

COMMERCIALIZATION OF THE RESULTS OF INNOVATIVE ACTIVITY OF JOINT UKRAINIAN-CHINESE ENTERPRISES

<http://doi.org>

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Research objective. The objective of this study is to examine the current state of the establishment of joint Ukrainian-Chinese enterprises and to analyse the prospects for the formation of business associations engaged in commercialization of the results of innovative activities in Ukraine and China on a mutually beneficial basis.

Research methodology. In the paper, the authors examined the innovation process in Ukraine and China in order to substantiate the feasibility of establishing joint Ukrainian-Chinese companies engaged in the commercialization of innovative solutions. The review of publications demonstrated China's significant achievements and global leadership in innovation. The paper describes a set of prerequisites that led to China's innovative leadership. The considered prerequisites and the chronology of the legislative regulation of the Ukrainian-Chinese cooperation in the field of innovation activity allow to state that there are prospects of establishing joint Chinese-Ukrainian enterprises. A review of the development of the Ukrainian-Chinese partnership in historical retrospect shows the advantages and disadvantages involved in the establishment of joint Ukrainian-Chinese enterprises. In line with the findings of the study, the prospects for the organization of innovative joint ventures are outlined. The dominance of the Chinese system of state control and management of economic development over the private sector is emphasized.

Conclusions. The authors conclude that China intends to use planned economic expansion to conquer foreign markets and subjugate all continents to its sphere of influence. The creation of Sino-foreign joint ventures also fits into the scheme of the superiority of the Chinese economic model over the Western model of economic relations. Ukrainian-Chinese joint ventures are also influenced by China's global long-term development program. Examples of Chinese investments in the Ukrainian economy and the placement of Ukrainian capital in China confirm the above observations. In each of the cited cases, the advantage of the Chinese influence over the partner party can be traced. It is relevant that China achieves this state of affairs by keeping the levers of influence in the hands of the state at all levels of state management of the country's economy.

Practical implications. The results of this study are of interest to representatives of business structures that are interested in implementing projects on commercialization of the results of innovation activities. The authors conclude that in the process of creating joint ventures one should look for the “do no harm” sector, which maintains a level playing field for partners.

Originality/value. This study highlights the similarities and differences in approaches to creating innovative joint ventures in Ukraine and China. The authors emphasize that China systematically

defends the interests of both state-owned and private Chinese companies in foreign and domestic markets. In the domestic market, foreign investors are regulated, while in the foreign market, this is achieved through a set of measures that include financial instruments, intergovernmental agreements, and many other effective mechanisms to ensure success. China benefits most from international globalization and free trade.

Key words: innovation; joint ventures; commercialization; Ukrainian-Chinese partnership; globalization.

Paper type: Research paper.

Formulation of the problem

Commercialization of innovative developments is quite an attractive sphere for business structures, but such activity is accompanied by significant risks. On the one hand, innovative products are in high demand among end users. On the other hand, the commercialization of innovative developments is associated with significant costs, which are covered, as a rule, when launching such innovation in serial production.

Analysis of recent studies and publications

The issue of commercialization of the results of innovation activity has become particularly relevant in the period of the post-industrial economy. The study of the activities of business entities in particular conditions of enterprise development and the role of higher education institutions in the formation of post-industrial society are devoted to the works of scientists such as C. Clark, A. A. Chukhno, A. E. Kuzmin [1], M. Yastrubsky [2], Y. V. Makohon [3] and others. In their papers, the authors reveal the importance of interaction between the sector of knowledge production and the sector of knowledge consumption. The development of enterprises in a post-industrial economy has its own characteristics. First of all, it concerns the attraction of investments for the implementation of innovations.

Since the latest technologies require significant costs for their implementation, it is, therefore, relevant to search for forms of interaction between different sectors of the scientific and educational sphere and business structures for commercialization of innovative developments. One such form of interaction is the creation of joint ventures engaged in the implementation of innovations in the real economy.

Formulating hypotheses and setting goals

The purpose of the authors was to investigate the issue of commercialization of innovations at this stage of transition to a post-industrial economy and to propose optimal ways to achieve the goals.

Research methods

In the course of writing this paper, the authors used empirical methods to compare the data obtained as a result of observing the patterns of innovative development of the economies of the world's leading countries. From the list of complex methods, analysis, and synthesis, as well as induction and deduction were used. From the list of theoretical methods, the method of ascent from the general to the specific was used, which allowed drawing reasoned conclusions on the raised issues of the formation of joint Ukrainian-Chinese enterprises engaged in commercialization of innovative developments.

