The Significance of Total Quality Management Principles in Industrial Organizations

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Abstract: *Nowadays the industry is one of the main economic sectors, with a major contribution to achieving and maintaining a high rate of economic growth. The processing industry operation to high economic performance requires changes in structural terms, the re-engineering of processes and management. In this regard, one of the main actions taken at the level of companies in the manufacturing industry is the implementation of quality systems. Practicing quality management system not only allows businesses to react to changes taking place in business, but also to inflict them by the controlling of the future. This paper aims to analyze the principles of Total Quality Management – TQM and will highlight the advantages that organizations could obtain by applying each principle separately in the process of management.*

Keywords: *Quality, Total Quality Management, Quality Assurance System, Quality Standards, Competitiveness.*

1. Introduction

The principles of total quality management (TQM) can be defined as rules or fundamental and complete convictions in the management of an organization, oriented towards the continuous improvement of performance in the long term, by the total customer orientation, while taking into consideration the needs of all other stakeholders.

Both in theory and in practice organizations it is generally accepted that the conceptual basis of the TQM philosophy is the principle of continuous improvement. To lead the continuous improvement process it is necessary to apply a number of fundamental principles of TQM. There are different formulations of the basic principles of TQM. For example, R.J. Schonberger makes particular attention to the principles of continuous improvement and quality assurance processes. G. Merli highlights the following basic principles: customer satisfaction, quality first, continuous improvement, involving all staff. Stora and Montaigne (2006) believe that the basic principles of TQM are: management implication, involving all staff and rational improving of quality. According to the authors Haist and Fromm (2011), they highlight the following principles: customer orientation, the 'zero defects' principle, continuous improvement, and focus on prevention.

2. The eight principles of TQM

Considering the different opinions expressed by specialists, as well as the stipulations of SR EN ISO 9000: 2006 – Chapter 02, we support the assertion that the basis for TQM and the development of family ISO 9000 were the eight principles of quality management considered being determinant for continuous performance improvement. Analyzed and interpreted today (under the impact of the increasing number of enterprises which have implemented ISO Standards and the methods of Kaizen system), the eight quality principles on which ISO 9001 is based are totally harmonized on the European Model of Excellence, Lean, Six Sigma and Business Process Management (BPM), but they are deficient when it comes to quality critical concepts such as social responsibility and stakeholder needs, which are limited to customers.

2.1 Customer Advocacy

This principle is to relief the organization's capacity to understand and meet the needs of its customers. For this, it is necessary, first, to identify external customers and internal customers. Then the requirements, the needs and the expectations are determined and then they are translated into specifications, based on which the products are made with certain quality characteristics. The customers' needs knowledge through market research is done on buyers, consumers and even competitors' customers. Also, if customers of the organization

are other organizations, the study should be extended to their clients. Based on study results, a list is drawn up with the needs expressed by customers and the importance given to each need.

Then it will be determined the technology and the processes required for the achievement of appropriate product requirements, and the investments that are necessary to provide manufacturer technical equipment.

In developing forecasts of customer needs organizations must cover both current interests and their evolution over time. Also, manufacturers can even determine an orientation of future customer requirements using intelligent advertising, like other channels offered by the media. The collaboration with the customer is recommended ('partnering') for cases where customers' real needs are different than those expressed in conducting the study. This can be done either through a dialogue with customers either in an organized frame or by customer participation in developing processes for a new product required by him, or through customer engagement in internal activities processes of the company such as planning new product development, technological estimation etc. Thus may be introduced in product design features that meet the unexpressed needs.

One method to correlate the customer requirements and expectations with the manufacturer's possibilities is Quality Function Deployment (QFD) developed by Yoji Akao and Mizuno Shigheru. The method can be applied in the market research process planning and in the customer-oriented production. The method is based on the answers to the following questions: 'What will consumers?' and how their requirements can be met? Based on analysis of customer requirements, the characteristics and technical specifications of products designed to satisfy these requirements will be set. But for this goal, the organization must provide the necessary information to knowledge needs. To this end it is necessary to adapt management subsystems, especially information subsystem. This subsystem should be adapted to allow the organization to retrieve and process all customer data. Thus, a customer-oriented information system should enable the compilation of reviews, the analysis of the customer after their effectiveness etc. The system also must exchange information with upstream and downstream partners of the organization.

Regarding the acceptance of orders made by the client, ISO Methods referring to the customer describe how to proceed to set a number of questions that must be addressed by the manufacturer, for example:

- What are the conditions specified by the customer, including those related to shipping the product and support requirements?
- What are the conditions unspecified by the customer but necessary for intended use (e.g. color)?
- What are the rules on product (e.g. legal or otherwise)?

