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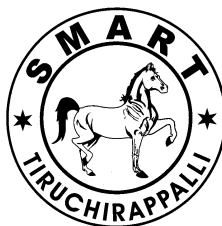
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TQM - KEY TOOLS

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Abstract

The paper highlights the way TQM brings about a complete transformation in the role of the workers and managers by emphasizing the quality of output rather than quantity of output. As such, managers and workers are not bound to achieve their work quotas. Instead they apply their expertise in work processes to foresee and eliminate the problems that come in their way to produce quality products, satisfying the customers' requirements.

Introduction

The primary objective of any organisation is survival. Survival in the industrial context means delivering products that satisfy the required Quality, Quantity and Schedule. Organisations have been widely implementing the TQM (Total Quality Management) methodology to ensure that their products meet the set quality standards.

The TQM method of management begins and ends with the customer. It is purely a customer-oriented method of management and focuses on ensuring employee participation in solving problems to help a steady improvement in the organisation. Employee participation is however cross-functional and extends beyond the hierarchical limits.

TQM deals with concepts like product quality, process control, quality assurance and quality improvement. In other words, it controls all transformation processes of an organisation, which are aimed at satisfying customers needs in a cost effective way. It owes its success to internal or self control policy in each of the units of the work system.

Internal control helps to push the problem solving and decision-making functions

down the hierarchical levels in an organisation. As such, people who work on the product can adopt corrective measures immediately if needed. This helps the organisation to respond to its customers' needs quickly and efficiently.

However, experts have different versions of applying TQM effectively to their organisations. For some, quality management is driven by the need to ensure customer satisfaction. For others, it is the internal productivity or cost improvement programme. It is also viewed as methods that introduce participative management.

What do customers want?

TQM being a customer oriented management programme, its main goal is to satisfy the customers. However, it is difficult to know what the customer expects and to measure the expectations. Customer's appreciation of the product's quality is based on his subjective comparison. Therefore, measurement of attitudes and systems becomes critical.

Customer's wants are broadly classified into three classes:

- **Verbalised or expressed wants:**
Verbalised wants are those demands of customers, which are expressed in terms

of product specifications. Most often companies do not try to find out what the customer does with the product or how he intends to use it. This results in improper design of the product.

- **Un-expressed wants:** Certain expectations of the customer are not verbalised. This is because customers feel that these expectations are evident and expect that they are built into the product. For instance, one such expectation is the safety of product. They are greatly dissatisfied if these expectations are not met. However, incorporating these expectations in the product does not satisfy them significantly.
- **Exciting quality wants:** These wants include customers' expectations for additional features in the product, which are provided by suppliers. For instance, a car with an electrical system that switches off headlights whenever the ignition is turned off. Such expectations, when met, give greater satisfaction to the customer.

Strategy to implement EMPLOYEE INVOLVEMENT (EI)

TQM's success depends on employee participation for improved quality product and customer satisfaction. Organisations need to have a strategy to be successful in implementing employee involvement. According to the GAO (General Accounting Office) study, a strategy should include the following features.

Readiness assessment: Organisations should have means to identify:

- The barriers to implementing EI and remedies to overcome these barriers.
- Present organisation culture.

This information would help in decision making to choose between various practices that suit the organisation. Interviews,

focus groups, observation and examining the records are methods to collect the required information. Organisations can also use the services of outside experts to carry out employee attitude surveys, performance analysis and statistical analysis for readiness assessment.

Communication: The goals set by management for achieving EI must be communicated. Employee participation can be improved by giving rewards and publishing accomplishments in employee newsletters.

Training: Managers and employees are trained to acquire the necessary skills like group leadership, providing feedback and problem solving for successful implementation of EI.

Strategy evaluation: This includes evaluating and monitoring employee participation in planning, problem solving and decision-making.

A follow up for decision makers

Not all quality programmes, which use EI, succeed. In 1987, GAO surveyed 962 private organisations. An analysis of the data from the survey shows that organisations that used readymade or pre-packaged EI programme failed in their initiative. The decision makers in each organisation should, therefore, consider their own organisation's history, culture and resources before designing a quality programme.

