

UDC 336.3

**Bondarenko S.M.,**  
Doctor of Economics, Associate Professor  
Kyiv National University  
Technologies and Design, Kyiv, Ukraine

## **MANAGEMENT OF QUALITY AT ENTERPRISES IN THE CONTEXT OF INDUSTRY 4.0**

Sustainable development and winning the competition in the context of globalisation and the international division of labour can only be ensured by enterprises that systematically manage the quality of business processes and products, which allows them to produce high-quality, environmentally friendly products in an ethical manner. The transition of enterprises and organisations to sustainable development is a requirement of the times. The processes of ensuring the high quality of the company's products and greening production play a crucial role in the sustainable development of enterprises, which should be considered in the context of Industry 4.0 technologies, which are increasingly becoming part of modern business.

Many scholars, including O. Livinsky, V. Savenkov, S. Palchyk, O. Chertkov [2], M. Hammar [4], R. Tricker [5], and others, have devoted their works to the development methodological foundations for quality management at enterprises.

Industry 4.0 is characterised by fully automated production facilities, where all processes are managed in real time and in response to changing external conditions. Industry 4.0 enterprises manufacture products in accordance with the requirements of individual customers, optimising spendings and production costs.

In the 21st century, robotics has become an integral part of building a successful business. With the advent of software robots, business processes have begun to transform. Automation and robotics are growing in many industries and are rapidly being introduced into our lives. The future, in which robots will replace humans in most technological processes, is near. Today, robotisation of routine manual processes is being implemented in many areas. Robotics and automation

dramatically improve the quality of business processes. Industry 4.0 has led to the emergence of Quality 4.0, a combination of comprehensive quality management and the concept of sustainable development, which is based on the triune nature of the economic, environmental and social spheres. The constituent elements of Quality 4.0 are comprehensive quality management in the context of sustainable development, a quality management system, greening of production and greening of quality.

Quality improvement in Industry 4.0 is ensured by eliminating the human factor from the production process. Humans tend to make mistakes, but robots do not. In addition, robotisation reduces the variability of business processes, which leads to improved quality, reduced costs and losses for the enterprise by reducing the number of defects, the cost of their processing or disposal.

Robotization of production made it possible to distinguish the normal course of the production process from the abnormal, which leads to the prevention of the production of defective products. At the same time, the number of employees is reduced, which leads to an increase in labour productivity. An important area of robotics is the computer-aided design and calculation (CAD) system, which is designed to automate the technological process of product design, resulting in a set of design documentation sufficient for the manufacture and further operation of the design object. The system is implemented on the basis of special software, automated databases, and a wide range of peripheral devices.

One of the types of future digital factories is consumer-oriented enterprises that have established mass production of consumer products. In this case, rapid response to changes in consumer preferences and the use of product demand forecasting based on simulation modeling and big data are widely used. Consumers have the opportunity to design products based on their own needs and preferences. This digital factory model is promising for use by companies that manufacture consumer products.

Thus, Industry 4.0, which is characterised by the development of information and communication technologies, automation and robotisation of business processes, leads to the emergence of Quality 4.0 – a combination of comprehensive quality management and the concept of sustainable development. Automation and robotisation of business processes at the enterprise leads to a reduction in the variability of business processes, automatic detection of anomalies in the production process, elimination of the human factor, reduction of costs and losses of the enterprise by reducing the number of defects, costs of their processing or disposal.

### **Literature**

1. Бондаренко С.М., Касич А.О. Використання концепції загального управління якістю (TQM) в органах місцевого самоврядування. *Державне управління: удосконалення та розвиток*. 2017. № 2. URL: <http://www.dy.nayka.com.ua/?op=1&z=1029>
2. Лівінський О.М., Савенков В.І., Пальчик С.П., Чертков О.Ю. Менеджмент якості в будівництві і геном ділової досконалості організації. Київ: Центр учбової літератури, 2018. 232 с.
3. Kasych A., Horak J., Glukhova V., Bondarenko S. The Impact of Intellectual Capital on Innovation Activity of Companies. *Quality Access to Success*, Vol. 22, No. 182 - June 2021, pp. 3-9. [https://www.calitatea.ro/assets/arhiva/2021/QAS\\_Vol.22\\_No.182\\_Jun.2021.pdf](https://www.calitatea.ro/assets/arhiva/2021/QAS_Vol.22_No.182_Jun.2021.pdf)
4. Tricker R. (2020) *Quality management systems. A Practical Guide to Standards implementation*. Routledge. Taylor and Francis Group. London and New York. 259 p.
5. Mark Hammar (2021) *Quality Management System: What is it?* URL: <https://advisera.com/9001academy/knowledgebase/quality-management-system-what-is-it/>.