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QUALITY INSTRUMENTS FOR EFFICIENT AND SAFE ORGANIZATION MANAGEMENT

*Security isn't everything
but without security everything is nothing*
K. Nauman

ABSTRACT

The quality management system in an organization can ensure the safety of the organization's operation by unambiguous definition of tasks, competences and responsibilities of employees and continuous improvement of the activities carried out. The implementation of procedures resulting from the essence of the quality management system in an organization are flexible enough to be able to react freely to changes taking place in its environment, and thus should be focused on continuous improvement. In order to be able to perform the tasks and achieve the goals resulting from the implementation of the strategy, the company must have the tools and means that will allow it to shape the product quality at all stages of the production and commercialization cycle. The aim of the article is to present the place that the instruments of improving quality management systems occupy in ensuring safe functioning.

KEYWORDS: *process, system, quality management system, Deming principles, ABC method, Kaizen, Six Sigma*

INTRODUCTION

In the last decade there has been a noticeable growing tendency to implement various organizational management systems. These systems play a significant role in formulating and developing the relationship of the organization's goals with regard to customers, the natural environment and the local community, as well as in relation to other organizations. Organizations more and more often decide to implement a quality management system. The greatest phenomenon of our time is the noticeable increase in the role of quality (Skrzypek, 2000, p. 9).

The quality system is designed to create conditions for establishing and managing all activities that may affect the safe functioning of the organization and at the same time can ensure that the products or services offered to the recipients meet the required standards (Wyrębek, 2013, p. 186).

A feature of a well-designed and efficiently functioning quality management system is continuous improvement, improvement of production processes, and improvement of products and services offered by organizations (Wyrębek, 2010, p. 128). Ensuring the safety of the organization's operation covers many areas, e.g. improvement of products, work, work organization, processes. It means improving the functioning of the entire organization. Process analysis, especially inter-functional processes, helps to improve the functioning of the organization. An organization is as effective as its processes are.

Products and services are the result of processes implemented in the organization (Slywotzky, Morrison, Adelman, 2000, p. 42). The process of each planned and performed operation can be presented as a sequence of organized stages in which various factors are involved. The output parameters (product or service quality) are measurable values. The obtained quality of workmanship is compared with the assumed quality, and on this basis, possible corrections of the input factors are made.

A process is understood as: the transformation of input factors into output factors (Steinbeck, 1998, s. 83). The input factors include: skills, knowledge and involvement of people, materials, methods, machines and devices, measurement tools, organization and management, as well as the environment,

i.e. the immediate and distant environment. Output factors can be: tangible product, software, information, or some other form of document.

The output of the process can also be a service or materials processed in the form of liquids, gases, and products that are any combination of the above-mentioned process outputs.

The safe functioning of an organization results from the efficient and effective management of many interrelated processes. The use of the system of processes in the organization along with their identification and interactions between these processes and their management is referred to as the process approach. This approach facilitates the management of process improvement opportunities through the use of concepts, methods and principles that enable the safe operation of the entire organization. In the changing environment organizations are still looking for methods of improving the efficiency of operations that can guarantee them a competitive advantage leading to operational safety (Wysokińska-Senkus, Wyrębek, 2012, p. 83).

The aim of the article is to identify, analyse and evaluate the quality factors affecting the management process of an organisation ensuring its safe functioning. The following research problems have been accepted for solution:

- what customer requirements should be taken into account in the organisation's activities?
- how to improve the quality of internal processes?
- how to improve internal communication within the organisation?
- what instruments can influence product quality?
- what factors ensure the safety of an organisation's operations?

The authors try to answer these questions in this article.

The multistage methodological apparatus used to diagnose the scientific problems posed in the area of holistic crisis management in the face of contemporary threats and to determine the directions for improving the interaction of subsystems relates to five mutually interpenetrating scientific disciplines: the system approach, which is part of systems theory; the theory of efficient action, which belongs to praxeology, security science and administration science and management science. Some stages of the research required a much broader view of the research problems under consideration and the application of the methodological apparatus of other scientific disciplines such

as statistics. Research tools and techniques were used, such as: analysis and synthesis of literature sources and subject literature, surveys of opinions and expert judgements, interviews and opinion polls.

