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AN INTRODUCTION OF PRODUCT QUALITY COSTS INTO AN ENTERPRISE ACCOUNTING SYSTEM

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ABSTRACT

Studies conducted in Russian organizations of various industries, allowed us to offer the following classification of costs for quality: prices for maintaining quality; quality improvement costs; expenses for the development of new recipes, technologies, product names. In this case, only decapitalized fees are considered. It proposed to organize accounting of quality expenses in a separate collection and distribution account with the allocation of certain items: "Quality maintenance costs"; "Costs to improve quality"; "Costs for the development of new formulations, technologies, product names".

The authors proposed a multilayer hierarchical methodology for classifying and organizing the accounting of costs for quality, which consists of several stages and accounting procedures that are consistent with the characteristics of activities and the product life cycle. All steps of the proposed system of accounting for costs of quality include the allocation of types of products (product groups), their life cycle (current production, reduction, development of new ones), types of activities (supply and procurement, production, marketing). It should have been noting that the stages in the construction of an accounting system can expand, taking into account the type of organization of enterprises, real business situations, and other specific conditions. The above methodology for organizing the generalization and distribution of quality costs can serve as the basis for the development of new methods for their planning and analysis. It creates an opportunity to determine the effectiveness of investing in quality costs by comparing investments with an increase in price or sales.

Disciplinary: Business and Accounting, Product Development.

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1. INTRODUCTION

One of the complex methodological issues in the development of a cost accounting system at enterprises is the allocation of costs associated with the quality of output from the total cost of production and marketing of products. It is determined by the fact that the composition of the costs for ensuring the quality of products required by the consumer and the state is different in each organization. The lack of a methodological basis for determining the composition and organization of accounting for these expenses led to the fact that enterprises either completely ignore their allocation, or establish their nomenclature, which in many cases is not analytical and does not allow to draw reasonable conclusions about their required value, investment volumes, as in the industry context, and for the specific technology used by a particular enterprise.

The next point, causing increased attention to the need for separate accounting of expenses for ensuring the quality of products, is a significant increase in this type of expense, which is caused by the emergence and existence of a competitive environment. The product quality indicator, along with the price level and the assortment of output, is a determining factor in the company's positioning on the market. Based on the inevitability of participation in the competition, organizations are forced to invest in measures to maintain quality, to improve the quality characteristics of products, the development of new types of products and other market segments. The recommendations of the European Organization for Quality Control [3] noted that for the company to succeed in the competition, it needs to spend 15-20% of the total production costs on quality, and at the time of the organization's establishment, 30-35%.

The circumstances outlined identified the need to develop a methodology for accounting for costs of product quality that meets the regulatory accounting system and the requirements of internal consumers of information.

2. MATERIALS AND METHODS

To solve the problem, it is proposed to use the following multilayer hierarchical methodology, which consists of several stages and accounting procedures that are consistent with the characteristics of activities and the product life cycle (Figure 1).

All stages of the proposed system of accounting for costs of quality include the allocation of types of products (product groups), their life cycle (active production, reduction, development of new ones), types of activities (supply and procurement, production, marketing). The proposed stages of building an accounting system can be expanded to take into account the type of organization of enterprises, real business situations, and other specific conditions. However, in any case, such additions should not violate the architecture of the model. The implementation of these steps requires detailed disclosure of their content.

3. RESULTS AND DISCUSSIONS

Stage 1. The development of the architecture of the model for accounting for costs of product quality consists of several blocks of procedures.

When grouping types of products, in addition to the recommendations of the tax authorities, we used the accounting approach of matching income and expenses within the reporting period. The proposed grouping allows you to agree on the construction of analytical accounting of finished

products and the allocation of costs to ensure the quality established by the standards for the same analytical groups.

