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MANAGEMENT AND FINANCING OF INNOVATIVE DEVELOPMENT OF SMALL BUSINESSES: A MECHANISM FOR TECHNOLOGY TRANSFER AND COMMERCIALIZATION

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Abstract: *The article examines the management and innovative development of small businesses as important factors in ensuring sustainable economic development. Effective management and organization of financing for the transfer and commercialization of innovations have become priority tasks for countries around the world. The rapid dissemination of the results of innovative activities and their significant impact on economic development have intensified competition among countries in the field of innovation. This requires strengthening scientific and innovative potential, improving innovation management systems, and developing effective approaches to the commercialization and financing of innovations. In this context, improving management mechanisms for financing the transfer and commercialization of internal and external innovations in the development of small businesses in Uzbekistan is becoming increasingly important and further enhances the relevance of this research.*

Key words*: innovation, human capital, innovative activity, inclusive innovative development, transfer of innovations, small business, start-up (start-up), financing of transfer of innovations, emission of cryptocurrencies, sustainable development, global economy, innovative, development, small business, innovation transfer, commercialization of innovations, financing mechanisms, scientific and innovative potential, economic growth, advanced, developing countries, globalization process, domestic and foreign innovations, innovation competition, living standards, innovation efficiency, innovation financing, innovation results, new commercialization methods.*

Introduction

In the sustainable development of the global world economy, the innovative development of small business is recognized as one of the most important scientific and practical directions, and it has become an important task for every country to increase the volume and efficiency of financing the transfer and commercialization of internal and external innovations in this field. Because the development of the world economy depending on the factors of inclusion is sharply increasing the importance of financing the transfer and commercialization of innovations. Today, the results of innovative activities are characterized by rapid and wide spread, and they affect quantitative and qualitative changes in the economy of advanced developing countries. Such changes, which are reflected in the increasing trends in the living standards of the peoples of the world, force countries to compete for top positions in the field of innovation **[1]**.

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This, in turn, requires today to dramatically increase the scientific and innovative potential, to find new ways to commercialize the transfer of innovations and increase the effectiveness of their financing mechanism. Therefore, innovative activity is considered as the main factor in ensuring the sustainable growth of the economy of the countries of the world. In Uzbekistan, the need to improve the financing mechanism for the transfer and commercialization of internal and external innovations to small business development and its results increases the urgency of this problem in the current globalization process **[2]**.

Literature review and analysis on the topic

Based on the bibliographic analysis of foreign countries, among the foreign scientists who contributed to the theoretical views, methodological basis and development trends in the field of innovation and innovative activity, for example, the following can be included: J. Madsen, R. Solow, P. Draker, N Menkyu, Y. Schumpeter, Sh. Groh, J. Hauschildt, S. Salomo, and S. Chappell. The existing theoretical and methodological base in foreign countries is mainly made up of models of endogenous and semi-endogenous innovative economic growth and R&D (Research and Development) and human capital development **[3]**.

At the international level, scientific research is continuously being carried out to achieve an effective solution to the issues of financing and commercialization of the transfer of innovations to small businesses, and in this, scientists from the USA, Western Europe, Japan, Singapore, and the Republic of Korea focus on their methodological and practical importance, and in the CIS countries, they are more theoretical. aspects are emphasized. Currently, the most comprehensive scientific study on startups is the Startup Genome Report. National and international systems of innovative development of business entities based on the results obtained from existing research are continuously being improved. It should be recognized that the problems of the innovation factor, the state and problems of the organization of start-ups and their development have been studied at the level of an expert survey. However , it is related to the improvement of the efficiency of the mechanism of financing innovations and their transfer to small business entities and the theoretical views of scientists in the field of innovative activity, the trends of innovative development, the impact of innovations and investments on economic growth , and the improvement of the innovation financing system. issues are not researched separately.

Identification and development of innovation factors and their sources that

increase the volume of production and economic competitiveness in Uzbekistan are the main tasks of long-term economic growth. Therefore, some relevant legislative acts of the Republic of Uzbekistan have made it necessary to improve the mechanism of financing the transfer of innovations to small businesses [4].

The transfer and the commercialization of its content will make sense if the innovative technology (innovation) reaches the consumer and both parties achieve their goals. To do this, usually, four parties are involved in the transfer process.**[5]**

To improve the innovative development of the national economy of Uzbekistan and the mechanisms of state regulation of innovative activities, to improve the innovation-investment environment for the introduction of scientific projects and innovative technologies into production, to increase the effectiveness and efficiency of scientific-innovative activities, to promote scientific-research projects and results to national and special attention is being paid to the creation of the necessary conditions for the creation of competitive products in international markets. Also, the fact that all spheres of society and state life are rapidly developing requires the implementation of reforms based on modern innovative technologies that ensure rapid and high-quality progress of our country on the way to the ranks of the leaders of world civilization **[6]**.

