

Knowledge as a determinant in developing a quality management system

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Abstract

Article is devoted to the factors conditioning the improvement of the quality management system (QMS) of industrial company. In this paper, these factors are called determinants of improvement in the QMS. Particular attention was paid to factors which sources should be sought in knowledge management in the organization. These determinants have been identified in the research process which was conducted among the management of one of the large industrial companies. In the research process, degree to which the determinants support forms of professional organization was assessed. These forms are described in the first part of the following process which these are the innovations and Kaizen. The corrective and preventive actions are mentioned as the third form of improvement mechanisms which are in the form of obligatory procedures for quality management systems based on ISO 9001 quality management standard. The last part of the Article is dedicated to chosen aspects of the role of Knowledge Management in the improvement of the quality management system.

Introduction

In today's process which is subject to rapid change, knowledge management enables the development of the organization, and therefore, allows to gain advantage over competition. Only a company that manages to utilize their knowledge wisely, lead the way among the competition [1]. The reason for this contest is a client that by purchasing at the given time maximizes the benefits of transaction. Customers guided by rationality, as it must be assumed, choose products with the highest value to them at the lowest possible price. For current businesses, this means a constant need of improvement in product quality and improvement of the efficiency and effectiveness of their business processes. Improving products generally speaking is associated in the broad sense with planned design and implementation of new solutions to increase customer satisfaction with the purchase and use of the product. However, improvement of business processes should be understood as a scheduled activity that leads to improving effectiveness and efficiency.

Science and practice underline the need to approach these two organizational activities – improvement of products and processes – in a systemic way. With covering of these two categories as one management system it is possible to achieve better results in terms of improvement. Therefore, both products and processes are elements of the quality management system (QMS) based on ISO 9001 standard. As a result, improvement of the QMS must be identified with the improvement of products and processes. The basis of building a QMS, i.e. the principles of quality management, especially demanding a continuous improvement and a strong customer orientation should be the foundation for improvement of products and processes. Unfortunately, the mere possession of certified quality management system by a company does not guarantee its effective improvement. It is reasonable to put forward the thesis that there are factors which have a measurable impact on the effectiveness of improvement in the QMS. This paper presents prefatory results of research that will be used to verify

the given thesis in the future, through comprehensive research on a wide group of companies.

Results of research is presented in this paper which purpose was to identify factors that support the three forms of improvement of organizations in the industrial companies. The forms of improvement included innovation, Kaizen and procedures describing the corrective and preventive action (in accordance with ISO 9001). The study was conducted in 2013 in one selected large industrial company operating on the Polish market. The research was conducted on group consisting of 15 senior and middle management level individuals. In the first stage participants identified the factors for improving the QMS using the brainstorming method. In the second stage, the group determined the level of support for each of the identified factors for each of the forms of improvement.

Methods of improving the organization

Improvement can be made on the basis of two classic forms – rapid and abrupt improving changes is the so-called innovation and slow and continuous changes made, based on the philosophy of Kaizen.

While the innovation requires a radical changes, in the Kaizen method, it is enough to take small steps toward development. In contrast to innovation, where the effects are often problematic, Kaizen provides long-term progress based on common sense and low cost approach. Using the Kaizen philosophy, one does not take the risk associated with large costs, as this approach is less risky, you can return to using the previous methods at any time. Innovation is a one-off project but Kaizen is a continuous effort that gives the cumulative effect and steady growth. Kaizen begins by stating that every company has problems. This means that their solutions need to start by creating the corporate culture, in which everyone can admit to their own problems without any fear. Masaaki Imai, author of Kaizen – The Key to Japan's Competitive Success, says openly that Kaizen means improvement. Kaizen is subtle and takes place without dramatic tension. The results of it are rarely directly visible. One of the advantages of Kaizen is that it does not require advanced technology. Kaizen strategy is the most important concept of Japanese management, the key to its competitive success. Kaizen means continuous improvement for all, top executives, managers and supervisors. This concept is key to understanding the differences between Japanese and Western management approach [2].

