

### **Раздел 3. «IT-технологии, энергетика, автоматизация и вычислительная техника»**

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#### **Логистика мен жабдықтау тізбегін басқаруда блокчейн технологиясын қолдану**

Мақалада логистика мен жабдықтау тізбегін басқаруда блокчейн технологияларын қолдану қарастырылады. Blockchain технологиясы деректердің ашықтығын, қауіпсіздігін және өзгермейтіндігін қамтамасыз етеді, бұл жеткізілім менеджментінің тиімділігін айтарлықтай арттырады. Орталықтандырылмаған транзакцияларды тіркеу жүйесі арқылы компаниялар тауарлардың нақты уақыттағы қозғалысын бақылай алады, алаяқтық тәуекелдерін азайтады және сапаны бақылау процесін жақсартады. Блокчейн ақылды келісімшарттар арқылы операцияларды автоматтандыруға ықпал етеді, бұл жеткізілім тізбегінің қатысушылары арасындағы өзара әрекеттесуді жеңілдетеді және операциялық шығындарды азайтады. Мақалада технологияны логистикалық процестерде қолданудың практикалық мысалдары, оның тәуекелдерді басқаруға әсері және осы саладағы одан әрі даму перспективалары талқыланады.

Түйін сөздер: блокчейн, логистика, жеткізу тізбегін басқару, ашықтық, деректер қауіпсіздігі, ақылды келісімшарттар, орталықтандырылмаған жүйе, автоматтандыру, бақылау

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#### **«Application of Blockchain Technologies in Logistics and Supply Chain Management»**

The article discusses the application of blockchain technologies in logistics and supply chain management. Blockchain technology provides transparency, security and immutability of data, which significantly increases the efficiency of supply chain management. Thanks to a decentralized transaction registration system, companies can track the movement of goods in real time, reduce the risk of fraud and improve the quality control process. Blockchain facilitates the automation of operations through smart contracts, which simplifies interaction between supply chain participants and reduces operating costs. The article discusses practical examples of the application of the technology in logistics processes, its impact on risk management and prospects for further development in this area.

*Key words:* blockchain, logistics, supply chain management, transparency, data security, smart contracts, decentralized system, automation, product tracking, risk mitigation, risk management.

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**Раздел 4**

**Экономика.  
Общеобразовательные,  
социально-  
гуманитарные и  
фундаментальные  
дисциплины**

#### **Раздел 4. «Экономика. Общеобразовательные, социально-гуманитарные и фундаментальные дисциплины»**

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##### **On the issue of the university patent strategy**

The expectations of universities from the patent system at the initial stage of its formation in Kazakhstan were largely associated with the prospects for obtaining additional income from the commercialization of a new type of asset - rights to the results of intellectual activity (RIA). Realizing the leading role of intellectual property in the search for new opportunities to increase competitiveness, enterprises and organizations strive to improve the processes of managing the commercialization of the results of creative activity. When it comes to the creation of intellectual property, universities have a lot of potential. Throughout the years, there have been notable obstacles to the efficient use of university-generated intellectual output, linked to both inadequate legal frameworks and a deficiency of managerial and organizational tools for the commercialization process. An asset that guarantees the university's involvement as a full-fledged participant in the rapidly evolving technology sector of the market is its patent portfolio. Developing a patent strategy based on the university's adopted intellectual property policy is necessary to manage the university's patent portfolio [1].

*Keywords:* strategy, patent portfolio, commercialization, university, industrial partner, outcomes of intellectual work, and intellectual property.

##### *Introduction*

Universities' implementation of intellectual property objects to reap financial benefits from their use has been further enhanced by the government's actions to strengthen the legislative framework [2].

The licensing of patents, trademarks, industrial designs, and copyright is how universities and other public research organizations in developed nations generate technology and other intellectual property.

Companies and other entities work to enhance the procedures for managing the commercialization of the products of creative endeavors because they recognize the vital role that intellectual property objects play in the pursuit of novel alternatives to boost competitiveness. Universities have a lot of potential when it comes to producing intellectual property. The practice of efficiently utilizing the output of university-generated intellectual activity has been severely constrained over the years, both by the inadequacies of the laws and by the absence of managerial and organizational tools for the commercialization process. The government's efforts to strengthen the legal environment have greatly sped up the processes by which colleges are implementing intellectual property objects in order to reap the financial benefits of their use.

