature [10][11][30]. TPM embraces empowerment to production operators establishing a sense of ownership in their daily operating equipment [21]. This sense of ownership is an important factor that underpins TPM to its continual success with every operator being responsible to ensure her own machine is clean and maintained. It involves the employees to have a common understanding of the basic principles of TPM. The importance of total employee involvement is based on the beliefs that shop floor operators have the most hands-on experience with the machines they operate daily. Thus, TPM demands active participation from the shop floor operators in the continuous improvements activities, cross-functional teamwork and work suggestion schemes [22].

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III. Categories important for managing commitment
As mentioned earlier, management commitment must permeate an organisation before implementation begins. The comparative literature study of TQM and TPM implementation led to identification of common activities that influence intangible factors. Several categories of activities common to TQM and TPM, which affects commitment during the change process. The categories, considered to be important, are:

Leadership, which implies making employees feel recognized, and visibly showing the significance of the implementation to motivate employees. Management should also consider the work environment, i.e. whether employees have the time and resources for improvement efforts; this is fundamental for ensuring that employees willingly comply with the implementation.

Strategic planning, which implies activities which link TQM and TPM to the company mission, vision and defined business strategy, and strategic priorities and goals. This gives a clear picture of how the improvement will benefit the organisation and promote desired achievements such as management and employee understanding.

Planning the implementation implies developing a clear scope in order to identify obstacles and driving forces. This facilitates monitoring and follow-up, which promotes such desired achievements as management and employee understanding and involvement. It also implies activities which promote the participation of all concerned parties (e.g., front-line staff, unions, and management), usually by means of small teams, in goal setting, and identifying solutions. The participation of employees promotes such desired achievements as involvement and ownership.
Empowerment implies such activities as selling the concept to each group, identifying what each group or level of employees and management want. Empowerment activities, such as sharing responsibility promote involvement, job satisfaction, independence and ownership among employees.

Training and education implies activities that develop employee competence, skills and knowledge. Training promotes employee belief that the company is investing in them; it also supports understanding and awareness.

Information architecture implies open and meaningful communication about aims and goals, and about the concept and how it will affect employees personally. Information and communication promote such desired achievements as understanding and involvement. Monitoring and evaluation implies such activities as obtaining measurable and quantified results and objectives, so as to have a clear scope and focus, and continually monitoring and following through the process. This reveals progress and results that promote management and employee involvement and understanding.

The theoretical knowledge gained from the literature study is presented in Figure 1 as a structure of categories.

![Fig. 1: Structure of categories gained from Literature Study](image)

**IV. CONCLUSION**

The review of the literature shows, on the one hand, that there have been studies analyzing the critical factors for successful TQM implementation and its influence upon the results, TPM implementation and its influence upon the results. After this review, it can be said that, there is no unique model for a good combined TQM & TPM programme. TQM and TPM implementation implies organizational change. It is imperative that management and employees are committed to implementation. Management must address intangible factors such as motivation, engagement and acceptance, in order to nurture a willingness to change. In the current literature on implementation of TQM and TPM, an overall approach regarding the management of intangible factors seems to be needed.

The structure of common categories identified, should facilitate management of intangible factors, and thereby promote commitment during implementation. As represented in Figure 1, committed management, as a prerequisite, should focus on activities within these important categories: leadership, strategic planning, training and education, process management, continuous improvement and information architecture. This should promote the employee commitment that is so essential to the successful implementation so as to have positive impact on the organizational performance indicators to improve quality of product and/or service, productivity indicators and financial measures.

This paper has pointed out, on the one hand, which TQM and TPM factors must be considered by managers who desire to successfully implement combined TQM and TPM approach within their firms. In practice, the next step could be the use of the various quality award models to define improvement activities. Then, once the management is aware of the TQM and TPM factors, activities can be developed for their implementation.
REFERENCES