Innovation activities are quite different in nature. It is worth noting that perception of innovation

in management sciences evolved with the growth of the economy. Initially, until the 70s, the concept of innovation was identified with the technical aspects of human activity. An example of this is the classic definition of where innovation should be understood as a discontinuous implementation of new combinations of production factors for the five cases [3]:

- the introduction of a new product, or its variation not yet know to the customer;
- the introduction of new production methods, not yet used in practice of particular branch of production to which it refers;
- opening towards a new market, in which a particular branch of production was not yet present;
- acquiring new sources of raw materials or semi-finished product;
- implementing a new system of business processes, both in production and in the area of commodity circulation.

One of the most unambiguous definitions of innovation presents it as the first use of the invention in the world [4]. However, a deeper analysis of the literature on innovation makes it clear that the issues concerning innovation are more complex, as it covers the different types of events – technical, organizational, and financial and economic.

The broad and ambiguous definitions of innovation has led to dealing with them in terms of organizational change. Connecting innovation with change is very common in the literature and in practice but it does not matter, in which area of the enterprise this change applies. According to some researchers, innovation does not mean a complete novelty. Any change can be classified as innovation if it is new for the person or group of people within the organization. The innovation can be identified with the introduction of new and improved work practices, deliberate introduction and application in the workplace (within the group of employees or the organization of ideas) processes, products or procedures that are new to the environment, team or organization, whose aim is to improve the functioning of the given structures [5, 6, 7].

Organizational change refers to any real process, in which the final status of the company as an organization (or part of it) is different from any aspect of the organization: work processes, criteria for integrity, span of management, equipment, skills, etc. [8].

In the literature, there are many criteria for the classification of changes: source of changes, the pursued objective, changes of strategy, range of organization, the range of innovation, actual

results [9]. In addition, technical and technological changes, economic, structural and social [10]. Moreover, we distinguish between surface, deep, slow, fast, fixing and agreed changes [11].

Despite the presented differences, both action based on innovation and on Kaizen should be combined to form the basis for changes improving the organization. This is especially important within an organization with a certified quality management system, because the ISO 9001 standard obliges organizations to constant improvement. As one can read in the previously mentioned standard, an organization shall continually improve the effec-

tiveness of the quality management system (...). According to literature: a process of continuous improvement is a permanent search for all employees to find opportunities and ways to improve their own work, and how to fulfill in the best possible way the needs and expectations of all clients [12]. Constant improvement of the organization must be based on organizational culture, which is the key of support for practices and procedures. In order to continuously improve the QMS, the ISO 9001 standard requires establishing formal mechanisms for improvement. In particular, the establishment of procedures describing the corrective and preventive

Table 1. Relationship between the conditions and forms of improvement [own study]

Determinants (marked in the table of knowledge management)	Forms of improvement		
	Inno- vation	Kaizen	Corrective and preventive actions
Common knowledge and understanding of staff associations for policies and strategies of quality and quality objectives	+	++	+++
Effective diagnostics of functioning of the quality management system. Monitoring, measuring and analyzing of effectiveness and efficiency of processes	++	++	++
Staff possessing the needed knowledge and skills on methods and tools for improvement		+++	+++
Availability of data, information and knowledge describing the state of operation of the QMS to staff	+++	++	++
Effective methods for the collection, analysis and use of information received from customers	+++	++	++
Tracking technology. Technological knowledge. Benchmarking of technology	+++	+	
Conducting effective research and development R & D by the company	+++	+	
Reliable internal auditing in companies. Only such an approach provides a reliable diagnosis of the QMS and identification of areas for improvement	++	++	+++
Transparent company development strategy connected with the quality policy and quality objectives. The strategy should set directions and objectives of improvement and provide a framework for evaluation	+++	++	+
Involvement of top management in improving the QMS. Senior management should identify the improvement of QMS as a systematic approach to organizational development	+++	+	+
Budgeting improvement activities. Improvement of the QMS should be treated as an investment. Supporting the strategy of excellence in the submission of the lack of cost of the process is wrong	+++	++	+
The systematic assessment of managers at all levels on the basis of their actual (substantiated) achievements in improving the QMS	+	++	++
Involvement of employees based on the strong motivation and ambition in the improvement of the quality management system		+++	+++
Systematic assessment of personnel for improvement initiatives and the actual (substantiated) improvement of the functioning of the organization, especially in work		+++	+
Operating in formal organizations aimed at continuous improvement (quality circles, Kaizen teams)	+	+++	
Inclusion of the employee's duties improvement activities in the scope. Creating conditions for the improvement of job-guaranteed time and financial resources	+	+++	++
A serious approach of managers (decision makers) towards improvement initiatives made by the staff		+++	+++
Occurrence of operation procedures and programs in a company which aim is to improve the QMS	+	+	+++
Appropriate organizational culture which main purpose is to eliminate the pressure only on the quantitative results of operations		+++	+++
Showing the relationship between the development of the company and employee's professional development		+++	++