Presenting main material

The dynamics of socio-economic transformation at this stage is impressive in its scale and goes beyond the boundaries of a single state. The political and socio-economic development of any country in the modern world is closely related to the situation and condition of partner countries. Globalization of the world economy makes it necessary to model the prospects of socio-economic development of a separate country in connection with other models of partner countries. In this paper, we will focus on the prospects for the development of economic relations between Ukraine and China in the context of the performance of joint ventures that have chosen innovation as a priority.

Actually, the products of innovative activity are in increasing demand in the consumer market today, so one can state that entrepreneurial activity based on the principles of innovation is in trend. It is clear that for a business entity operating on a self-supporting basis, the financial result, which a priori must be positive, is relevant. Therefore, it is not the innovation process itself that is important, which usually involves significant development costs, but rather the commercialization of the results of such innovation activities, which is designed to cover these costs and at the same time provide competitive advantages to the company that implements innovative developments.

Thus, the process of commercialization of the results of innovative activity, i. e. the use of the intellectual capital of economic entities, is becoming increasingly relevant, involving mutually beneficial actions of stakeholders to identify research and technological results (innovations) in order to obtain profit or other market benefits from their development or sale [1].

At this stage, the perception of China as the world's largest factory state is becoming a thing of the past. China is losing its main advantage – cheap labor – as wages rise in the country. But it is not prepared to lose its competitiveness. This is evidenced by the focus of Chinese state policy on the innovative path of development. China has the largest number of researchers and engineers in the world. In 2018, the share of China's R&D expenditure amounted to 2.19 % of GDP. In particular, investments in basic research amounted to 5.5 % of total R&D expenditures, which in monetary terms amounted to more than 100 billion yuan.

China's total research expenditure in 2018 was 1.97 trillion yuan (\$278 billion), an increase of 207.2 billion yuan compared to 2017. [2]. At the same time, Ukraine's real GDP in 2018 was UAH 3,083,409 million (USD 130,832 million) [3].

As we can see, China's expenditure on research alone is more than 20 times higher than Ukraine's total GDP for the period. Taking into account the fact that the share of Ukraine's expenditure on professional, scientific, and technical activities in the period under consideration was less than 3 % of GDP, it is clear that the linear dependence of R&D results on their funding does not leave much room for Ukraine to compete with China. It would be possible to assess the prerequisites for creating an innovative product depending on the state of investment activity in historical retrospect, but the picture will not change dramatically – the trends remain unchanged.

Rapid economic development has been accompanied by significant progress in China's education system. The sharp rise in the quality indicators of the education system is evidenced by the high positions of Chinese universities in the Times Higher Education world rankings [3].

Based on the current situation, it is important to engage in cooperation in the sector where it is possible to achieve a positive result given the limited amount of funding for innovative developments. In our opinion, such a sector could be the creation of joint Ukrainian-Chinese companies focused on the commercialization of the results of innovative activities.

The current legal framework of Ukraine-China relations generally corresponds to the current state of bilateral interaction. The basic documents on economic cooperation between Ukraine and China were signed at the beginning of Ukraine's statehood. In 1992, the Government of Ukraine and the Government of the People's Republic of China signed an Agreement on Trade and Economic Cooperation (8 August 1992). This document was preceded by the Agreement between the Government of Ukraine and the Government of the People's Republic of China on Scientific and Technical Cooperation (27 April 1992), and in 1993 the two governments signed an Agreement on the Promotion and Mutual Protection of Investments (30 May, 1993). The initiatives launched have been further developed in our time. For example, on 5 December 2017, Ukraine and the People's Republic of China agreed at the highest governmental level on an action plan to implement the initiative to jointly build the Silk Road Economic Belt and the 21st Century Maritime Silk Road [5]. In the joint document, the parties declared their intention to promote cooperation between companies and financial institutions of both states on the basis of mutually beneficial principles, including joint efforts in trade, especially in agricultural products, implementation of large-scale projects in the fields of infrastructure and energy, including renewable energy. The document provides for the devel-

opment of cooperation in the field of high technologies, expansion of the volume and scope of investments for entrepreneurs, strengthening and stimulation of cooperation between Ukraine and China in the investment, trade, economic, scientific, and technical spheres.