Appropriate methods and instruments

The objectives of the survey are to be made clear for the communication to be effective. The management should clearly express what they want the information for and what they intend to do with it. This would enable the researcher to develop appropriate instruments for gathering the information.

KAIZEN

Kaizen is a Japanese word, which means gradual, orderly and continuous improve-

ment with minimal investment. Kaizen is an ongoing process focusing on elimination of wastes in all systems of an organization.

Two Elements of KAIZEN

Improvement\change for the better and ongoing\ continuity are the two elements that construct Kaizen. Absence of one of the elements would not be Kaizen. For example, the expression "business as usual" contains continuity but not improvement whereas "breakthrough" includes change or improvement but not continuity. KAIZEN should contain both the elements, **Maintenance and Innovation**. These functions should occur in an organization simultaneously.

Maintenance refers to smooth functioning of current status, setting up of procedures and implementation of standards. Usually the lower level people of organization are responsible for maintenance.

Innovations are breakthrough activities such as buying new machines, developing new markets, directing R&D etc.

KAIZEN is an intermittent function involving small steps but with continuous betterment. Lower/middle management and workers, with encouragement and direction from the top management, should implement it.

Japanese KAIZEN activities, whether individual or group, focus on the following themes.

- Work improvement.
- Working environment improvement.
- Process improvement.
- Machine capability improvement (minimum down time)
- Improvement in production aids (jigs, fixtures, tools etc.)

- Improvements in service areas – office work
- Quality improvement.
- Improvement in customer service and customer relations.
- Improvements for new products (ideas)
- Improvement in the human individual capabilities.

The belief held by the Japanese management is that managers should spend 50% of their time in making improvements. The starting point of KAIZEN is identifying waste. The management should primarily focus on:

- Excess inventory
- Over production either in the form of components or finished products.

Management – oriented KAIZEN should result in

- Achieving maximum efficiency and quality.
- Minimum inventory.
- Eliminating methods that cause fatigue to workmen
- Maximizing utilization of facilities, tools etc to achieve efficiency.
- An open management, which allows questioning of the existing systems and processes.
- Encouraging learning and providing opportunities for its employees to learn.
- Encouraging synergistic teamwork and cooperation.
- Striving for and catalyzing continuous improvement at all levels.
- Systems improvement. In short Kaizen is an involved leadership that guides people to continuously improve their ability to meet expectations of high quality, low cost, and on-time delivery.

QUALITY FUNCTION DEPLOYMENT ... Voice Of The Customer!

Quality Function Deployment (QFD) is a technique for optimizing the process of developing and producing new products on the basis of customer need. It is a team-based methodology used to identify and translate customer requirements into technical specifications for product planning, its design, process, and production. In simple terms, it is used to transform customer requirements into company requirements.

Implementation of QFD

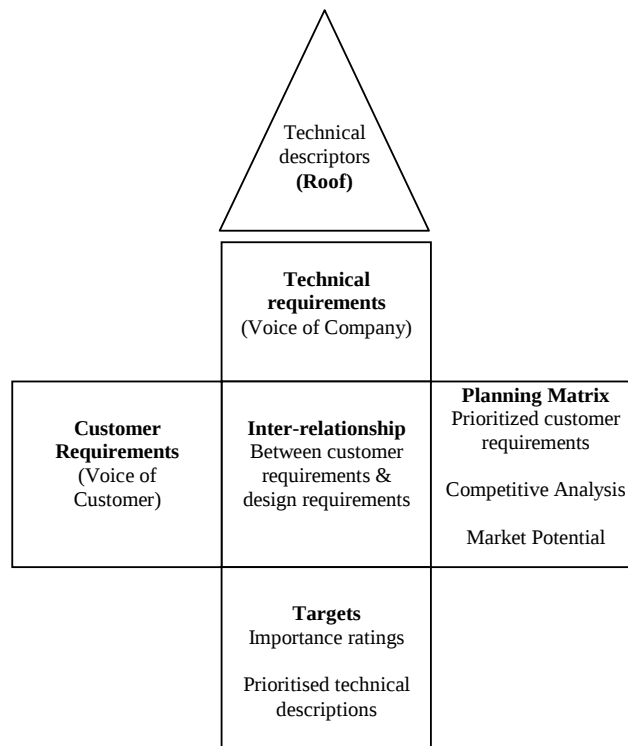
QFD is a five-stage process that transforms customer requirements into a definite plan or schedule to produce a product/service.