Then the standard requires a review covering the following questions:

- It was well explained the requirement?
- If the order was made verbally, it was confirmed by the client?
- They were resolved all issues of contract?
- Is the company able to meet customer requirements?
- What happens if the customer changes the order?

Finally, the standard tries to clarify if the company has effective methods of contacting the client in order to obtain: product information, call for tenders, orders and changes, customer response including complaints.

Most companies have their own method of receiving orders. ISO standards in this area are flexible, asking just to formalize and adapt them to cover all aspects of the standard.

Since this principle is considered crucial to the present and future competitiveness of organizations we have introduced questions in our studies about how the organization's management understands this principle in the current activity. When asked 'What consumers / customers want?' The answer of the most business representatives was limited to three requirements that they considered most common in relationships with customers: the best quality; compliance with the delivery time; lowest price.

Trying to make a summary of the benefits generated by the application of this principle, they could be:

- provide reliable information for knowledge and understanding of customer needs and expectations
- allow the establishment of appropriate organizational objectives according to the customer needs and expectations;
- increase market share
- create the best conditions for customer loyalty;
- allow to measure and analyze customer satisfaction and initiate actions based on results;
- managing the client relationship, ensuring a balance between satisfying customers and other direct stakeholders (shareholders, employees, suppliers, society etc.).

2.2 Ensuring leadership (management involvement)

This criterion covers both the capabilities of a leader and the organization management. Leaders have the mission to find solutions to motivate employees and develop enthusiasm for quality. While managers are currently working, leaders are leading for future. In quality management, the term refers to how all managers of an enterprise initiates, supports and ensures the promotion of TQM culture. Leadership for Quality expresses the ability to positively influence people and systems under a single authority to have a significant impact and achieve important results.

This principle is to ensure the personal commitment of the general manager and management structure to be involved in the implementation of the integrated approach to TQM. For this purpose, the organization management will adopt plans for the development of TQM, the management system of the organization, internal training system, financial resources and personnel etc. Leaders involve employees in the implementation of quality management, with a decisive role in the operationalization of all the principles underlying quality management. Top management of the organization is formulating the vision, mission, strategy, policy and quality objectives and it is required to observe permanently the realization of those, in all activities of the organization, and to react in case of nonconformities to remove them.

The role of managers in promoting TQM to the structural operating levels must be:

- Top managers must focus their attention throughout the organization. Activities in which they are directly responsible for quality must be: establishing the purpose of the implementation of the quality standard; direct involvement in solving the problems that are generated by the achievement of the aim; allocation of resources required for implementation and effective operation of the quality system; rewarding employees for participation in continuous quality improvement; minimize problems of communication between organizational levels.
- Middle level managers (heads of departments) must focus their attention at process level to optimize the activities of the departments they lead. Activities are evaluated, correlated and made in a unitary manner.
- Employees must understand and comply with quality system at execution level: ‘well done the first time and every time’ to remove non-quality and to the compliance with the requirement of ‘zero defects’.

This principle plays a key-role in developing and implementation of projects. Project managers must act as leaders themselves, establishing unity of purpose of the project, project objectives and actions of the project team. The project manager is the person who has formal authority and responsibility for project management and thus to ensure that quality management is established, implemented, maintained and improved. He must assume leadership, developing a favorable culture for the project quality.

To get the desired results, the project manager's decision related to the implementation and efficient operation of the quality management system must be taken in an effort to ensure the beneficiaries that there are conditions for it to be executed in conformity with the stipulations set by the contract.

The benefits of applying this principle can be summarized as follows:

- ensure compliance with the needs of all stakeholders;
- enable the development of the objectives that will ensure increased competitiveness of organization and thereby will establish a clear vision of the organization’s future;
- providing the necessary resources for the training and the freedom to act with responsibility and efficiency for the staff;
- build confidence and eliminate fear, by encouraging and recognizing personal contributions;

2.3 The involvement of all staff in decision-making

This principle consists in developing the capacity to act and to decide individually in solving problems, and to engage in quality improvement projects. The staff has the main role at all organizational levels and only by total and conscious involvement and aware is possible that everyone’s skills should be involved to achieve quality policy. For this purpose it may act through measures to ensure full motivation of all staff to permanently participate to the process of improvement, innovation and creativity, thus ensuring the organization’s objectives.