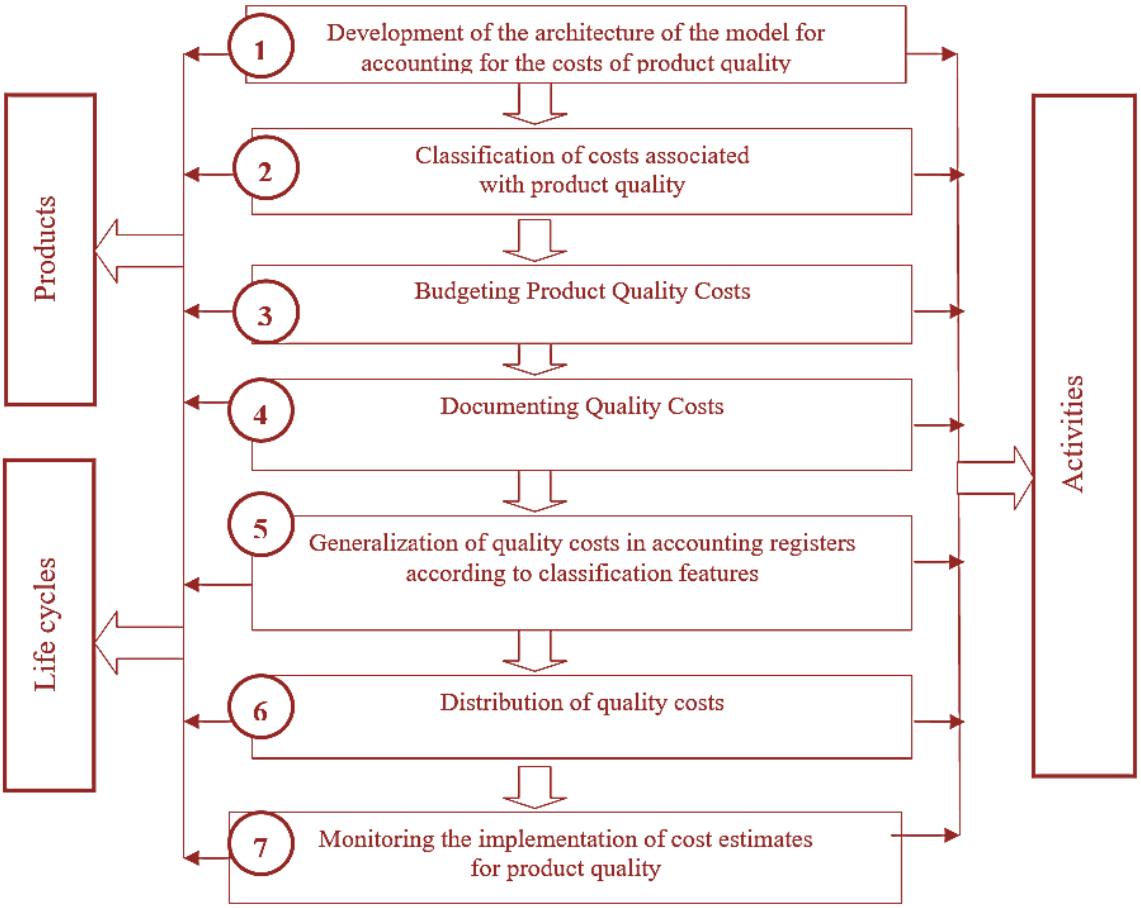

Figure 1: The main stages of developing a system of accounting for the product quality costs

To establish the stages of the life cycle, it is necessary to conduct a dynamic and trend analysis of the actual release and sales by product names, the results of which must be compared with the conclusions of marketing. Differentiation of costs for quality not only by product groups but also by stages of their life cycle makes it possible to isolate the costs of maintaining established quality, improving the quality characteristics of products that have reduced demand, preparing and mastering new formulations, and types of products. The block of procedures for differentiating expenses by stages of the life cycle will serve as the basis for establishing the composition of expenses and their classification (Table 1).

