NON-QUALITY COSTS AND THEIR CONSEQUENCES IN THE ORGANIZATION

ANDREI DIAMANDESCU*

Abstract
The purpose of this paper is to evaluate and analyze non-quality costs. This approach can be best based on the definition and understanding of the quality costs and then passing to the study of the effects of failures on the quality and the costs of these failures. Finally the paper will suggest several ways to improve the control costs of non-quality.

Keywords: *quality system, quality costs, non-quality, evaluation of non-quality, total quality management.*

Introduction

The problem of quality costs can be treated in terms of highlighting the costs, the time evolution of the concept and their classification (types of quality costs). Quality costs contribute to a high proportion of the total costs of an organization. Their importance is as important as they can not be fully reflected in the accounting documents, many of them can not be measured in practice. Thus, some costs can be calculated, such as for example the costs involved during the warranty period, others, due to wastage or subsequent processing can be found in the documents, others can not be practically measured.

If it were be possible making comparisons between quality costs, they can be regarded as a qualitative benchmark of an organization. However, to perform such analyzes should be considered different cost categories and among these must be the most carefully studied non-quality costs. About these costs it is said that they are most important in the organizations.

About the costs of quality there are opinions that the correct wording would be "cost of poor quality" or "non-quality costs." Although the arguments using the phrase, non-quality costs "were quite strong, yet most authors use the term" quality costs ", considered to be more comprehensive and fairer because, logically, quality costs include non-quality costs.

Quality costs are in fact a generic formulation of an activity for all costs involved in getting a quality product or service, they can be defined as "costs of insurance and quality assurance as well as losses incurred if the quality is not reached ". This definition completes an earlier definition given all of J.M. Juran, but the definition which better capture the idea of non-quality costs, "costs will disappear if there will be no defects"[1]

Quality costs include three categories of costs that voluntary cost to achieve a desired level of quality, cost involuntary failures in reaching this level (these cost categories were called "quality costs" - costs of compliance and the "cost of non-quality" - costs of non-compliance), plus the cost of the lost opportunity.

This classification was made to distinguish clearly between "useful cost, good, necessary" that will produce the desired quality and "bad costs, unnecessary", which are cost penalty for failures to achieve the desired quality.

Methodology for assessing non-quality

Evaluation of non-quality is first considering the cost of the investment in quality systems. These investments are designed to bring the organization to a level of quality according to the

* Assistant Lecturer, Faculty of Economic Studies, "Nicolae Titulescu" University of Bucharest; PhD Candidate at The Bucharest University of Economic Studies (email: dandrei@univnt.ro).

[1] Joseph M. Juran – *Quality Control Handbook*, McGraw-Hill, New York, 6th Edition, 2010.

requirements. The second issue concerns the costs incurred by the organization for quality failures. These costs are most important to the organization and should be as carefully controlled and managed.

Working on quality management organizations generates some costs that are not included in the traditional accounting systems. However the biggest challenge in testing, evaluating and reducing quality costs represent precisely these hidden costs. The cost of non-quality can be calculated as the difference between the costs actually incurred by the organization in the current and costs reduced if there was no error and no defect during the design, manufacture, marketing and use of products.

Information necessary to compute non-quality costs are sometimes difficult to obtain. The data source for the analysis of these costs may be technical and commercial product documentation, and accounting organization since it records the data. Another source of data could be estimates based on surveys and organizations interested in knowing the costs of non-quality.

Total Quality Costing

Traditionally, so-called quality costs have been divided into the following four main groups[2]:

1. Preventive costs;
2. Inspection / appraisal costs;
3. Internal failure costs;
4. External failure costs.

In the quality literature, it is often claimed that total quality costs are very considerable, typically between 10–40% of turnover. This is why these costs are also called 'the hidden factory' or 'the gold in the mine'. We believe these figures can be much higher, especially if invisible costs are taken into account.

Invisible costs are everywhere. This can easily be seen by looking at developments in quality cost theory from before 'the TQM age' to the present.

Before TQM. Quality costs consisted of the costs of the quality department (including the inspection department), costs of scrapping, repairs and rework and cost of complaints. The companies were aware of the above division of quality costs and understood that prevention was better than inspection and that an increase in preventive costs was the means of reducing total quality costs. Most companies, however, did not deal either systematically or totally (i.e. in all the processes in the firm) with these costs.

