MODERN APPROACHES TO THE ANALYSIS OF PRODUCT QUALITY PROFIT

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Abstract: An analysis of the quality management system of industrial enterprises on the basis of valuation of the index, the necessity to improve approaches to the analysis arrived in the QMS. The algorithm for calculating the return on product quality through a process approach is proposed.

To measure the efficiency of QMS "effect/cost" model is often applied which emphasizes financial results.

But this is not consistent with the requirements of ISO 9000 and the methodology of TQM, as the goals of QMS are not limited by the achievement of positive results in financial and economic sphere, but also affect such aspects as the "staff", "consumers", "shareholders", "internal processes of the organization", etc. Consequently, when measuring the efficiency of QMS the approach encompassing different parties of the organization should be applied.

The above mentioned disadvantages require the creation of such a valuation model, which could be descriptive and normative, comprehensive and systematic, ensuring the generalized index and more insightful management.

In order to measure the efficiency of QMS the economic literature encourages using the model of index valuation of performance assessment. According to this model the efficiency of QMS is determined by a number of indicators, among which profit is the key one.

The whole set of indicators in the QMS is converted from absolute to relative values. Using data on industrial enterprise producing confectionery, we have calculated the effectiveness of its QMS (Table). Generalized evaluation results obtained on the basis of two correlation estimates (by deviations and inversions), is as follows

$$E = ((1 + C_d)(1 + C_i))/4 = ((1 + 0.567)(1 - 0.333))/4 = 0.261,$$

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where E – effectiveness of QMS; C_d – coefficient of deviations; C_i – coefficient of inversions.

Coefficient "E" varies from 0 to 1. The coincidence of actual and specified indexes manifests the highest level of QMS goals achievement. At "TAKF" neither the standards of QMS efficiency, nor the system itself are developed. Once received the final assessment of the efficiency of the processes, it is necessary to interpret its meaningful value.

At first glance, this should not cause difficulty, if we take into account the variation of the performance in a range from 0 to 1. For example, the value of $E = 0.261$ can be explained that the efficiency of the QMS equals 26.1 %. Thus, less than a third of the QMS potential is involved. In our opinion, this way of evaluation is not very effective because the set of indicators "distorts" it, on the one hand. On the other hand, the profit figures are taken in a general form, without allocation of quality profit.

Quality profit as the difference between benefits and costs is a static measure, as well as the rate of profit expressed as the percentage of profits to costs.

In our opinion, these criteria for assessing the cost-effectiveness "embedded in quality" can be calculated for the business entity as a whole, and for the processes of the QMS, which corresponds to the concept of process management of quality costs.

Analysis of the QMS "TAKF" effectiveness

QMS effectiveness	Rank	2008	2009	2009 % to 2008	Growth ranks	Sum of ranks	The square of the sum of ranks
Sales profit	1	1481	1821.5	122.991249	4	5	25
Revenues	2	87223	127019.55	145.6262076	2	4	16
Productive assets and stocks	3	28704	41475.3	144.4932087	3	6	36
Equity	4	87955	99278.8	112.8743582	5	9	81
Production workers payroll fund	5	42683	24121	56.51198811	9	14	196
Total advanced capital	6	78897	86805.04	110.0232409	7	13	169
Short-term liabilities	7	31664	74462.73	235.1652692	1	8	64
Percentage of issuer with higher professional education,%	8	6.6	7.4	111.4457831	6	14	196
Staff	9	85	90.0	106.1016949	8	17	289
Spearman rho	0.567						
Kendall rho	– 0.333						

The advantage of assessing the cost-effectiveness by the processes is that correlation between costs and profits increases, thus facilitating the planning of long-term decisions. Ultimately, according to M. Brown and D. George, the costs of quality activities assume the character of investment. However, the calculation of costs and benefits of process faces several problems, including certain organizational and methodological difficulties and considerable financial costs.

BS 6143:1992 "Guide to the quality economics", Part 1 "The cost model for quality" enables to determine the costs of the processes combined with a process-functional model of the QMS of ISO standards.

However, the features of the Russian accounting system does not allow the model to project costs for the process of BS 6143:1992 for domestic enterprises. For this reason it is very difficult to determine the quality profit by each process. An approach to solving this urgent problem has not been developed yet. In our view, it can be solved, and we propose the following algorithm for calculating the quality profit of the relevant processes.

1. It is necessary to determine the weight (significance) of each process in the creation of products. For each company, and possibly for each product, these indicators of weight will be different. To calculate the latter we can use the ranging, experimental, statistical and normative methods.

The basic list of processes in the QMS is documented. When documenting the process owners of the processes are set out in the number of qualified professionals with thorough knowledge of their processes and able to assess their significance calculated using by the given methods. From the vast majority of processes we identify those which can benefit and bring profit. This allows using reasonable approach to the allocation of resources in the management of the organization including the distribution of costs. The significance of each process can be expressed as a relevant coefficient. Its value does not exceed the unity.

2. It is necessary to assess the quality of each process for the reporting period (month, quarter, year). In order to assess the quality of processes, it is necessary to establish a list of necessary and sufficient indicators of such an assessment. Assessing the quality of the technological process can be carried out by the method proposed U.V. Zorin and V.T. Yarygin and express it in the coefficient form so that these coefficients can be used produce the necessary calculations.

3. Having adjusted the rate (ratio) of quality process performance by the coefficient of its weight and multiplied the total quality profits (total quality profit for the business unit), we can produce the process quality profit.

4. The ratio of the estimated process quality profits to the costs of the same process enables to assess the cost effectiveness of the quality at each process. This indicator can be called cost-effectiveness of quality cost.

Quality management is considered cost-effective if the profit and profit rate (return on quality) are positive values. The dynamic parameters include: the cumulative cost of quality which is the difference between the amounts of cumulative discounted annual profits (losses) on the one hand, and corresponding sum of the costs of actions in the field of quality management, on the other hand, and the dynamic profit rate, which is the ratio of the cumulative

value of quality cost to the amount of cumulative annual discounted cost of quality. The methods of calculating these indicators are introduced by M. Brown and D. Georgi, and used by domestic scientists studying economic issues of quality.

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**Современные подходы к анализу прибыли
от качества продукта**

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Ключевые слова и фразы: алгоритм расчета прибыли по качеству по соответствующим процессам; значимость процесссов СМК; модель затрат на процесс по BS 6143:1992; модель «эффект/затраты»; норма прибыли; оценочный коэффициент результативности «Р» и диапазон его значений; прибыль по качеству; рентабельность по затратам.

Аннотация: Представлен анализ функционирования системы менеджмента качества промышленного предприятия на основе индексного нормирования, обоснована необходимость совершенствования подходов в анализе прибыли в СМК. Предложен алгоритм расчета прибыли от качества продукции на основе процессного подхода.