

## THE USE OF TECHNOLOGIES IN DIFFERENT FORMS MANAGEMENT

Inna BALAHUROVSKA

Joint Doctoral School, Department of Applied Social Sciences, Faculty of Organization and Management,  
Silesian University of Technology; ibalahurovska@polsl.pl, ORCID: 0000-0003-3642-9506

**Purpose:** This article aims to investigate the necessity and importance of using technology – artificial intelligence in modern management forms, such as information management, innovation management, project management, knowledge management, quality management, and HR management.

**Design/methodology/approach:** The research method used in the article is an analysis scientific works, which describe the features of various forms of management in organizations. The research procedure included a review of world scientific literature, methodological analysis, identification of consistent connections between the two main structural parts of the researched question, and deductive reasoning.

**Findings:** The article examines the issue of the need to use artificial intelligence in management to increase the organization's effectiveness. The analysis of the characteristics of six modern forms of management in organizations showed how exactly artificial intelligence could improve the activity of the organizational system. The work describes the positive aspects and benefits of using key components of artificial intelligence in the manager's management activities.

**Research limitations/implications:** Our proposals for future research are to conduct research in organizations with different degrees of technological development to identify the dependence on the efficiency of activities and the level of technology provision of organizations.

**Practical implications:** Modern technological development requires every manager to implement technologies in the managed organization. Analysis of the need to use artificial intelligence in various management forms to improve the organization's efficiency is important for managers striving for high financial results in their activities.

**Social implications:** Implementation and use of technologies in organizations ensure their stable development. Developed organizations form a strong economy that provides people with a high standard of living.

**Originality/value:** The study results indicate the importance of studying issues related to implementing and developing technological processes in the organization. The analysis of the characteristics of the forms of management and their connection with the key components of artificial intelligence prove the necessity of its use in management to achieve the organization's financial stability.

**Keywords:** management, technology, artificial intelligence.

**Category of the paper:** Research paper.

## 1. Introduction

Effective management of the organization is a key factor in achieving high economic results and forming the competitiveness of the organizational system. This type of management is only possible with a manager who strives for the development of the enterprise. The role of a manager in an organization is specific and critical. An effective leader influences the organization, which generally consists of a social and technological component, in such a way that the implementation of the mission of the managed system is fully fulfilled.

Today, technology in management is necessary to perform many management functions. This necessity is connected with the development of the modern world, which can only do by using various technologies, including artificial intelligence.

## 2. Results

The use of technology by people is an integral part of everyday activities in any sphere of social life. The large amount of information surrounding each of us requires rapid processing and systematization for high productivity in regular and professional life. The technological orientation of organizations is necessary for the formation of high economic results and competitiveness of the organizational system.

There is a science of information technologies for collecting, storing, processing, and transmitting information, and information is the lifeblood of complex industrial societies, and its importance is increasing (Forester, 1985). Information is a necessary tool that ensures the development of society in various ways, it is a source of the latest knowledge for people and creates conditions for the formation of education in the community. It is information-savvy people who can become the basis of successful organizations for developing the economy in any country.

The effective managerial activity of managers in organizations is a key process that ensures the effectiveness of the business entity (Kuzior et al., 2021). One of the manager's main tasks is to manage the organization's technological development. On the other hand, some scientists equate the management process with technology (Bloom et al., 2017), a rational, innovative, and effective strategy.

Artificial intelligence and cognitive technologies have already entered the lexicon of the world of science, business, and technology (Kuzior et al., 2022). Thanks to artificial intelligence, various opportunities facilitate employees' work in many areas of activity. A specific task of artificial intelligence is to make certain decisions in managerial activities

(Kuzior et al., 2019, 2020) since the level of success of the organization depends on the effectiveness of the work of managers.

There are a large number of directions and forms of management. In the proposed work, we will consider six management forms where artificial intelligence as technology plays a significant and productive role - information management, innovation management, project management, knowledge management, quality management, and HR management.

Table 1 shows the characteristics of each proposed management form for a more accurate understanding of the need to use artificial intelligence and cognitive technologies in these management areas.

