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Latest Quality Management Systems getting implemented in Indian Automobile Industries

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Abstract : Total quality management (TQM) is considered a very important factor for the long-term success of an organization. TQM implementation has been an important aspect for improving organizational efficiency. TQM have many features for improving productivity, efficiency and company's reputation. Along with this, there are many other methods also have been established like Kaizen, 5S, QFD, PDCA and Taguchi methods for quality management. Taguchi has envisaged a new method of conducting the design of experiments which are based on well defined guidelines. This method uses a special set of arrays called orthogonal arrays. These standard arrays stipulates the way of conducting the minimal number of experiments which could give the full information of all the factors that affect the performance parameters. With the implementation of the quality principles discussed in this paper, companies will produce profits for themselves and also satisfy the needs of consumers.

Key Words : Quality, TQM, ISO, 5S, QFD, Kaizen, PDCA, Poka Yoke, Taguchi Methods, Quality Circle

Introduction : A quality management system (QMS) is a formalized system that documents processes, procedures, and responsibilities for achieving quality policies and objectives. A QMS helps coordinate and direct an organization's activities to meet customer and regulatory requirements and improve its effectiveness and efficiency on a continuous basis. The history of quality can trace its roots back centuries when craftsmen began organizing into unions called guilds. When the Industrial Revolution came, early quality management systems were used as standards that controlled product and process outcomes. As more people had to work together to produce results and production quantities grew, best practices were needed to ensure quality results.

In today's business there is no single definition for quality. One of the ways quality can be defined is as" the totality of features and characteristics of a product or service that bears on its

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ability to satisfy the given needs" (American National Standards Institute, 1978). Quality can be defined as the process to meet or exceed a customer's expectation.

The term Total Quality Management was developed by the Naval Air Systems Command to describe its Japanese - style approach to quality improvement and became popular with business in the United States during the 1980s. Total quality is based on 3 basic principles:

- To focus on customers and stakeholders
- Ensure participation and teamwork by everyone in the organization
- Creating a process focus supported by continuous improvement and learning

Concepts of TQM Philosophy : Total quality management is one of the measurements used in the automobile industry to ensure that the cars manufactured are reliable, satisfying the consumers at large and to ensure competitiveness in the market, as well as conformance to the international standard.

All the existing automotive industries have reduced costs, increased process efficiency and strive to improve the quality of their products and services by meeting the needs of the people they serve through the application of total quality management (TQM) principles.

As the competition is increasing globally quality management is gradually becoming important to the leadership and management of automotive industry. By implementing the following quality management tools, organizations will produce benefits for owners, employees, customers, suppliers and society as a whole.

Many companies like Ford Motor Company, Motorola and Toyota Motor Company have implemented TQM in order to meet customer requirements. :

1. Concept
2. Main Idea
3. Customer Focus
4. Goal is to identify and meet customer needs
5. Continuous Improvement
6. A philosophy of never ending improvement
7. Employee Empowerment
8. Employees are expected to seek out, identify, and correct quality problems

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9. Use of quality tools
10. Ongoing employee training in the use of quality tools
11. Product Design
12. Quality should be in built in the process, sources of quality should be identified and corrected
13. Managing Supplier Quality
14. Quality concepts must extend to a company's suppliers
15. Measurement &Feedback

Review of Literature

As the Indian economy is globalizing, achieving quality excellence is becoming one of the basic goals of all companies specially the automobile companies. Many companies are trying their best to get their hands on the Deming Award awarded for achieving for quality standards in their manufacturing activities.

According to a few studies done around the world by a few companies on TQM, it has been found that TQM has got a positive influence on a company's growth and success. When the financial performance of 600 quality award winner companies was analyzed, it lead to the conclusion that when TQM is implemented effectively, the financial performance also improves drastically (Singhal and Hendricks, 1999). TQM also helps companies to increase their market share and improve their competitiveness as found in a study done by Mohrman and Powell in 1995. TQM is considered to be a direct factor in influencing the corporate performance of a company.

According to a study carried out on the efficiency levels of TQM in India, it was found out that TQM implementation in Mahindra & Mahindra, one of the top India automobile companies considerably improved its performance. A similar survey carried out in Larsen & Toubro concluded that TQM has a significant impact on the company's financial performance (Singh, 2000). TQM implementation in Indian industries even though is in its growth stage, is bringing about incredible changes in the performance of the organizational work force and helps in increasing the productivity and reducing costs.

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Total Quality Management has gained for itself a substantial acceptance in Indian automobile industry with the aim to raise the performance standards if Indian companies to world class level (Dinesh Sethi, Deepak Tripathy, 2006).

