MANAGEMENT SYSTEM TRANSFORMATION WHILE MOVING TO DIGITAL ECONOMY

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Abstract: *The article describes the transition to digital economy, which requires a revision of the entire management system, since the existing tools are outdated and do not fit the emerging qualitatively new management paradigm, which is built on the principles of digital management and the use of personalized production instead of standardized production. Modern economy is facing fundamental changes in the ways of organizing business based on digital platforms. This trend also has an impact on the transformation of the modern management system.*
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Introduction

Currently, global economy is undergoing a structural transformation associated with the changes in the technological and economic structure of the world. The life cycles of these processes manifest themselves as Kondratyev's long waves and are characterized by ongoing institutional changes predetermined by technological and social revolutions and world economic crises.

The complex situation in the world system is characterized by the overlapping processes of changing technological and economic structures, which result in a resonant intensification of the crisis phenomena. The COVID-19 coronavirus pandemic also adds its negative impact.

EXPOSITION

The transition to the new (sixth) world economic order requires a radical complication of economic policy and an increase in the efficiency of both public administration and private companies' activities. It should be based on a combination of strategic planning and market self-organization, state control over the banking system and free enterprise, state ownership of infrastructure facilities and private entrepreneurship in competitive sectors of the economy.

Microelectronics and software are the key factors of the fifth technological order that is dominant in the modern economy. Its core consists of technological breakthroughs which include electronic components and devices, computers, radio and telecommunications equipment, laser equipment, and computer maintenance services. The generation of technological innovations that determine the development of this technological order occurs within the specified complex of industries and is mediated by strong nonlinear connections between them.

At present, as follows from the pace of long-term technical and economic development, this technological order is close to the limits of its growth – the rise and fall in energy prices and the global financial crisis are sure signs of the dominant technological order final phase and the beginning of economy restructuring to adjust it to the following order.

Today, the reproduction system of the new, sixth, technological order is beginning to take shape. Its formation and growth will determine the global economic development in the next two or three decades of the 21st century.

The transition to the sixth technological order will be marked by developing nanotechnology, transforming substances and designing new material objects, as well as introducing cellular technologies for changing living organisms, including the methods of genetic engineering. The core of the sixth technological order will also be based on the electronics industry, information technology and software.

At the moment, the key directions of its development have been formed: biotechnology based on the achievements of molecular biology and genetic engineering, nanotechnology, artificial intelligence systems, global information networks and integrated high-speed transport systems. It can be assumed that flexible production automation, space technologies, the production of structural materials with predetermined properties, the nuclear industry, and air transportation will receive further development.

It is also possible to predict with a certain degree of confidence that there will be an even greater intellectualization of production, a transition to a continuous innovation process in most industries and lifelong education in most professions. Therefore, the transition from a "consumer society" to an "intellectual society" will be completed. The new society's requirements for the quality of life and the comfort of the living environment will be of paramount importance. The ecological component will be seriously taken into account.

However, for the transition to the digital economy to occur, there should be a combination of several technologies that change the functionality of enterprises.

The management system also requires drastic changes. Computer-aided design systems are being actively developed. Together with marketing tools and forecasting technologies, they make it possible to move to automated management of the entire product life cycle on the basis of CALS technologies, which are becoming the dominant culture for managing the development of CALS production. Most industrialized countries resort to CALS (Continuous Acquisition and Life-Cycle Support) – the concept of using a single information space (the so-called externally integrated information environment) on the basis of international standards for uniform information interaction of all the participants of the product life cycle: developers, consumers, suppliers, operating and maintenance personnel.

CALS-technologies are intended to serve as a tool for integrating industrial automated systems into a single multifunctional system. The purpose of the integration of automated design and control systems is to increase the efficiency of developing and using complex equipment.