**Table 1.**

*Characteristics of information management, innovation management, project management, knowledge management, quality management, and HR management*

<b>№</b>	<b>Management</b>	<b>Characteristic</b>
1.	Information management (Reitz, 2004)	The skillful exercise of control over the acquisition, organization, storage, security, retrieval, and dissemination of the information resources essential to the successful operation of a business, agency, organization, or institution, including documentation, records management, and technical infrastructure.
2.	Innovation management (Birkinshaw et al., 2005)	Management innovation involves the introduction of novelty in an established organization, and as such it represents a particular form of organizational change.
3.	Project management (Munns et al., 1996)	The function of project management includes defining the requirement of work, establishing the extent of work, allocating the resources required, planning the execution of the work, monitoring the progress of the work and adjusting deviations from the plan.
4.	Knowledge management (Quintas et al., 1997)	Knowledge management is the process of continually managing knowledge of all kinds to meet existing and emerging needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities.
5.	Quality management (Dean et al., 1994)	A philosophy or an approach to management that can be characterized by its principles, practices, and techniques. Its three principles are customer focus, continuous improvement, and teamwork.
6.	HR management (Opatha, 2021)	HRM is the adoption of certain functions and activities for utilizing employees efficiently and effectively in an organization to achieve its goals which include satisfying the key stakeholders to the possible extent and contributing positively to the natural environment. It involves formulation, implementation, and on-going maintenance of strategies, policies, procedures, rules, practices and systems of managing employees strategically, participatorily, and sustainably.

Source: constructed by authors.

As seen from Table 1, management in the described areas of activity, such as information, innovation, knowledge, quality, and human resources, ensures organizations' development and high economic performance.

Let's consider the effectiveness of using artificial intelligence in the proposed forms of management of organizations to solve certain tactical and strategic tasks facing the manager.

1. A large amount of information surrounding modern people requires the ability to use and process it. The sources from which data comes are diverse, and there is a need for their systematization and some filtering for reasonable consumption.

Artificial intelligence in information management ensures the performance of decision-making exploration and intelligent information support by mediating data with knowledge and base resources (Wiederhold, 1992).

Information management in organizations has the following features:

- information should be considered a resource that needs proper management, like money, human resources, and materials,
  - at the most superficial level, information management involves the planning and coordination (if not direct control or use) of the following: information skills, information technology, information sources, and services,
  - information management requires careful "observation" of new developments that can contribute to better management of information resources,
  - information management requires understanding the patterns of information flow within the organization and then requires systematic means of displaying and monitoring such flows (Rao, 1999) it can be stated that the use of artificial intelligence in this form of management ensures the effectiveness of the implementation of such management tasks.
2. The second example is artificial intelligence's effective use in innovative management. Potential areas of application of AI in the innovation process:
- development of ideas by overcoming the limitations of information processing. An AI system can identify and evaluate more information, which can then be used to develop insights,
  - generating ideas by overcoming the limitations of information processing. An artificial intelligence system can recognize more problems, opportunities, and threats that can be used to create new ideas,
  - development of ideas by overcoming the local search routine. An AI system can identify and evaluate more creative/exploratory ideas,
  - generating ideas by overcoming local search routines. An artificial intelligence system can recognize and create more creative/research problems, opportunities, and threats to generate new ideas (Haefner et al., 2021).

Since ideas are a key component of the innovative field of activity, simplifying and improving management tasks related to their generation and processing with the help of artificial intelligence indicate the need to use technologies in this management direction. However, the ethical context of innovation management should always be kept in mind (Kuzior et al., 2019) and how they serve the Sustainable Development Goals (Kuzior et al., 2022).

3. The third example is using artificial intelligence in project management. AI is useful for decision-making, speech and language recognition, learning new project ideas, planning, and problem-solving (Dacre et al., 2022). Project activity and its management require a detailed information study of the scope of implementation, the target audience, the project's expected results, effective organization, planning, and control over the

performance of the project program. The use of artificial intelligence tools ensures the effectiveness of these management tasks.

4. In looking at ways for sharing knowledge, transforming individual knowledge into collective, organizational knowledge, and reincarnating organizations into “knowledge organizations”, the field of artificial intelligence (AI) can help push these basic tenets of knowledge management (Liebowitz, 2001).

Knowledge management in the organization is necessary for achieving high results in the organization's activities and requires the manager's attention to form effective communication with the staff and team members among themselves. Such a tendency is connected with people being the bearers of knowledge.

The use of artificial intelligence in knowledge management occupies a special place because key element of knowledge management is knowledge sharing within a given environment or community (Kaniki et al., 2013). That is, the manager must consider that human resource - knowledge and its use can be used more effectively with the help of specific technological processing.

5. A high level of development of quality management in the organization is the manager's task, which ensures the enterprise's competitiveness and financial stability (Wolniak, 2019). The manager's focus on developing quality management indicates his high level of professionalism and the effectiveness of management activities.