1. The first stage is to identify customer requirements. These include characteristics

directly attributable to the product/service. For instance, parameters like how a product compares with competition etc.

2. In the second stage, the requirements are transformed into technical specifications with the help of technical experts.
3. In the third stage, the technical specifications are further re-formulated to arrive at the end-product specifications. Termed as 'critical part characteristics', these are both sufficient and necessary to lead to a product/service that meets customer requirements.
4. The fourth stage designs processes that convert the above specifications into products and services.
5. The fifth stage comprises all activities done to produce the required output.

THE HOUSE OF QUALITY



The “House of Quality” can be used as a stand-alone tool to generate answers to a particular development problem. Alternatively it can be applied within a more complex system in which a series of tools are applied for each stage of the product/service development. The outputs of the first stage give the product/ service design specifications (the Hows). These in turn form the inputs (or whats) for the second stage of development. This sequence repeats at every stage and the outputs of the fifth and final phase are the production requirements for the product/service.

‘5-S’ PRACTICE

The “5-S” practice is a well-recognized methodology used by the Japanese to improve the work environment. This concept is fast catching up in many western countries. It has now evolved into a formal technique, which the Japanese believe is useful not just for improving the physical environment, but also for improving Total Quality Management (TQM) processes as well. It is also seen that many companies have included a few aspects of the “5-S” in their routine processes without being aware of its existence as a formal technique. In fact, the “5-S” can be applied to activities in all walks of life.

What does “5-S” stand for?

The term “5-S” represents five words in Japanese, namely, Seiri, Seiton, Seiso, Seiketsu and Shitsuke. The English equivalents for these are Structurise, Systemise, Sanitise, Standardise and Self-Discipline. In other words, these “5-S” mean Organisation, Neatness, Cleaning, Standardization and Discipline.

Organisation (Seiri)

Organisation is about sorting items (like tools, parts and materials), which are essential for a job from those that are not. Efforts should be made to select only the vital few and place them at convenient locations. The essence of organisation is defined by:

- Discard unwanted things
- Organise the storage of parts, files and other items
- Deal with the causes of defects, noise and leaks
- Treat defects, leaks and breakages
- Aim for the policy of “one is best” — one-location file, one-stop service for customers etc

Neatness (Seiton)

Neatness determines the rate at which things can be located or placed. It eliminates the time wasted in locating and placing things in an organisation. In simple terms, it emphasises on:

- Clearly designated names and places
- Functional placement of parts, tools and materials
- Quick (30-second) and easy retrieval of documents, parts and tools
- Neat and easy-to-read notice boards (with special attention to removal of old and obsolete boards)
- Filing standards and controls
- Zoning and placement marks
- Arrangement for first-in, first out

Cleaning (Seiso)

In any organisation, cleaning involves delegating individual areas of responsibility. Every individual should be thoroughly aware of his duties and responsibilities. In doing this, it is important that all assignments be absolutely clear and that there are no undefined, unallocated, or grey areas. This can be done by:

- Assigning individual cleaning responsibilities
- Adopting simple methods for cleaning and inspection
- Regular cleaning activities
- Cleaning even the less-noticed places

Standardisation (Seiketsu)

This emphasises strict and continual maintenance of organisation, cleanliness and neatness. It includes personal and environmental cleanliness. It also implies standardizing the principles of “5-S” practice. By maintaining standardized conditions using visual management, employees are motivated to act fast in any circumstance. This necessitates:

