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THE COST OF QUALITY

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ABSTRACT

The totality of the expenses incurred for carrying out an action in an enterprise represents its cost. The cost provides numerical information, having the same unit of measure, regardless of the nature of the action. With the help of this information, a comparative analysis can be made of the various actions carried out, establishing the efficiency of one in relation to another, the validity of the action. The economic aspect of any business is necessary and mandatory, so that any manager can make important decisions in the management of the company when the up-to-date situation of quality costs is known.

KEYWORDS: Costs of quality, Quality management, Internal failure costs, External failure costs, Prevention costs, Appraisal costs, Benchmarking.

1. INTRODUCTION

According to SR ISO 8402:1995, quality-related costs are costs to ensure and ensure satisfactory quality, as well as losses incurred when adequate quality was not achieved.

In other words, the cost of quality is a procedure that measures how much the company spends to satisfy its customers with the quality of the products and services offered.

The cost necessary to reach the desired quality must be kept under control, and important savings can be achieved.

Quality costs have a quantitative character, being easy to quantify, but also qualitative, difficult to measure, although they are very important (decrease in the company's prestige, loss of a market segment).

A competitive product or service based on quality-cost balance is the main objective of responsible management. It can be seen that when quality decreases, costs increase, and when quality increases, costs decrease (figure 1).

Quality cost analysis is an important management tool that ensures:

•a method of evaluating the global effectiveness of quality management;

• a means of determining problem areas and priority actions.

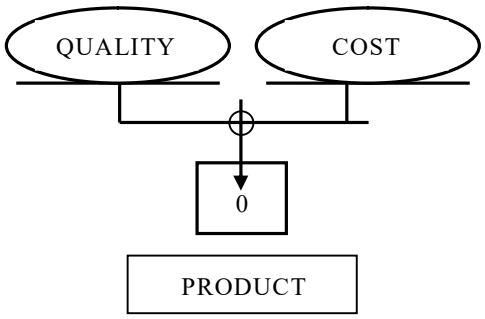

Fig. 1 Quality-cost balance

Quality costs can be separated into three categories:

1. Failure costs:
a) Internal failure costs;
b) External failure costs.
2. Appraisal costs;
3. Prevention costs.

2. FAILURE COSTS

Internal and external failures are due to work done poorly, as a result, some specialists include the costs of internal and external failures in the costs of non-quality.

a) Internal failure costs

These costs are due to work results that are not in accordance with quality standards, the

detection being done before reaching the customer. The internal failure costs include:

-losses due to errors, poor organization, wrong use of materials;

-rejection of defective products that can no longer be repaired, used or sold;

-reworking or correcting defective materials and parts or errors;

-the downgrading of some products that can be used, but do not meet the specifications, to be sold at a lower price;

-analysis of failure which will determine the cause of internal failure.

b) External failure costs

These costs occur when there are inconsistencies between the products or services resulting from a process and the quality standards, but the detection is not done inside the organization, so the result of the process reaches the consumer.

The external failure costs include:

-repair of products returned or delivered to the customer;

-complaints within the guarantee period, which are followed by product replacement;

-complaints that attract handling and service costs caused by customer complaints;

- returns that involve the handling and research of products rejected by the customer or brought back by the manufacturer itself, including transport costs;

- the guarantee in the sense of the existence of disputes related to the guarantee or other complaints, which may lead to the modification of the contract.

3. APPRAISAL COSTS

These costs refer to the appraisal of compliance with the specifications for the materials and raw materials supplied, processed for the products or services in various stages of execution. The appraisal includes:

- tests and checks for incoming materials, for setting up processes, the way processes are carried out, products and intermediate or final services;

-quality audits to check if the quality system works satisfactorily;

-equipment control, calibration and maintenance of all measuring and control equipment;

-the appreciation of the seller, thereby understanding the evaluation and acceptance of the suppliers of products or services.