Table 1: Blocks of procedures of accounting for quality cost and their characteristics

Procedure Blocks	Procedure content	Limitations
Product grouping	Choice of grouping features and grouping	Recommendations of the Federal Tax Service of Russia
Establishment of the stages of the product life cycle	Analysis of production volumes: active production, reduction, preparation, and development	Marketing research of demand and product promotion segments
Allocation of cost centers	Development of criteria for the allocation of costs for quality in the supply and procurement, production, marketing activities	The proportion of quality costs in the total cost; the possibility of documenting and isolation in accounting

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The development of criteria for the allocation of expenses at the places of their occurrence should include a planned level of the materiality of these types of expenses, the possibility of providing separate documentation, and on this basis, allocation in accounting. The block of procedures for identifying places of occurrence of expenses limited by the designated types of internal activities of organizations creates the prerequisites for documenting the emerging costs of quality, the economic content of which is determined by these types of processes. This should be used in the preparation of cost estimates for quality, budgeting of the total costs of units, when assessing the contribution of each structural unit to the quality management system.

Stage 2. Classification of costs associated with product quality. The purpose of the classification of costs for quality is to obtain the necessary and reliable information about the composition and magnitude of these costs, as well as to simulate their transformation in connection with a change in the life cycle of products and the development of new types and technologies of cooking.

There is no consensus in the world and domestic economic literature on the grouping of expenses related to quality, the content of their itemized nomenclature, the procedure for recognition in accounting, and their reflection in financial and managerial reports. Two approaches can be distinguished: product orientation; quality assurance activities and evaluation of its results.

We emphasize that most economists adhere to the classification proposed by the American scientist Feigenbaum [5] and called PAF (according to the first letters of the three groups of costs for quality (Prevention, Appraisals, Failure), he divides all the costs of quality assurance into three groups (Figure. 2).

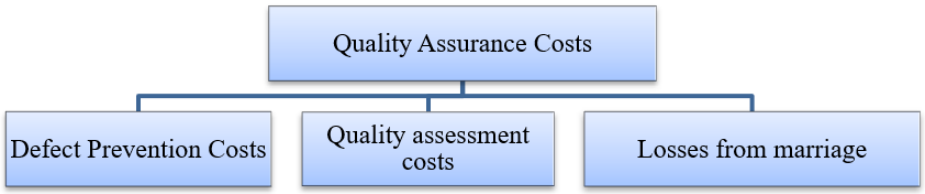

Figure 2: Classification of costs for quality assurance according to Feigenbaum (1986).

Not considering it possible in the methodology to analyze the accepted classification of quality costs used by Feigenbaum (1986), we indicate that we share his approach to determining the types and contents of quality costs. Japanese experts are considering the choice of the basis for classifying the costs of quality [4]. They laid the basis of classification for the principle of utility in activities related to quality, dividing them into only two groups: useful costs, i.e. cost of conformity prevention; Losses - the cost of the assessment and the costs associated with the marriage (cost of conformance). The calculations of the costs of quality assurance are, by this approach, the determination of the cost of work, the purpose of which is to reduce the total cost by increasing the cost of measures to prevent non-compliance and defects. The effectiveness of activities aimed at quality is determined by comparing costs with costs (useful costs are compared with useless ones), and not costs with revenues. It seems to us that this approach can be qualified as "managerial," it allows us to evaluate measures to prevent the appearance of defects at the stage of their development and planning and to analyze the actual costs of fixing the marriage or writing off the cost of the final marriage. At the same time, any activity related to quality cannot be separated from products, including changing (mastering) new technologies.

Officially in Russia, consideration of the issue of allocation of actual costs of quality was paid

attention in the 90s of the XX century by the publication of the State Committee for Standardization, Metrology, and Certification of the Recommendations for determining the cost of ensuring product quality "R-50-601-31-92", by which it is recommended to separate them from other expenses of organizations to justify decisions regarding measures to ensure product quality.

Among domestic scientists, there is also no consensus on the classification of quality costs. It is proposed from two grounds for classifying expenses to ten. However, the classification focused on calculating the cost of products, determining its changes as a result of measures to ensure the quality of products, has not been given due attention and there are practically no recommendations on how to allocate such expenses in accounting. Two extremes are noted - the first one consists of an overly expanded list of costs for quality, the second - on the contrary, involves the use of limited nomenclature.

