# INTELLECTUAL PROPERTY AND ARTIFICIAL INTELLIGENCE

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**Abstarct.** Innovation projects are projects because of which innovations are created and commercialized - fundamentally new products (services, technologies) that are created on the basis of modern achievements of science, technology and technology. Innovative projects are characterized by: significant volumes of R&D, significant uncertainty of the work performed in terms of timing, type and cost, the presence of high risks, and significant costs. They have a significant gain if they are successfully implemented and large losses in case of unsuccessful implementation.

**Keywords**. intellectual property, artificial intelligence, digital economy, entrepreneurship.

**Introduction**. For the development of IP objects in the innovative processes of high-tech enterprises, the use of artificial intelligence represents additional results of intellectual activity that can independently create innovative products. The difficulty in this issue lies in identifying copyright - who is the author: the user of the artificial intelligence program or the program itself. IP includes rights relating to all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields. It follows that systems, technologies and objects of artificial intelligence are classified as types of IP objects depending on the area (sphere) of their use. The emergence of the concept of “artificial intelligence” dates back to 1956. From now until 2020, according to WIPO, 340 thousand patent applications for inventions in the field of artificial intelligence were filed worldwide (about 5,000 applications annually). The largest number of applications were received in the USA (more than 150,000) and China (more than 135,000), accounting for 85% of all applications submitted. Recognized leaders in filing applications in the field of artificial intelligence are the following organizations: IBM, Samsung, Tochiba, Microsoft.

Currently, artificial intelligence programs have reached a level at which they can successfully compete with humans in the field of generating IS results; in addition, the industrial generation of IS results is impossible without the use of modern electronic computing systems.

Before analyzing the use of IS results created by artificial intelligence, it is necessary to define its concept. To date, there is no clear definition of the category “artificial intelligence”. All available definitions are divided into two groups:

- definitions representing the scope of scientific knowledge;
- definitions representing the properties and characteristics of specific systems or devices.

The use of artificial intelligence allows high-tech industry enterprises to process large volumes of information generated in their production, operations and ongoing projects, as well as use this data in accepted decisions. Using the capabilities of artificial intelligence, enterprises can form and optimize business processes, ranging from production of products to their sale to consumers. In addition, the use of artificial intelligence helps enterprises manage product quality, optimize logistics chains and perform preventative maintenance and repairs equipment.

Recently, artificial intelligence has reached a new level of possibilities for its use: from identifying and classifying images to recognizing reasoning and images. This progress has been driven by the increased impact of three factors: computing power, algorithms, and training data. For example: the increase in the accuracy of automatic image recognition has increased compared to 2012 from 85 to 95% (this figure for a person is 93%). An increase of 10% allows these algorithms to move from innovation to innovation, such as collecting orders in a warehouse for further transportation.

In 2022, AI-based decisions are "trained" on millions of image information data, 100 times more than in 2012. These solutions are supported by special chips for recognition and processing of graphical data images, which are executed more than 1000 times faster and 5–10 times more complex than in previous periods. Information costs in the field of artificial intelligence (creation, storage, calculation) are decreasing on average by 35% per year. In the near future, the use of artificial intelligence will be based on implementation tools that allow it to be used in a smarter, more intuitive and faster way.

High-tech industrial enterprises are moving even faster into the field of artificial intelligence, investing in R&D using it, as well as using the industrial Internet. To manage the efficiency of innovative assets and optimize innovative processes, analytics based on artificial intelligence are used, which increases production safety, and "smart" the software is used to plan innovation processes, adapting to changes in innovation in real time. Artificial intelligence systems form and provide new, higher levels of optimization of all industrial production, such as predictive preventive maintenance and increased product quality management.

In the era of "Industry 4.0" (IV industrial revolution), the leading positions in the world are held by those high-tech enterprises that have carried out a digital transformation of industrial production using artificial intelligence technologies, which provides them with a fundamentally new level of quality in their developed and manufactured products. The main role in this process is played by the use of advanced innovative technologies, primarily computer digital design and modeling of innovative processes, allowing industrial leader enterprises to develop and produce innovative competitive products of a new generation in all industries and types of economic activity in the shortest possible time.

In the global scientific community, significant contributions to the development of the study of artificial intelligence occurred in the mid-2000s. This situation is due to a number of factors:

- significant progress in productivity and reduction of processing time of information algorithms due to the development of deep learning technologies;
- significant growth in data of various types (text, images, map data, etc.);
- creation of technologies that provide virtually unlimited possibilities for accessing and storing data.

Due to the increasing complexity of technologies and processes for managing the production activities of an enterprise, caused by the increasing volume of processed and analyzed data, it is now practically impossible for an enterprise to operate effectively without the use of IS tools based on artificial intelligence - Industry 4.0. This toolkit includes industrial enterprise management automation systems: ERP, MES, SCADA; automated design systems: CAM, CAD, CAE, as well as PDM, PLM class systems, including automated process control systems - automated process control systems, virtual models of innovative processes - digital twins.

Artificial intelligence provides the opportunity to simulate various situations that arise during the production process and allows you to determine the most suitable scenarios for technological processes to get rid of force majeure and failures.

A digital twin represents a system of interconnected digital models of an object, process, product, the parameters of which can be controlled in a virtually organized environment. The results of virtual tests must correspond to the results of natural tests on a real object with an accuracy of ±5%. This artificial intelligence technology:

- relieves the manufacturer from carrying out lengthy and expensive tests on a real object;
- allows for faster redesign of the facility to meet newly emerging requirements;
- minimizes and eliminates a significant number of calculation errors (arising, among other things, due to the human factor);
- provides the opportunity to increase the level of localization production;
- reduces the dependence of domestic manufacturers on foreign technologies and products (import substitution) while meeting high requirements for technological, operational, and consumer indicators.

The structure of the digital twin of the project is a real diagram of the project with digitization of the main provisions and technologies for its implementation. At the input, requirements for project restrictions are formed, reflected in the form of certain parameters and restrictions formed during the development of the project.

The main type of restrictions are resource ones, including: technological, production, logistics, operational, financial (design for a “specific cost”), time (“design and specified deadlines”), environmental, etc. The information cascading block includes the necessary information data used in project, distributed by levels of information provision and consumers. After digital R&D is completed, a prototype is manufactured in virtual mode.

At the next stage, the virtual sample is tested to determine its compliance with the operating parameters, after which the stage of eliminating errors and correcting the prototype begins. The industrial production stage is carried out after the recommendations of the project to implementation.

Currently, digital twins are used in enterprise building models, technologies, and products. In addition to other qualities that increase the efficiency of innovation, the digital twin is “learnable”; during operation it acquires new qualities, becomes “smarter”, allows developers to supplement and optimize the project, accompanied by the addition of information databases, knowledge bases, and solution databases. In addition, the digital twin of the project allows you to identify and eliminate errors before the stage of industrial operation, eliminates the human factor from the project, and significantly reduces the time for the development and implementation of an innovative project.

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