Artificial intelligence in quality management concerns the following components of the organization (Carvalho et al., 2021):

- management commitment, i.e., the use of artificial intelligence ensures improvement of the manager's performance of obligations,
  - employee involvement, increasing the level of this indicator in the organization depends on the use of technologies to optimize the working conditions of employees,
  - information and analysis, information processing, and its analysis are necessary components of improving the quality of services or goods produced in organizations. Artificial intelligence always aims to increase the efficiency of working with these components.
6. The sixth proposed example is using artificial intelligence in personnel management. The role of artificial intelligence in human resources management: personnel selection, verification and interview process, reduction of administrative burden, selection, reduction of discrimination, improvement of efficiency, and enrichment of training at the workplace (Yawalkar, 2019).

It is this understanding of the need to use artificial intelligence that identifies the presence of a team in organizations that is constantly developing and is aimed at fulfilling the tasks set by the manager for the realization of the organization's mission.

Key Components of AI: Machine learning, Deep learning, Neural network, Cognitive computing, Natural language processing, Computer vision (Kanade, 2022). Let's consider how these key components relate to the six forms of management proposed for analysis in work. Table 2 shows the results of this study.

**Table 2.**

*The relationship between key components of artificial intelligence and forms of management*

Forms of management	Key Components of AI					
	Machine learning	Deep learning	Neural network	Cognitive computing	Natural language processing	Computer vision
Information management	+	+	+	+	+	+
Innovation management	+	+	+	+	+	+
Project management	+	+	+	+	+	+
Knowledge management	+	+	+	+	+	+
Quality management	+	+	+	+	+	+
HR management	+	+	+	+	+	+

Source: constructed by authors.

As can be seen from Table 2, the key components of artificial intelligence can be applied in Information Management, Innovation Management, Project Management, Knowledge Management, Quality Management, HR Management to increase efficiency in management processes.

So, despite different opinions (Baker-Brunnbauer, 2020; Bawack et al., 2021; Zhang et al., 2021; Kuzior et al., 2022) regarding the use of artificial intelligence, the effectiveness of technology in management activities has a positive effect on the results of organizations. Improving processes through the use of artificial intelligence in the management of information, innovation, projects, knowledge, quality, and personnel positively affects the development of organizations and their financial results.

### 3. Conclusions

Modern technological development of people's various life processes ensures positive societal transformations. As the main function in organizational systems, management requires the manager to provide technology to enterprises. Having considered six forms of management that ensure the development of organizations - information management, innovation management, project management, knowledge management, quality management, and HR management, we can conclude that their common and main feature is the availability of a large amount of information. This information is an important resource for development in the organizational system and requires processing, systematization, and specific filtering to achieve certain positive results in management activities.

Artificial intelligence, as a technology, performs these tasks and improves the organization's work. Six key components of artificial intelligence able to positively influence the effective implementation of the forms of management proposed in work.

## References

1. Baker-Brunnbauer, J. (2020). Management perspective of ethics in artificial intelligence. *AI and Ethics*. <https://doi.org/10.1007/s43681-020-00022-3>.
2. Bawack, R.E., Fosso Wamba, S., Carillo, K.D.A. (2021). A framework for understanding artificial intelligence research: insights from practice. *Journal of Enterprise Information Management*, 34(2), 645-678. <https://doi.org/10.1108/jeim-07-2020-0284>.
3. Birkinshaw, J., Mol, M., Hamel, G. (2005). Management Innovation. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1306981>.
4. Bloom, N., Sadun, R., Reenen, J. (2016). Management as a Technology? *NBER Working Paper No. 22327*.
5. Carvalho, A.V., Enrique, D.V., Chouchenea, Charrua-Santosa, F. (2021). Quality 4.0: An Overview. *Procedia Computer Science*, 181, 341-346.
6. Dacre, N., Kockum, F. (2022) Artificial intelligence in project management. *Association for Project Management*, P.28.
7. Dean, J., Bowen, D. (1994). Managing theory and total quality: improving research and practice through theory development. *Academy of Management Review* 19(3), 392-418.
8. Forester, T. (1985). *The Information Technology Revolution*. Oxford: Blackwell.
9. Haefner, N., Wincent, J., Parida, V., Gassmann, O. (2021). Artificial intelligence and innovation management: A review, framework, and research agenda☆. *Technological Forecasting and Social Change*, 162, 120392. <https://doi.org/10.1016/j.techfore.2020.120392>.
10. Kanade, V. (2022). What Is Artificial Intelligence (AI)? Definition, Types, Goals, Challenges, and Trends in 2022. <https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-ai/>.
11. Kaniki, A.M., Kutu Mphahlele, M.E. (2013). Indigenous knowledge for the benefit of all: can knowledge management principles be used effectively? *South African Journal of Libraries and Information Science*, 68(1). <https://doi.org/10.7553/68-1-753>.
12. Kuzior, A. (2021). Innovation management as a tool for sustainable development and improving the quality of life of societies. In: K.S. Soliman (ed.), *Innovation management and sustainable economic development in the era of global pandemic* (pp. 211-216). International Business Information Management Association.

