Information support of a quality management system in the context of digitalization of business processes

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Abstract. In conditions of improving production processes, the organization and implementation of a quality management system is one of the most important issues in the management system of individual business processes and the organization as a whole. The formation and implementation of control over the organization of production, product quality, labor protection and other business processes and management objects is carried out in accordance with the accumulated theoretical, methodological and practical experience. However, at present, in the conditions of intensive development of technologies that allow us to move to a qualitatively new level of production, traditionally established approaches to managing business processes are losing their relevance and require additions, including in terms of enhancing the automation of information support for the quality management system. Therefore, as part of this study, it is proposed to pay attention to the development of tools of intelligent quality management systems in terms of performing control and analytical tasks.

1. Introduction
Currently, the digital economy and the areas of activity that are associated with it are rapidly developing in the world, namely: the public sector and business, citizens' livelihoods, ensuring information security, telecommunication network capabilities, etc. This process involves activities in which one of the factors (resources) of production are digital data that acts both as a means and as a result. Such activities contribute to the development of the information society by:
- creating an information space that takes into account the needs of citizens and society as a whole in high-quality and reliable information,
- development of information infrastructure in Russia;
- the creation and use of Russian information and telecommunication technologies.
Information is one of the most important components of reality surrounding us. Now the understanding of information should be interpreted much more widely than previously done. Information is not only information necessary for the user about an object, but also a new asset, which, unlike other groups of assets, has a unique value, the essence of which is that the information can be used for new purposes and for implementation of new activities.
The use of information currently characterizes it as a resource, the result of intellectual work, along with labor, material, financial and other resources.
In this regard, the question arises of the relationship between the concepts of “knowledge” and “information”. Discussions of scientists regarding whether it is possible at the moment to argue that information is an ordered knowledge of any object comes down to a positive statement. In accordance with this, knowledge is a category that is close to information, focused on a specific user to make a specific decision.

One of the main goals of the quality management system is to confirm the buyer's confidence that the product he purchases meets all quality standards and also fully satisfies all his needs. Currently, in the scientific literature the topic of digitalization of individual business processes is widely discussed, however, specific approaches to applying digitalization tools to existing management systems are often absent or are fragmented, even contradictory. Therefore, the transformation of the information support of the quality management system in the context of digitalization of business processes is one of the important problems requiring immediate solution in terms of not only supplementing the theoretical experience, but also improving the practical aspects of introducing the formulated recommendations into the enterprise management system as a whole and individual business processes in particular.

2. Methods and materials

To solve the problem of developing an approach to the transformation of information support of the quality management system in the context of digitalization of business processes, the following methods were used:

- systematization - the collection and grouping of information from scientific literature and other sources that led to the conclusion that there is no comprehensive approach to the transformation of information support for the quality management system in the context of digitalization of business processes;
- modeling - building a model of information support for a quality management system in the context of digitalization of business processes;
- the method of complexity - research and proposal for the transformation of information support of the quality management system on the basis of an integrated approach by integrating information about all objects of management in a single intellectual environment;
- the dialectic method - the study of the content of the concepts of “information” and “knowledge” as the main tools of communication and interaction in modern society.

3. Discussion

The study of information issues, its role in society, as well as issues of promising information management systems was carried out by such scientists as A. Esatiani, E.J. Pentinen, Strouhal J., Orak J., Boksova J. and several other scientists.

The development of approaches to the transformation of control systems in the context of digitalization of data and business processes was studied by scientists Limonova E., Stankin A., Kopnov V., Correa P., Fernandes A., Uregian C. and others.

Based on a study of the results of research by economists regarding digitalization, it was concluded that digitalization means the transition from an analog form of transmitting information to digital. At the same time, digital transformation involves the use of modern technologies to dramatically increase the productivity and value of enterprises. However, currently in the economic literature there is no comprehensive approach to the transformation of information support of the quality management system in the context of digitalization of business processes. Therefore, this direction was chosen as the goal of this study.

4. Results

Production activities are more focused on achieving effective indicators: maximizing profits, improving product quality, reducing costs, using more modern materials for production, switching to automated production and management, etc. As a result of the study, it was found that digital technology is changing the operating model of companies, especially in the banking and telecommunications sectors, increasing cost efficiency and identifying new opportunities in the market.

In the service sector, the benefits of digital transformation are cost savings of up to 60 percent and significant acceleration of the launch of new products on the market. Another result is an increase in
customer loyalty and the frequency of interaction with them, leading to an increase in customer base profitability. Partnerships or partnerships with companies in related fields also provide access to new customer segments. For industry, the use of robotics, artificial intelligence, big data systems allows us to produce high-tech products that are in demand on the market. According to research, the best companies, the “digital elite” (Digirati) of our time, combine digital technology and strong leadership, making the transition from just using IT to transforming a business. Automation allows the company to reorient its team to solving strategic problems, gain more free time to improve managerial skills, concentrate on research and creativity, and not waste time on repetitive processes. This significantly contributes to the rapid formation of data streams that can be useful in mining.