action. These procedures were treated in this study as the third form of improvement – a mandatory and procedural form.

The procedures for corrective and preventive actions describe the actions eliminating the causes of non-compliance, either resulting or potential, in order to prevent their occurrence in the future. As we read in ISO 9001 standard, an organization shall establish documented procedures to define requirements for:

- identifying non-compliance or its potential occurrence;
- determining the causes of non-compliance;
- assessing the need for action to ensure elimination the causes of non-compliance in the future;
- determining and implementing needed action (corrective and preventive);
- recording the results of the actions taken;
- reviewing the effectiveness of the undertaken actions.

Although the standard generally requires two procedures, due to the similar mechanism of eliminating the causes of problems organizations often establish a procedure describing both corrective and preventive actions. Unfortunately, as research shows, only establishing of previously mentioned procedures in an organization do not ensure their effective implementation and improvement of the QMS [13]. Improvement of the QMS, as one might guess, is determined by a number of factors and organizational conditions.

Determinants of improvement of the QMS

As it was mentioned, enterprises tend to improve their own QMS through the use of three forms of improvement – innovation, Kaizen and procedures for corrective and preventive actions. Improvement processes are usually difficult. Difficulties and barriers delimiting improvement must be sought not only in the process of improvement itself but especially in the decision to start this process. Efficiency of improvement of QMS is dependent in any industrial enterprise on a number of factors – determinants of QMS improvement. During the study 20 determinants were identified to be improving the QMS. They are included in table 1. It also establishes the extent to which each of these three determinants determines the form of improvement. The strength of this effect was assessed in three-point scale.

The research shows that adequate knowledge has impact on the efficiency of improvement of the QMS, not just the one generated in a company but also a source of knowledge which should be sought out, and which the company is forced to transfer.

Knowledge management and improvement of the QMS

Currently, the most important asset of enterprises have become the information, knowledge and intellectual capital [14]. The literature indicates that the data is based on knowledge and information that they become aware of only after their processing [15]. The data are the building blocks of information, raw and unanalyzed facts, figures and events [16]. Currently, the most common are saved and stored in the form of formal records. They should be understood as a set of isolated facts which are concerning an event. Processed data form the messages and shape information. Information is an organized data and all other relevant factors used to make decisions. Information arises from the data processed and interpreted so as to be useful to the recipient. The primary role of the information is to provide a new point of view in the perception and interpretation of events or objects, in which the recipient sees some factors and their impact on his behavior and judgment. Information can also be seen as a logical and factual data connection allowing feedback and explaining phenomena. Knowledge is information used for solving a given problem [17].

As mentioned earlier, the main objective of the quality management system is its continuous improvement. The objective of this improvement is:

- improvement of effectiveness and efficiency of business processes;
- increasing customer's satisfaction through refinement of products, e.g. in the design process.

The basis of improving the QMS are data and information derived from the monitoring and measurement of processes (including supplying processes), and evaluation of customer's satisfaction.