CONDITIONS OF THE QUALITY MANAGEMENT SYSTEM

Various activities undertaken in the organization are included in the enterprise management system. This system is an ordered set of instruments, procedures and management rules, as well as structures that manage the organization. All this is related to the environment of the organization through numerous mutual relations (Łańcucki, 2004, p. 10).

The main goals of the quality management system are:

- ensuring that products (both products and services) meet all kinds of requirements – legal, technical and internal company;
- ensuring customer satisfaction with the delivered product (Zapłata, 2009, p. 19).

The basis of the quality management system may be the requirements contained in the ISO 9001 standard, which can be met in various organizations, regardless of the type, scope and place of business. This is because the standard 9001, relating to the sphere of organization and management, contains only general requirements relating to such areas of activity as: planning, creating documentation, ensuring resources, and measuring products and processes. It is worth noting that the ISO 9001 standards also apply to activities belonging to other subsystems of the organization, such as occupational health and safety or environmental management. Standardization, however, does not apply to all aspects of such areas as: marketing, human resources management or finance, which necessitates covering them with other systems (Tricker, 2019, p. 67).

The quality management system is sometimes incorrectly identified only with ISO 9001 standards. As a consequence attempts are made to separate the enterprise management issues in enterprises from those of systemic quality management. Meanwhile, the management system quality as one of the enterprise management subsystems, it cannot be isolated. Various systems in the organization are closely related to each other through the processes that take place in the organization.

Enterprises recognize the need to implement and certify quality management systems. This is because organizations need systemic management of various activities taking place in the management process in order to obtain the appropriate quality of the final product.

However, among the premises indicated as key to the implementation of the ISO series standards, there are (Ciekanowski, Nowicka, Wyrębek, 2017, p. 239):

- customer requirements;
- improving the organization (improving the quality of internal processes);
- reduction of poor quality costs;
- improving the quality of the final product;
- improvement of internal communication;
- improvement of supervision over internal documentation;
- the possibility of entering new markets, especially foreign ones;
- reducing the cost;
- increase in product quality, efficiency and productivity;
- building the company's strategy;
- gaining a competitive advantage – the certificate is treated as a marketing element that positively affects the image of the organization in contacts with the environment.

The reasons which the company follows when deciding to implement a quality management system are closely related to the purpose of the implementation.

Therefore, we can classify the premises into:

- internal, i.e. those caused by internal decisions of the company;
- external, i.e. those that result from the organization's environment.

If we take a closer look, we will notice that the external premises can be considered in two planes. The first possibility is when a quality management system is implemented solely for the purpose of obtaining a certificate. This happens when the certificate is necessary for customer requirements or to meet tender specifications. Then the implemented standards may turn out to be of little use in improving processes in the organization, and may even have a negative impact on the conducted business activity and its results.

The second case concerns a situation where the implementation of the quality management system is caused by marketing reasons.

It should also be noted that the external motives for implementing quality standards have been losing importance for several years. Due to the large number of issued certificates, the impact of the certificate was weakened as an element of the company's competitive advantage. Having a certified quality management system is no longer a distinguishing feature, but has become one of the basic requirements of business operations. The lack of a certificate is stronger than having a certificate – it reduces the competitive potential of the organization (Baraniecka, Witkowski, 2000, p. 39).

Organizations that implement and certify their quality management systems, guided by the pressure that comes from the market, and not the desire to actually improve the management system, pay less attention to quality and its improvement, and focus all their attention on obtaining the certificate. On the other hand, when the organization approaches the quality management system as a tool to improve the enterprise by influencing the quality, it means in practice that obtaining the certificate itself is only the beginning of the maintenance and continuous improvement of the introduced system. The second situation is more favorable for the company because it leads to positive changes in the functioning of the organization (Zapłata, 2009, p. 22).