The TQM age. Total quality costs are defined as the difference between the firm's costs of development, production, marketing and supply of products and services and what the (reduced) costs would be in the absence of defects or inefficiencies in these activities. Put another way, total costs can be found by comparing the firm with 'the perfect firm' or 'the perfect processes'. In this sense, there is a close connection between the concept of quality cost and benchmarking.

There is also a close connection between quality control points and quality costs. A quality control point is defined as a result (output) of a process which management has decided to control and therefore measure. The result of any process is thus a potential quality control point. Since all firms consist of a large number of processes, there will be a similarly large number of potential control points. Each of the firm's processes can be compared with the perfect process and all the potential control points can therefore be compared with the result of 'the perfect process'. If the difference between the result of the perfect process and the firm's present process result is valued in money, we get the process's contribution to the total quality costs. We can also call this the process's Opportunity For Improvement measured in money. This process can best be determined either at the time of the annual quality audit or during the year when the quality improvement teams choose new quality problems to solve.

[2] Dahlgaard J.J., Kristensen K., Kanji G.K – Fundamentals of Total Quality Management – Process analysis and improvement; Taylor & Francis Group, e-Library 2007.

Approach of non-quality

We can not talk about quality without managing non-quality, if we get the additional costs, which reduce the competitiveness of products.

Concept of quality means the assessment of the cost of non-quality improve previously attempted definition of quality is "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs" (ISO 8402). Quality is "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs" (ISO 8402).

The best definition in the opinion of many specialists can only come from those who are considered as the pioneers of quality management. Thus, for K. Ishikawa "Quality can only be defined in terms of one who does it."

For the worker quality means "to be proud of his work".

For enterprise manager quality means the realization of the required production.

For the engineering director quality is the compliance with the specifications

For the marketing manager quality is the best fit of the product to public expectations.

However, obtaining this quality implies a cost that denominates the cost of obtaining quality"

Evaluation of the non-quality methodology

We can distinguish two aspects:

• The first aspect is related to the investments we made to achieve the level of quality that meets the requirements. This is the price to pay to ensure an acceptable level of quality.

• The second aspect is the cost of doing things wrong, or not doing them well since the first time. The cost incurred is twice the price it would be enough to invest to make a conform quality product.

Financial implications

The production activity generates energy losses, human and physical resources that do not appear in conventional systems where only conventional accounting costs of material, labor and workshop are taken into account. Research quality should reduce these hidden costs.

The cost of non-quality can be defined as the difference between the current cost and reduced cost if there were no errors and defects in the design, production, marketing and use.

It is possible to calculate the cost of non-quality in % of turnover of a company or a nation's GDP.

The information needed to calculate the costs of non-quality are sometimes difficult to obtain (often confidential). They can be obtained from the accounting documents (analytical and general), technical documents, administrative or commercial. It is always possible to make an estimate from surveys of persons concerned.

Elements of costs of non-quality that involves in the evaluation

Most experts say that non-quality costs can be measured from:

- Excess of financial expenses
- Delays billing
- Loss of prestige
- Delayed start or premature introduction of new products
- Absence, insufficient or inadequate presence of the product in retail outlets
- Repeated requests for changes in design
- Purchase price wrongly established or calculate
- Out of stock or excessive stock
- Stop production

- Investments not utilized at their entire capacity
- Over-consumption of raw materials and supplies
- Failures of production tools
- No recovery or inadequate utilization of by-products.

After the evaluation, the following ratios are calculated and integrated dashboard management company. They constitute the reference indicators to monitor progress in the improvement process:

$$I_1 = \frac{NQC}{T} \times 100$$

$$I_2 = \frac{NQC}{AV} \times 100$$

$$I_3 = \frac{NQC}{NE} \times 100$$

NQC = Non quality costs
T = Turnover
AV = Added value
NE = number of employees

Analysis of the different costs of non-quality

The calculation of the cost of non-quality is an accounting method that locates in the business all unnecessary expenses caused by the failure of products and services. The cost of quality has the same elements with the addition, the cost of failure prevention.

The result of the calculation of the cost of non-quality allows the company management to prioritize the improvement of the quality programs.

It is important to observe that the data at the origin of this information are not always reliable, and these expenses are only part of the shortfall.