The identification of costs of product quality and the development of their classification are associated with certain difficulties: dispersal across many accounts and articles of the current nomenclature of analytical accounting of production costs, the multiplicity of cost centers, the lack of guidelines for the procedure for separate reflection of quality costs in the current planning and accounting system and calculation, insignificant distribution at the Russian enterprises of international standards ISO 9004-2015.

Studies conducted in organizations of various industries, allowed us to offer the following classification of costs for quality: costs for maintaining quality; quality improvement costs; expenses for the development of new recipes, technologies, product names. In this case, only decapitalized expenses are considered.

Each of the groups includes economically homogeneous expenses. The proposed approach allows us to delimit expenses between reporting periods. Thus, the costs of maintaining quality will always be expenses of the current period, since they are associated with the actual release of products (Figure. 3).

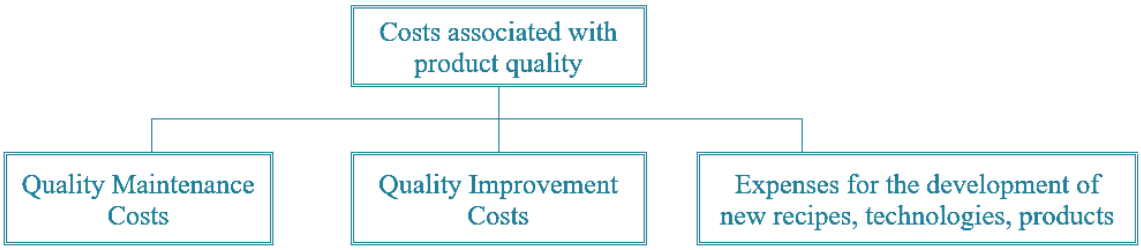

Figure 3: Proposed classification of quality costs.

Even though the costs of improving the quality are also associated with the actual release of specific products, they can be attributed both to expenses of the current period and expenses of future periods, depending on the adopted accounting policy and tax rules. In turn, the costs of developing new recipes, products, and technologies are most logical to attribute to deferred expenses. The rationale for this assumption can be a short development cycle for recipes and products, a flexible production process, focused on accelerated change in the range of production. Concerning the costs of mastering new technologies, it should be said that at this stage of the life of the product they can be significant and therefore it is more expedient to attribute them also to the expenses of future periods.

Stage 3. Budgeting of expenses on the quality of products is necessary to establish the direction of investment of funds and resources, make decisions on the optimal choice of the assortment of

output, as well as calculate cost estimates for activities and divisions. When designing the costs of quality, we consider it appropriate to develop a separate budget, taking as a basis for the planned activities and the proposed cost structure. Budgeting should help to find reserves of product quality, to monitor the effectiveness of spending.

Stage 4. Documentation of the quality costs incurred, recognized in accounting, is possible subject to the division of responsibilities for the implementation of activities related to product quality between structural units and the establishment of responsibility for the consumption of resources within the approved budget amounts. In this case, it is necessary to develop projects of organizational and technical measures for quality with a grouping of certain types of work by type of activity (supply, procurement, technological stages of production, marketing) and structural production units (responsibility centers).

Most of the arising costs of quality are relatively easy to document with the usual documents of the primary accounting system and can serve as a source of information for operational and accounting types of accounting. Articles such as the consumption of raw materials, materials, semi-finished products (own production and purchased), finished products used for quality control processes are standardized and are currently being formalized with documents unified for the industry. Depreciation of equipment of control laboratories, depreciation of special tools, and special devices should be made out in separate accounting calculations. As well as the costs of certification of products, training of technologists and supervisors, improving their skills. Technological calculations confirm the data on the consumption of resources for the development of new recipes, products, and technologies, attached to the production reports of responsibility centers.

To obtain reliable and complete information about the cost of quality for each of the three analytical articles, it is advisable to fix a separate code of expenses. In this case, when computer processing information, it becomes possible to rearrange the data of primary documents.