Universities and other public research institutions in advanced economies create technology transfer and other forms of intellectual property through the licensing of industrial designs, patents, trademarks, and copyrights. Other than licensing patented research findings, international institutions can transfer technology in a number of methods, each with its own set of intellectual property management obligations. These include industry-sponsored research, consulting, publishing, and start-ups by university employees. It is also common practice to indirectly stimulate innovation activity at the local and regional levels by creating company incubators and research parks. These activities are desirable for universities because they can encourage the opening of innovative businesses and increase the number of jobs in the region [3].

Strategic management of intellectual property is important because a well-managed portfolio can yield significant benefits for universities, but it can only be successful if it is coordinated with other university development goals and policies. Intellectual property commercialization enables universities to make money from the sale or licensing of intellectual property. For instance, auditing university departments to find

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intellectual activity results with commercial potential, creating a strategy for intellectual property rights protection, locating industry partners willing to implement the results, and signing pertinent agreements are all required steps in the intellectual property management process at overseas universities [4].

##### *Main part*

With substantial research potential, universities can successfully carry out the process of commercializing intellectual property, which is essentially the conversion of research and development results into income-generating products. Universities can boost their competitiveness by using monopoly rights to intellectual property objects and attracting additional funds from their commercialization. To do this, they must carry out procedures for searching, evaluating (examination), and selecting innovations for financing, attracting funds, legally securing rights to future intellectual property (innovation), introducing innovation into production, and further modifying and supporting the intellectual product.

The goal of a university's intellectual property management is to accomplish strategic goals such promoting scientific and creative endeavors, monetizing the output of intellectual work, and developing intangible assets that boost a university's viability.

When it comes to intellectual property, a system of pecuniary incentives is one of the most popular methods for promoting scientific activity, although it is not always efficient. This is due to the fact that one of the unique features of intellectual property is the ability to protect the inventor's rights to their invention.

Foreign researchers' opinions on the disparities between industry and academic incentives for patenting and licensing vary significantly. Economic consequences that provide incentives for scientific discoveries and inventions serve as a foundation for patenting in industry. However, priority recognition is the dominant reward system within academic science norms. Being the first to find and publish a novel result is crucial to an academic scientist's career. As a result, it might be claimed that since the priority system already offers incentives for creative work, patenting is not necessary in academics.

The majority of academic research findings, according to the survey results, are not yet ready for direct commercial application. Since the additional research and development needed to commercialize scientific inventions is needlessly costly and risky, surveys also reveal that academic research outputs that are transferred to industry for commercialization have a failure rate of more than half. The majority of academic research projects are at the conceptual prototype or laboratory stage and require significant additional research and development before they can be developed into a commercially viable outcome [5].

Because publishing an invention in the public domain precludes its eventual patenting and commercial usage, the prospect of patenting is therefore essential for the commercialization of outcomes even though it does not encourage academic researchers. The outcomes of scientific research projects that are patent-protected are therefore far more desirable for commercialization. A number of domestic universities have successfully implemented measures to stimulate scientific and inventive activity, such as providing financial support for the patenting process and encouraging scientific and pedagogical staff to view intellectual property as a profitable product.

##### *Findings and their discussion*

A specific infrastructure of scientific activity makes it attainable for universities to engage in active, innovative activity in order to get the outcomes of intellectual activity and intellectual property management. The updated infrastructure, which was created with the idea that scientific activity should have the greatest possible impact, will be able to facilitate researcher-to-researcher contact, supply the information and organizational resources that are required, encourage research that is commissioned by business structures, secure funding for scientific advancements, and guarantee intellectual property management, including intellectual property protection.

A country's patent activity can be measured by looking at the number of registered patents and patent applications that its citizens and foreign residents have filed.

The most crucial measure of a country, business, or organization's efficacy is its patent activity, publications, and citation indices [6].

Absolute measures like the total number of patents granted, including to both domestic and foreign

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applicants, are used to describe the degree of inventive activity, the speed at which national scientific and technical accomplishments are disseminated, and the extent of the nation's technological dependence (Table 1).