But implementation of TQM is not an easy task. Many companies still do not commit themselves to its implementation whole heartedly (Downs and Mohr, 1980, Miller, 1993). One of the major success factors for implementation of TQM is a strong level of organizational commitment.

Four more indispensible questions required for each company to answer for the successful implementation of TQM are:

1) Is there a presence of top management involvement?

2) Does the company face opposition from workers' organizations?

3) Is the middle/upper management involved and interested?

4) Does there exist an organizational quality culture?

A Total Quality strategy is effective only through the long-term commitment and devoted appliance by the top and middle management. The top management is held responsible for setting goals, strategically planning and allocating resources to aid implementation of all plans and initiatives. (Deming, 1982 & Oarvin, 1987).

Another important aspect for successful TQM implementation is employee participation promoted at all levels. Individual responsibility can be discharged only if power is delegated in different degree at all levels across the organization. Also the mission, vision and policies of a company should be consistent with those of TQM. Visionary leadership of the top management and complete involvement of the middle management along with the support of employees results in TQM being a successful endeavour in the company.

It is has been found out that 62% of the Indian automobile sector believes to follow TQM as a guiding philosophy while 38% has still not adopted TQM as a guiding philosophy (Caravatta, 1997, Sharma, 1997, Agrawal, 1999). It is estimated that 70 % of the India automobile sector promises on time delivery more than 80 % of times. According to the world standards, Indian automobile industry is lagging behind. Only 52 % of the automobile companies are working towards achieving a cost reduction of more than 5% while shockingly still 48% of the organizations do not consider cost reduction as an important aspect.

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Unfortunately only 10-15% Indian automobile companies are using quality cost as measure of their quality performance thereby loosing an opportunity to spot critical areas for improvement (Harrington, 1997)

Customer Driven Quality Cycle : It provides a view of the process in which customer needs and expectations (Bruce T. Barkley, James H Sailor, 2001).

Quality Frameworks that support Quality Management

The following items are quality concepts that support an organization in pursuing improvements and quality excellence, but they are not designed as sets of requirements against which to create a quality management system, and a QMS cannot be certified against these guidelines.

Lean: The core idea is to maximize value by eliminating waste. The main concept is that anything that adds cost to a product, but not value, is waste and should be controlled or eliminated. Lean concepts are used to improve processes by removing waste, thus making them more efficient. The concept of lean (also referred to as lean manufacturing, lean enterprise or lean production) was derived in the 1990s mostly from the Toyota Production System, which used a concept of the reduction of "seven wastes" to improve customer value.

Six Sigma: This is a set of tools and techniques used for process improvement by focusing on using the statistical outputs of the process to improve the process. It is used in many organizations to support the QMS by helping to improve processes, but Six Sigma does not define a QMS. The tools of Six Sigma were developed by Motorola in 1986 as a means of improving the quality of processes and their outputs by identifying and eliminating the causes of defects.

TQM: Total Quality Management consists of practices designed to improve the process performance of a company. The techniques help to improve efficiency, problem solving and standardization of processes. These techniques are used to aid in quality management, but do not provide a framework for a Quality Management System. The concept of TQM was originated in the early 1980s and became widespread near the end of that decade. It was mostly supplanted by ISO 9001, Lean and Six Sigma by the late 1990s; however, many of the concepts are still used in conjunction with these other philosophies.

There are six main concepts of TQM philosophy :

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1. ***Customer Focus*** : For every company customer is the king. The automobile industry also depends on their customers and strives to meet their needs and also exceed their expectations (ISO) by providing a perfect product. It is never easy to determine what a client desires due to their changing tastes and preferences for cars. The customer driven quality cycle provides a view of the process in which customer needs and expectations are translated into perceptions during the design, production, and delivery processes .
2. ***Continuous Improvement*** : TQM is concerned with continuous improvement in all spheres of work like strategic planning and decision-making, to detailed execution of work elements on the shop floor. Kaizen as it is referred in Japanese means 'change' or 'the action to correct' while 'Zen' means 'good' implying that Kaizen means a change for good or an action to correct something to make it better. Kaizen aims to eliminate waste by improving standardized activities and processes. One of approaches that help automobile companies is to constantly improve is the plan -do- study - act (PDSA) cycle which describes the activities a company needs to perform in order to incorporate continuous never ending improvement in its operation .
3. ***Employ Empowerment*** : Empowerment as a process of decentralizing decision making in an organization, whereby managers give more discretion and autonomy to the front line. One good strategy that enhances the feelings of empowerment in employees is expressing confidence in them as well as establishing a realistic high performance for them by creating opportunity for employees to participate in decision making and giving them the autonomy to form bureaucratic constraints.
4. ***Use of Quality Tool*** : TQM requires the employees to identify and correct quality problems using certain graphical and statistical methods to plan work activities, collect data, analyze results, monitor progress, and solve. These are also known as the seven means for quality control which are:
    - Cause and effect diagrams
    - Scatter diagram
    - Flowcharts
    - Pareto chart
    - Histogram