At the individual level, work is essentially virtualized - the work process is no longer associated with a physical workplace. Corporate collaboration tools and networking tools allow employees to communicate with colleagues wherever they are. A number of tools that allow you to work remotely become powerful means of exchanging information. Sales managers and front-office employees are beginning to actively use tools for collaboration, thanks to which they can quickly establish communication with experts and receive answers to questions in real time. They also gain access to a single, global point of interaction between the company and their customers. Transactional systems give managers the opportunity to better understand products, regional characteristics and customer needs, which allows them to make informed decisions based on real data, not assumptions. This applies to both internal processes and client processes. The level of detail is also growing, which allows managers to compare current statuses and redistribute production capacities in ways that were previously unavailable. In addition to better awareness, digital transformation provides a change in the strategic decision-making process.

The indicated advantages of using digitalization in a quality management system are reduced to the need to build a high-quality new system of its information support, the model of which is presented in a simplified form in Figure 1.

![Diagram of information support for a quality management system in the context of digitalization of business processes.](image-url)

**Figure 1.** A model of information support for a quality management system in the context of digitalization of business processes.
The presented model contains two blocks in the basis: the information sphere and the intellectual sphere. The information sphere is understood as a unified system of external and internal data necessary for product quality management, which inevitably transforms into digital form or is created in such a form, stored on a dedicated server or on the cloud, processed in a single automated intellectual program and can be interpreted and detailed in the most user-friendly form. The intellectual sphere is a set of rules, laws, parameters, algorithms, processing and interpretation of information about the objects of the quality management system, which allows without significant user intervention to develop the most effective solution or system of solutions to a given problem.

The proposed model of information support for the quality management system in the context of digitalization of business processes using an intelligent information processing system allows avoiding the direct participation of a specialist in quality management and increasing the efficiency of processing large volumes of unsystematized and fragmented data to make effective management decisions.

Computerization of enterprise management assumes that this should be a coordinated support of the functional and process component of management activity using information technology and automation.

What is common in information systems is that they are designed to support management processes. Possible problems with the digitalization of the quality management system, in particular:

1. The lack of qualified specialists who can professionally build a real process model of an enterprise management system.
2. Lack of a sufficient number of properly qualified specialists who are able to work with BigDate.
3. Given the fact that the "digitized" enterprise assumes complete transparency of the personnel’s activities and minimization of the negative impact of the human factor, the implementation of digitalization measures will meet with opposition from the employees, most of whom seek to conceal “failures” in quality (concealment of marriage, excessive time, financial and material costs in the production process).

Due to the fact that the digitalization of business processes is a fairly new and not fully understood phenomenon, the quality management system is characterized by risks associated with the transformation of its information support. The systematization of the risks of digitalization of the quality management system is presented in Figure 2.
Figure 2. Risks of digitalization of the quality management system.

With regard to information support, one of the important risks in the context of digitalization of business processes is the development of IT fraud, an increase in the risk of unauthorized access to confidential information. Therefore, to protect the company from online fraud, it is necessary to use the latest means of protecting information.

Based on the risks presented, as well as the proposed model of information support for the quality management system in the context of digitalization of business processes, we determine how the principles presented to the quality management system in terms of digitalization should look like:

1. Consumer orientation - organizations depend on their consumers and therefore must understand their current and future needs, fulfill their requirements, taking into account the increase in sales in Internet commerce, the use of Internet things, which will most quickly and efficiently satisfy consumer demand.
2. Leadership of the leader - leaders ensure unity of purpose and direction of the organization. Digital transformation requires strong leadership - only it can be a driver of major changes. A clear understanding of which parts of the company should be transformed is also required.
3. Personnel involvement - employees of all levels form the basis of the organization, therefore their full involvement in solving problems in the context of digitalization, as well as continuous training, enables the organization to use their abilities to the benefit.
4. Process approach - the desired result is achieved more efficiently when activities and related resources are managed as a process.
5. A systematic approach to management - the identification, understanding and management of interconnected processes as a digital system contribute to increasing the effectiveness and efficiency of the organization in achieving its goals.
6. Continuous improvement - improving the organization's activities, taking into account its innovative development.
7. Making decisions based on facts - effective decisions should be based on the analysis of data and information, increasing the efficiency of its processing and presentation of a user-friendly form, which
is ensured by the proposed system of information support for the quality management system in the context of digitalization of business processes.

8. The principle of flexibility: the quality management system should be easily changed if there is a potential to improve the quality of services, labor productivity, profitability, and reduce costs.

9. The principle of manufacturability: the quality management system should use digitalization and robotization tools to improve the quality of service.

The presented traditional principles presented to the quality management system, supplemented taking into account modern digitalization requirements, allow you to build your own path of development of the enterprise in a turbulent economy and the lack of transparency of the future business environment.

5. Conclusions

Thus, in the course of the study, a comprehensive approach to the transformation of information support of the quality management system in the context of digitalization of business processes was applied to solve the problem. Modern technological, economic and social conditions dictate the requirements of the business as it should be. One of the essential qualities today is fast, informational, open, digital. If an enterprise does not make a qualitatively new leap to the digital future, or at least does not supplement traditional approaches and tools for managing modern attributes, it is no longer able to compete in the modern market.

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