

The usage of the quality – cost analysis in a production process

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ABSTRACT

Purpose: The main aim of the research is estimation of optimum - level of product's quality. In this paper it was introduced the methodology of evaluation in the quality-cost analysis and the manner of calculation of each coefficients.

Design/methodology/approach: It was presented the quality – cost analysis in a production process in a Polish enterprise. The quality – cost analysis consisting from eight stages has been accomplished on the basis of two machine tools.

Findings: It was introduced the usage of the results from this analysis to undertake decisions from the point of view of relation between costs and product's quality level. The results permits to reach higher quality level and lower production costs.

Research limitations/implications: The quality – cost analysis, used in all kind of enterprises but to similar products, makes possible defining, which undertakings will bring the best results, regarding manufacturer's and consumer's business.

Practical implications: Frequent carrying out the quality - cost analysis, including all costs connected with a quality gives the certainty of activities effectiveness of the enterprise, minimization of the production costs, improvement of the products quality as well as the technological efficiency of processes.

Originality/value: Thanks to this analysis it is possible to get the information about the height of unit expenditure of costs, falling on 1% of reached quality level what facilitate the undertaking the legitimate decision about the economic important decisions. This paper can be a simple rule how to conduct the quality - cost analysis in the enterprise.

Keywords: Quality management; Quality system; ISO 9001 standard; Process approach; Quality – cost analysis

1. Introduction

From every enterprise which is run in the market economy it is required the effective management, which is the process of never ending restructurisation. It relies on the creative learning and adaptation to the changing and competitive surroundings, however more and more often it is underlined that for achieving the success it isn't enough only undertaking the decisions assuring adjustment to surroundings. Among many factors in the strategy of management it is shown the general culture of enterprise which

is estimated through customers and suppliers relation to the quality problems [1].

Enterprise's managing needs many important information from different areas of its activity. The analysis as well as aligning data is necessary to undertake optimum decisions to the functioning of a quality management system [2].

ISO series 9000 standards are sweeping the world. It is rapidly becoming the most important quality standards' series. Thousands of companies in over 100 countries have already adopted it, and many more are in the process of doing so.

ISO series 9000 standards applies to all types of organizations. It doesn't matter what size they are or what they do. It can help both product and service oriented organizations achieve standards of quality that are recognized and respected throughout the world.

Those standards are important because of their orientation. While the content itself is useful and important, the content alone does not account for its widespread appeal.

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The important tool of management including the estimation of the optimum level of product's quality is the quality – cost analysis. It has the aim the preparation of detailed information about mutual relations between costs and quality level, to facilitate the undertaking the decision about economically important aspects [3].

The analysis of data relating to the risk, costs, benefits is one of the most important ways of efficiency evaluation of a quality system. Taking into consideration the fact that the aim of the quality control in the enterprise is lowering losses resulting from low quality level, cost analysis seems to be particularly important [2].

2. Quality management system in the enterprise

The new technologies make possible the products' production which characterize the increasing of function quantity and higher level of usefulness. However the growth of consumption emphasised the large failure of products. Manufacturers are always uneasy with faults of their products because large defectiveness causes the additional costs and is a danger to their competitive position on the market [4,5].

The different phenomenon of the market is shaping the consumers' opinion in the face of observed faults of the products. It values that the stepping out the level of products' faults is considerably inflated in consumers' opinions in fact. Even in situations, when the level of faults and defects diminishes more slowly than it enlarges the number of delivered products on the

market, the quantity of dissatisfied consumers' will grow up. Next aspect of a quality is diminishing consumer's tolerance in relation to insignificant incompatibilities and esthetical problems [6].

The competition on the market forces the manufacturers not only to undertake the preventive activities against the loss of a quality, but also to significant rising the quality of produced articles. This challenge of the market requires the considerable modification of the traditional production process. Other reason, for which the problem of a quality became the strategic factor in activity of the enterprise, is the overage of the supply over demand. The majority of world markets became the consumer's markets. Therefore the quality became the strategic element in the development of enterprise, creating directly its functioning. The quality should relate to the product, the efficiency of production process as well as correctness and efficiency of every activity in the enterprise. [2,5].

The enterprises with the long tradition know that the main aim of activity is not only gaining the new customers but first of all the maintenance of old ones. The aim of enterprise exposing on the long-lasting success becomes the fulfillment of customers' needs and expectations. From there implementation of the quality management system is the essential pillar supporting their long-term strategies leading to the success [2,4].