Analyzing the requirements of the presented standard one come to the conclusion that we have a classic mechanism to generate knowledge that is necessary for the improvement of the QMS. As it is presented in the standard IOS 9001: the organization should use appropriate methods for monitoring and measuring the execution and evaluation processes and evaluation of customer's satisfaction. The methods used should be given the opportunity to demonstrate the ability of the processes to reach planned results in the QMS. The standard clearly requires managers to determine the applicable methods, including statistical methods, and also the extent of their usage. Each identified process of quality management system should be measured and evaluated. Without this management becomes impossible. The consequence of these requirements

of monitoring of quality is management system generating a series of data that need to be analyzed. The ISO 9001 requirements of section 8.4 devoted to the requirements of analysis of data, states that the organization shall determine, collect and analyze appropriate data to demonstrate the suitability and effectiveness of the quality management system and also to evaluate opportunities for continual improvement of the effectiveness of the quality management system. The analysis of data shall provide information relating to:

- customer satisfaction;
- conformity with product requirements;
- the characteristics and trends of processes and products;
- suppliers.

It implies that the ISO 9001 standard requires managers to establish a formal mechanism for the development of knowledge necessary for improvement of the QMS. This mechanism seems to be in line with today's concepts of knowledge creation through the collection of data and its transforming into useful information. Improvement based on the concept of resources and generation of knowledge through the QMS is presented in figure 1.

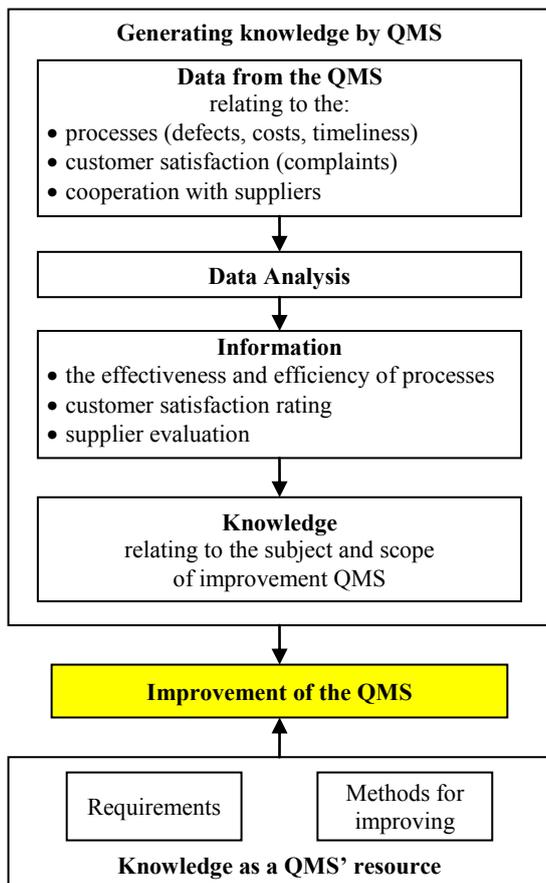


Fig. 1. Concept of improvement based on resources and generating knowledge through the QMS [own study]

Effective improvement also requires answers to questions about what is the desirable targeted product after the process of improvement. In addition, one should answer the question concerning the way of solving problems in the process of improvement. What methods and tools are used? Organizations focused on improving treat this knowledge as a key QMS resource. If the resource is not sufficient for effective improvement, it is necessary to seek knowledge. In this case, the process of improvement will include an analysis of the sources of knowledge and a selection of the most effective ways for transferring and spread of knowledge in the organization. With no doubt, knowledge is treated as a precious resource on which the improvement is based.

Conclusions

Improving the functioning of processes and products is now a necessity. In particular, it concerns the industrial companies functioning based on ISO 9001 standard. In this case, not only the market and competition forces improvement, but the ISO 9001 standard itself on which base the QMS is certified. Unfortunately, the process of improvement is not always easy, fast and cheap. Efficiency of improvement of the QMS is determined by various factors. Particularly important determinants of improvement is knowledge. Improving the Quality Management System supports the knowledge generated by the QMS on the subject, the target of improvement. The target improvement should result from a reliable diagnosis of the QMS. This will allow you to answer the question: what should be improved? In addition, it appears to be an essential knowledge to carry out the improvement processes. The effectiveness of improvement is determined to answer the question, how to carry out the process of improvement and the means by which and by means of the tools.

Without a doubt, knowledge turns out to be a key resource in determining the efficiency of improvement of the QMS. Knowledge management should be a key process formally included in the quality management system. Certainly, it will increase the efficiency of improvement of the QMS.

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