INSTRUMENTS FOR IMPROVING THE QUALITY MANAGEMENT SYSTEM

The literature talks about techniques, tools, methods, principles and other instruments of influencing quality. Different designations of the instruments are used, which can sometimes lead to confusion. Meanwhile, in fact most of these instruments, despite having different names, have a very similar or even the same mechanism of action. Moreover, the use of some of them is an attempt to transfer directly from other fields, especially from management engineering and economics, without assessing the advisability of their adaptation for the needs of the quality management system.

Some authors try to organize the terminology in this area. It is used in Polish management literature division into organizational techniques and methods, the boundary between them being very fluid.

One of the researchers of instruments suggests the following division:

- quality management principles – define the attitude of enterprises and employees to generally understood quality problems;
- quality management methods – they are characterized by a planned and scientifically based method of proceeding in the implementation of projects related to quality management;
- quality management tools – they are used to collect and process data related to various aspects of quality management (Hamrol, Mantura, 2005, p. 208).

In practice, the concepts: methods and tools are often regarded as identical, and thus used interchangeably. The division cited above allows for the systematization of the instruments used and, as a result, for their more effective use.

Principles and tools are used to a large extent in quality activities throughout the product life cycle. The use of methods is limited to its specific stages.

Two groups are distinguished from among the methods:

- methods used in the design of products and processes, which can be called design methods for quality;
- methods that are used primarily in production, which are called quality control methods, among which control methods are of primary importance (Luthra, Garg, Agarwal, Mangla, 2020, p. 197).

A separate group of methods are methods of teamwork, which in a way support quality management tools as well as design and control methods.

Principles, methods and tools are not isolated from each other. There are interfaces between them, which allow the use of data collected on the basis of production and use of the product for continuous quality improvement. Data that is later used by the methods must be pre-processed with appropriate tools. In order for the information obtained to be used in an optimal way through the methods, rules must then be laid down which define the objectives to be achieved. In this way, all three defined groups of instruments form a system that can be fully used if the quality management takes place within the implemented and functional quality management system (Wasilewski, 1998, p. 234).

The rules define the attitude of the company and its employees to quality management. They are very helpful in the implementation of the quality management system in motivating employees to act towards its development and

improvement. The rules do not provide ready-made solutions or procedures. However, they make every single action properly motivated and directed. As a result of their existence, they allow the use of the symmetry effect in the quality management system.

Improving quality by improving processes leads to cost savings. Each activity in the process generates a cost. Listing all activities in the process and assigning them the costs that they generate will allow to estimate the cost of the process.

An institution may use the activity-based costing (ABC) method to calculate the cost of a process. Traditional costing systems answer the question: how can a company break down costs for financial reporting and cost control for each department. The ABC method consists in determining the costs of individual activities using the cost drivers of the resources used. Activity Based Costing assigns resource costs to individual activities and uses activity cost drivers to link activity costs to cost objects (Kindlarski, Bagiński, 1994, p. 65).

Activity cost bearing is a quantitative indicator of the effects of the activity, e.g. for an activity maintenance of equipment the cost bearing will be the number of maintenance hours. Cost carriers can be of various types – e.g. quantitative operation carriers indicate the number of operations performed, duration carriers indicate how much time is needed to perform a given activity. The type and complexity of the medium depends on the institution's choice between accuracy and cost of measurement.

An important element of the ABC method is linking the costs of activities with cost objects, i.e. products, services and customers – the final beneficiaries of the activities carried out. In an ABC system, any allocation of cost to an activity, product, service or customer should be transparent and connectable via a cause-and-effect relationship with the resource demand of a cost object (activity, product, service or customer).

R. S. Kaplan and R. Cooper point out that the process image introduces various kinds of cost carriers, which we will call process carriers. They help in determining the amount of resources and thus the costs needed to perform the activity. Recall that activity cost drivers (cost drivers used in the vertical plane to allocate activity costs to products) measure the number of activities required by specific products. The process media depends on the performance of the activity. Each activity can be assigned several process carriers (Opolski, 2000, p. 78).

It can therefore be concluded that the integration of cost accounting and process improvement occurs at the activity level.