Identifying and developing the innovation factor and its sources that increase the volume of production and competitiveness of the economy in Uzbekistan are the main tasks of long-term economic growth. Therefore, a number of relevant legal documents of the Republic of Uzbekistan made it necessary to improve the mechanism of financing innovation transfer to small business.

Due to the fact that business entities in developed and developing countries of the world need to quickly get used to and master new technological know-how in their activities, international competitiveness in Western countries is realized by applying the innovation factor **[7]**.

As part of the large-scale reforms implemented in Uzbekistan, the active investment policy, innovative activities of the scientific and technical sphere, the transfer of their results and promotion of IMO commercialization, and the search for improved financing mechanisms are required. In this case, these results should meet the goals and requirements of the innovative development of the country's economy and the financial and credit sector in the context of the state's modern progressive macroeconomic policy. For this purpose, it is necessary to put into practice the results of scientific research, which are created on the basis of the funds of the state budget, the volume of financing for the implementation of modernization projects and rearmament of production is increasing year by year. It is appropriate to rely on the rules of socio-economic systemology and systematic financial engineering for their solution **[8]**.

cannot be considered as a source of significant income and a complete solution to the above-mentioned problems without a favorable system of innovation-investment environment . The economic benefit from this system consists of the financial activity that appears in the process of commercialization of innovations, both for the state and for society. This system of innovation transfer to scientific and innovative activity subjects (IFS) and the whole society, commercialization of research results, creation of flow of orders for research, creation of new investments, new technologies, new jobs, volume and profit of new goods with high added value, as well as creates opportunities to increase tax revenues to the state budget.

Among the problems of scientific innovation activity (IIF) in the field of transfer and commercialization of the results of scientific innovation activity, the following can be distinguished:

• Implementation of IIF without market demand. This problem is related to the incomplete and less effective management and marketing work of IFSs on market research and work on it;

• the fact that most subjects of IIF management are not ready to work in conditions of competition and risks;

• the high cost of innovations and the outdated methods of true risk assessment;

• The absence of a modern and universal system of innovation-investment support of the IIF system and mechanisms, which can finance and commercialize all types of IIF, innovation transfer projects. In this case, the interests of financial institutions, funding periods, volumes and sources are not always compatible with each other, IIF and the national policy of the country to support innovations, as a rule, the state budget and the possibilities of innovation potential remain limited.

Therefore, by creating a new financing mechanism that encourages the development of the system of providing a favorable innovation-investment environment in the country, it is necessary to make maximum use of the available resources and potential, and to transfer the obtained results not only in the form of scientific knowledge, but also to the market in one way or another. it is necessary to ensure its economic implementation. For this, first of all, there are scientific collectives and departments that create new scientific knowledge, which are designed to commercialize the results of IIF, provide comprehensive services, stimulate the demand for the results, and create a mechanism for the economic implementation of these results. it is required to create an infrastructure that includes