Stage 5. The generalization of quality costs in accounting registers according to classification features is a set of procedures for collecting, registering, and recording on the accounting accounts integrated data from technological documentation, operational documents, magazines, and production reports into a special accounting register (Figure 4). Like any system, information processing processes for internal consumers have their technological sequence.

Even though quality issues have been considered in regulatory documents and economic literature for a long time, it is believed that in accounting the problem of identifying such expenses has long been resolved. Meanwhile, in the accounting system, the costs of quality assurance are reflected together with other components (Figure. 4).

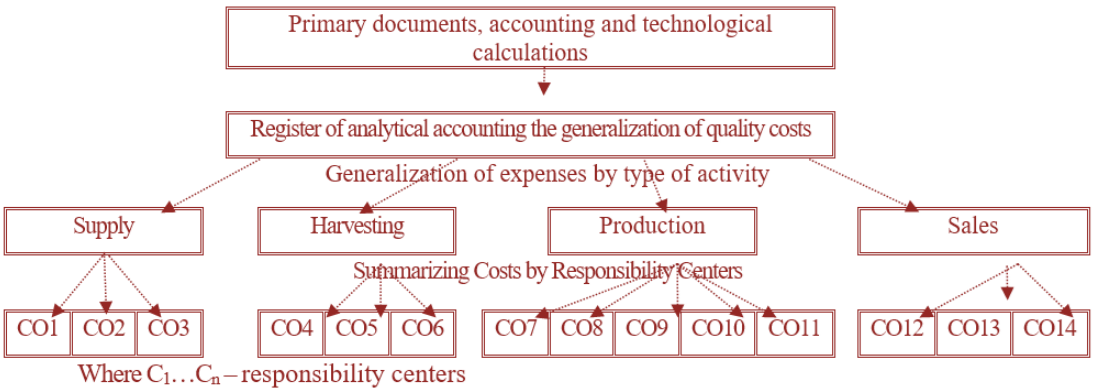

Figure 4: Model for summarizing quality cost information.

In principle, agreeing with those economists who propose that these costs be taken into account on a separate account, we propose to build cost accounting on a separate free collection and distribution 27 "Quality costs" with sub-accounts open to this account: "Quality maintenance costs"; "Costs to improve quality"; "Costs for the development of new formulations, technologies, product names." Analytical positions for subaccounts can be opened in the context of activities and divisions, by type of product, by measures taken and expense items. In general terms, the scheme for reflecting the costs of quality is shown in Figure 5. Disclosure of information on the costs of ensuring the established quality for the year, their composition and percentage of the total cost of the issue should be reflected in the explanatory note to the annual report in the form of a statement that decrypts the article-by-budget content and additional costs.

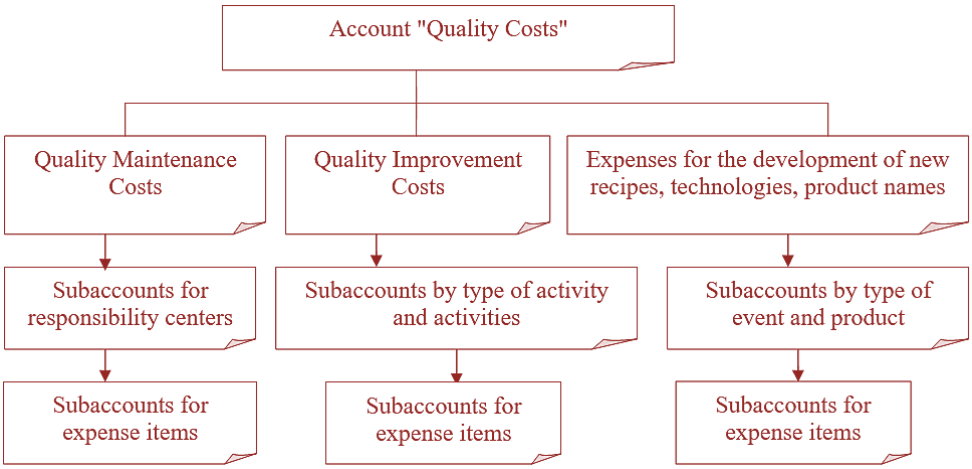

Figure 5: A multi-level diagram of the structure of sub-accounts to the account "Quality expenses".

