THEORETICAL RESEARCH IN THE QUALITY MANAGEMENT SYSTEM IN ORGANIZATIONS

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Abstract. *Quality is an important aspect in achieving the success of an organization and fulfilling established objectives. It is a complex process that has emerged through the completion of three essential stages in quality engineering. This article includes theoretical elements alongside the evolution of the stages of the Quality Management System. According to the specialist J.M. Juran, the evolution of quality has three stages of quality engineering development. The first stage is represented by inspection and refers to providing quality products and services that meet customer requirements. The second stage is statistical process control. The third stage is represented by quality assurance, proposed by continuous improvement of the product or service provided. All three stages form the equivalent of total quality, which aims to efficiently satisfy customer requirements by involving all interested parties in this quality management system. Continuous improvement involves training personnel, suppliers, and customers. (Juran, 1986) For each stage, we have captured the theoretical stages, along with the important periods in its development over time.*

Keywords*: inspection, control, total quality, the historical evolution of the concept*

Introduction

Quality is a driver of significant changes that lead an organization to success. From the unique responsibility for all activities leading to the final result, we moved to the specialization of activities within organizations. The product was realized by several employees who worked in series or in parallel, which led to the loss of quality. This was solved by developing a quality management system.

Currently, quality management in an organization is "a phenomenon by which an organization is capable of providing good quality of services or products by focusing on the quality of the means of obtaining them." [4] It is well known that customer opinion is beginning to weigh more and more in the activities of companies, so the focus is on internal and external factors that influence the development of the quality sector. Thus, the Quality Management System becomes a primary factor of competitiveness among organizations.

The historical evolution of the concept of quality

The concept of quality has undergone a wide variety of definitions and interpretations over time. According to ISO 9001:2015, quality represents the degree to which a set of inherent characteristics meets the established requirements. [4]

In 1903, Henry Ford introduced the inspection of finished products, which marked the first appearance of the concept of quality in an organization. In 1907, the inspection on the assembly line was introduced, and in 1924, statistical inspection of parts or products was introduced.

Feigenbaum emphasized in 1945 the need to check all activities in an organization such as research, marketing, design, supply, manufacturing, and commercialization, which is known as total quality control.

In 1959, the American Society for Quality Control introduced the concept of quality assurance by implementing measures to identify problems that need to be solved by managers and performers at all stages of production [3].
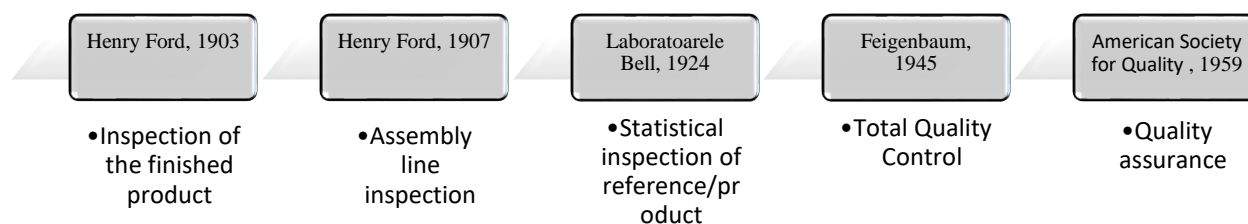
Henry Ford, 1903	Henry Ford, 1907	Laboratoarele Bell, 1924	Feigenbaum, 1945	American Society for Quality , 1959
•Inspection of the finished product	•Assembly line inspection	•Statistical inspection of reference/pr oduct	•Total Quality Control	•Quality assurance

Figure 1. The historical evolution of the concept of quality

Figure 1 illustrates the stages of the emergence of the quality concept in the field of work. Through inspections, control, and quality assurance, today's companies are able to easily adapt to environmental changes, establish values that they introduce into their activities, all for the fulfillment of clear and measurable objectives [6].

The concept of quality management

According to ISO 9000, quality management represents "coordinated activities to direct and control an organization with regard to quality."[4] As mentioned earlier, Feigenbaum A. introduced the concept of "Total Quality Control" as a system to integrate efforts from all departments of an organization with the aim of efficiently satisfying the customer [2].

Over time, organizations have felt the need to develop quality improvement and management systems, thus simple inspection activities have been replaced by quality control and assurance as a continuous process. In the literature, the evolution of quality management has had four stages:

1.Quality inspection
2.Quality control
3.Quality assurance
4.Total quality management[1]

Quality inspection

Quality inspection is performed by quality inspectors or specialists with the purpose of verifying the products or services produced, by comparing them to the standards that must be met. Products that do not meet technical specifications and standards are removed from the total quantity offered for sale. In this stage, the causes of defects are not emphasized.

