

Total Quality Management Makes “Japanese Industry as a Miracle”

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Abstract

Quality is the key to competitive advantage in today's business environment. As more organisations opt for Total Quality Management (TQM), the choices open to those wanting to set up a quality system are becoming increasingly varied. TQMEX is an important proposal. The model is a sequence of steps arranged logically to serve as a guideline for implementing. TQMEX model also includes- BPR, QCC and Problem Solving and Total Productivity Maintenance (TPM). BPR aims at analysis and redesign of workflow within the enterprise. QCs are small groups of volunteers usually from the same work area who meet at regular intervals to identify, analyse and solve problems related to their tasks. The goal of a TPM programme is to increase production and improve employees' moral and job satisfaction. The present study aims at studying various tools for the management of quality. For understanding the role of each concept, a case study has been discussed with the relevant tools.

Keywords: ISO 9000, Japan, Quality circles, TQM, Continuous improvement, India, Libraries, Management activities.

Introduction

“Whatsoever will be produced will be sold” phrase has no meaning in this competitive era. Manufacturing firms are experiencing that demand for quality products and services are increasing with rapid speeds. Theory of comparative advantage predicts organization. In order to compete in global economy, our products, systems and services and economic activities will move to places where natural resources are abundant and marketed in near. But this fact proves wrong when we see that Japan exports are ten times more than Brazil although the latter has the same population and is about ten times closed to the USA. This implies that comparative advantage is not a gift from nature alone, but a dynamic entity designed by people and includes investment in education, public facilities, technology, export promotion etc. It implies investment in quality management pays than any other investment. In this reference, it can be said that TQM is an invisible asset for any product of a higher quality than our competitors. Now it becomes necessity for every manufacturer to adopt TQM in their organizations.

What is TQM

TQM is the totally integrated effort for gaining competitive advantage by continuously improving every facet of an organization's activities. TQM can be defined as:

Total: Every one associated with the company is involved in continuous improvement.

Quality: Customers expressed and implied requirements are met fully.

Management: Executives are committed.

TQM provides the overall concept that foster continuous improvement in an organization. The TQM philosophy stresses a systematic, integrated, consistent, organization wide perspective involving everyone and everything. It focuses primarily on total satisfaction for both the internal and external customers; within management environment that seeks continuous improvement of all systems and processes.

TQM is a necessity. It is a journey which never ends. It makes "Japanese Industry as A Miracle." QM works by targeting not only to remove defects rather than continuous improvement in every facet of organizations' activities.

'Quality' according to TQM is the "totality of features and characteristics of a product or service that bears on its ability to meet a stated or implied need."

Japanese companies target not only 'conformance to standard' but they believe in "providing extraordinary customer satisfaction," e.g. if a Japanese video tape specify 180 minutes recording it can normally record up to 190 minutes, if you buy mink coat from a store they will provide you an extra facility to store that fur-coat in their temperature control room during summer season free of charge. They call their extra facilities as "delighting the customers."

Review of Literature

Richard J. Schanberger (1983) defined Quality Control Circles (QCC) as a technique for improving quality, productivity and worker morale, have been widely adopted in western industry. In this paper, it is viewed that plant configuration consideration should be foremost among the factors emphasised in an industrial work improvement programme and that western industry should not expect too much from QCC.

Alan Stainer (1997) discussed the challenges of evaluating input and output factors, highlighting the basis of capital input measurement and taking into consideration the issues of inflation, operational capacity and technological change. It placed that productivity is a performance-measurement tool. It is explored the affinity of productivity and its various measures to management accounting with special focus on price recovery and profitability. Models have been introduced for capital input within total productivity, based on replacement cost the interrelationship of capital and labour inputs with total productivity and its relevance to managerial strategic decision-making has been demonstrated.

Samuel K.M. Ho (1999) explained that the fundamentals of TQM are revisited for

providing a relevant perspective on business excellence. Judging from the experience of the Japanese TQM movement, there is a need for a step-by-step approach towards TQ. As a result of exploratory research, a model called TQMEX standing for TQM Excellence model has been developed based on sound TQM practices. The theoretical background, personal experience and results of an intensive questionnaire survey conducted in Hong Kong, Japan and the UK have highlighted the importance of the Japanese 5-S, BPR, QCC, ISO 9000 and TPM to TQM practice. The findings were useful for firms wanting to benchmark against the business excellence of leading firms which have survived and grown despite the two global oil crises and the recent Asian financial turmoil.