At present in world free-market economy the key role plays the quality of produced and delivered to the customer products. More and more often not the quantity of produced products, and also not their price are decisive factor about the firm's mark. First of all matters the customer's satisfaction that is production such goods and services, which possess the high quality. The guarantee through firm the quality of products and services assures the wide market of sale in the country and abroad. The quality system is the quality of firm's organization, enabling the realization of own market strategy, possessing the ability to adaptation in the continuously changing market conditions.

The quality system is the organizational structure, division of responsibility, procedures, processes and resources enabling the implementation of the quality management.

The quality management is the aspect of total management functions, which is decisive in defining and implementation the quality policy [4].

Quality management is the part of general management. The quality management organizes and directs the money servants to achievement of quality aims as well as control these money. In other words it first of all has the relationship with defining the quality policy (it means undertakings and aims of quality) and its implementing. The quality policy is total intentions and directions of activities of organization relating to the quality, in formal way expressed by the highest management in this organization.

The quality system functioning in the firm has as a task to qualify, how and what it is done, leads the suitable records relating to these activities as well as records the results to show that intentional activities were executed [6].

In work of every enterprise we have to deal with "the combination of production factors" such as: people, machines, materials, methods, management, and only through the suitable quality of these elements the enterprise can reach the planned profit. If among mention elements it lacks the quality, it will appear for sure the defects and incompatibilities, and finally it will bring to losses. The quality management means the same, that

the management of the enterprise to reach the improvement of the economic results has to limit the appearing of the defects (that is the lack of quality). Quality management is a process, in which managers take in their hands manners connected to the whole enterprise. It should be noticed that the best results achieve these enterprises which will engage all workers on every position in the management process. It is possible to prevent the formation of defects on every position in work. Therefore the quality can be called as the lack of defects.

The quality management systems according to ISO series 9000 standards became in last years in European Union so popular that in many trades it is hard to imagine working without the suitable certificate. Against what enemies of these systems often repeat, this popularity does not only result from the law, because implementation of ISO 9000 standards is voluntary. It is possible to distinguish several basic causes of reaching through enterprises from Western Europe to the quality systems. Majority of them also treats to Polish enterprises [7].

In last years one of the main causes of applying to certificates of the quality systems was the desire of their marketing usage. The enterprises, which have such document can be identified and perceived as more certain and better. Their products more easily gain buyers. This effect of sale enlargement at present gradually diminishes in countries of European Union, because it has already existed many firms possessing the quality systems, and therefore the customer who has larger choice pays attention on different criterions again. This does not mean that marketing effect stopped existing, it only altered its face – now the products of firms without certificate of the quality system are more and more often skipped already at the preliminary choice. It stopped being the aspect of competitive superiority and it became the point of exit to search the buyers. It should be noticed, that Poland is still in the first phase and certified enterprises selling on Polish market by several years will use this superiority. The enterprises with the long tradition know that gaining the new customers is not the main aim of working, but first of all it is the maintenance the old ones. It is possible to make this more easily and cheap than to explore more and more new markets. The technique “sell and disappear” is not profitable and long-lasting strategy. Steady customers come back to firm and also encourage different people to using services or products. The aim of enterprises exposing on long-lasting success becomes the fulfillment the needs and expectations of customers. This is difficult to fulfill at once - this often requires years of work, from here it is necessary the efficient system of continuous improvement. Such system is contained in ISO 9000 standards. Enterprises of European Union noticed that the implementation the quality management system will be essential pillar supporting their long - term strategies leading to the success [5].

Initially the underestimated aspect of implementation was lowering the internal costs of bad quality. The norms were portrayed as panacea on the problems of economy in the scale of macro. It turned out however, that the enterprises which implemented system correctly write down the diminishing costs of bad quality. The same continuously improvement system which permits us to keep old customers, works on lowering the internal costs in a firm. If we improve the individual elements of the production processes or service then we reduce the quantity of failures simultaneously, and so the costs of bad quality diminish.

Obviously the maintenance of system, trainings and development cost, but expenses on it are usually smaller than savings. The implementation in countries of European Union the quality systems, doubtless contributed to the change of contacts between organizations and their suppliers. When only enterprises began taking care of customer's satisfaction, needed to this the suitable materials. So the choice of suppliers gradually stops being based on the price. Therefore the suppliers are also encouraged to the implementation of their own quality systems, which will assure the stability of deliveries and the continuous improvement of the products. It is just the growing popularity of quality systems according to ISO 9000 standards caused that in directive of European Union were captured as criterion of estimation of the agreement with requirements. The area of estimation was divided to: obligatory and voluntary. The activity in the obligatory area without certificate of the quality is practically impossible, however in the voluntary area it is very difficult [8].