Table 1

Details of security documents provided for industrial property items

Applications	2018	2019	2020	2021	2022	2023	2024	Share of applications in the total amount for 2024, %
Total	11	9	27	25	22	3	7	100
<i>Total number of applications filed for inventions</i>	8	8	20	16	13	-	6	72,7
Domestic applicants	8	8	20	16	13	-	6	72,7
Overseas applicants	0	0	0	0	0	0	0	0
<i>Applications for utility models filed, total</i>	3	1	7	9	9	3	1	27,3
Domestic applicants	3	1	7	9	9	3	1	27,3
Foreign applicants	0	0	0	0	0	0	0	0

According to the NAO «Karaganda Industrial University» website, data indicators for submitting applications for the national registration of industrial property objects and providing security papers showed an upward trend in 2024, similar to other years [7].

In 2024, the downward trend was reversed by the positive dynamics of filing applications for the issuance of security documents for inventions that took place in recent years. The level decreased by 7 units from 2022 to 6 units in 2024.

Furthermore, the National Patent Office received no applications for inventions in 2023. This indicates that the NAO «Karaganda Industrial University» saw a 25% decline in the overall patent activity in 2024 as compared to 2018. The total number of applications received for utility models in 2024 was 1 unit, which is almost three times lower than the same figure for 2023.

From the data in the table, it can be concluded that the main share of applications is for inventions. In recent years, work on foreign patenting of applications for inventions and utility models has intensified.

Table 2 provides data on foreign patenting of applications for inventions.

Table 2

Distribution of applications from national applicants for the issuance of protection documents for inventions, filed under the PCT procedure and in accordance with the EAPC, units

Application type	2020	2021	2022	2023	2024
Filed under the PCT procedure	0	0	0	0	0
Filed under the EAPC procedure	0	2	0	0	0

Two patents for inventions submitted under the EAPC procedure were obtained in 2021, as indicated by the data in table 2.

Data on overseas patenting of utility model applications is illustrated in table 3.

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Table 3

The distribution of national applicants' files for protection documents for utility models submitted in compliance with the EAPC and the PCT procedure, units Patent Classification (IPC)

Application type	2020	2021	2022	2023	2024
Filed under the PCT procedure	1	1	0	0	0
Filed under the EAPC procedure	0	0	0	0	0

Two patents for inventions submitted under the PCT method were obtained in 2020–2021, as indicated by the data in table 3.

Figure 1 illustrates the trends of invention and utility model patents received between 2018 and 2024.