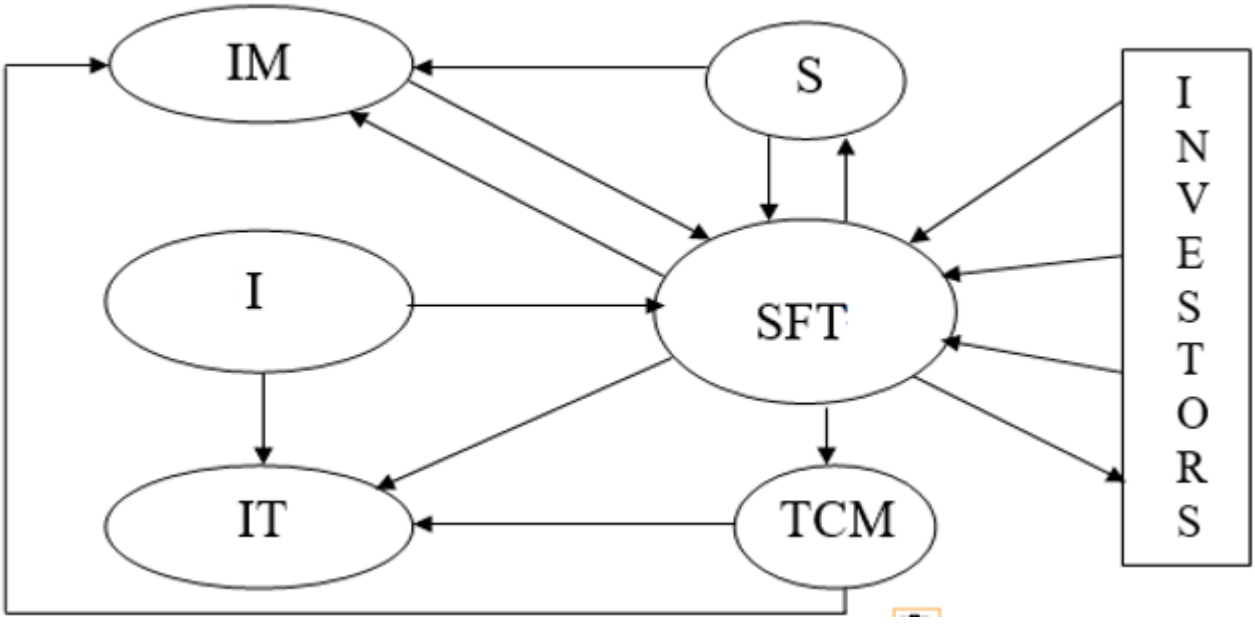


Figure 1. A financial mechanism to promote innovation transfer and commercialization of IMO

Here: IB - innovation market; I – IFS (owners of intellectual property rights); IT - applicants for innovations (for transfer and commercialization), i.e. Start-up; IMS is a syndicate financing the IIF and the transfer and commercialization of its results (based on public-private partnership); D – State (supporting body of IFS of IFS); TTM - transfer (commercialization) consultant and manager.

Such an infrastructure (as shown in Figure 1) allows, on the one hand, to work with investors (subjects of innovative activity) who can interest potential customers, and on the other hand, to be consumers of the results of scientific and innovative activity, who can formulate tasks and put them before innovators. should establish organic relations between production and business entities that have the opportunity and support them. Figure 1 above shows a schematic model of such an infrastructure.

In this scheme, D and IMS provide financial, legal and organizational support to intellectual property rights holders.

IMS must have financial resources (on behalf of investors) and have a package (share) of IT shares with I.

An important function of D and IMS is to approve state orders for scientific research (fundamental, applied and innovative) and study the real demand of IB; maintaining a single state register on financing and commercialization of the transfer of IIF results based on monitoring; acting as a guarantor for the economic realization of innovations, as well as providing a guarantee for state investment bonds. The protection of intellectual property rights created and transferred during the IIF process should be given great importance in allocating state grants.

The state may introduce tax investments and credits for innovative development. At the same time, a part of the excise tax can be sent to support the innovative development of the economy, since the economic implementation of the innovation creates additional benefits. IMS finances *start-up companies* with the temporary support participation of the state , which allows IMS to refinance the shares of temporary participation to investors by issuing and placing special government investment bonds. State investment bonds guaranteed by IMS are sold to investors as well as foreign investors. These bonds are of average quality and are later converted into IT shares.

In order to encourage innovation, it is necessary to give the right to own, use and dispose of intellectual property to the innovator(s) and not to the organizations. In addition, the income of innovators in the form of fees and interest payments under license agreements should not be subject to income tax, and when innovations are included in the authorized fund of some company, they should have the right to receive dividends with the specified income.

Based on the above, the following conclusions and suggestions are appropriate.

All over the world, technology transfer plays a decisive role in achieving rapid growth in the technological sectors of the economy. Why does technology transfer play such a big role? Because the transfer technology is a "weak link" in the chain of innovation cycle stages; on the one hand, it requires a lot of effort and resources, and on the other hand, it creates great risks. In addition, at this stage, decision-making and ownership of intellectual property rights can often overlap within the

chain (between the intellectual property owner, the investor, and the developer). At this stage, specialists from various fields of knowledge are required: financiers, patentists, managers, marketers. Favorable conditions for IIF, quality product, good management and effective public and private financing system (IMS) are the keys to success.

High-tech business is a special risk group. Banks are interested in financing production projects that are not very profitable, but more meaningful. Government programs and innovation and government incentive financing of the IIF are maintained.