For the implementation of this principle it is very important to create an internal environment based on the cult of quality, and for the ‘well done work for the first time and every time’.

If we refer again to the development projects, to achieve this goal it is necessary that for all project team members to be clearly defined the authority and responsibility to participate in the project. Employee involvement in improvement (quality, cycle-time and loss), usually by teams, can be achieved through various forms of training associated with participation in management decisions and actions that give rise to employee

empowering. The results of applying this principle can be measured through the quality indicators, among which the most important are the quality and cost of labor productivity.

Among the advantages of applying this principle we retain:

- understanding by employees of the importance of their role and contribution in the organization;
- employees can evaluate their own performance compared to their personal goals;
- employees will be permanently preoccupied to develop the knowledge and experience to enhance their performance;
- it creates the framework in which employees openly share their knowledge and experiences in solving involving problems.

2.4 Process approach to management

Principle 'approach as a process' for quality management system is reflected in clauses 4.1 and 4.2 of ISO 9001: 2008. This principle is a fundamental concept underlying the international standard ISO 9000 family, each process having inputs and outputs and involving people and other resources. More resource-intensive activities that contribute to achieving an output element (a blank, subassembly products, part of a service, important activities of a project, etc.) can be considered a process. In this interpretation, the process means a set of activities that relate and interact to transform inputs into outputs. We observe that most times the output elements are elements of a process of entry into the next process. Applying a system of processes within an organization, including identification and interactions between them and their management may be considered a 'process approach'. This type of approach is aimed at fulfilling a dynamic cycle of continuous improvement and enable significant gains for the organization by reducing costs, shortening the implementation process by efficient use of resources and better results based on focusing to consistent and predictable opportunities of process improvement.

This approach requires, in particular, identifying processes that an organization should implement to keep them under control and continuously improve their efficiency. Such an approach will allow management to focus on those processes and not every activity that takes place within an organization. It will also facilitate the focusing on customers and increasing their satisfaction by identifying the key-processes in the organization and their further development towards continuous improvement.

By knowing the main processes of the company we can determine precise responsibilities for the management and identify process interfaces with the organization functions to be pursued consistently.

To identify the processes needed for quality management system and their application in organizations we need to know what processes is required for the proper functioning of the quality system and which are inputs and outputs of each process, if there are processes subcontracted and, of course, who are customers for these processes and what are their requirements. Generally, the processes-chain includes processes of management, execution of works processes, support processes and monitoring and measurement processes. For the needs of quality management the identified processes system should include all production processes, execution and customer service provided by the administration that product or service quality and customer satisfaction.

The process identification may be performed by more than one solution – for example, the outline of broad processes or simply by listing the departments of the organization, e.g. purchasing, receiving, production control, sales and marketing, customer service, production, quality control, expeditions. Then it will be shown the correlation between the processes, by using a flow chart or diagram representing visually the sequence of interfaces between them. This activity is a prerequisite for the subsequent formulation of the process improvement solutions.

Another solution is recommended by a document of ISO TC 176 Secretariat / SC 2 which specifies four categories of management processes: processes for management of the organization; resource management processes; product development processes; measurement, analysis and improvement processes.

- processes for management of the organization include processes referring to strategic planning, determining quality policy and quality objectives, ensuring communication between functions and processes in the organization, ensure availability of the resources for quality objectives and the analyzes of the quality management system;
- Resource management processes are those processes that provide resources, and they are necessary for the organization's management processes for realization and measurement of the product.
- Processes for implementation (product development processes) are those which result in the intended outcome and refer to the product or production process of service. These processes include: planning processes

of product realization, processes related to customer care, processes of design and development of the product or service, production process or service provision, the supply process control measurement devices and monitoring. Product realization processes can be adapted in quality management system documentation and implementation to the specific needs of the organization. Document specifying the quality management system processes, including product realization processes and resources to be applied to a product, project or contract is called 'Quality Plan'.

• The measurement, analysis and improvement processes are necessary to measure and collect data to analyze performance and to improve the effectiveness and efficiency of quality management system. These include processes for measuring, monitoring and auditing, performance analysis and improvement processes (e.g. for corrective and preventive actions) and constitute an integral part of management processes, resource management and realization processes.

These four categories of quality management processes can be considered as typical processes, but it can be identified also specific processes for each organization.