Samuel K.M. Ho (1999) explained that TQMEX is an important proposal. The author explained that this model is a sequence of steps arranged logically to serve as a guideline for implementation of a process in order to achieve the ultimate goal. The range of activities of TQM is broad and well-covered.

Nihar Kanta Patra, Jayanta Kumar Tripathy and Dr B. K. Choudhary (2005) discussed the implementation of office TPM in Indian Institute for Production Management (iiPM) library situated at Kanshbahal, Orissa, India. It described very briefly the reasons for and benefits of implementing office TPM and explained the policies, objectives, roadmap and methodology used at the iiPM Library. It also elaborated the Japanese terms, which are known as 5S. The goal of a TPM programme is to increase production and improve employees' moral and job satisfaction.

P.S.Ahuja (2009) explained that the global marketplace has necessitated many organizations to implement proactive lean manufacturing programmes and organizational structures to enhance their competitiveness. Over the past two decades, manufacturing organizations have used different approaches to improve maintenance effectiveness. One approach to improving the performance of maintenance activities is to develop and implement strategic TPM programmes. Manufacturing organizations worldwide are facing many challenges to achieve successful operation in today's competitive environment. Modern manufacturing requires that, to be successful, organizations must be supported by both effective and efficient maintenance practices and procedures.

Need for Total Quality Management

The concept of TQM emerged as a new, challenging, marketable philosophy. It involves three spheres of change in an organization – people, technology and structure. The role of top management in implementation of total quality is crucial and its input on people far reaching. TQM, therefore, should be understood as management of the systems through system thinking, which means understanding all the elements in company and putting them to work together towards the common goal. The TQMEX model advocates an integrated approach in order to support the transition to systems management which is an ongoing process of continuous improvement that begins when the company commits itself to managing by quality.

Model:

A model is a sequence of steps arranged logically to serve as a guideline for

implementation of a process in order to achieve the ultimate goal current quality models have beneficial applications in organizations. However, they do not address the strategic dynamic issues present within TQM applications in organizations. In order to have a systematic approach to TQM, it is necessary to develop a conceptual model. The model should be simple, logical and yet comprehensive enough for TQM implementation. TQMEX model by Samuel K. Ho is an attempt to fulfil the need to put the best quality practices together in sequence, which can be used as a step-by-step guide for the companies who want to achieve TQM.

TQMEX Model:

The implementation of TQM is possible with a number of management approaches. Any company according to its own circumstances can follow the work given by various "quality gurus", such as Deming, Juran, Crosby etc. Whenever any approach is to be implemented in any organization, it is required that due changes are to be made. The organization needs to develop a suitable TQM implementation and performance improvement system by adopting a changed model that is feasible. Current quality models have beneficial applications in organizations. However, they do not adequately address the strategic and dynamic issues present [or are "sketchy" at best (Hermel and Bartoli, 2001)], within TQM applications in organizations. There is a need for a model to put the best quality practices together in a sequence, which can be used as a step-by-step guide for the companies who want to achieve TQM. It is argued that organizations are different and there is no universal approach to total quality. The TQMEX model by Samuel K. Ho (1994) attempts to offer something to everyone which is being represented in Figure-1 below:

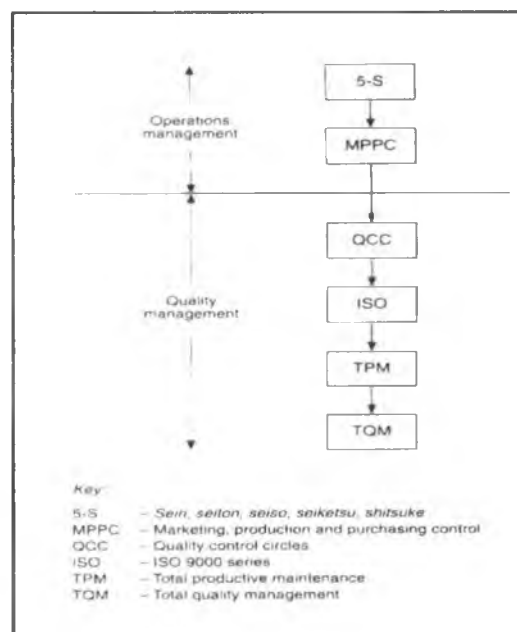


Figure 1. The TQMEX Model

The model's name **TQMEX** is made up of **TQM** and **Excellence**, indicating that high standards and outstanding successes are the goals. It is a sequential model which is easy to remember and simple to implement

Japanese 5-S Practice:

The original concept of 5-S was developed in early eighties. This 5-S practice is a technique which is used to establish and maintenance of quality environment in any of the organization. Japan was the first country to use this 5-S practice from a long time. The practitioners in Japan believe that the 5-S practice is not only useful for improving the quality rather than useful for the improvement of industrial management process as well. The name stands for five Japanese words: *Seiri*, *Seiton*, *Seiso*, *Seiketsu* and *Shitsuke*.