- Certification of inspections using labels, tags, etc.,
- “Danger” warning marks and signs
- Colour coding of files, pipes and containers
- Responsibility labels
- Preventing noise and vibrations
- Directional markings on pipes and gangways

Discipline (Shitsuke)

Discipline involves instilling the ability of doing things as per the defined rules and regulations. This helps in building good habits like framing and following rules. Discipline, an integral part of industrial safety, emphasises:

- Following safety rules
- Wearing safety helmets, gloves, shoes while at work
- Executing individual responsibilities
- Good communication practices
- Practicing dealing with emergencies
- Checking and following “5-S” practices always.

Many successful organisations found that by developing a high quality work environment and instilling discipline in the form of procedures and work instructions, the employees devoted more energy and time to achieve results. The ‘5-S practice’ has now become a highly appreciated technique in business, which not only helps to impress the customers but also to establish effective quality processes for good services and products.

COST OF QUALITY

The concept of quality is often misunderstood. Most of us wrongly conceive ‘quality’ as something which is complete, perfect and flawless. Quality is fulfilling the intended purpose of the customer satisfactorily at the lowest cost. When quality improves, the number of defective products decrease, leading to a reduction in wastage of resources. When abundant resources are available, they must be effectively utilized. Improved quality means less rework and reduced scrap. It results in lesser use of machinery and equipment, ultimately reducing asset investment and costs.

Categorizing Cost of Quality

Cost of quality refers to the sum of costs incurred

- For preventing poor quality
- To ensure that the product/process is in conformance with the quality standards
- Due to producing poor quality

Poor quality simply implies failure to meet customer requirements. Sometimes authors refer to ‘Cost of Quality’ as ‘Costs Of Poor Quality’. However, it refers to the costs incurred to prevent poor quality as well as costs incurred due to producing poor quality, also known as failure costs. The COQ are divided into three categories.

- Prevention costs
- Appraisal costs
- Failure costs

Prevention costs

Costs associated with all activities designed to prevent defects in products or services are prevention costs. There are possibilities of errors, defects and mistakes being committed right from the product design stage till it is finally shipped to the customer. To

prevent these defects, organisations incur some costs on aspects such as quality training and education, pilot studies, quality circles, quality engineering, supplier capability surveys, tender technical support, process capability analysis, and new product reviews.

Appraisal costs

The final product ready for use evolves from stages like design, development, production etc. At each stage, the product is evaluated to ensure it is in conformance with the quality standards and specifications. The expenses incurred for this stage wise verification and evaluation of the product are called appraisal costs. Inspecting and evaluating supplies are some examples of appraisal costs.

Failure costs

Costs incurred due to failure of the product or service, that is, when it fails to meet customer requirements, are called failure costs. Failure costs are divided into

- Internal failure costs
- External failure cost

Internal failure costs :

The costs incurred due to failure of the product found before the product reaches the customer are internal failure costs. Customer here refers to the end user or the external customer. Examples are rework, redesign, corrective actions etc.

External failure costs

External failure costs are the costs incurred due to the defects that reach the end user and are noticed by him. The company will ultimately bear the cost in the form of warranty, onsite service, return, and product replacement. More significant is the cost borne by the company due to customer dissatisfaction leading to loss of market share.

Costs as a price of conformance

Prevention and appraisal costs are those incurred to ensure that the product is in conformance with the quality standards. CROSSLY refers to these costs as ‘ **Price of Conformance**’. Similarly, since failure costs (both internal and external failure costs) are incurred due to producing poor quality products, they are referred to as ‘ **Price of non -conformance**’.

Conclusion

The above-mentioned TQM tools are very important for all industries to cut-down cost, keep continuously improving the quality of products, quality of working, quality of shop-floor practices, and quality of employee working style etc., In a nutshell, the word “Quality” can be added to all activities involved in the manufacturing sector.

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