13. Kuzior, A., Kwilinski, A. (2022). Cognitive Technologies and Artificial Intelligence in Social Perception. *Management Systems in Production Engineering*, 30(2), 109-115. <https://doi.org/10.2478/mspe-2022-0014>.
14. Kuzior, A., Kettler, K., Rąb, Ł. (2022). Digitalization of Work and Human Resources Processes as a Way to Create a Sustainable and Ethical Organization. *Energies*, 15(1), 172.
15. Kuzior, A., Kwilinski, A., Tkachenko, V. (2019). Sustainable development of organizations based on the combinatorial model of artificial intelligence. *Entrepreneurship and Sustainability Issues*, 7(2), 1353-1376.
16. Kuzior, A., Pidorycheva, I., Liashenko, V., Shevtsova, H. Shvets, N. (2022). Assessment of national innovation ecosystems of the EU countries and Ukraine in the interests of their sustainable development. *Sustainability*, 14(14), 8487.
17. Kuzior, A., Zozuľak, J. (2019). Adaptation of the idea of phronesis in contemporary approach to innovation. *Management Systems in Production Engineering*, 27(2), 84-87.
18. Kwilinski, A., Kuzior, A. (2020). Cognitive technologies in the management and formation of directions of the priority development of industrial enterprises. *Management Systems in Production Engineering*, 28(2), 133-138.
19. Liebowitz, J. (2001). Knowledge management and its link to artificial intelligence. *Expert Systems with Applications*, 20(1), 1-6. [https://doi.org/10.1016/s0957-4174\(00\)00044-0](https://doi.org/10.1016/s0957-4174(00)00044-0).
20. Łukaszczyk, Z., Kuzior, A. (2021). *Komunikacja w zarządzaniu. Dialog czy konfrontacja? Między teorią a praktyką*. Gliwice: Wydawnictwo Politechniki Śląskiej.
21. Munns, A., Bjeirmi, B. (1996). The role of project management in achieving project success. *International Journal of Project Management*, 14(2), 81-87. [https://doi.org/10.1016/0263-7863\(95\)00057-7](https://doi.org/10.1016/0263-7863(95)00057-7).
22. Opatha, H.H.D.N.P. (2021). A Simplified Study of Definitions of Human Resource Management. *Sri Lankan Journal of Human Resource Management*, 11(1), 15. <https://doi.org/10.4038/sljhrm.v11i1.5672>.
23. Quintas, P., Lefere, P., Jones, G. (1997). Knowledge management: a strategic agenda. *Long Range Planning*, 30(3), 322-391. [https://doi.org/10.1016/s0024-6301\(97\)00018-6](https://doi.org/10.1016/s0024-6301(97)00018-6).
24. Rao, R. (1999). Information Management: Scope, Definition, Challenges & Issues. *DRTC Workshop on Information Management*, P.1-16.
25. Reitz, J.M. (2004). *Dictionary for library and information science*. Libraries Unlimited.
26. Wiederhold, G. (1992). The roles of artificial intelligence in information systems. *Journal of Intelligent Information Systems*, 1(1), 35-55. <https://doi.org/10.1007/bf01006413>.
27. Wolniak, R. (2019). The Level of Maturity of Quality Management Systems in Poland—Results of Empirical Research. *Sustainability*, 11(15), 4239. <https://doi.org/10.3390/su11154239>.



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28. Yawalkar, V. (2019) A Study of Artificial Intelligence and its role in Human Resource Management. [https://www.researchgate.net/publication/331596981\\_A\\_Study\\_of\\_Artificial\\_Intelligence\\_and\\_its\\_role\\_in\\_Human\\_Resource\\_Management](https://www.researchgate.net/publication/331596981_A_Study_of_Artificial_Intelligence_and_its_role_in_Human_Resource_Management).
  29. Zhang, C., Lu, Y. (2021). Study on artificial intelligence: The state of the art and future prospects. *Journal of Industrial Information Integration*, 23, 100224. <https://doi.org/10.1016/j.jii.2021.100224>.