The principle of continuous improvement in Japan is known as Kaizen and it is a development of the fifth principle of Deming, which says that you should constantly search for the causes of problems so that all elements of the production system and related activities become better and better.

Kaizen is a management philosophy derived from Japan. Kaizen is closely related to Japanese culture, so it is difficult to define the origins of this philosophy. Kaizen has been used for many years in companies such as Toyota, Honda and Sony. The Japanese Masaaki Imai is considered the master and guru of this philosophy, and in 1986 he published a book entitled Kaizen. The word Kaizen means constant improvement, improvement, improvement. Kaizen aims to constantly improve the workplace, work process and everyday life.

The Kaizen philosophy states that the way a person coexists as a member of a specific community (family, organization, company, sports teams, etc.) requires continuous improvement. Human activity in every area of life requires continuous improvement. This improvement can be carried out in small steps, which, however, lead to a constant approach to perfection. One of the messages of Kaizen is that no day should pass without making some improvement in one of the areas of the company's operation.

In order to limit deviations and then eliminate them, first of all, you should start removing special deviations as they are easier to identify. After removing them or at least developing an effective method of limiting them, the process is under control and, consequently, it is possible to predict the state of its outputs. Only then should we begin to reduce natural variations and, as a result, to permanently improve the quality (Hamrol, Mantura, 2005, p. 98).

The Kaizen method is introduced in the enterprise in seven stages. Those are:

- defining the area of improvement;
- analysis and selection of key problems;
- identification of reasons for improvement;
- planning of remedial measures;
- implementation;

- comparison of the results;
- standardization (Ładoński, Szołtysek, 2005, p. 42).

It is often emphasized that the introduction of the Kaizen concept is possible only if the organization correctly introduces the 5S principle first. According to this concept, the basis for shaping the optimal organizational structure are: organization (seiri), order (senso), purity (seiso), preservation (seiketsu) and discipline (shitsuke).

An optimal organizational structure is understood as an organization in which people are in the first place. This approach stems from the Japanese culture that no enterprise can be better than the employees who work for it. Moreover, employees are given greater independence (than employees of European companies) and tasks to be performed, thanks to which they can be inventive and present their skills.

Organization in the 5S concept is translated as the proper preparation of the place, method and tools of work. Proper preparation means removing everything unnecessary from the workplace.

Order in the 5S concept is understood as an order covering the place and way of work and the preparation of all require tools in a way that enables their quick and easy use.

Cleanliness in the 5S concept means maintaining order in the workplace, which allows you to increase work safety, control the operation of devices and responsibility for the means of production entrusted to employees.

Consolidation in the 5S concept consists in reminding employees of their obligation to care for the maintenance of tools and devices in good condition, to maintain order in the workplace, which is necessary in the process of total improvement of quality.

Six Sigma is one of the newest quality management concepts. It comes from the USA, where it was introduced in Motorola plants at the end of the 1980s. At Motorola, the definition of Six Sigma was developed, according to which: Six Sigma is the business philosophy that guides operations by clearly defining the value of the organization within its compensation system and a business strategy focused on reducing costs and increasing customer satisfaction (Dwiliński, 2000, p. 71).

Sigma is an expression taken from statistics. It is the standard deviation of any random variable around the mean value. Six Sigma then means six times the standard deviation distance. Standard deviation is information about the number of non-conforming units under conditions when the process is centered and a given feature is a feature with a normal distribution. Simply put, the bigger the sigma, the better (less error rate).

Six Sigma is inextricably linked with the principles of TQM. Due to its dynamic nature, however, it has become a more effective instrument in the pursuit of excellence. Six Sigma has developed or systematized many statistical and business tools that allow its effective use in reducing costs, defects and production cycle times, increasing market share, customer retention, product development. Six Sigma applies to every step of the manufacturing and administrative process.