The benefits, which result from the quality management can be divided on three areas [8]:

Benefits for worker

- the definite standard of working,
- interchangeable assigned the responsibilities and authorization,
- making clear for workers their place in the whole work of organization,
- the clear qualification of indispensable supplies to the realization of work as well as the bright defining of the expected effects.

Benefits for management

- the support for planning of expenses (the possibility of foreseeing), the organizational changes, restructurization,
- the easiness in implementation and the confirmation of definite standard of offered services,
- the growth of credibility of firm for investor, customer,
- the improvement of the information circulation in a firm,
- the establishment of the uniform principles of functioning inside the firm.

Benefits for surroundings

- the reliable proof of born expenses, growth of credibility for the local community and owner (of the founder's organ),
- the possibility of co-operation and exchange of experiences in the range of the efficient management with similar units - the benchmarking,
- the strengthener of building the image of the professional firm and friendly for the customer,
- rising the attractiveness for potential investors.

The task of a modern thinking, creative businessman is also the creation of definite organizational culture of a firm which on the first place puts the quality of products, services, processes, and also the people. Wide comprehended quality, including all smaller systems of the enterprise, is the basic condition of achieving the market success, about which always remembers a good businessman [9].

At present, the challenge for economic spheres, for all enterprises independently from profile of running activity, becomes the programme of the total quality management which basic foundation is the international standard ISO 9001:2000.

The endeavour to implementing the management system by quality became the principle universally applied through firms on the whole world, because it could assure them the future.

ISO 9001 standard is one of the significant quality programmes entering on the international scene of business. It focuses on three basic aspects (fig. 1) [9]:

- implementing the quality control,
- the suitable documentary evidence of processes setting in the organization as well as
- assuring that pressure on proper quality is applied by everybody in the organization.

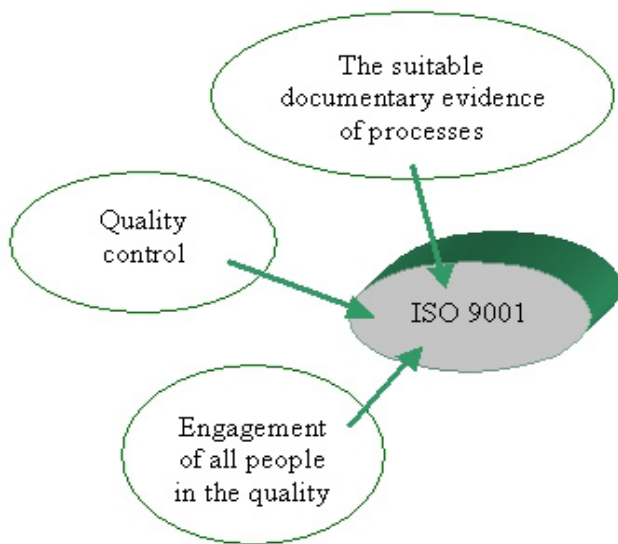


Fig.1. Basic aspects of ISO 9001 standard [9]

Although ISO 9001 standard does not emphasize on the key elements of business however its basic philosophy concerns the improvements of the organization functioning through the processes improvement of enterprise's management. It is the way, which makes possible for the enterprises to prove that they do this, what they declare - and they declare this, what "dictates" them the customer. Just understanding the customers' requirements is the key to the quality. It can be said that ISO became the common understanding of common aim – a general quality, and entry on the way of ISO creates the conditions to undertake wide conceived pro-quality activities, which after full development and integrating will give measureable effects, more than once going beyonce the expectations [10].

The modern conception of the quality management is based on the prevention, the complexity as well as the style of management preferring the joint responsibility for the quality of all workers.

ISO 9001:2000 standard describing the quality management system was constructed according to eight basic principles of the management (fig.2) [11]:

- organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

- leaders establish unity of purpose and direction of organization, they should also create and maintain the internal conditions, in which employees can be fully involved in achieving the organization's objectives.
- workers at all levels of management are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.
- desired results are achieved more efficiently when activities and suitable resources are managed as a process.
- identifying, understanding and managing the interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its planned objectives.
- continuous improvement of the organization's overall performance and its processes, should be a permanent objective of the organization.
- effective decisions are based on the analysis of data and information confirmed by facts.
- an organization and its suppliers are independent and a mutually beneficial co-operation enhances the ability of both to create added value.