The efficiency increase can be seen in the following aspects:

1. The quality of products is improved as more information is taken into account while planning and making management decisions. Thus, the validity of decisions made in the automated enterprise management system will be higher if the managers and the corresponding programs of the automated enterprise management system have online access not only to the automated management system database, but also to the databases of other automated systems (computer-aided design systems, and automated systems for technological preparation of production). This complex approach enables managers to maximally optimize work plans, the content of applications, the distribution of duties, the allocation of finance, etc.

It should be noted that online access is not just the ability to read data from the database, but also the possibility to interpret information correctly, which means that all the data should comply with the protocols adopted in the automated control system. The same applies to other systems. For example, technological subsystems must necessarily perceive and correctly interpret data coming from computer-aided design subsystems. However, there can be certain difficulties associated with the fact that the main enterprise and related organizations work with different automated systems.

2. With automated systems products are designed and manufactured in less time and at a lower cost. The use of CALS technologies can significantly reduce the scope of designers' work, since the databases of network servers store the descriptions of previously completed

successful designs of spare parts, devices, equipment components, machines and systems. These descriptions are available to any user of the CALS technology. Accessibility is also ensured by the consistency of formats, methods, guidelines in different parts of the overall integrated system. In addition, there appears a greater scope for enterprise specializations, including virtual enterprise creation, which also contributes to costs reduction.

3. Operating costs are significantly reduced due to implementing integrated logistics support functions. The solution of problems of maintainability, integration of products into various systems and environments, adaptation to changing operating conditions is greatly facilitated. These benefits of data integration are achieved by using modern CALS technologies.

In connection with such revolutionary changes in both business and management, the requirements for managers are beginning to change – it can be said that vast digitalization of management is happening.

Companies are beginning to form a need for a CDO (Chief Data Officer) manager – a digital technologies director, a top manager who is responsible for the digital transformation of the company. The main function of a CDO manager is to make the company's digital transformation strategy a necessary element of management, which will serve as the foundation for all the other divisions.

The responsibilities of a digital top manager are different from those of the company's executive. Here they are in more detail:

1. Developing a monetization strategy for digital markets: a CDO manager is supposed to be well aware of customer needs in order to determine which products and services will be in demand not only at the moment, but also in the foreseeable future.

2. Preparing a long-term innovation strategy: to do this, it is important to understand the nuances of new markets, follow the trends, but at the same time look for solutions outside the usual framework. One of the key skills of CDOs is creativity and out-of-the-box thinking.

3. Developing a new corporate culture with a focus on transformation: the manager should be respected by the team, constantly interact with specialists, develop teamwork skills and staff cohesion. It is necessary to overcome employees' resistance to change by creating a team and including the most active people in it. A CDO must work hard on team cohesion and help employees overcome their resistance to change.

4. Improving efficiency mostly through automation and integration of big data. In the digital economy companies' success greatly depends on how effectively and efficiently they accept, process, use and store information.

CONCLUSION

Thus, the following conclusions can be made:

Currently, there is a transition to digital economy or the sixth technological order happening. Changes are already noticeable in such industries as biotechnology, nanotechnology, artificial intelligence systems, global information networks and integrated high-speed transport systems.

Flexible automation of production is being actively developed. The new working methods require a qualitatively new management system, the so-called digital management based on the use of CALS technologies. Also, there is a growing need for CDO (Chief Data Officer) managers – digital directors responsible for the digital transformation of a company. People occupying such a position are supposed to have qualitatively new digital skills in company management.

Reference

Order of the Government of the Russian Federation dated July 28, 2017, No. 1632-p "Digital economy of the Russian Federation", electronic source: http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf

A.G. Makushkin, E.A. Osochenko. Atlas of cross-cutting technologies of the digital economy of Russia — Moscow: JSC "Granatom", 2019.

G.I Kurcheeva, A.A. Athletdinova, G.A. Klochkov. Management in digital economy: textbook — Novosibirsk: Publishing house of NSTU, 2018.

G. Sheve, S. Huzig, G. Gumerova, E. Shaimiev. Management of the digital economy. Management 4.0.: monograph — Moscow: KNORUS, 2019.