Six Sigma is based on six basic principles (Jones, 2017, p. 402):

- focus on the customer,
- based on facts and data,
- process-based approach to management and improvements (in the entire area of the organization),
- proactive management – a dynamic management style in which the staff sets themselves ambitious goals, evaluates their progress and is guided by clear priorities. This style is based on initiative, creativity, and efficiency,
- cooperation without barriers – creating conditions in which employees understand well their role in the company, the role of co-workers and all functional connections,
- focus on perfection and tolerance for errors – actions aimed at perfection and achieving the six sigma level are associated with a change in management style, production methods and technology.

The aims of Six Sigma are:

- elimination of variability – variability is considered the main reason for quality problems, low efficiency and high costs. It should be eliminated in every process taking place in the organization,
- customer's satisfaction,
- shortening the production cycle time,
- reduction of costs related to error correction, repairs, scrapping,
- improving the market position of the organization.

The implementation of Six Sigma in an enterprise includes several phases (Harry, Schroeder. 2005. p. 8):

- recognition – that is, defining the problem,
- measurement – that is, measuring processes in the enterprise,
- analysis – that is, defining the causes of defects,
- improvement – that is, building processes in terms of quality improvement;
- control – that is, constant monitoring of the effects of activities.

Each of these phases is designed so that it can guarantee the company systematic implementation of the strategy and the use of its results in the company's operations.

CONCLUSIONS

The needs and benefits of implementing a quality management system are not limited only to the market. Users of the quality management system more and more often emphasize that the introduced system contributed to organizing the organization. In practice, young, dynamic and fast-growing organizations appear which already have a significant position on the market, which do not even have an organizational chart. Such an organization has several employees who interact with each other.

However, after some time, new employees and customers are added, and problems also arise. At this time, working colleagues are overwhelmed by the excess of duties, there is a bad atmosphere at work and, as a consequence, there are delays with orders. Then you need to make changes. The first such change may be a quality management system which, through its activities,

develops an organizational chart and at the same time defines the responsibilities and rights of employees.

Thanks to this, work is carried out by people with appropriate qualifications, the quality of work is stabilized, the stress of employees is reduced, and the atmosphere at work improves.

An important motive for introducing quality management systems is the need to recognize the processes implemented in the organization and then to improve their consistency. In many organizations, work is organized around functional structures. This enables the introduction of coherent work, which is located in various divisions and departments, which in turn leads to complications in the flow of information.

The quality management system enforces the identification and description of all processes carried out in the organization. At the process level, the quality management system increases the competitiveness of the organization by improving the quality of the products and services offered and reducing unnecessary costs.

Each process consists of a series of operations and activities that are assigned to specific work stations.

In the quality management system, attention is paid to such aspects as:

- creating appropriate working conditions,
- identifying and shaping the factors that influence them,
- providing the necessary resources,
- keeping order (Hamrol, Mantura, 2005, p. 178).

Employees should know what is expected of them. Tasks should be clearly formulated and the criteria for their correct performance should be defined. Employees must be properly prepared for work, they should have the skills, knowledge and authorizations necessary to perform their tasks. Employees' skills and predispositions should be analyzed individually. An important issue is to ensure effective internal communication. Management should know that the assigned tasks are well understood and that employees consider their execution to be realistic. Workers, on the other hand, should be informed about the results of their actions.

Another reason for introducing quality management systems is the desire to facilitate cooperation with other organizations, especially with those that have

already implemented a quality management system. The ability to conduct audits of the other party significantly influences mutual understanding and understanding of the partner's requirements and capabilities. The cooperation is also tightened by taking corrective and improving actions resulting from the analysis of complaints, comments and customer audits.

Quality management is one of the fundamental elements of an organization's success (Wyřębek, 2010, p. 139).

In a modern organization, regardless of the profile of its business, it becomes the basis of its safe functioning.

The expanding inclusion of the quality guarantee as a criterion in the decision to purchase goods or services clearly confirms the thesis that only products characterised by good quality can play a key role in winning new markets or in maintaining the achieved market position.