Cooperation in science and technology is a priority area of bilateral relations between Ukraine and China. The main mechanism for implementing this cooperation is the Commission on Cooperation between the Government of Ukraine and the Government of the People's Republic of China, established in 2011. The chronology of legislative regulation of bilateral agreements on cooperation in science and technology is shown in Table 1.

Table 1

Chronology of the legal regulation on bilateral cooperation in the field of innovation activity

Validity period	Name of the intergovernmental cooperation body	Results achieved	Priority areas of cooperation
1	2	3	4
1997–2010	Joint Ukrainian-Chinese Commission on Scientific and Technical Cooperation	Eight meetings were held, which resulted in an expanded range of areas of cooperation. Within the framework of the respective two-year cooperation programs, 98 projects were jointly funded	Training and internships for graduate students and young researchers, energy efficiency, rational development of aerospace, information and communication technologies in aircraft construction, shipbuilding, and environmental management
July 2012, Beijing	Subcommittee on Scientific and Technical Cooperation	Approval of the Ukraine-China S&T cooperation program for 2013–2014	Implementation of a number of joint specific projects between research and educational institutions of both countries
23 June 2016, Kyiv	Second meeting of the Subcommittee	Discussed the state and prospects of Ukrainian-Chinese cooperation	The Program of Cooperation between Ukraine and China for 2017–2018 was approved.
17 June 2016, Harbin	Session “Ukrainian-Chinese Cooperation in Science and Technology”	An overview of the prospects for cooperation between Ukraine and China in the field of science and technology was conducted	Reports and presentations were given by Ukrainian scientists and representatives of the production and scientific sectors of Heilongjiang Province and Harbin
November 2017, Jinan	First Ukrainian-Chinese Conference on Research and Innovation	Agreement on scientific and technical cooperation signed between the National Academy of Sciences of Ukraine and the Academy of Sciences of Shandong Province	
21–24 November, 2017, Kyiv	Ukrainian-Chinese innovation exhibition	Innovative developments presented	Over 80 Chinese institutes and companies interested in cooperating with Ukrainian scientists participated
6–7 June, 2018	Third meeting of the Subcommittee on Scientific and Technical Cooperation	A new program of scientific and technological cooperation between Ukraine and China for 2019–2020 has been agreed	Partial financing of Ukrainian institutions by Chinese funds is envisaged
24–26 October 2018, Qingdao (Shandong province)	Scientific conference “Development of Ukrainian-Chinese scientific and technical cooperation within the framework of the “One Belt, One Road” initiative”	Ten Ukrainian research centers and more than 40 Chinese companies participated	Scientific conference dedicated to the 100th anniversary of the National Academy of Sciences of Ukraine

1	2	3	4
April 2019	Intergovernmental Agreement between Ukraine and the PRC	The Program of Scientific and Technical Cooperation between Ukraine and the People's Republic of China for 2019–2020 was approved	32 joint projects were included
26 May 2020, PRC***	China–Ukraine Scientific and Technical Conference “Innovation and Entrepreneurship”, Weihai 2020	Innovations in shipbuilding, medicine, oceanography, agriculture, and textiles from Kyiv, Mykolaiv, and Kherson were presented	Among the innovative developments presented, priority was given to innovations in the field of textiles, and a cooperation agreement was concluded
21 December 2021	Fourth meeting of the Subcommittee	The list of joint research projects to be included in the Program of Scientific and Technical Cooperation between Ukraine and China for the period of 2022–2023 was approved	The state and prospects of science and technology development in Ukraine and the PRC, results of joint research projects, and prospects for intensifying and expanding scientific, technical, and innovative cooperation were discussed

Based on the materials of <https://china.mfa.gov.ua/spivrobotnictvo/187-naukovo-tehniche-spivrobotnictvo-mizh-ukrajinoju-ta-kitajem>

As the data in Table 1 show, bilateral economic relations between Ukraine and China tend to focus on innovation and the commercialization of the results of such activities. At the same time, according to a study by the Center for International Private Enterprise (CIPE, Washington, D. C.), the most active investors in the above programs are state-owned enterprises. Lending is usually also carried out by state-owned banks in China. It is characteristic that Chinese companies prefer to cooperate with Ukrainian state-owned enterprises, choosing energy and agriculture as their priorities. According to experts, these investments have not only commercial but also political goals [6]. This encourages limited measures to promote Chinese investment in Ukraine at the level of the Security Service and the National Security and Defence Council. In view of the above, we have a relatively low foreign direct investment in Ukraine. Thus, as of the beginning of 2021, only \$47 million was received from mainland China and \$60 million from Hong Kong [6]. In total, Chinese investment in Ukraine over the past five years has reached \$260 million, a five-fold increase.