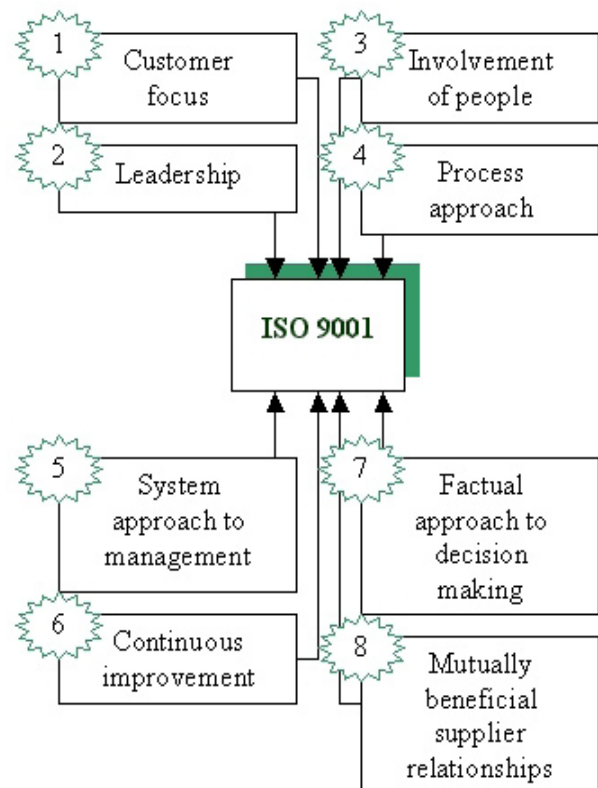


Fig. 2. Eight quality management principles [11]

The organization which directs in its activity according to above mentioned principles goes to the systematic improvement, according to Deming's Circle, it aims to identificate the internal and external customers with offered product, or service as well as

it seeks the effective ways for lowering costs. Quality management system is based on the prevention of defectiveness and should serve to indicate the places, which are the cause of instability of basic and additional processes, economic or organizational [4,8].

ISO 9001 standard is based on the conception of process management according to Deming's Circle as well as it puts the pressure on continuous improvement of processes (fig.3) [11].

The fundamental requirement of ISO 9001:2000 standard is the usage of the process approach both on the stage of working out and implementing the system, as also on the stage of its improvement. It assures the continuous enlarging level of the customer's satisfaction. Process approach permits to hold the current supervision over the connections between each individual process and also over their interaction [10].

Although in ISO series 9000:2000 standards it is recommended the acceptance of the process approach by the organization, in the aim of assurance the effectiveness of the quality management system, the reason of this recommendation hasn't been explained. There has not been in the standards the references to the origin of a process approach. As the acceptance of this approach influences indeed on the method of investigation, shaping and appraisal of activities effectiveness in the quality management system it is noticed the necessity of the complex presentation process approach problem, exhibiting simultaneously often skipped in the frames of standards the problems connected to distinguishing the activities in processes included in the quality management system. Thorough, executed in well ordered way, the presentation of a process approach makes transparent the presentation of the possible range its usage in examining and appraising the activities effectiveness in the quality management system, and further the appraisal the effectiveness of the whole system [10].

The process approach depends on the glance on the enterprise through the prism of appearing in its the processes, the realization of their occurrence and controlling or managing of them. In ISO 9001:2000 standard discussed approach is defined as the usage in the organization the processes system together with its identification as well as interactions between these processes and managing them. This understood process approach was already used in many enterprises long time before the introduction of recommendation in ISO series 9000:2000 standards, though in the usage of reengineering method [4].

The process approach makes possible the presentation of activities in well ordered way. It extorts the presentation of activities as the elements of a process. It underlines the fact that the aims of previous activities in a process are conditioned by the aims of next activities, situated nearer customer or other interested side. Moreover the aims of activities distinguished in a process often result from formulated aims for the whole process [8].