In quality management such components of the organisation as a coherent organisational structure, tailored to the functions and objectives of the enterprise, the leadership model, standards, procedures and the course of processes are of fundamental importance. It should be noted that disregarding these conditions is one of the reasons why it is difficult for long-established companies to change their business model in such a way as to support value creation. It is important for all employees to feel responsible for the company's image as well as to identify themselves with the workplace.

The quality management system as a modern and effective tool for quality improvement requires many activities and far-reaching changes, but it brings unquestionable benefits in the organisational and economic sphere.

REFERENCES

- Baraniecka, A., Witkowski, J. (2005). Siedem pułapek certyfikacji systemów zarządzania jakością. *Przegląd Organizacji*. p. 39.
- Ciekanowski, Z., Nowicka, J., Wyrebek H. (2017). *Zarządzanie zasobami ludzkimi w sytuacjach kryzysowych*. Warszawa. CeDeWu. p. 239.
- Dwiliński, L. (2000). *Zarządzanie jakością i niezawodnością wyrobów*. Warszawa. Oficyna Wydawnicza Politechniki Warszawskiej. p. 71.
- Hamrol, A., Mantura, W. (2005). *Zarządzanie Jakością – teoria i praktyka*. Warszawa. PWN. p. 208.
- Harry, M., Schroeder, M. (2005). *Six Sigma*. Kraków. Oficyna Ekonomiczna. p. 8.
- Jones, E. (2017). *Quality Management Organizations Using Lean Six Sigma Techniques*. CRC Press. p. 402.
- Kindlarski, E., Bagiński, J. (1994). *Podstawy zarządzania przez jakość*, Seria: Zarządzanie przez jakość – doskonalenie jakości w firmach prywatnych i państwowych, metodyki, systemy, metody i techniki. Warszawa. Bellona. p. 65.
- Luthra, S., Garg, D., Agarwal, A., Mangla, R. (2020). *Total Quality Management. Principle, Methods, and Applications*. CRC Press. p. 197.
- Ładoński, W., Szoftysek, K. (2005). *Zarządzanie jakością*. Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu. p. 42.
- Łańcucki, J. (2004). *Efektywność systemów zarządzania*. Poznań. PZITS. p. 10.
- Opolski, K. (2000). *Jakość w banku w praktyce i teorii zarządzania*, Warszawa. CeDeWu. p. 78.
- Skrzypek, E. (2000). *Jakość i efektywność*, Lublin. UMCS. p. 9.
- Slywotzky, A. J. D. Morrison, D. J. Adelman, B. (2000). *Strefa zysków*. Warszawa. p. 42.
- Steinbeck, H. (1998). *Total Quality Management*. Kompleksowe Zarządzanie jakością. Warszawa. Placet. p. 83.
- Tricker, R. (2019). *Quality Management Systems*, Routledge. p. 67.
- Wasilewski, L. (1998). *Podstawy zarządzania jakością*. Warszawa. p. 234.
- Więcek, J. (2007). *Zintegrowane zarządzanie jakością*. Łódź. Wydawnictwo Uniwersytetu Łódzkiego. p. 79.
- Wyrebek, H. (2013). *Integracja systemów zarządzania jako wyznacznik dojrzałości organizacji*, [in:] *Dojrzałość organizacji – aspekty jakościowe*. E. Skrzypek (ed.), Lublin. UMCS. p. 186.
- Wyrebek, H. (2010). *Uwarunkowania procesu wdrażania systemu zarządzania jakością wg ISO 9001 na przykładzie przedsiębiorstwa produkcyjno – handlowego*. Siedlce. „Zeszyty Naukowe Akademii Podlaskiej nr 86 Seria: Administracja i Zarządzanie” (13) 2010. p. 128.
- Wysokińska-Senkus, A., Wyrebek, H. (2012). *Znormalizowane systemy zarządzania w Europie i na świecie* [in] „Zeszyty Naukowe” nr 23/2012. Wyższa Szkoła Handlu i Usług w Poznaniu. p. 83.
- Zapłata, S. (2009). *Zarządzanie jakością w przedsiębiorstwie*. Ocena i uwarunkowania skuteczności. Warszawa. Oficyna Wolters Kluwer Business. p. 22.