Meanwhile, Chinese investments differ from Western ones. They are usually non-transparent and are coordinated on the instructions of the Chinese Communist Party. Chinese investments can create risks of Ukraine's dependence on Chinese sources of financing and equipment, which in turn can be used to realize China's political goals [8].

Currently, China is the world leader in innovation. According to the World Intellectual Property Organization (WIPO) [7], China files more than 1.5 million patents annually in 2018–2021, having surpassed the one million patents per year mark back in 2016, while the same figure in the United States and Japan did not exceed 500 thousand for the same periods. It is worth noting that in 2000, the number of patents filed by China was 26.5 thousand. Over the past 30 years, the annual increase in patent applications filed has been 20 %. Most of them are for electromechanical equipment, computers, conductors, measuring equipment and similar devices. According to the Property Rights Alliance, in 2020, the value of the International Property Rights Index for Ukraine will be 4.466 on a 10-point scale, while for China it will be 6.045, with a continuous increase [9]. This means that Ukraine's innovation potential is attractive to China at this stage. In order to maintain the status of an innovative state, it is advisable for Ukraine to develop strong partnerships with China, which offers its support on the path of innovative development. It is important to note that China has been able to achieve impressive growth rates in its scientific and technological potential thanks to targeted government policies, resulting in significant achievements in the scientific

field. The State Program for Long-Term Development envisages that China will become the most innovative country in the world by 2030, and a world leader in the scientific field by 2049 [10].

Table 2 shows the number of patent applications filed in 2000–2021 by the leading countries of the world.

Table 2

Total number of patent applications for the period 2000–2021

Country \ Period	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	51906	63450	80232	105317	130384	173327	210501	245161	289838	314604	391177
Japan	436865	439175	421044	413093	423081	427078	408674	396291	391002	348596	344598
USA	295895	326471	334445	342441	356943	390733	425966	456154	456321	456106	490226
Country \ Period	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
China	526412	652777	825136	928177	1101864	1338503	1381594	1542002	1400661	1497159	1585663
Japan	342610	342796	328436	325989	318721	318381	318481	313567	307969	288472	289200
USA	503582	542815	571612	578802	589410	605571	606956	597141	621453	597172	591473

Fig. 1 shows a comparative diagram of the number of patent applications filed by the leading countries in the field of innovation.