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- Control charts
- Checklist

5. ***Product Design*** : Every company should ensure that while building quality into a product it should meet a customer's expectation which is not an easy task as customers often speak in everyday language. A product that is meant to be "attractive," "strong" or "safe" can have different meanings to different customers. It is necessary to convert customers' everyday language into specific technical requirements in order to produce a product that customers want.
6. ***Designing production system for Quality*** : These three are the important production system design objectives. After Ford acquired Jaguar, Jaguar's quality improved rapidly due to production system changes. This was due to Ford adopting Toyota's production process at the Jaguar plant which proved that production system affects quality. Also Ford analyzed incidents when defective purchased parts caused Ford to halt shipments of vehicles which made Ford conclude that "manufacturing problems caused 83 percent of these incidents, while design problems caused17 percent ".

Other Quality Management Systems

QFD : Quality Function Deployment (QFD) is a structured approach to defining customer needs or requirements and translating them into specific plans to produce products to meet those needs. The "voice of the customer" is the term to describe these stated and unstated customer needs or requirements.

Kaizen : a Japanese business philosophy of continuous improvement of working practices, personal efficiency, etc. By improving standardized programme and processes, kaizen aims to eliminate waste first implemented in several Japanese businesses, CL69 after the Second World War, influenced in part by American business and quality management teachers who visited the country. It has since spread throughout the world[4] and is now being implemented in environments outside of business and productivity.

PDCA : PDCA (plan-do-check-act, sometimes seen as plan-do-check-adjust) is a repetitive four-stage model for continuous improvement (CI) in business process

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management. The PDCA model is also known as the Deming circle/cycle/wheel, Shewhart cycle, control circle/cycle, or plan–do–study–act (PDSA).

Poka-Yoke : Poka-yoke is a Japanese term that means "mistake-proofing" or "inadvertent error prevention". The key word in the second translation, often omitted, is "inadvertent". There is no Poka Yoke solution that protects against an operator's sabotage, but sabotage is a rare behavior among people.[1] A poka-yoke is any mechanism in a lean manufacturing process that helps an equipment operator avoid (yokeru) mistakes (poka).

Taguchi Methods: are statistical methods, or sometimes called robust design methods, developed by Genichi Taguchi to improve the quality of manufactured goods, and more recently also applied to engineering, biotechnology,

Quality Circle : Perhaps the most widely discussed and undertaken intervention of employee involvement is the quality circle (QC). The concept of QC originally began in the United States and was exported to Japan in the 1950s. It is mentioned that it is the concept of QC that enabled Japanese firms to make high quality products at low costs. A quality circle is a volunteer group composed of workers , usually under the leadership of their supervisor , who are trained to identify, analyze and solve work-related problems and present their solutions to management in order to improve the performance of the organization, and motivate and enrich the work of employees.

TPM : In industry, total productive maintenance (TPM) is a system of maintaining and improving the integrity of production and quality systems through the machines, equipment, processes, and employees that add business value to an organization.

ISO Standards for Total Quality Management :

The International Organization for Standardization (ISO) is a worldwide federation of national standards' bodies from more than 140 countries (one from each country). ISO standards are documented quality systems and activities, used as the basis for adoption of uniform quality systems norms for international exchange of goods and services.

- ISO/TS 16949 Quality management systems – Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations. This document includes requirements for the application of ISO 9001 for automotive

production and service part organizations. The requirements include all additional QMS requirements agreed by the main automotive manufacturers to accompany ISO 9001. In addition, though, each main automotive customer that a company works with has an addendum to the TS 16949 requirements that are specific to that customer. A QMS designed using these requirements can also be certified against them.

- ISO 18541 Road vehicles – Standardized access to automotive repair and maintenance information (RMI)

Conclusion : All types of automotive industries aim to have reduced costs, increased process efficiency and improved quality of their products and services by working towards achieving the needs of their customers through the application of TQM. With growing cut throat competition, TQM has become an important aspect of the management of automotive industry. With the implementation of the quality principles discussed above, companies will produce profits for themselves and also satisfy the needs of owners, employees, suppliers and society as a whole.

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