JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125 VOL 7, ISSUE 02, 2020

DIGITALIZATION AS A TOOL FOR DEVELOPING A QUALITY MANAGEMENT SYSTEM

H.I. Avezova[1], P.R. Ismatullaev[2], P.M. Matyakubova[3], M.M.Maxmudjonov[4], G.R.Kosimova[5]

[1] National bank of Uzbekistan, auditor, 100084, Republic of Uzbekistan, Tashkent, Amir Temur Avenue, 101
[2,3] Tashkent state technical university, the Dr.Sci.Tech., professor of chair "Metrology, standardization and certification", Tashkent city 100 095, Uzbekistan,
E-mail: tgtu_mss@rambler.ru
[4] Tashkent state technical university,
assistant, "Metrology, Standardization and Certification" chairs
Tashkent city 100 095, Uzbekistan,

Received: 16.11.2019 Revised: 18.12.2019 Accepted: 20.01.2020

Abstract
Digitalization is not technology and not a product. It is rather an approach to using digital resources to transform the work of an organization. It involves redefining technologies and business processes to improve the working environment of employees, interacting with the customer and other participants in the activities of a modern distributed enterprise.Digitalization significantly increases the productivity and reach of the company and has already become one of the top priorities for business leaders around the world.
Keywords: Standards, QMS, Customer, Overall satisfaction, internal audit, effectiveness

1. Introduction

In the activities of an industrial enterprise, one of the first places is occupied by the adoption of rational management decisions, including on managing the quality of products in the context of digitalization of enterprises and the national economy, improving activities, ensuring sustainable development at various levels of management, and ultimately ensuring the quality of life of the population. It is shown that management problems in the digital economy, as well as development directions for their elimination. The necessity, possibility and expediency of introducing accurate (calculation) methods into the work of managers is noted. As part of this task, the possibility of carrying out work on the creation and development of a parametric model of a social system operating in an active environment to create appropriate techniques, tools, including computer programs for automation of management activities, an enterprise simulation model that can be used both in systems decision-making or decision support systems, and in training for the formation of decision-making skills.

2. Theoretical and experimental research.

While the type of QMS implemented will change with industry and regulatory requirements, there are many benefits shared by all quality systems.

Meet customer requirements – Customer focused QMS efforts lead to better overall satisfaction with the product.

Boost confidence in the organization – The external certification and improved quality standards lead to an enhanced image for the manufacturer, and a greater confidence that they can deliver results.

Secure repeat business – Operations that repeatedly deliver quality products are more likely to instill the confidence needed for repeat business, and are more competitive in bids for contracts.

Prevent costly regulatory intervention – QMS tighten the screws in an operation, as it were. The stringent standards for process execution and documentation reduce the likelihood of fines or regulatory intervention.

Better benchmarking – Manufacturers with a QMS have a better understanding of their products' KPIs. They are better able to set standards and understand deviations from their norms.

More effective use of resources – A core goal of any QMS is the continuous improvement of processes and the minimization of waste. Manufacturers with a QMS will naturally make more effective use of their resources than if they lacked a quality structure.

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A brief overview of the methodological base of management, which allows to solve the problem of creating a mathematical model of a social system, is given. In particular, a theoretical apparatus is defined - a set of theories that can be used to create a model. As a result, they can be used for mathematical modeling of a social system. The phase variables (parameters) of the social system are determined, which make it possible to describe its state and, as a result, to fix the trajectory of the enterprise development. This can be used to make decisions on evaluating the actions and activities of people by the impact on the development path, the coefficient of functional (system) stability of the company.
It is shown that on the basis of the model of the social system based on the methodological base under consideration, it becomes possible to create software for the automation of management activities, which opens up fundamentally new opportunities for organizing the activities of enterprises in the digitalization of society and the digital economy.