Wanting to improve and develop any organization it is impossible to skip the necessity of redesigning the processes, the adaptation to them the organizational structure of a firm and creating the quality management system. The development of a firm is connected with achieving higher and higher organizational level which should be treated as the qualitative category, meaning the implementation new elements to the management system of the enterprise, and also the improvement of the organization quality by the improvement both the structure and the processes. If it is not able to manage the processes and improve their results, it is not possible to manage the organization effectively. Moreover through processes it can be determined, how the organization functions, execute the indispensable measurements of efficiency of carried activities, optimize processes and on this basis foresee the perspectives of development [3].

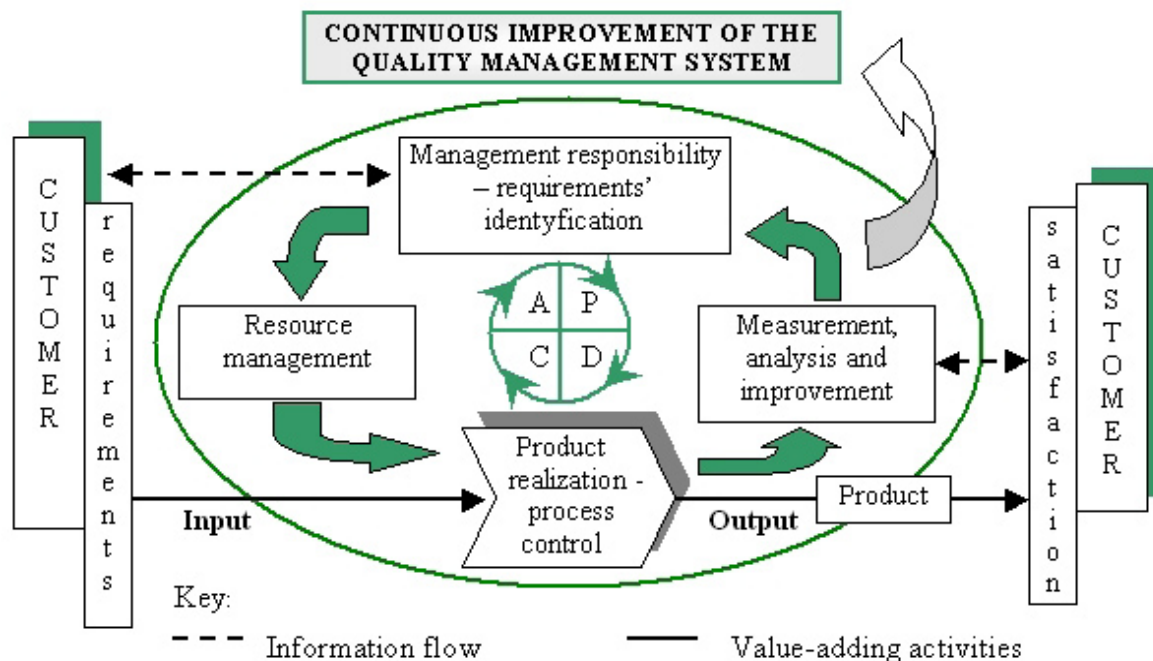


Fig. 3. Model of a process approach according to ISO 9001:2000 standard [11]

The requirements in ISO 9001 standard cover everything from how you plan your processes, to how you carry them out, measure them and improve them.

The standard calls a production processes “Product Realization”. This is where you are actually making your product or delivering your service.

Having an effective Quality Management System, (QMS) in place leads to many improvements in an organization. ISO 9001 standard is a proven foundation for an effective Quality Management System. Systems will be in place to identify problems, find the cause and eliminate it to prevent the problems from reoccurring.

ISO 9001 standard’s requirements [11]:

You must identify your Key Processes:

- the processes that affect product or service quality.
- these processes are included in the Quality Management System.
- this includes most of the processes in your organization.

And use a “Process Management Approach”:

- a process management approach is managing your organization as a system of interlinked processes.
- the output of one process is the input for the next process.
- requires that your processes are controlled and managed for continual improvement.

3. The quality – cost analysis in a production process

The quality – cost analysis permits on the adequate appraisal the effectiveness of the firm’s activities and minimization of the production costs. The aim of this analysis is identifying the tasks, which should bring to the reduction of the production costs at the maintenance or the growth of a quality level [3].

The essence of the quality – cost analysis (the QCA) relies on the calculation of several dependences, which take into account the level of symbolic quality of considered object in this analysis and connected with the obtainment of this quality level, costs, or costs obtainment or maintenance of this quality level (fig.4) [3].

This analysis has as the aim the preparation of detailed information about the mutual relations of costs and quality level to make easy the undertaking decisions about the economically important aspects [3].

