

CONTRIBUTIONS TO OPTIMIZE QUALITY COSTS IN THE AUTOMOTIVE INDUSTRY

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Abstract: The main goal of the research is that one to present a way of organizing the management accounting, so that it allow the calculate of a cost for quality pertinent for each activity and on every product made in the automotive industry entities. We critically analyzed the current system used to determine and track quality costs at the studied entities, in order to emphasize the need of organization and implement a modern management accounting, which allows quality control costs and increase the entities performance in this area. The research made, revealed the fact that in present the quality calculation costing is organized in terms of using methods that do not comply with accounting principles, and that it is necessary to organize and implement a management accounting, based on the use of modern methods, respective the cost activities method. The major implications of the proposed system for the studied area consists in the determination of a pertinent cost quality oriented toward entity management, highlighting the shortcomings of the methods currently used to manage quality costs.

JEL classification: M41, M49

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1. INTRODUCTION

Due to deep changes that have occurred in the economic and social environment, such as, the development of the globalization phenomenons and the increased of the competition, the acceleration of the technological innovation, accentuated reduction of the raw material resources, the diversification of the production and various combinations of goods and services in order to satisfy the customer demand more differentiated, the developmentof the support activities in the current period, quality has become a permanent concern of all entities, including those in the automotive industry.

In the speciality literature are found many definitions of quality products and services, but most appropriate and comprehensive is one offered by standards from series ISO 9000, and "quality represent the whole of properties and characteristics of a product or service that gives its the ability to satisfy customer expressed and implied needs".

In a broader sense, in addition to aspects of technical nature and customer satisfaction, which are resulting from this definition, the concept of quality must be approached also from the economically point of view and, respective of the costs involved with getting quality.

Regarding of the economic aspect of quality, is necessary to implement a methodology for tracking and managing quality costs, as an important component of total quality management system and at the same time as a previous step to optimize the quality cost in automotive industry entities.

2. OBJECTIVES

The quality cost analysis is an important tool for management an entity, because it could be constitute or turn into a potential source of profit maximization.

From the perspective of cost optimization for the increase of the entities performance from the engineering industry car, our study aims at improving the current calculation methodology of quality costs, by introducing an advanced calculation methods, more supple and more efficitetfor the entity management, taking into account the specific of the analysed domain. Following investigations, we concluded that the best methods for achieving the traced objectives are activities cost method (ABC) and target cost method (Target - costing), due to the many advantages which it offers in comparison to the methodology currently used for tracking and managing quality costs.

Target - costing is particularly adapted for the sectors in which the competitive pressure is high. This method is very effective in assembly activities, being less efficient in low range process activities.

In steps ABC it prefers to put on the first planethe overhead costs related to significant cost inductors. For here lies the main limitation of the target - costing over which the ABV method brings obscurity.

Based on these considerations, practically, in the entities engineering industry car it can be used the cost method activities (ABC) for the determination, analysis and quality costs control.

3. METHODOLOGY

The investigation methodology include general and specific approaches, especially analysis and synthesis, also qualitative research. We will take into account the existing calculation system in order to determine quality costs and vis a vis to this one we propose solutions for improvement.

Informational support of the study is the, besides the studied bibliography, the effect legislative and normative acts related with the field.

4. DETERMINATION AND PERSUIT QUALITY COSTS

Before proposing the implementation of an improved system for determining and tracking quality costs is necessary to define quality costs and performing critical analysis of the current system used by the in automotive industry entities for the calcul and the persuit these costs.

4.1 Defining and structure quality costs

In the specialized literature the quality costs are viewed with great interest, given heir high percentage in the turnover. According to numerous estimates realized, the balance of quality costs as part of an entity varies between 5% and 40%, depending on the entity type, producer of material goods or services provider and the used modalities of determination and follow-up. In reality the level of these costs is even

higher, if we consider that a number of quality costs can not be measured, quantified. It is about of the so-called hidden costs, invisible or lost opportunity costs: costs with the loss of the current and potential customers, loss of entity reputation, loss of markets, etc.

At the mid-century the General Electric was the first entity that implemented a management system based on quality costs. Within this system, shown in 1953 at the VII Congress of the American Society for Quality Control, the quality costs were defined as represent "costs due to leavings, reshuffles, inspections, tests, deficiencies shown by the buyer, quality assurance, including training programs on quality, product quality audit, inspection and statistical analysis". In a broader sense, the cost of quality is the total expenses that the manufacturer carry, user and society at large about the quality of processes, products, services and environmental protection²⁵.