To implement the processes, the organization must develop draft-implementing activities that compose processes and measurement processes, projects that include: communications in the organization, awareness, training, re-engineering management, involvement of top management, applicable analysis activities. Implementation projects must include measurements, monitoring processes and achieving planned inspections

Every part of the processes-system has clients (internal or external to the organization) and other stakeholders who are influenced by the process and determine the desired outputs, according to their needs and expectations. To ensure the operation and monitoring of these processes there are necessary information about the required resources for each process, about the characteristics outcomes, criteria for monitoring, measurement and analysis and also determine how these criteria can be included in the quality management system and in the works.

Among the advantages derived from this principle, we mention:

• defining systematic activities necessary to obtain the desired result and formalization of their main processes.

• setting clear and quantifiable responsibilities for the process management and identifying process interfaces with functions of the organization that will be tracked constantly;

• analyze and measurement of key processes capability;

• identifying interfaces between key-activities and the other organization's functions;

• focusing on factors that can lead to improving the organization's activities (resources, methods and materials);

• risk assessment, consequences and processes impact on all stakeholders;

2.5 System approach to management

The principle of the system approach for quality management system is reflected in clauses 4.1 and 4.2 of ISO 9001: 2008. The principle requires global approach to quality management, including all structures of the company and all employees. A perfect work performed by a department of the company, but neglected to another, loses all value. In fact, all departments of a company are, in one way or another, customers or suppliers to one another, as are the customers and external suppliers to the company. The qualitative approach will not bring positive results than respecting the condition that the entire company to align this approach that quality management is an organic component of the overall management of the company. Quality management system is part of the overall management of the organization, along with other parties such as human resources management subsystems, suppliers, health and safety etc. Even if these subsystems are not enough visible, they are found in every organization.

The principle involves understanding and conducting the quality management system in the company, given that its activities are embodied in interrelated processes, so as to ensure efficiency improvement organization. Quality management system processes are managed as a system by creating, understanding and conducting network-processes and their interactions. Consistent operation of this network of processes is often called a 'systemic approach' management and applies to the entire quality management system. 'The process' is related to the activities carried out and results obtained intermediate to produce the desired result for the client. Every process in the system processes has clients (internal or external to the organization) and other stakeholders who are influenced by process and defining the desired outputs according to their needs and expectations.

Applying this principle has as results:

- better achieve of the objectives pursued by integration and alignment of processes
- it provides confidence to the stakeholders on the existence, effectiveness and consistency of the organization;
- understanding the interdependencies between processes within the organization;
- a structured approach to harmonization and integration of processes;
- achieving a better understanding of roles and responsibilities;
- understanding the organization's capabilities and prioritization of actions according to material constraints;
- defining how specific activities will take place within the system;
- pursuing permanently the system improvement by measurement and evaluation;

2.6 Continuous improvement in performance

This principle consists in involving all staff at all levels and in all entities in activities to improve the organization's distinctive capabilities.

Responding to the requirements of this principle it was invented in Japan and applied by Masaaki Imai (2006) a new strategy of continuous improvement, named in Japanese 'Kaizen' which involves continuous improvement and involving everyone from managers to workers. In his turn, W.E. Deming has developed a continuous improvement process called 'P-D-C-A Cycle', introduced in Japan in 1950 and called 'the Deming Cycle'.

The four phases of this cycle are:

- *Plan (P)* – Planning activities for the improvement plan. At this stage the goals and necessary processes are determined to obtain results in accordance with customer requirements and the organization's policies.
- *Do (D)* – Implementation of the improvement plan. This stage consists in implementing in fact the processes.
- *Check (C)* – Checking the performed work. This stage consists in monitoring and measuring processes and products against policies, objectives and requirements for products, and reporting results. It is check therefore whether or not the implementation is on schedule and where the activities are, comparing to the planned activities.
- *Act (A)* – Action to correct the process. The stage includes actions to continuously improve process performance based on the findings of the previous stage. It aims at conducting and achieving standardization of the new procedures to prevent recurrence of nonconforming problems or to set goals for further improvements. PDCA cycle continuously spins given that once an improvement is made the resulting state becomes another target for improvement.

Current standards will be improved by KAIZEN activities, which will make it possible by passing from maintenance stage to improve stage.

Corresponding to this principle, the organization's overall performance should be a permanent objective of management. The phrase 'continuous quality improvement' can be used only when, as specified in ISO 9000: 2005, quality improvement is permanent, temporary actions to improve quality do not meet this principle.

Although most experts consider to be the most important principle of TQM, understanding its importance and how it applies is very different in the world. The greatest interest is granted by the quality management system practiced in Japan. We retain in this regard, Kaizen system practiced in this country, which is a concretization of the principle.