The stages in the quality – cost analysis:

1. Calculation of the quality cost coefficient C_k :

$$C_k = \frac{K}{Q} \left[\frac{PLN}{1\%} \right] \quad (1)$$

where:

K – cost,

Q – quality level in %.

The lower coefficient C_k , the better for a product.

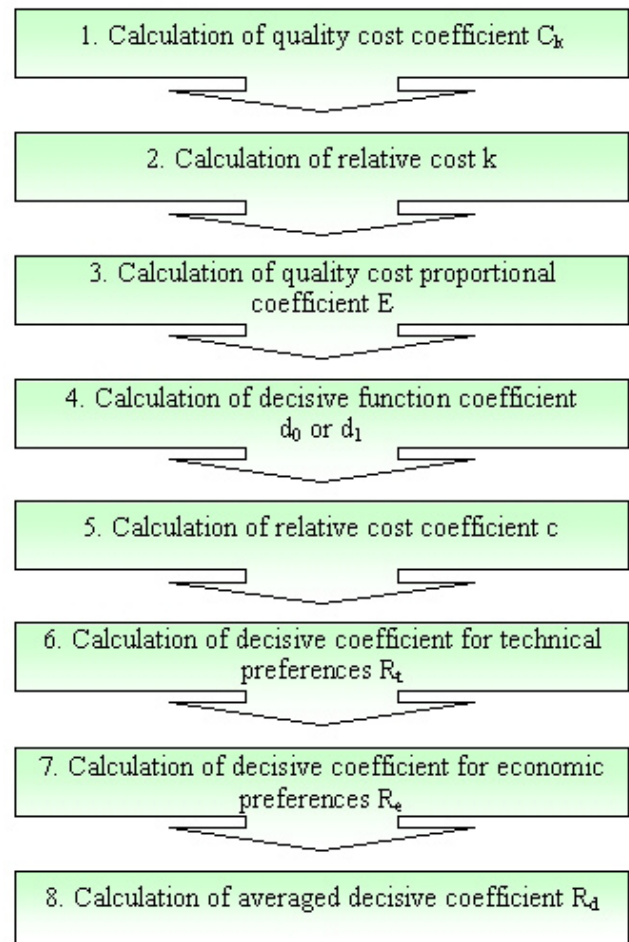


Fig. 4 The procedure of conducting the quality - cost analysis [3]

2. Calculation of relative cost k:

$$k = \frac{K_a - K}{K_a - K_i} \quad (2)$$

where:

K – temporary cost for a given case,

K_a – the largest cost for a given quality – cost analysis,

K_i – the smallest cost for a given quality – cost analysis.

3. Calculation of quality cost proportional coefficient E:

$$E = \frac{k}{q} \quad (3)$$

where:

k – relative cost,

q – quality level expressed by decimal fraction.

4. Calculation of decisive function coefficient d_0 or d_1 :

a) for $E = 0-1$

$$d_0 = 0,5 \cdot E \quad (4a)$$

b) for $E > 1$

$$d_1 = 0,5 + 0,5 \cdot \left(1 - \frac{1}{E}\right) \quad (4b)$$

The counted values d_0 lub d_1 , compared to universal, the unity scale of relative states, let the possibility of undertaking the preliminary decision about the choice of one variant from compared several ones.

In the case, when the technical and economic preferences have to be taken into account in undertaken decisions, the quality – cost analysis is continued in the following way:

5. Calculation of relative cost coefficient c :

$$c = \frac{C_{ka} - C_k}{C_{ka} - C_{ki}} \quad (5)$$

where:

C_{ka} – max. quality cost coefficient in a given quality – cost analysis,

C_{ki} – min. quality cost coefficient in a given quality – cost analysis,

C_k – quality cost coefficient of the analysed product.

6. Calculation of decisive coefficient for technical preferences R_t :

$$R_t = 0,0667 \cdot (8 \cdot q + 4 \cdot d + 2 \cdot c + k) \quad (6)$$

where:

q – quality level expressed by decimal fraction,

d – decisive function coefficient,

c – relative cost coefficient,

k – relative cost.