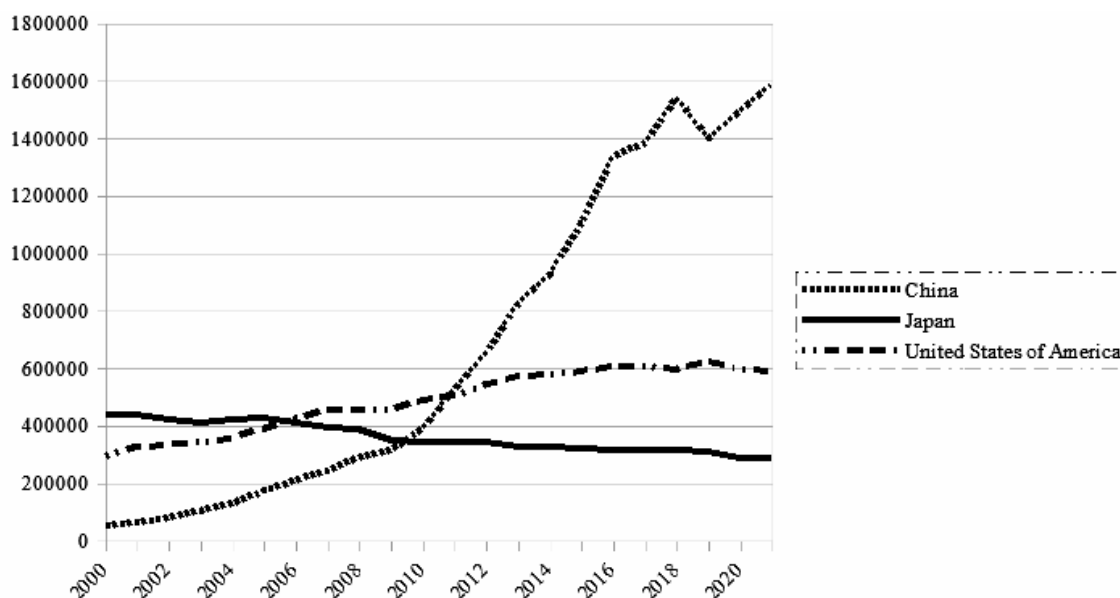


Fig. 1. Comparative diagram of the number of patent applications filed

Source: <https://www3.wipo.int/ipstats/ipplinechart>

At first glance, the idea of creating joint Ukrainian-Chinese companies to commercialize innovative developments seems quite attractive. However, it is worth remembering that Chinese partners do not neglect the opportunity to borrow useful inventions from neighbouring countries. China is characterized by attempts to include a clause on the transfer of intellectual property in contractual documents, and in the absence of such a clause, to focus on copying the necessary equipment, trying to carry out “reverse engineering”, i. e. to ensure the transfer of important production to mainland China, etc.

In view of the above, there are both good prospects and risks for cooperation between Ukrainian and Chinese businesses in the commercialization of innovative projects. After all, a similar situation is typical for the competitive environment in general. The Ukrainian-Chinese partnership is no exception to the rule.

Thus, we have the prerequisites for the development of Ukrainian-Chinese partnership in terms of commercialization of innovative developments, but to achieve mutually beneficial principles, it is necessary to weigh various components when concluding partnership agreements.

It is relevant to analyze the prospects for establishing joint ventures between China and foreign countries. According to Chinese analyst Bobby Lee, there are both advantages and disadvantages in organizing such enterprises [11]. Table 3 summarizes the information of the analytical review.

Table 3

Advantages and disadvantages of establishing a China-Ukrainian joint venture

Advantages	Disadvantages
<ol style="list-style-type: none"> 1. Opportunity to gain more local knowledge and experience in the region 2. Avoidance or simplification of complex bureaucratic procedures 3. Greater access to a large market and any existing distribution networks 4. Sharing all risks and costs with a partner 5. Wider access to local resources and optimal labor costs 6. Strengthening of the company's position in the international market and the possibility of gaining a larger share of capital 7. Possibility to maintain and increase competitiveness in the global space 8. Opening new business opportunities outside the company's core business 	<ol style="list-style-type: none"> 1. Inconsistency of partner positions can lead to costly business decisions 2. Sharing all risks and costs with an unsuitable partner 3. Conflicting management styles can lead to inconsistencies within the company 4. Poor resource management will lead to increased costs and waste 5. Possibility of imbalance due to the introduction of uncoordinated factors by each partner 6. Cultural differences can lead to confrontation between partners and discord

Summarizing the information in Table 3, it can be noted that success in partnerships depends on the balanced position of each of the parties involved. Competent organization of the business process will allow to take advantage of the benefits, while omissions in the organization of business activities and making unwise decisions can lead to undesirable consequences, and in this case, one's own mistakes can be justified by the shortcomings of the organization of joint ventures.

The issue of risks for a particular joint Ukrainian-Chinese partnership is not critical. Today, there are a number of examples of Chinese investment in the technology sector in Ukraine, such as the attraction of new international residents to a business park in Kharkiv by the Ukrainian company "Ecopolis HTZ" Business Park, together with China's Tus-Holding and a branch of Tsinghua University[15]. At the same time, Ukrainian companies tend to relocate their production facilities to China. For example, Corum, a member of the SCM group specializing in mechanical engineering, has registered a subsidiary in China to sell specialized equipment for the mining industry [12, 40].

At the same time, there is a downside to cooperation between Chinese and foreign companies, and Ukraine is no exception. Both in the case of Chinese investment in the Ukrainian economy and in the case of the presence of Ukrainian business in mainland China, effective means of control by Chinese government agencies are always invisibly present. This fits in with the state concept of the PRC's economic development, which is based on the planned conquest of foreign markets. This concept envisages the global economic expansion of Chinese companies, finance, and labor. The signing of trade and business cooperation agreements with more than 30 countries in 2017 at an international forum in China, which launched the One Belt, One Road project, allows China to significantly strengthen its economic presence in the countries participating in the project.