Separate reflection of quality costs creates the possibility of rationing, budgeting, monitoring the implementation of planned activities and estimates, as well as determining the effectiveness of the measures taken through a comparative analysis of the state of the product on the market

Stage 6 "Distribution of expenses on quality" is devoted to the delimitation of groups of expenses between reporting periods following the fact of temporary certainty and priority of content over the form, between individual types of products. Using the above requirements and assumptions, it is proposed to distribute in two stages (Figure. 6).

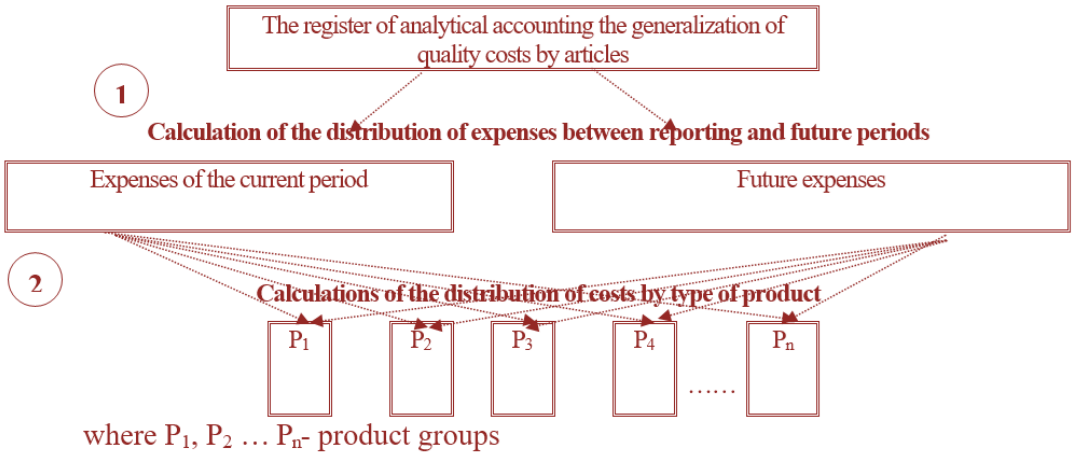

Figure 6: General scheme of the distribution of quality costs between reporting periods and groups of products.

At the first stage of calculations, the distribution of costs on quality between reporting periods is carried out following the norms of the accounting policy of the organization. Moreover, each article of all three sub-accounts opened by type of activity and responsibility center is considered following its economic nature, which allows you to determine the period to which they relate and the procedure for their inclusion in the cost of products. As a result, after the first stage of distribution, the registers are formed in the required format, which makes it possible to compare the final data of the accounting registers with the recognized amounts of expenses in tax accounting.

At the second stage of the distribution of costs for quality, further redistribution of costs by product groups is carried out. Direct costs are directly attributable to the cost of product groups, to maintain and improve the quality of which the plan has been implemented. Indirect - (the costs of improving the quality management structure, etc.) are distributed in proportion to the selected base, which should be justified and recorded in the accounting policy. It is proposed to distribute the costs of maintaining quality in proportion to the volume of production. Costs for improving the quality can be qualified as direct since they arise during activities to improve the quality characteristics of specific types or groups of products. It is advisable to extend this technique to the costs of developing new recipes and technologies.

Stage 7. Monitoring the implementation of estimates of the costs of product quality. This stage of the general methodology for accounting for quality costs consists of numerous control procedures and requires a similar budgeting and accounting system, except for the use of a different classification. To establish the responsibility of managers for the cost of quality and determine the effectiveness of the measures taken, the costs must be reorganized into two groups: controlled and uncontrolled.