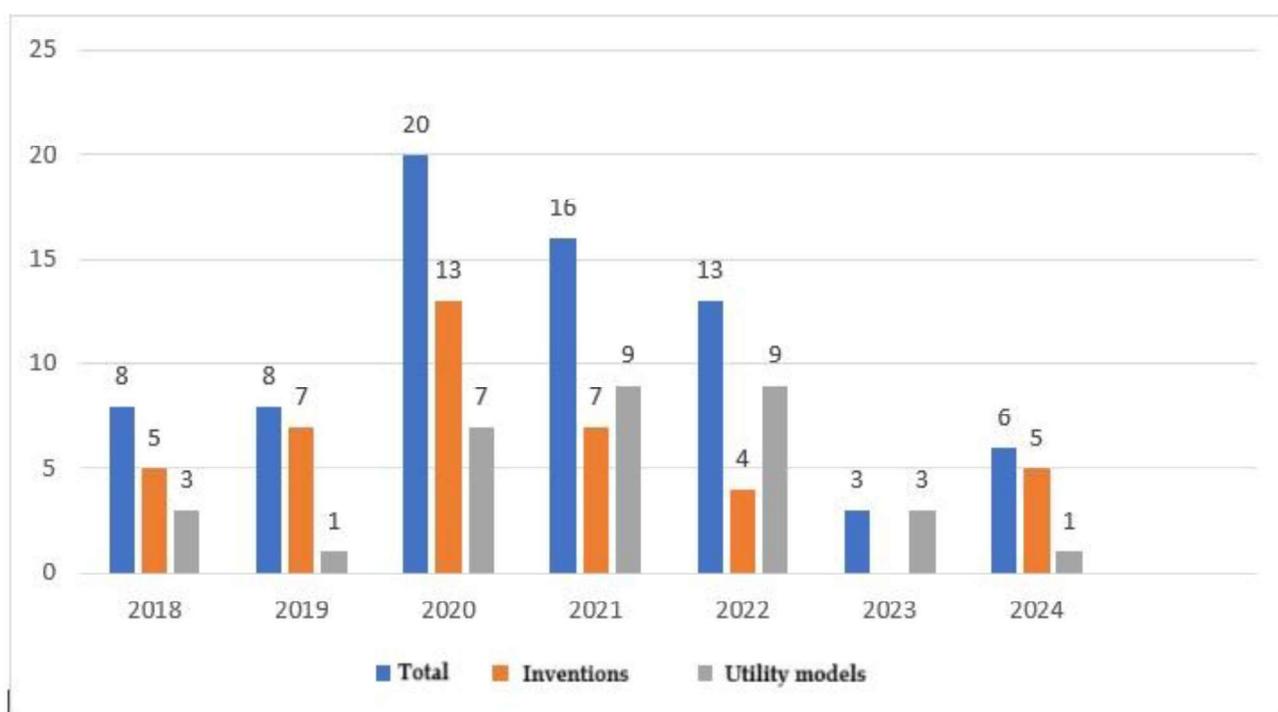


Figure 1 - Dynamics of received patents for inventions and utility models for the period 2018-2024

According to the analysis, the following sections issued the most protection documents for inventions between 2018 and 2024: «Chemistry and Metallurgy» (63, or 90.0%), «Construction and Mining» (five, or 7.14%), and «Various Technological Processes» (two, or 2.86%) (see figure 2).

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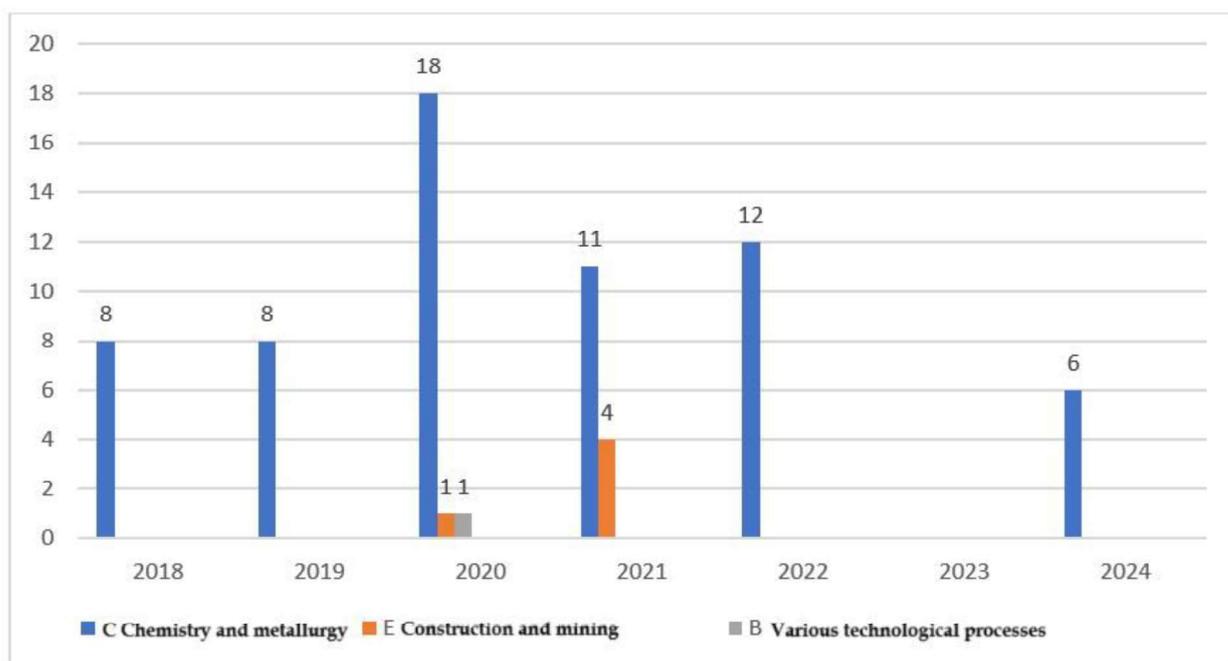


Figure 2 - Distribution of issued protection documents for inventions by sections of the International Patent Classification (IPC)