Forms of private investors called business angels are very developed in foreign countries, but this is still not typical for Uzbekistan. Attracting private investors to form an innovative (start-up) joint-stock company and primary placement of shares or placement of shares on the free capital market is not yet widespread in Uzbekistan, and it is very difficult to use them without IMS in the coming years. Even if a potential investor is well-known, if he is not a public fund, he should think seven times before deciding to finance a new type of scientific and technical business. The risk of non-return is very high, the guarantee system is not always in place, state guarantees for foreign investments are limited and other investment guarantee mechanisms are not in place. All these and other factors speak about the current gap between the initial and final stages of the innovation process, which prevents rapid implementation of scientific and technological developments in production.

Producers of innovative technologies and owners of know-how do not know how and to what extent they can not rationally dispose of them. Investors do not have mechanisms to insure investments in high-tech businesses.

Manufacturers are not ready to receive "raw" developments. Also, the importance of the state in the implementation of such works is very great. The state should create and support an innovative system in the development of IIF results through IMS. In addition, the country's development depends on the competitiveness and technological level of goods in domestic and foreign markets.

Increasing the competitiveness of industrial enterprises in the regions is important in the development of the innovation system. The main goal of the regional innovation policy is to effectively apply the results of the IIF in solving social and economic issues, to ensure the competitiveness of local products, and to create legal, organizational and favorable conditions for innovation-investment activities. For the development of IIF in the regions, the strengthening of cooperation between local state authorities and IMS plays an important role in the formation of innovation policy. State and local support programs are very important in supporting technology transfer and IIF.

Therefore, since the creators of new technologies are employees of higher education institutions (HEI) and research organizations, it is appropriate to bring the support system closer to them using IMS. Despite the experience of creation of innovative infrastructure of TSEs, the results of innovators, businessmen and investors have not yet been felt in the country. Therefore, it is

appropriate to rely on foreign experiences in the implementation of these infrastructure functions **[8]**.

In the context of the results of the conducted research and these proposals and recommendations, the application of the experience of the Federal Republic of Germany (Germany) in the development of innovative activities and financial support for the transfer of its innovations for Uzbekistan will ensure the transition of our country to an innovative economic development model. the conclusion makes sense. Because this conclusion is shown in the following.

Germany is one of the world's top spenders on innovation research, spending 2.9% of its GDP annually on research and development (R&D) funding. divides the percentage. This indicator is 1.9% higher than the EU rate. Therefore, Germany occupies one of the leading places in the world in terms of funding of scientific researches and ITTKI. It should be noted that the costs of financing innovations of German companies in 2010 amounted to 130 million. established the Euro. 1/4 of this amount was invested by the German automotive industry alone. Currently, the volume of production of new products in Germany is 27 percent, and the volume of new products in the automotive industry is 52 percent. In general, a system of innovation development and support has been created in Germany, the products of the companies are more high-tech, and they are distinguished by their competitiveness in the world market.

Institutions and professionals engaged in research and development in Germany receive state funding for business planning and the search for investors, patenting and legal assistance.

Max-Planck-Gesellschaft ", "Frauenhofer", "Leibniz" and "Helmholz" are actively working in the German higher education system . They unite many scientific research centers and provide financial support for future realization of scientific and innovative research.

Currently, more than 300 special centers are operating in the system of German research institutes (ITIs) and higher education institutions (HEIs). The main activities of these centers are implementation of new inventions, financing of the transfer of innovations, creation of business plans for *start-up companies, consulting and technological assistance in the establishment of new companies.* For example, we can take the "Dortmund Center for Technology Transfer" established in 1995 under the Dortmund Technical University. Today, this center is one of the leading technology centers in Europe, and it is considered a leading initiator and an important locomotive that ensures the transfer of innovations to economic sectors. The center offers a wide range of services to companies and start-ups to support their business ideas.