By maintaining state influence at all levels of government, China has been able to offer the world's most global economic project, allowing it to reach a qualitatively new level of economic expansion. This is also true of other relatively small-scale economic investment programs. Thus, participation of the Chinese company Huawei in the modernization of Ukraine's telecommunications equipment has caused concern in

Western countries due to potential cybersecurity threats. Another example of concerns about Ukrainian-Chinese cooperation is the relocation of Nord refrigerator production to China because of the inability to use its facilities in Donetsk, which is currently located in the non-government-controlled area. This situation raises concerns about making the company dependent on China, given the restrictions on foreign capital.

Under Chinese law, foreign companies cannot hold a controlling stake. Only a state-owned Chinese company can own a full stake in a company. In addition, the use of local components in production is mandatory. As a rule, foreign-owned enterprises are not allowed to sell their products in China on their own, which weakens competitiveness of their products.

It is also worth noting the clear regulation of the activities of foreign investors through the transfer of modern technologies, as well as the citizenship of managers and employees.

Thus, both China's investment in the Ukrainian economy and Ukraine's investment in the Chinese economy are primarily beneficial to China. So far, China has proven to be a country that has benefited from international globalization and free trade.

At this stage, the global economy is a tightly intertwined web of financial institutions, foreign markets, and socioeconomic systems that form the globalization process in development. It will not be possible to abandon this process, as it is generally not beneficial to any of the parties. In this situation, companies should look for such areas of partnership where parity conditions of activity and development prospects are equal. The model of allocation of financial resources for research and development is useful for application [14]. This issue requires further research and will be dealt with in the following publications.

Conclusions

The following conclusions can be drawn from this study of the conditions for the creation and operation of China-Ukrainian joint ventures.

1. Today, innovative products are in demand in the consumer market, so commercializing innovative developments is promising for the business sector.

2. The creation of Ukrainian-Chinese joint ventures focused on the commercialization of the results of innovative activities can provide Ukraine with a favorable position in the international market, as China is a world leader in innovation.

3. There are a number of favorable factors and risks on the way to the development of the Ukrainian-Chinese partnership in the area of commercialization of innovative developments, so to achieve the effectiveness of such cooperation, it is necessary to weigh the various aspects of the contractual terms.

4. China reacts very quickly to the risks associated with the dominance of foreign capital in the domestic economy. It therefore regulates the activities of foreign investors through legislation.

5. In order to protect Ukraine's innovative developments and domestic investment projects, Ukraine needs to systematically bring its legal and regulatory framework into compliance with modern requirements.

Prospects for further research

The issues raised in this article require further study, and this is primarily due to the need to argue for the feasibility of establishing such joint ventures for Ukraine. However, this issue is beyond the scope of this paper and will be discussed in subsequent publications on the commercialization of innovative developments.

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КОМЕРЦІАЛІЗАЦІЯ РЕЗУЛЬТАТІВ ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ СПІЛЬНИХ УКРАЇНСЬКО-КИТАЙСЬКИХ ПІДПРИЄМСТВ

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Наведено огляд інноваційного процесу в Україні та в Китаї для обґрунтування доцільності створення спільних українсько-китайських підприємств, зайнятих комерціалізацією інноваційних розробок. Огляд показав значні досягнення та лідерство Китаю у світовому масштабі в інноваційній сфері. У статті описано комплекс передумов, що зумовили інноваційне лідерство Китаю. Розглянуто передумови та хронологію законодавчого регулювання українсько-китайсь-

кої співпраці у сфері інноваційної діяльності, які дають підстави стверджувати про перспективи створення спільних китайсько-українських підприємств. Огляд розвитку українсько-китайського партнерства в історичній ретроспективі дав змогу виявити переваги та недоліки організації спільних українсько-китайських підприємств. За результатами дослідження визначено перспективи організації інноваційних спільних підприємств. Підкреслено домінування китайської системи державного контролю та управління економічним розвитком над приватним сектором.

Дослідження висвітлює подібності та відмінності у підходах до створення спільних інноваційних підприємств в Україні та у Китаї. Зазначено, що Китай системно відстоює інтереси як державних, так і приватних китайських компаній на зовнішніх і внутрішніх ринках. На внутрішньому ринку діяльність іноземних інвесторів чітко регламентована, а на зовнішньому це досягається за допомогою комплексу заходів, які передбачають фінансові інструменти, міжурядові угоди та низку інших ефективних механізмів, що забезпечують успіх. Китай найбільше виграє від міжнародної глобалізації та вільної торгівлі.

Ключові слова: інновації; спільні підприємства; комерціалізація; українсько-китайське партнерство; глобалізація.