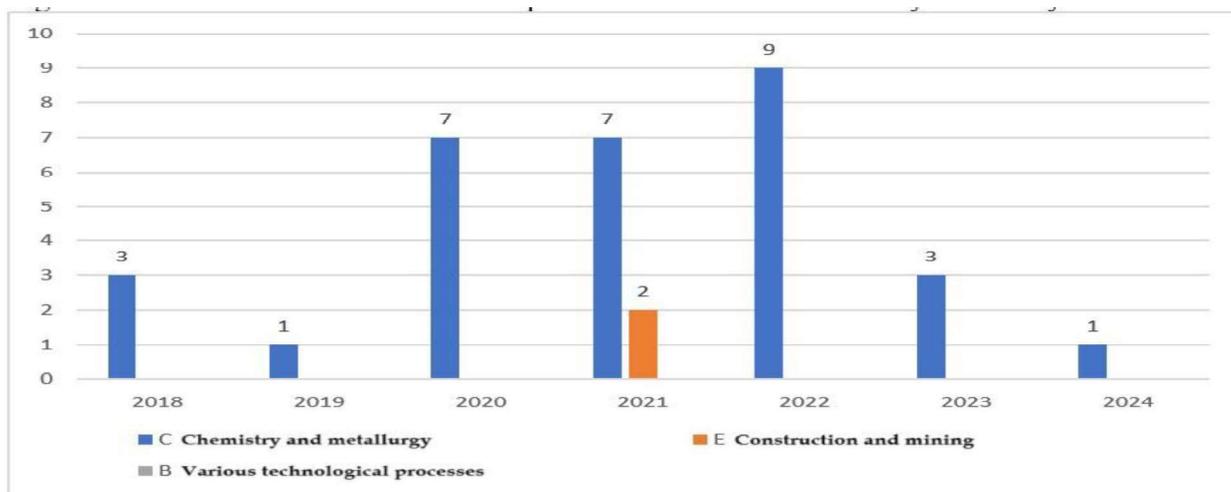


Figure 3 - Distribution of protection documents issued for utility models by IPC

According to the data, out of all the protection documents for inventions granted in this case, for 2018–2024, the utility model protection documents in the sections «Chemistry and Metallurgy» 31 (93,9%) and «Construction and Mining» 2 (6,1%) predominate.

*Conclusion*

The complexities of commercialization processes necessitate that university management use contemporary tools and techniques to make management decisions at different levels of management. This allows the internal mechanism of intellectual property management to be adjusted in a way that maximizes the return on intellectual activity. In contemporary colleges, the primary obstacle to technology transfer is the

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dearth of experts possessing the necessary skills. Contrary to popular belief, developers, inventors, and researchers currently handle commercialization difficulties directly.

The market potential of an invention cannot be accurately assessed by scientists who possess high scientific potential in their field and the ability to innovate, but lack market analysis tools, economic knowledge, and the necessary understanding of patent legislation [8]. The separation of functions for the production of intellectual property objects and the commercialization of the outcomes of intellectual activity will be the solution to this problem.

##### *Measures and results of activating inventive activity*

Measures	Results
The university's reimbursement of invention patent fees	Increase in the number of applications
Selection of patents to be paid for on a competitive basis	Reduction of costs associated with discoveries that show no promise for commercialization and leveraging the rights to an industrial property item to generate revenue
Involvement of inventors in the marketing of intellectual property. Payments made to inventors one-time and their involvement in the revenue generated by the use of intellectual property objects	Increase in the number of promising developments
Organization of university departments' ratings (a scientist's personal rating) according to the number of invention patents they have obtained	The initiative of divisions in the sphere of commercializing innovative developments, the framework of objective criteria for competitive patenting

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#### **Университеттің патенттік стратегиясы туралы сұраққа**

Университеттердің патенттік жүйеден Қазақстанда оны қалыптастырудың бастапқы кезеңіндегі күтулері көбінесе активтердің жаңа түрін — зияткерлік қызмет нәтижелеріне құқықтарды коммерцияландырудан қосымша табыс алу перспективаларымен байланысты болды. Бәсекеге қабілеттілікті арттырудың жаңа мүмкіндіктерін іздеудегі зияткерлік меншік объектілерінің жетекші рөлін түсіне отырып, кәсіпорындар мен ұйымдар шығармашылық қызмет нәтижелерін коммерцияландыруды басқару процестерін жетілдіруге ұмтылады. Университеттер зияткерлік меншік объектілерін құру саласында айтарлықтай әлеуетке ие. Бірнеше жылдар бойы жоғары оқу орындары құрған зияткерлік қызмет нәтижелерін тиімді пайдалану тәжірибесінде заңнаманың жетілмегендігімен де,