Typical control procedures and the sequence of their implementation are present.ed as follows:

- verification of the correct identification, measurement, documentation of actual costs of quality in the context of our proposed classification of articles by type of activity and units;
- studying the data of signal documents, technological calculations in case of excess consumption of a resource, finding out the reasons for the appearance of negative deviations;
- determination of deviations of actual costs of quality from the amounts provided for in the estimates;
- comparison of actual indicators for different periods with reference values;
- calculation and analysis of the dynamics and structure of quality costs;
- monitoring the profitability of each product.

3.1 APPLICATION OF THE PROPOSED ACCOUNTING METHODOLOGY

The developed methodology for organizing cost accounting for quality tested at the distilleries of the Krasnodar Territory and the city of Smolensk (Bakhus OJSC, Smolensk, Fortuna LLC, Timashevsk, Krasnodar Region). Studying the practice of existing enterprises indicates that they don't do the accounting and analysis of such costs due to the lack of organization of their separate planning and accounting. They have not systematized and dispersed in different respects. It leads to the fact that the possibilities of using information about the costs of quality for solving problems of rational spending of resources are not fully used, which complicates their analysis.

In many economic sectors, including organizations producing and selling ethyl alcohol, alcoholic and alcohol-containing products, the resources consumed have a broad spectrum. That is, some costs have not yet been adequately reflected in accounting. Either the composition of economically similar

values is blurred by elements, or presented in an integrated form. The quality of the final product for the production of alcohol, alcohol-containing, and alcoholic products depends not only on the quality of drink but also on the water, feedstock, auxiliary materials. Therefore, it is especially advisable to allocate costs for quality at such stages as preparatory, primary, final - in alcohol production, alcohol preparation and storage, and water preparation - in the production of vodka.

Table 2: Financial results of Bacchus OJSC before and after implementation of the proposed methodology

Indicators	2019 r.	Project	Absolute deviation (+,-)
Revenues, thousand rubles	526404	555540.46	29136.46
Cost of sales, thousand rubles	499023	522013	22990
Gross profit, thousand rubles	27381	33527.46	6146.46
Selling expenses, thousand rubles	10551	10551	0
Administrative fees, thousand rubles	7496	7496	0
Profit from sales, thousand rubles	9334	15480.46	6146.46
Other income, thousand rubles	9	9	0
Additional costs, thousand rubles	286	286	0
Profit before tax, thousand rubles	9057	15203.46	6146.46
Current income tax, thousand rubles	1860	3089.29	1229.29
Change in deferred tax liabilities, thousand rubles	-31	-31	0
Change in deferred tax assets, thousand rubles	44	44	0
Other, thousand rubles	377	377	0
Net profit (loss), thousand rubles	7587	12504.17	4917.17
Return on sales profit from sales, %	1.77	2.79	1.01
Return on sales calculated on gross profit (gross profit margin), %	5.2	6.04	0.83
Return on sales calculated on net profit (profit margin after-tax), %	1.44	2.25	0.81

The methodology for organizing quality expenses proposed and tested at Russian enterprises made it possible to more fully take into account the specifics and features characteristic of organizations engaged in the production of ethyl alcohol and alcohol products in current conditions.

4. CONCLUSION

The use of control procedures in the system of accounting for costs on quality can significantly increase the efficiency of resource use, more accurately determine the profitability of each product, and develop an optimal assortment structure. Thus, the problem identified by us of the need to allocate quality costs using accounting is relevant for any industry in the conditions of market relations. Measures to improve the quality indicators of products, ensure the quality level specified in the normative and technical documentation, develop new formulations, technologies, and types of products caused other expenses that were different from ordinary types of activity and determined the need to distinguish them depending on the economic nature of this type of expenses.

The presented methodology for organizing the generalization and distribution of quality costs can serve as the basis for the development of new methods for their planning and analysis. It creates an opportunity to determine the effectiveness of investing in quality costs by comparing investments with an increase in price or sales.

5. AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding authors

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