In our assessment, the inclusion of this principle in the 2000 edition of the standard 9001 by dropping the phrase 'quality assurance' and replacing it with the phrase 'continuous quality improvement', targeting the excellence, was correct. It can be considered that the implementation and efficient operation of the quality management system presumes that was effectively ensured quality in all activities of the organization. Therefore the concern of management and employees must focus on continuous quality improvement, i.e. towards excellence, as required by the guidelines provided by ISO 9004: 2011, which was designed to pair with ISO 9001. The observation is consistent with requirements for continuous quality improvement, which is manifested in the European Union. Currently, the requirements for product quality and service have increase beyond the level implied by the phrase 'quality assurance', and believe that customer satisfaction is no longer sufficient to overcome expectations by promoting the concept of 'Beyond Customer Satisfaction' according provided that the product must exceed customer requirements, to enthuse him.

Among the advantages of organizations applying this principle, we remember:

- continuous performance improvement becomes a permanent approach across the organization

- requires staff training methods and tools for continuous improvement;
- continuous improvement of products and processes is a goal of every person in the organization;
- establishment of measures for continuous improvement and its tracking;
- recognition and distribution of the improvements.

2.7. Management by facts

This expression signifies that each person involved in the organization must ensure that any decision is based on facts. Management decisions and actions on quality management system is based on the analysis of 'facts' that represent data and information on the performance levels of current products or services provided by the organization and which are obtained from information contained in the audit reports, corrective actions, non-conforming products, customer complaints, etc. Analysis of relevant data based on information reduces the risk decisions based on personal 'opinions'. All documents, information, procedures constitute a proper quality management information system that intertwines, in some areas, with general information system existing in the organization. Those managers must be reserved in making decisions for which there are no verified information in practice

The benefits of the principle can be:

- decisions are pertinent and reliable because they are based on accurate and verified data and information;
- data and information analyzing is made using established methods;
- making decisions and setting up actions based on an analysis of the facts, balanced with experience and intuition;
- providing access to data to those who need them.

2.8. Mutually advantageous relations with suppliers

The latter implies definition and proper documentation requirements that must be met by suppliers. It is necessary to analyze and assess their performance to control the supply of quality products or services.

At the same time the manufacturer must also take account of the interests of the supplier, so both have benefited from business conducted jointly. Relations beneficial win-win between the organization and suppliers increases the capacity of both entities to create added value. This principle includes relationships with domestic suppliers. Mutually beneficial relations between all processes undertaken within the organization and between them and external partners contribute to an osmosis between internal activities, on the one hand, and between the organization and working environment on the other. So the management of relations with suppliers focuses on providing quality and performance of services, involvement and integration provider (supplier partnership) and the capability of providing improvements in its work.

In practice, we noticed that there are few companies that were aligned to the requirements of stakeholders in the supply chain, manufacturing processes and solutions capabilities to achieve this "best practice" deeply rooted in quality standards. Therefore, we consider it necessary to reconsider the customer-supplier relationship, often adverse positions they were in traditional models of management in achieving the idea of partnerships throughout the supply chain.

As said Professor Daniel T. Jones, co-author of the paper 'The Machine That Changed the World', '*No organization is like an island. Your customers depend on the excellence of your supplies ... The best companies create alliances with suppliers to ensure their customer retention'* (Daniel T Jones, James P Womack, Daniel Ross, 2007).

In fact the application of quality management in terms of efficiency is impossible without the existence of these alliance relationships with suppliers. One example is enough to confirm this assertion: the method Just In Time, which aims "zero inventories and total quality" means that the product must reach exactly when the client needs it. However, a prerequisite in this regard is thus synchronizing the production may be achieved only reduce inventory, related costs, increase quality, productivity and adaptability to changes.

During the process of choosing suppliers to establish relations of partnership, companies pursue objectives such as:

- the possibility of establishing relationships that balance short-term gains with long-term;
- mutual consent providers and beneficiaries on resource gains;
- identification and selection of major suppliers able to make improvements in their own activity;
- setting common activities to improve quality.

3. Conclusions

Analyzing the above principles, we believe that the basic principles of TQM must be included in the organization's culture to generate a climate of open cooperation and teamwork between members, customers and suppliers. Managers must understand that by implementing total quality management principles can improve considerably the competitiveness of organizations. We consider that the implementation of generalized systems of quality management, organizations can record a short-term benefits such as winning new business, increasing customer demand and protect business reduce costs by continuously improving efficiency and reducing losses and increasing labor productivity.

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