Reporting to the quality costs, the European Organization for Quality - EOQ considers that these consist in expenses with prevention, evaluation as well as loss due to refuse found in the production process or at customers. In a similar manner, are defines the quality costs and German Society for Management Systems (Deutsche Gesellschaft für Managementsystemen).

According provisions from standards in series ISO 9000, "the costs related to quality, are costs made for achieving proposed quality, providing the necessary confidence and the losses incurred when the proposed quality is not achieved"²⁶.

On quality costs, must be accurate that, over the time, there were views according to which for the name for these costs would be more appropriate the terms "cost of poor quality", introduced by Juran or "price of non-compliance", introduced by Crosby²⁷. These terms were used in connection with the way in which many experts have defined structure quality cost at a time.

However, in the current period, most of the expressed opinions in Romanian and foreign literature lead to the use of the term "quality costs", considering that this captures better the fact that in the structure of these costs are included, in addition to internal and external failure costs, also some expenses not related to realization of some products or services of poor quality, but it refers to the prevention of nonconformities or evaluation operations.

On the line of costs quality research we find that in the specialized literature there were multiple concerns, for which we retain the authors' opinion C. Mironeasa and S.Mironeasa (2009), which emphasizes that "quality costs approach is achieved by associating them with that costs that considering prevention, finding and correcting defects"²⁸.

Referring to the quality cost, D. Popescu (2008) believes that they are "those costs associated with the nonconformity product quality or service as they were defined by the demands set by the organization and customer contracts, given the social conditions "²⁹.

²⁵ Ionita I. - *Techno-Economic Quality Management Systems*, ASE Publishing House, Bucharest, 2002.

²⁶ Ionita I. – *Op. cit.*

²⁷ Mironeasa C., Mironeasa S. - *Quality costs*, Matrix Rom Publishing House, Bucharest, 2009, p. 62.

²⁸ Mironeasa C., Mironeasa S. – *Op. cit.*, p. 58.

²⁹ Popescu D. - *Quality Management, Principles and Practice* , Universitaria Publishing House, Craiova, 2008.

Another opinion concerning quality costs can be found at J.M. Juran, who groups them into 11 categories: involved cost of market research, products conception activity costs, research – design activity costs, costs of planning manufacturing activity, costs of maintaining the work accuracy of the processes and equipments, costs related to human resources and materials necessary for the control of the technological process, marketing costs, product evaluation costs, costs to prevent defects, loss due to lack of conformity, costs of personnel permanent information about activities related to quality. From all these, Juran considers that the first seven categories should be supported by the entity to realize a product and obtain incomes, and the other might be avoided to a certain extent.³⁰

Vis - à -vis of the views expressed in the special literature, sometimes disputed, in our opinion, in the definition of quality costs should take into account the specifications required by the ISO 9000 standards, that include internal activity, also to include external beneficiaries.

In the special literature there have been debates on the classification and structure of the quality cost, being used different grouping criteria: purpose, resources nature, possibility of highlighting, the way of evolution, the place where they are registered. Any of the criteria listed assume classification from the practical point of view, of utility and not from the point of view in terms of compliance with strict accounting principles³¹.

As far as we are concerned, we believe that the most appropriate classification of quality costs is that made from the point of view of the manufacturer, since this is the first responsible of quality assurance and, at the same time, is the leading and can optimize the quality through costs. We stopped at these classification of quality costs and from practical considerations for the objective of our approach, given its compatibility with implementing an improved system for determining and tracking quality costs .

In relation to this criterion, we have four categories of costs:

- prevention costs include costs for all activities in an entity contributing to the realization of some products, according to customer requests and quality specification;
- evaluation costs, those costs realized by the producer as part of the verification, inspection, testing and audit activities, having the role to discover products not correspondent from qualitative point of view;
- internal deficiencies costs include costs generating by machines break – down, insufficient personnel qualification, raw materials and materials that do not correspond from qualitative point of view, refuses, reframing, etc.;
- external deficiencies costs, those costs referring to product return, guarantee and post-guarantee costs, customer’s complaints, loss of orders, etc.

Moreover, this classification is very similar to the first group of quality costs that makes AV Feigenbaum³² and is later adopted by the ISO standards.

³⁰ Juran J. M., Gryna jr. F. M. – Products quality, Practical treaty of planning, designing, realization and control, Translation from English – USA, Technical Publishing House, Bucharest, 1973, p. 76-77.

³¹ Mironeasa C., Mironeasa S. – Op cit. p 67.