The five Ss concept takes its name from the initials of five Japanese words:

- *Seiri*, meaning "to organize", applies to WIP, tools, documents, unused equipment, etc. It is about separating the things which are necessary for the job from those that are not keeping the number of necessary ones as low as possible and at a convenient location.
- *Seiton* meaning, "to put in order neatly", dictates organization and preparedness: a place for everything and everything in its place, ready for use where and when needed. It is the study of efficiency
- *Seiso*, or "to clean up", keep the workplace clean. Cleaning should be done by everyone in the organization. The Japanese believe that while they are doing cleaning they are cleaning their minds.
- *Seiketsu* or "stanardization", enjoins us to develop habits of orderliness. It means continually and repeatedly maintaining of an organization's neatness and cleaning.
- *Shitsuke* means "discipline", to follow procedures and practice the other 4 Ss. The emphasis is on self-discipline because it reached beyond discipline.

Practising the 5-Ss creates the conditions for quality production and prevents many kinds of potential problems

Japanese 5-S Practice in Practical:

The 5-S implementation requires commitment from both the top management and everyone in the organization. The 5-Ss set out a clear, simple route towards achieving a total quality, equitable, environment where well-controlled processes and operations produce high quality goods and services. Management must be seen to practise 5-S itself and to maintain commitment. O'Eocha (2000) states that management improvement and change of practice even in a small firm requires strong leadership by example and not words.

Implementing 5-S at the Wellex Corp. in the USA (Abramovitch, 1994):

Wellex Corporation was established in 1986 by three Taiwanese immigrants in the USA. By 1990, Wellex was an award-winning printed circuit board contractor with annual turnover of US\$13.5 million and had built a good reputation among clients like IBM, Sun Microsystems, and Silicon Graphics. As the business grew, the

company employed 300 people from over 30 different countries.

In 1991, the demand for high-tech hardware plummeted. At that time, the only way to survive was to cut costs. Nevertheless, Wellex decided not to reduce staff since the management treated the employees as their biggest asset. In the attempt to cut costs, they turned to the Japanese experience.

In August 1991, the managing director and five managers visited Miyoshi Electronic, a Japanese company engaged in a similar business. There they were astonished by the cleanliness and neatness of the factory floor and the impact of overall organisation on employees' performance. The secret was in the 5-S system, the principles of which are basic for further quality improvement. The workers understood the importance of instilling the 5-S in their personal lives as well. It all contributed to improvement of interpersonal relationship across the company.

The team from Wellex was impressed and decided to launch the same practice back in their company. Although there was a certain amount of scepticism towards the 5-S, a typical reaction of an individualistic culture, the results were encouraging. One of the assembly line workers explained the impact of the 5-S implementations as "Before, I would have to wait around for my supervisor to tell me what to do. Now, I know what to do when I arrive in the morning. I have a schedule, and I keep records of all my work. This is a good system. Everybody knows what the problems are and how to fix them." They all emphasized the importance of organisation, cleanliness and discipline for a good atmosphere and mutual support in the factory. The 5-S system set different sets of rules from the previous practice but it made people more of a team. As another worker stated "Before the 5-S, we just worked. Now, I try to improve my work."

Just two years after the 5-S came to Wellex, productivity has skyrocketed by over 26 per cent, with turnover exceeding US\$23 million. This result proves that the 5-S culture is universal and can be related to any working environment if there is a commitment to the common objective.

Business Process Re-engineering (BPR):

It is an approach related to management. The ultimate aim of BPR is to improve the process that exists within the organisation by means of elevating efficiency and effectiveness. It is the analysis and redesign of workflow within and between the enterprises. Seven principles of BPR as suggested by Hammer and James Charpy are:

- to organize the customs not the tasks.
- to identify all the processes in an organization and priorities then in order of urgency.
- to integrate information processing work into the real work that practises the information.
- to treat geographically dispersed resources as though they were centralized.
- to put the decision point where the work is positioned, and built the control in to the process.

- to link parallel activities in the work flow instead of just integrating their result.
- to capture information once and at the source.

BPR can give huge benefits, if implemented properly. It has helped giants like Proctor and Gamble and General Motor Corporation succeeded after financial drawbacks due to competition. BPR transforms an organization in ways that directly affect performance.