For example the fact of losing dissatisfied customers services business is generally much more serious than replacing defective products.

The design means manufacturing and distribution is not perfect and it causes defects in the product that will result in losses automatically.

These losses can be quantified directly:

1. Internal anomalies: scrap, rework, repairs - repairs, decommissioning of finished product or ongoing losses unemployable purchases other internal costs, pollution, accidents, absenteeism, etc.

2. External anomalies: Customer complaints, cost of warranty, other external costs, late fees, interest charges for missed deadlines, loss of customers, reimbursement for damage caused to others, insurance premium to cover the liability products etc..

We must add to this the indirect losses in credibility as the loss of brand image (and often most difficult to quantify)

Detection

- Salary and expenses related to audits
- Cost control outsourced
- Supplies and products for various tests used to evaluate the product
- Costs calibration

Prevention

- Establishment of quality documents (manual quality assurance, quality plan, control plan, procedures)
- Evaluation of suppliers
- Awareness, motivation and training to quality and quality management.
- Conducting quality audits.

Methodology to reduce the cost of non-quality

- Understanding the situation, identifying all the costs of non-quality (state of places)
- Set realistic and achievable goals of decreasing costs.
- Prioritize problems with the cost Pareto chart:
- Ranking the costs.
- Identifying the priorities
- Determine the true causes the diagram cause - effect (Ishikawa) that classifies a structured way the views of various experts
- Define corrective actions, monitor their implementation and measure the effectiveness with dashboards
- Conclude preventive actions
- An inappropriate choice of suppliers may result in the following consequences:
- Reinforced entrance inspection
- Returns to suppliers
- Delays
- Incidents manufacturing.

Action process for the treatment of non-quality

Cost improvement

Lowering costs is given by:

- Improving process operations
- The removal of non-rewarding operations
- The improved results following improvements oriented process.

To improve the results, it must be directed to the process and not move towards results. The process must be understood in its broadest sense and includes the development. The largest gains are achieved in the design and industrialization.

Reduction of losses

In an attempt to reduce losses, investments are needed.

Investment in hardware detection

It is investing in equipment, methods and techniques of control:

- Receiving inspection
- Controlling the products
- Verification of the measuring instruments
- Controlling the lines
- Inventory control
- Monitoring time
- Control orders and invoices

But this investment is limited. This is strictly a consequence andit does not address the causes of evil.

Investment in prevention equipment

We can talk about the reason to investing in equipment, methods and techniques of prevention.

- Check specifications (contract)
- Review design and production
- Improvement plans and records of planning and control
- Creating quality indicators
- Training of staff
- Implementation of a quality approach from model

An investment in prevention is made only if the losses will be reduced. The optimization is made knowing that there is a correlation between losses and investment.

Conclusion

Non-quality costs money. The cost of non-quality proves to be an indicator that can help the company management to understand the problem of quality, highlight opportunities for improvement and to measure the progress of the improvement actions.

It thus makes it possible to summarize the overall situation of the quality in the company and speak in common terms, which allows us to measure progress and set priorities in corrective actions.

It is therefore necessary to manage quality by implementing a gradual process of continuous improvement that will bring the industrial enterprise of a state of "detection - defection" to a state of "prevention - action."

The most productive investment would ultimately be for many businesses prevention. This will be a key element of quality management.

References

- Ph.B. Crosby – *Completeness: quality for the 21st century*. Dutton, New York, 1992.
- Campanella, J. – *Principles of Quality Costs,* ASQC, Milwaukee, Wisconsin, USA 1990.
- Dahlgaard J.J., Kristensen K., Kanji G.K. – *Fundamentals of Total Quality Management*. Taylor & Francis Group, e-Library 2007.
- Kèlada, J. – *La gestion intégrale de la qualité. Pour une qualité totale*, Edition Quafec, Québec, 1990.
- Duret D., Pillet M. – *Qualité et production*, Editions d'organisation Paris, 2002.
- Joseph M. Juran – Quality Control Handbook, McGraw-Hill, New York, 6th Edition, 2010.
- Joseph M. Juran – Upper Management and Quality, New York, 1980.
- Joseph M. Juran – Management of Quality Control, New York, 1967.
- Graham W. Parker – *Costurile calităţii* Editura Codecs, Bucureşti, 1998.