7. Calculation of decisive coefficient for economic preferences R_e :

$$R_e = 0,0667 \cdot (8 \cdot k + 4 \cdot c + 2 \cdot d + q) \quad (7)$$

8. Calculation of averaged decisive coefficient R_d :

$$R_d = 0,5 \cdot (R_t + R_e) \quad (8)$$

4. Own research

The quality – cost analysis consisting from eight stages has been accomplished on the basis of two machine tools. Using the data (tab. 1) connected with production costs and the quality level it was counted: quality cost coefficient; relative cost, informing about relative intensification of cost in the area of its possible changeability; quality cost proportional coefficient; decisive function coefficient; decisive coefficient for technical preferences; decisive coefficient for economic preferences as well as averaged decisive coefficient (tab. 2). The results analysing permits to reach higher quality level and lower production costs.

Table 1

Stages and data to quality – cost analysis of two machines

Stages	Data - Machine 1	Data - Machine 2
1. Calculation of the quality cost coefficient C_k from equation (1)	$K = 137261,49$ PLN $Q = 94\%$	$K = 66042,60$ PLN $Q = 89\%$
2. Calculation of relative cost k from equation (2)	$K = 137261,49$ PLN $K_a = 144124,56$ PLN $K_i = 130398,42$ PLN	$K = 66042,60$ PLN $K_a = 69344,73$ PLN $K_i = 62740,47$ PLN
3. Calculation of quality cost proportional coefficient E from equation (3)	$k = 4,99$ $q = 0,94$	$k = 0,5$ $q = 0,89$
4. Calculation of decisive function coefficient d_0 or d_1 from equations (4a) or (4b)	$E = 5,3$	$E = 0,56$
5. Calculation of relative cost coefficient c from equation (5)	$C_{Ka} = 1533,24$ $C_{Ki} = 1387,22$ $C_K = 1460,22$	$C_{Ka} = 779,15$ $C_{Ki} = 704,95$ $C_K = 742,05$
6. Calculation of decisive coefficient for technical preferences R_t from equation (6)	$q = 0,94$ $d_1 = 0,9$ $c = 0,5$ $k = 4,99$	$q = 0,89$ $d_0 = 0,28$ $c = 0,5$ $k = 0,5$
7. Calculation of decisive coefficient for economic preferences R_e from equation (7)	$k = 4,99$ $c = 0,5$ $d_1 = 0,9$ $q = 0,94$	$k = 0,5$ $c = 0,5$ $d_0 = 0,28$ $q = 0,89$
8. Calculation of averaged decisive coefficient R_d from equation (8)	$R_t = 1,19$ $R_e = 2,98$	$R_t = 0,65$ $R_e = 0,49$

Table 2

The results from the quality – cost analysis

Stage	Coefficient	Data - Machine 1	Data - Machine 2
1	C_k	$C_k = 1460,22$ [PLN / 1%]	$C_k = 742,05$ [PLN / 1%]
2	k	$k = 4,99$	$k = 0,5$
3	E	$E = 5,3$	$E = 0,56$
4	d_0 or d_i	$d_i = 0,9$	$d_0 = 0,28$
5	c	$c = 0,5$	$c = 0,5$
6	R_t	$R_t = 1,19$	$R_t = 0,65$
7	R_e	$R_e = 2,98$	$R_e = 0,49$
8	R_d	$R_d = 2,1$	$R_d = 0,57$

From the quality – cost analysis results that, regarding the economic and technical aspects the best variant is number 2 (fig. 5) because there is the lowest acceptable quality level, but at the lowest taken into account costs' variants. It is worth paying the attention to the quality cost coefficient C_k , which gives very important information about, how much the 1% of quality costs in these conditions, so in the first case it is 1460,22 PLN, and in the second case it is 742,05 PLN. Wanting to reach higher quality level and lower costs it should work over the intensification of machines' control and check the production process. Management should accept as the aim the modernization of production machines as well as tools used in the quality appraisal of controlled products.