Example:

Rank Xerox is a part of Xerox Corporation, a multinational company that found itself in deep trouble in the late-1970s. From the mid-1960s to the mid-1970s its profits rose 20 per cent a year, not least because it had a near-monopoly on photocopier technology. By 1980, it saw its market share halve, as aggressive competitors moved in and beat it on price, quality and other important measures.

Xerox's solution was to benchmark the way its photocopiers were built, the cost of each stage of production, the cost of selling, the quality of the servicing it offered, and many other aspects of its business against its competitors and against anyone else from whom it could learn. Whenever, it found something that someone else did better it insisted that the level of performance became the "new base standard in its own operations."

BPR has now become an everyday activity for every department in Xerox and Rank Xerox. The guiding principle is: "Anything anyone else can do better, we should aim to do at least equally well." It is closely tied into the company's quality management programme, because BPR is one of the most important ways of identifying where quality improvements are needed. Not only has Xerox worldwide improved its financial position and stabilised its market share, but it has increased customer satisfaction by 40 per cent in the past four years.

Quality Control Circles and Problem Solving

QCCs are small groups of volunteers usually from the same work area who meet at regular intervals to identify, analyze and solve problems related to their tasks. They discuss the management issues related to improvement in production methods or quality control. This group of persons put suggested solution to the management for consideration and decisions. QCC is based on the philosophy of participative and humanistic approach of management. QCC based on six principles:

- Workers are recognized as one of the valuable resources.
- Team work should be promoted.
- Whatever the project is, it should be correlated with daily worker.
- All employees, at all levels should participate equally.
- Creativity should be encouraged.
- Workers should be created as useful measures.

The QCC can make benefits in any work place. Japanese industry has the experience to adopt QCC in solving the problems. Various tools used for QCC are Pareto

Diagram, Check sheets, Histogram, control charts, brainstorming etc.

Implementation of QCC - Quality circles are viewed as the most powerful technique to allow any manufacturing firm to affect efficient TQM for it is based solely on the philosophy of teamwork, which is recognized as the backbone of TQM (Aravindan *et al.*, 1996).

Japanese QCC Experience

In Japan, every November is designated as the Quality Month; across the nation and QC and QCCs are promoted and emphasized. In no other country is the movement promoted so continuously, nor is there any other country where four levels of annual QC conferences for presidents of companies, managers, foremen, and consumers are held to regularly. These are the general features of Japanese QCC, but do not necessarily represent the QCC activities of individual firms.

Example:

A medium-sized plastic injection moulding factory : The factory had five plunger-operated injection moulding machines with a rigid structure. Each of them carried a mould. Locking mechanism at one end and a heated cylinder for softening the thermo-setting plastic material at the other. One day an operator of Machine B found that there were some sink marks and voids on each product produced the engineer came in to investigate the cause.

The first thing he did was to compare the readings of all machines. He ran the Machine B and was surprised to find that the cylinder temperature was much lower than with other machines. After investigation, it was found that the thermocouple was malfunctioning. So he replaced the old thermocouple with a new one and ran the machine again. The extent of sink marks and voids were wrong reduced but still appeared to be thought that there was still something wrong in Machine B. He finally found another distinctive factor - the mould temperature was lower in Machine B than in all other machines. Out of the several alternatives, it was confirmed to be the dirt in cooling channels. After cleaning, the machine started to produce good quality parts again.

To prevent future problems from arising again, the engineer suggested that there should be a team of fitters responsible for the maintenance of all the machines. Special care was taken that no dirt, dust and granules were to be entered into the injection moulding machines. Further, there should be daily check on hydraulic oil levels, lubrication, and leaks on pressure lines, loose connections, and electrical wires, including thermocouple leads. Every week the machines were to be cleaned thoroughly and the oil checked. .

Finally, the management has ensured smooth implementation of the newly installed equipment.

Quality Management System (ISO)

The International Organisation for Standardizations are ISO 9001-2008 included standards for a Quality Management System addressing the principles and processes surrounding the design, development and delivering a general product or service. The ISO 9000 series of quality management and assurance standards has been