³² Mironeasa C, Mironeasa S.- Op. cit. p. 68.

4.2 . Critical analysis of the current system for determining and tracking quality costs

Providing products and services of quality at the lowest costs possible should be the main concern of any entity. To ensure the efficiency of this approach must have known his costs. Determining and tracking quality costs represents an important way to increase profits, through an appropriate program to reduce these costs.

Even at the present, most of entities ignore this opportunity, either due to exclusive focusing on production amount and aiming financial efficiency, either due to the difficulty of quantifying different components of the quality cost, which is generated also by defective organization of these costs accountancy.

In this context, it should be noted that the vast majority of entities have not implemented a modern system for determining and tracking quality costs, from types of costs, on products / services, on the activities, departments, enabling the establishment of responsables and the causes of a high cost due the poor quality, in order to take appropriate corrective measures.

In fact, in practice, determination and tracking quality costs takes place extra-accountant and is limited to preparation of some operational accounts (reports) by the department that deals with issues of quality control within an entity and organizational is part of the structure of the production.

But quality costs are not specific only to the production function, but in a higher proportion or less, they are found in all activities, functions and entity compartments: conception, design, provision, production, marketing, delivery, etc.

Furthermore, from an accounting perspective, relying on the fact that some of the quality costs are difficult to identify and quantify, are pursued only part of the cost of quality, that cost is easily identified and quantified (costs with final scrap, with reshuffled scrap, costs incurred by the quality control department). Most often either these costs are not evidenced separately as quality costs, but are included in the total manufacturing costs.

In fact, the determination and quantification of the real cost of quality is a function solely accounting and as such, at the level of each entity for collecting and processing data regarding quality costs should be a close collaboration between the accounting department of quality with the quality control compartment and with other departments with the attributions on the line of quality assurance of products and services.

In conclusion, we can say that the current system for determining and tracking quality costs, existing in the entities from the engineering industry car, the information provided by the accounting does not help much to reduce costs and improve quality. This is because quality costs are not provided by the entity's normal accounting system, and sometimes are being used methods for collecting and analyzing data that does not correspond to the principles of accounting. Therefore , we consider it necessary to implement a modern system for determining and tracking quality costs, which rely mostly on accounting entity, that provides the largest part of data on quality costs. Such data must be analyzed and supplemented by estimates of the hidden costs of quality, which are difficult to quantify through specific procedures of accounting.

Among the hidden costs of quality thye most difficult to assess is the cost of lost opportunities, which can be estimated by deeming the opportunity cost, respective lost profit by the cancellation of orders by customers for products and services of low quality.

In this context, we believe that accounting systems should be designed so as to support decisions and strategy entity in the quality field.

4.3. Opportunities to improve the system for determining and tracking quality costs

Entities that do not have a modern quality management cost can not act effectively to reduce these costs and, related to this, to improve performance.

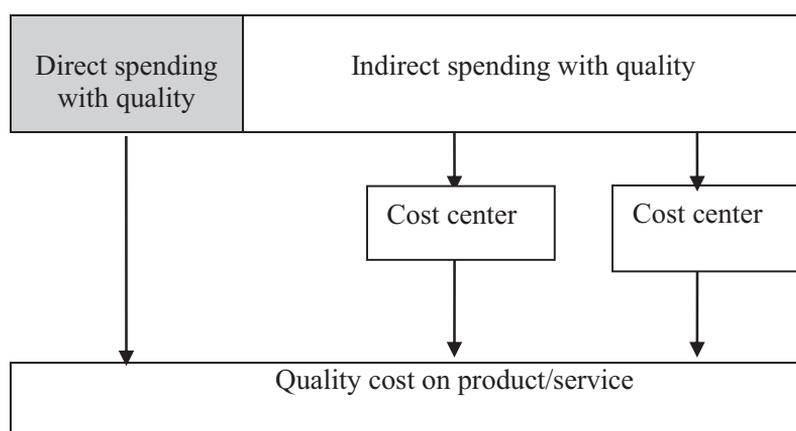
I said earlier, that most entities determine and track quality costs using extra accounting sources and methods. These information do not represent the real quality cost, as gathered and obtained often by personnel that is not part of entity's accountancy department.

In this context, we believe that the activities cost method (ABC) can be used to improve cost quality management system, as this method examines the important activities of a company in terms of process, product and quality cost, and can identify those activities that are important in terms of customer requirements.

By implementing the ABC method can achieve a cross - cutting, on the entity activities, since in the conception of this method the activities and not products are those that does not consume resources.