All this determines the emergence of specific requirements for quality management systems, which involve increasing the importance of the application of economic and mathematical methods in making managerial decisions; modern means of collecting and processing information, using the latest achievements of digitalization. An important element of the quality management system is the incoming quality control of raw materials. Incoming quality control, in fact, is the activity aimed at identifying and eliminating inconsistencies, which leads to an increase in the cost of specific units of products manufactured using resources subject to control. At the same time, measures to assess the ability of suppliers to provide and improve the quality of supplied resources allow in the long run to reduce costs per unit of final product and thus increase the efficiency of operations. In other words, the tightening of input control is an extensive path of development, leading to an overexpenditure of resources in the framework of joint activities of the supplier and consumer; and evaluating suppliers and related activities to improve their quality management systems is an intensive way to save resources. One of the important contradictions of the digital era is the following: on the one hand, managers are required to create new jobs, thereby fulfilling the social responsibility of business to the state and the population. On the other hand, managers must implement advanced manufacturing technologies that allow the company to save important resources. If the manager does not introduce advanced technologies, then he puts the enterprise at great risk, namely, there is a risk of technological lag of the enterprise and its further closure. However, with the high introduction of robotization, there is the possibility of reducing employees and increasing unemployment (primarily among low-skilled workers), which, in turn, can lead to increased social protests and public discontent. In addition, directly managers themselves risk losing their jobs due to the fact that most processes will be carried out automatically. The coordination of processes will take place in real time and 24/7, which means that many managers will simply become superfluous due to the high digitalization of the processes.
It is worth noting that there is a completely opposite point of view, which is based on the judgment that with the introduction of robotics for production, production capacities will increase and strategically important resources of the enterprise will be saved. At the same time, employees will be able to retrain, not lose their jobs, become more flexible and mobile. As an example, supporters of this theory cite the introduction of the 1C: Accounting program. At the very beginning of its implementation, many accountants were confident that it would ruin their profession and lead to a sharp reduction in field accountants. However, this was not observed. In addition, the mobility of accountants has increased. Opportunities for additional earnings from bookkeeping of small entrepreneurs opened up before them, and entrepreneurs can now afford, depending on the size of the enterprise, not to keep an accountant on an ongoing basis. You can give a similar example with the company Uber, which has revolutionized the field of passenger transportation. At the same time, the venture of the enterprise was initially considered a wrecking industry. would have to dismiss all taxi fleet operators, reduce the number of taxi drivers working (this judgment was based on the fact that taxi drivers' mobility would increase, and the demand would remain the same, which would lead to an inevitable reduction), dumping prices in the industry (this would reduce the net profit of enterprises) . Over time, it turned out that there was no need to dismiss taxi drivers and operators, the demand for taxis and the company's net profit increased. At the same time, the mobile taxi application made it possible to attract new taxi drivers for whom the transportation of passengers is an additional income in their free time from their main work.
A number of legitimate questions arise for enterprises collecting such information:
1. Does the enterprise provide a list of measures and countermeasures to protect this kind of information?
2. What legislative measures can guarantee the security of this kind of information?
3. Has an appropriate infrastructure already been created to protect the collected customer information?
4. What responsibility will be incurred by the company in case of leakage or dishonest processing of information?
5. Will there be limited interaction between enterprises in terms of obtaining information about joint customers?
It is worth noting that corporate practice also knows unsuccessful examples of world-famous enterprises that unconditionally used only one technology to develop their business. A striking example is the company Kodak, which did not want to develop digital photography, because sincerely believed in the continued success of analog

ISSN- 2394-5125 VOL 7, ISSUE 02, 2020

photos. Because of this, the company did not develop other areas of activity, which subsequently led to its bankruptcy.

That is why managers of the 21st century face a very difficult task of maintaining a balance between technological innovations, including production robotization and, as a consequence, the creation of "smart factories" and employees. Currently, the problem of organizing incoming product quality control is particularly relevant. This is due to the fact that the quality of products depends largely on the use of high-quality raw materials. However, in modern industrial enterprises this type of control is not given enough attention, which leads to problems in the manufacturing and production process. The basic principle of working with suppliers, formulated in the ISO 9000 series standards, suggests that working with them should be based on mutually beneficial partnerships. Work with suppliers includes determining the quality requirements for the supplied material and technical resources, components, products, registration of these relations in the relevant regulatory and technical documentation; definition of requirements for the processes of suppliers, as well as criteria for evaluating and selecting suppliers; assessment and selection of qualified suppliers and conclusion of quality agreements with them; forming a system of partnerships with suppliers; implementation of incoming quality control. One of the main elements of working with a supplier is the evaluation and selection of suppliers who are able to provide the required level of quality of the delivered products, the use of the main methods of supplier assessment: work analysis, internal audit, second-party audit, independent evaluation. After evaluating and selecting suppliers, it is necessary to conclude relevant agreements with them, which must establish requirements for ensuring the quality of the delivered products, which are divided into two types: requirements related to products and requirements related to business processes. The requirements related to products include: requirements for product quality; requirements for containers, packaging, storage, transportation; the procedure for the implementation of incoming control; handling products of inadequate quality; indemnification for the supply of products of inadequate quality; product safety during transportation.

3.Methodology

The requirements relating to the processes of the supplier include: the procedure for the implementation of incoming quality control; staff qualification requirements; requirements for the presence of certain procedures, processes and equipment; quality management system requirements. Incoming quality control is the control of supplier products received by the consumer and intended for use in the manufacture, repair or operation of products at the enterprise. The purpose of the incoming control is to confirm that the consumer has received products of appropriate quality. In practice, continuous control of a batch of products, selective control of a batch of products using probability theory are used; random sampling based on the use of random sampling. The main types of incoming quality control are continuous and selective control, a type of selective control is a single-stage, two-stage control, multi-stage and sequential control. In the framework of ensuring high quality products, an important role is played by the improvement of the input quality control system of an industrial enterprise, which eliminates the possibility of penetration into the production of raw materials, materials, semi-finished products, components, tools with deviations from the quality requirements reflected in contractual obligations.

4. Finding

Improvement of the input control system is carried out in the following areas: improvement of control technology; improvement of controls; staff development; improvement of documentary support of the input control system. The input quality control of raw materials includes the preparatory phase of the input control of materials, the stage of control and the final stage.

5. Conclusion

An analysis of the theoretical literature and the practice of organizing incoming quality control of raw materials makes it possible to formulate the following conclusions. The effectiveness of the implementation and use of digital technology is largely dependent on the availability of standards. The approaches to standardization of digital production considered in the article make it possible to identify areas of promoting digitalization of industry based on the standardization mechanism. Standards provide technology transfer and system compatibility, including hardware and software components.

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