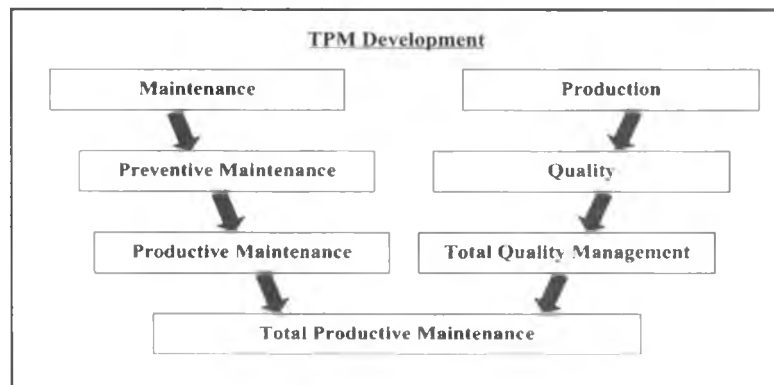
developed by a technical committee (TC 176) working under the International Organization for Standardization (ISO) in Geneva (Ho, 1997). The series took several years in the making before its publication in 1987. In 1987, the ISO adopted BS 5750 as a full international standard, the ISO 9000 series, and as a European standard, the EN 29000 series. The second edition came out in 1994 and third in 2000.

The ISO 9000 family comprises 17 different standards, which are listed. Out of these 17, only the ISO 9001, ISO 9002 and ISO 9003 are quotable standards, *i.e.* can be audited against. In fact, some 99 per cent of the ISO registered firms are registered under ISO 9001 or ISO 9002. In terms of the contents ISO 9002 is a sub-set of ISO 9001. A survey of the total number of global ISO 9000 certifications has been carried out using the resources of the Mobil Oil Corporation.

Total Productivity Maintenance (TPM)

It is a system which combines the different forms of maintenance so as to achieve the maximum effectiveness of production equipments by avoiding and discharging overtime. TPM is a new approach to equipment and facility management. TPM is a maintenance programme that involves a newly defined concept for maintaining plant, equipment and facilities (Venkatesh, 2003). In every organization there are two chief areas: maintenance and production areas as shown in Figure-2 below:

Figure 2. Total Productivity Maintenance



Source: Patra *et al.*, 2005

When TPM used in any of the organisation, it is assumed that company's maintenance and workers will look in the overall maintenance of workers will be responsible for the quality of their output and maintenance their equipments. The machine operator performs and all the routine maintenance task by him. Usually of traditionally maintenance is done only when there is a breakdown of machinery, obviously it affects normal working. Preventive maintenance as reverse to traditional methods is a method where a regular check and maintenance is being recorded. It is a new way of looking at maintenance. It is a proactive approach that essentially aims to prevent any kind of slack before the occurrence, the objective of

TPM is "Zero Error, Zero Work-Related Accidents, and Zero Loss"

It is maintenance programme which involves a concept of maintaining plants and equipments. TPM is directed towards the increasing the morale of employees and their job dissatisfaction. The target for TPM is to avoid wastage and producing goods at reduced cost without reducing product quality.

Difference between TQM and TPM

Criteria	Total Quality Management	Total productivity maintenance
Objective	Quality (output and effects)	Equipments (input and cause)
Means for attaining objectives	Systemize the management. It is software-oriented.	Employees participation and it is hardware-oriented
Target	Quality for PPM	Elimination of losses and wastes.

Conclusion

The effective use of TQMEX Model not only paves the way for healthier, meaningful and highly successful TQM in manufacturing firms, but also prevents the initiation of weakly structured systems. Moreover, TQMEX Model contains comprehensive expert knowledge; immediate expert consultation is available, which saves time and money. One important feature of TQMEX is the ability to offer a step-by-step procedure in achieving TQM. Furthermore, each individual step can be used in its own right, and its results can be assessed separately (Ho, 1996). This has a great advantage because companies can make a choice where to focus their effort, and even go back to the previous steps if they have not yet done so.

Since the model is straightforward and dynamic, more and more production rules and hypotheses can be added to make the system perform more efficiently. If the five steps *viz.* 5-S Model, Business Process Re-engineering (BPR), Quality Control Circles (QCCs), Quality Management System (ISO), and Total Productivity Maintenance (TPM) are implemented successfully, the organization can easily achieving TQM. This is because by then the organization will have had a good quality environment, well-defined business objectives and processes, a good quality culture, effective quality systems in place and good equipment supports. It is a matter of choosing an appropriate TQM framework for further improvement. TQM is basically a customer-oriented organization organized around processes (Oakland, 1993). The emphasis on customer focus requires a company use a process-based model. The TQM is a flow of interdependent processes and there is dire need of understanding and improving these processes. The TQMEX model can be used as a process/system for this purpose. In conclusion, we can say that the proposed TQMEX Model encompassing 5-S, BPR, QCC, ISO 9000 and TPM is an essential part and adequate state for the successfully implementing Total Quality Management.

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