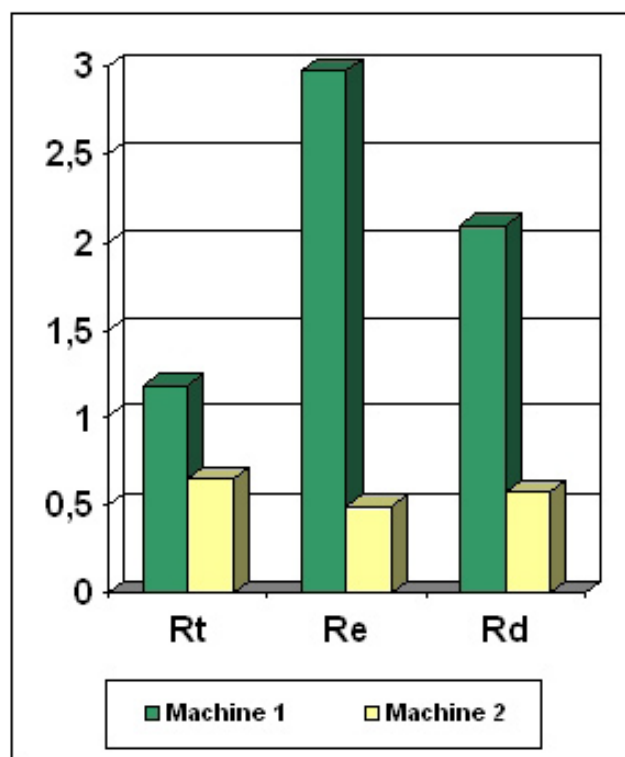


Fig. 5. Comparison of the coefficients in conducted analysis

5. Conclusions

The competition on the market forces the manufacturers not only to undertake the preventive activities against the loss of quality, but also to significant rising the quality of produced articles. This challenge of the market requires the considerable modifying of the traditional production process. Other reason, for which the problem of quality became the strategic factor in the activity of the enterprise, is the overage of the supply over demand. The majority of world markets became the consumer's markets. Therefore the quality became the strategic element in the development of the enterprise, creating directly its functioning. The quality should relate to the product, the efficiency of production process as well as correctness and efficiency of every activity in the enterprise [2].

The quality system is the quality of firm's organization, enabling the realization of own market strategy, possessing the ability to adaptation in the continuously changing market conditions. The quality system is the organizational structure, division of responsibility, procedures, processes and supplies enabling the implementation of the quality management.

At present, the challenge for economic spheres, for all enterprises independently from profile of running activity, becomes the programme of the total quality management which basic foundation is the international standard ISO 9001:2000.

Many organizations decide to implement ISO 9001 standard and obtain registration because it assures the customers that the company has a good Quality Management System (QMS) in place. An organization with an effective Quality Management System will typically meet the customer expectations better than an organization that does not have an effective Quality Management System. Many organizations require their suppliers to have ISO 9001 registration [5].

When you build your Quality Management System based on ISO 9001:2000 standard, you will be managing your organization as a system of interrelated processes.

You will plan all processes, identify how they relate to each other, set goals, measure the processes and make improvements.

The basis of a process approach should be the proper grouping of processes, which aim is realization the received by organization mission connected with a quality. The grouping processes is particularly essential for documenting the quality management system. The criterions used for grouping processes should be mainly: the common aims, practice, the specific of working and location.

The process structure of the quality management system should take into account the existing organizational structure of the enterprise, ISO 9001 standard requirements, the customers' identification, suppliers, duties to the surroundings of a firm, the agreement with the valid law. The presentation of the process structure depends on the way of documenting the quality management system in the enterprise.

In the model of a process approach, put in the standard, it was used the idea of the continuous improvement by W. Edwards Deming. Deming stated that to get the improvement of a quality level it should in conscious way realize four - stage programme: Plan (P), Do (D), Check (C), Act (A).

The quality – cost analysis is the important tool of the management including the estimation the optimum level of a product quality. Thanks to this analysis it is possible to get the information about the height of unit expenditure of costs, falling on 1% of reached quality level what facilitate the undertaking the

legitimate decision about the economic important decisions. In conducted analysis it is visible that the second variant is better considering economic and technical aspects; there is the lowest acceptable quality, but at the lowest costs. The quality – cost analysis makes possible defining, which undertakings will bring the best results, regarding manufacturer's and consumer's business. Frequent carrying out the analysis, including all costs connected with a quality gives the certainty of activities effectiveness of the enterprise, minimization of the production costs, improvement of the products quality as well as the technological efficiency of processes. The detailed measurement expenses connected with the assurance and maintenance the desirable quality level will make possible the proper approach to the costs recording, particularly, if the quality costs are considered in the context of necessary costs and definitely indispensable in the expenses of the enterprise. The way in which the enterprise is able to satisfy the customers' needs decides about its success on the market. The quality improvement in the enterprise has the influence on two kinds on situation of a firm: it decides about the improvement of machine tools competitiveness and permits on costs decreasing born by the firm. The improvement of the costs structure leads to rentability improvement and the ability of the competitive firm [6].

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