Quality inspection involves three stages: collecting information, sorting and classifying information, as well as taking measurements and testing values found to be non-conforming [7]. Tab 1 [9], [10], [11], [12], [13] illustrates some of the tools used in product/service inspection within companies.

Quality inspection in large organizations is a necessary process in ensuring quality products and services. In large companies, inspection takes place at multiple levels, from ensuring the quality of raw materials to inspecting finished products. Additionally, organizations implement the ISO 9001 standards for quality improvement. By using a suitable quality management system, organizations ensure a high level of quality and generate trust among their customers.

Table 1.

The historical evolution of quality inspection

PERIOD OF TIME				
The ancient period	The medieval period	*The Industrial Revolution*	*The 20th century*	*Currently*
✓ Primitive methods; ✓ Visual inspection of products; ✓ The firts product seal;	✓ Visual inspection of products; ✓ Regulations for the imposition of manufacturing standards;	✓ The first formal inspection systems appear in the textile industry;	✓ New non-destuctive methods of quality inspection; ✓ X-ray and ultrasound inspection;	✓ Inspection becomes an integrated part of manufacturing or service prosses;

Quality control

Quality control is a more refined and laborious form of quality inspection. It is a 'post-event' process, like the first stage. The difference is that in addition to detecting and eliminating non-conforming finished products, this stage also focuses on controlling the technological flows and identifying the causes of defects [7]. This stage involves activities of inspection, testing, and verification of conforming products/services by comparing them to predetermined standards [5].

Table 2.

The historical evolution of quality control

PERIOADE				
The ancient and medieval period	*The Industrial Revolution*	*The 1950s – 1980s*	*The 1990s – 2000s*	*Currently*
✓ Based on the knowledge of skills;	✓ Rigorous methods and the first formal quality control systems are introduced; ✓ Statistical Process Control (SPC) is introduced;	✓ Failure mode analysis (FMEA) is introduced; ✓ Causes of defects are identified and eliminated;	✓ Information technology and software tools for real-time data analysis are introduced;	✓ traditional physical testing methods and new non-destructive testing methods are used; ✓ The process is continuously improved;

As specified in Table 2 [9], [10], [11], [12], [13], quality control has undergone significant evolution over time due to the development of technology and manufacturing or service processes. Additionally, customer requirements are becoming increasingly demanding, and companies are constantly expanding their scope of control to ensure compliance with their customers' requirements.

Quality assurance

Quality assurance is an activity that takes place 'before and during the event' with the aim of preventing errors that may occur. The objectives of this stage are to provide confidence to both customers and management and employees, achieved by verifying services or products and evaluating them against the required standards for the ability to meet expected requirements [7].

As specified in Tab 3, [9], [10], [11], [12], [13] quality assurance has evolved significantly, making its appearance in the 1950s, due to the need for quality before and during the manufacture of products or provision of services

Table 3.

The historical evolution of quality assurance

The 1940s – 1950s	*The 1960s – 1990s*	*The 2000s – 2100s*	*Currently*
✓ The concept of quality assurance ✓ The quality standards are defined The procedures for ensuring compliance with quality standards are introduced;	✓ The concept of continuous improvement of quality is introduced to ensure that products meet the established requirements;	✓ The quality management appears ✓ Risk management; ✓ New quality norms and standards are introduced; ✓ Development of monitoring technology;	✓ All stakeholders of the organization are involved; ✓ It focuses on continuous improvement and customer satisfaction;

Total Quality Management (TQM)

Total Quality Management encompasses the previous three stages with the objective of improving organizational performance through the design, manufacturing, and delivery of high-quality products and services, as illustrated in Fig 2 [7].

Figure 2. The elements of Total Quality Management (TQM)

After the 1980s, Total Quality Management (TQM) was widely accepted in both public and private organizations. This concept was proposed by Joseph Juran and led to the development of ISO standards (International Organization for Standardization), which are still used today for continuous quality improvement.

Conclusions

The Quality Management System involves the participation of all members of an organization. The efficient performance of each employee's activities leads to the maximization of prosperity. Total Quality Management focuses on customer satisfaction through continuous improvement of the quality of products or services provided.

When discussing quality in an organization, the focus is on standardized requirements that the organization can effectively meet in order to achieve its objectives.

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