Appraisal activities produce the costs of correctness checking.

4. PREVENTION COSTS

They are associated with the design, implementation and maintenance of the total quality management system.

Prevention refers to:

•product or service requirements (determining requirements and setting up appropriate specifications for input materials, processes, finished products and services);

•quality planning (creating plans for quality, reliability, operations, production, supervision, inspection);

•quality assurance (creation and maintenance of the entire quality system);

•inspection equipment (design, development and supply of equipment used in the inspection activity);

•training (development and maintenance of training programs for all staff);

•other activities (office activities, travel, supply, shipping, communications and other office management activities related to quality).

Prevention activities incur costs to get it right the first time.

5. OPTIMIZING THE COST OF QUALITY

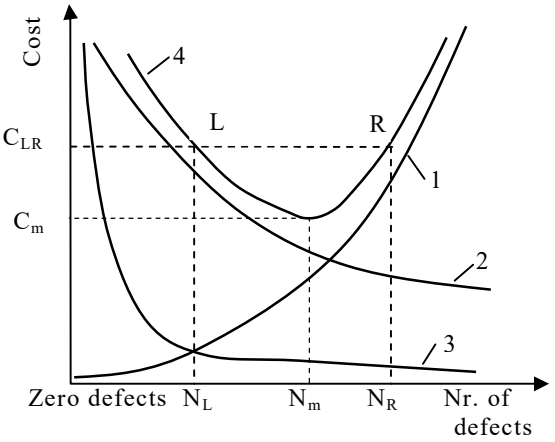

Fig. 2 The cost of quality depending on the number of defects: 1- Failure costs, 2- Appraisal costs, 3- Prevention costs, 4- Quality cost.

Figure 2 shows the cost of quality and its components depending on the quality level, expressed by the number of defects.

The ideal condition corresponds to the case with "zero defects". Achieving this objective requires a very large prevention effort, at a very high prevention cost. It can be seen that the evaluation costs are also very high.

A low level of quality (a high number of defects) leads to a high cost due to failures, while the level of prevention expenses is low. The quality cost curve has a minimum of coordinates N_m (quality level) and C_m

(minimum cost).

The interdependence between the prevention cost and failure cost is obvious, so that a greater importance given to prevention activities, respectively a higher prevention cost, attracts a decrease in the number of defects, thus a reduction in the failure costs.

If there is no preventive action, then the failure cost is very high.

Two cases correspond to a certain quality cost C_{LR}, corresponding to points L and R (figure 2).

The N_L quality level is characterized by higher prevention costs and lower failure costs. The N_R quality level is characterized by lower prevention costs and higher failure costs. In case D there is a decrease in productivity as a result of the consumption of time, materials, energy and effort for reconditioning. The decrease in productivity is accompanied by the loss of prestige caused by unsatisfactory quality. These losses cannot be estimated at a given moment, but they will have negative consequences in the medium and long term.

In conclusion, it follows that for a certain quality cost, the L case (located to the left of the optimal level of quality) is more favorable, confirming that it is more efficient and favorable to prevent than to fix.

The optimal level has a dynamic character, varying over time. Along with the technological development, with the degree of competence and involvement of the personnel, with the evolution of the mentality in the direction of quality, the level of quality increases and the N_L point tends to move to the left.

Total quality emphasizes the prevention of failures, from the design phase, with costs being higher the closer the moment of defect detection is to the end of the production flow and product use (figure 3).