To calculate the quality cost the ABC method is based on the group of costs in direct costs and indirect costs.

According to this classifications, the calculation model of quality costs in a accounting based on activities, is presented in a simplified version in figure 1.



Source: I. Ionescu, Iacob C., Ţaicu M. - Management control. Synthesis and applications. Universitaria Publishing House, Craiova, 2012, p. 118.

Figure no. 1 Calculation of quality cost in ABC

In terms of direct costs related to quality (consumables, direct workmanship), these are allocated directly to the products or services, based on different documents that highlight resource consumption (consumer bills, vouchers work, payroll, etc.).

In the concept of method ABC the indirect expenses are represented by the expenses related to the activities in which the entity was cutting and their imputation product / service is via several steps, in the manner hereinafter.

The first stage involves identifying the activities that generate quality costs and to identify, codify and quantify all categories of quality costs in each activity.

Quality costs are manifested throughout the life cycle of a product, which means that all activities in which decomposes an entity in the automotive industry, started with the conception and design of the new product and ending with its marketing and sales, give costs related with the quality.

The activities consume resources, but not always they are independent and cannot establish one responsible for each activity identified. The activity is found in a certain function of the entity in hierarchical upright cutting – functional of these, and therefore must be identified belonging responsibility center in order to be able to determine the person responsible for management decisions relating to the activity. Is necessary these relationship with the structure of responsibilities in order to enable cost control activities.

In the second stage proceed to the determination and delineation between the activities of all costs (indirect) relevant, that is, in fact, the cost of consumed resources by the activities. Quality costs are analyzed in terms of design, supply, production and the behavior way of the products at the consumer. This analysis is necessary to allocate the cost on the activities they generate.

The third stage involves identifying activities that have ties involving interdependence between them and that involves quality costs. For example, the supply department will seek to buy at the lowest costs, neglecting aspects of quality of the raw materials and materials, with consequences on product quality embodied in defective or scrap, as well in maintenance expenditures and higher repairs, which leads to unfavorable influences on the entity management. These costs should be allocated among the various interdependent activities using a distribution key, more or less arbitrary, which can lead to the obtaining inaccurate costs, and consequently, to poor decisions.

In the fourth stage is set factors that generating quality costs, so-called activities inductor cost. Cost inducers allow more accurate allocation of indirect costs with the quality on products or services, following the development of causal relationships between inducers and expenses subjected to allocation.

Correct identification of cost inducers preset a special importance to ensure the quality of accounting information. Any change in the cost inducers causes a change of the share of different quality costs in the total cost of carrier cost.

The penultimate stage the activities with the same inductor cost are grouped into a single cost center. This group is required because the establishment of an analysis center for each identified independent activity would lead to an extremely informational bulky accounting with hundreds of such centers, with all the consequences that result from here. Follows the calculating of the unitary cost of each inductor cost, by reporting total spending related to associated activities grouped in a group center cost to the respective inductor volume.

Please note, **that after the first five stages were completed the first major objective is achieved of the method on activities (ABC) regarding the quality costs, respective determination and tracking quality costs on activities (cost centers), and within these on categories (ways) of quality costs.**

The last stage regarding the treatment of indirect costs of quality in terms of implementing the ABC method, consists in allocating these expenses on carriers cost, which is obtained by weighting the unit cost of each inductor cost with the volume consumed inductores consumed by each carrier cost.

Finally, we get the full cost with quality on cost carriers (products, services, customers) by adding the cost of consumed activities at the direct expenditure with quality.

So, the second major objective of the ABC method is achieved regarding quality costs, respective determining and tracking quality costs on cost carriers, and within these on categories (types) of quality costs.

5. CONCLUSIONS

The added value of this paper consist in making a rigorous study of informational costs quality system in a very important sector for the Romanian economy.

The ABC model is relevant in order to help more radical change in way that aimed optimum reconfiguring of the quality cost management system.

We consider here that, in our view, the map activities that forms entity folds better on the calculation of some costs used by managers in taking decisions - riented on the final customer satisfaction of carriers (product, work, services).

Costs calculation per activities (ABC) can be useful to entities from vehicle constructing industry concerning analyze, execution and implementation of the strategies for quality problems, during the entire life cycle, starting with the activity of conception and design. The pattern of activities offers a realist basis for the forecast of indirect expenses with quality, employment from the phase of election of product manufacturing conception.

In conclusion, the ABC method is a method of administration and management that has specific tools for assessing and measuring the quality real cost on activities and products, also its impact on profit and on the performance of the entity.

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