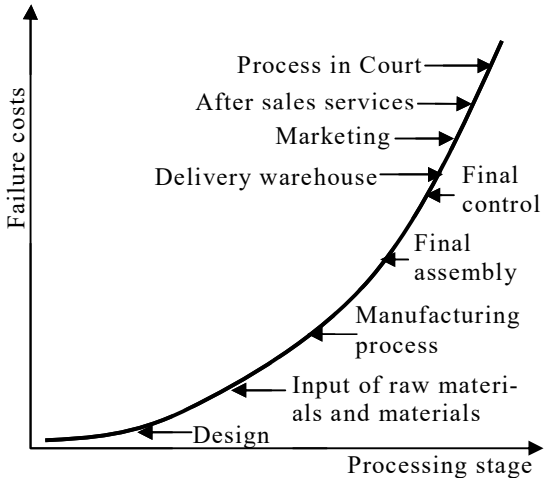

Fig.3 The cost of failure depending on the stage in the product's life

Quality costs must be closely followed by companies in order to improve their own competitiveness.

Many organizations highlight only the costs that can be measured, which is a big mistake because in reality the costs of quality are much higher. Non-productive areas such as finance, human resources, legal, computer systems, public relations, supply and sales must be considered.

Business managers must be more attentive to the costs involved in achieving and maintaining compliance with the quality predetermined in the project.

5. COMPETITIVE BENCHMARKING

Along with quality costs, benchmarking is a tool for company management, providing information about performance indicators and ideas for product and process development.

Benchmark is a simple reference point that is used as a standard of comparison for current performance. Here are some typical benchmarks:

- the specification;
- the client's wishes;
- the competition;
- the best in an industrial branch;
- the best in any industry.

Benchmarking establishes what the company needs for the purpose of development, in order to reach a performing level in its class.

High performances can be in all economic sectors. Even among the best performers there are companies that have higher effective costs or the flexibility and quality of the activity are weaker than in the case of others. The best competitors are not only market leaders. In most cases, they hold a leading place in terms of quality and flexibility.

Competitive benchmarking involves going through the following stages:

• determining the characteristics that will be the object of the comparison;

Because of the wide variety of processes to be examined, the benchmarking team must be composed of a large number of specialists with diverse training (executives, production professionals and other fields).

• determining the organizations that will serve as a standard;

Benchmark candidates are carefully selected in order to compare with your own business. Sometimes the most useful visits should not be made to large national companies, which are assailed by visitors, but to smaller companies that are not yet very well known and where visitors can better understand the

difficult problems they have to solve.

• data collection;

Accepting a certain method of measurement (appreciation) for the available information sources, the essential objectives observed for the target company must be dissociated from the less important ones. A benchmark team leader with more experience is especially helpful in this regard. The gathering of the obtained results, as well as the multiple review of the acquired data, constitute a guarantee of the success of the action.

• determining the best in class;

Researching primary data of enterprises, interviews with customers, collaborators, financial analysts and consultants can be elements that lead to the selection of a particular company for benchmarking.

• analyzing the company's condition compared to the best in class;

Interpreting the results obtained is the most interesting and difficult stage, requiring a lot of discipline in work, a large number of visits and clairvoyance. The number of visits is dictated by the nature of the problems and requirements that the benchmark teams have to observe. In the end, a consensus is reached that must emphasize what was learned.

• setting objectives and embedding them in overall business plans;

• developing strategies and action plans, including periodic milestones, with clear deadlines;

• measures to make it possible to highlight progress at each periodic milestone.

By going through these stages, one tries to achieve the goal of benchmarking, which is to propose to managers ways that bring new light to the realization of their own process.

The search in benchmarking activity probably never ends. Benchmarking is a way to force the company to examine the best practices outside the company, regarding not only the possible practices, but also the way they are applied.

6. CONCLUSIONS

Both quality costs and competitive benchmarking are necessary tools for quality management to stimulate and support the process of improving the company's own competitiveness. Analyzing quality costs aims to optimize them.

The optimal level has a dynamic character, varying over time. Along with the technological development, with the degree of competence and involvement of the personnel, with the evolution of the mentality in the direction of quality, the level of quality increases, aiming for "zero defects".

On the other hand, benchmarking establishes comparative standards, in permanent reporting to reference products existing in the market, providing indicators regarding the productivity, economy, quality and efficiency of the organization.

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