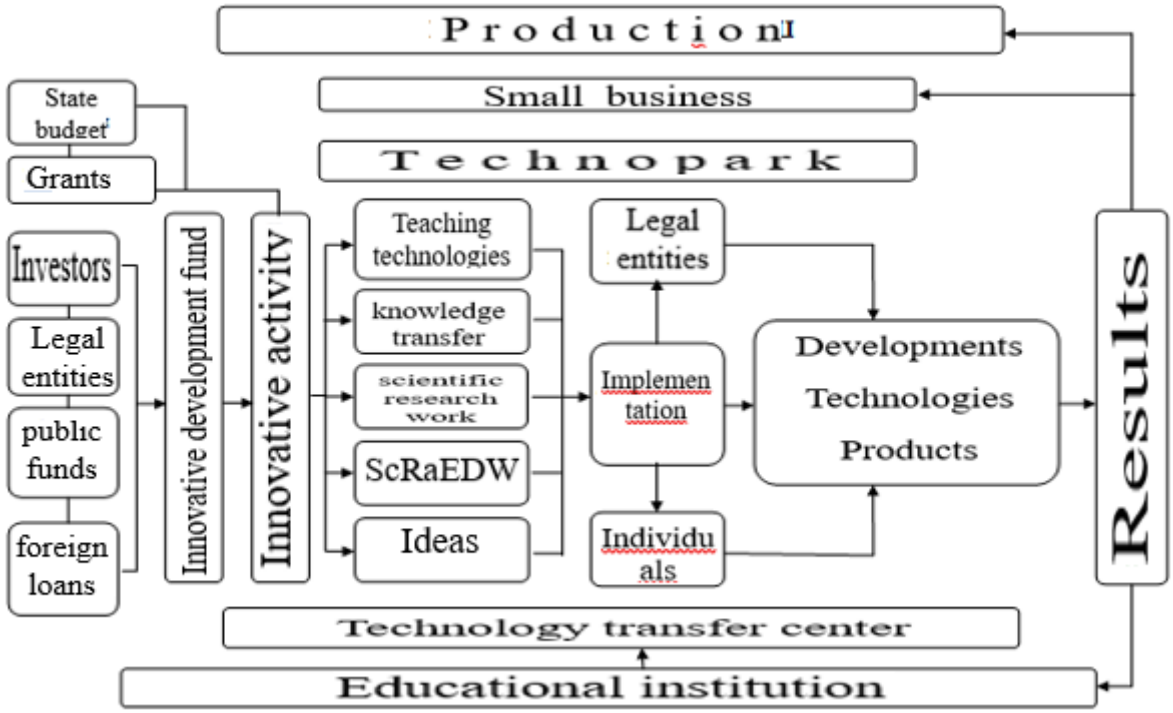


Figure 3.2. Transfer of innovations to small business financing model

Similar technology transfer centers (STTT) are considered an important element of the system of managing the results of scientific research and innovation activities of the educational institution implementing the innovation policy within the single educational and scientific complex of HEIs. Their operational functions and innovation transfer financing model are shown in Figure 2 above.

According to this model, innovation transfer is financed as follows. Public foundations such as the aforementioned Max-Planck-Gesellschaft , Frauenhofer, Leibniz, and Helmholz support new scientific developments, innovative projects, and start-ups in more than 300 specialized centers in the German SRW and ETS system. allocates grants to finance internal activities. Since most technology transfer centers are located in universities, the participation of university scientists in them is directly important, because innovations are processed with the help of scientists' developments or their advice and presented for funding. Grant societies review projects and approve them for funding. There are many similar public foundations in Germany. In addition, SRW and ScRaEDW are financed from the funds of large enterprises. We can see in Table 1, the distribution of state budget funds and funds of large enterprises through societies.

Table 1 shows the competition of research societies for funding of research and innovation (sorevnavaniya nauchnyx obshestv).

Table 1.

Seed funding for research and innovation

Research institutes	State funding	At the expense of the economy	In relation to the account of one employee
Blaue Liste/ Leibniz ITI	744 million euros	208 million euros	12400
Helmholtz Society	1,400 million euros	700 million euros	24000
Fraunhofer Society	517 million euros	621 million euros	12870
Max Planck Society	1,020 million euros	254 million euros	12050
Titelgruppe 73 (RIF)	13 million euros	39 million euros	795

Table 2 shows that large research companies such as Blue List / Leibniz, Helmholtz Association, Max Planck Society receive more subsidies from the state than Titelg Gurkhas. Funds received from the economy account are the opposite. Titel groups have more financial resources than large companies. Because Titel groups work together with small businesses and medium-sized enterprises.

Innovation comes from problems in businesses. These problems are considered and solved by scientists in RIF through interdisciplinary collaboration. New ideas are supported and funded by companies until they are ready for the market.

Table 2 shows research funding and efficiency per employee.

Table 2.

Research efficiency (per employee, EUR) comparison

Research institutes	By the state	At the expense of the economy
Blaue Liste/ Leibniz	60,000	16,500
Helmholtz Society	58,000	29,000
Fraunhofer Society	40,000	48,000
Max Planck Society	84,500	20,500
Title groups 73 (RIF)	16,500	49,000

Table 2 shows the amount of grants awarded per employee in research societies. Large research societies such as the Blue List / Leibniz (60,000), the Helmholtz Association (58,000), the

Max Planck Society (84,500) receive more public grants than the Titel groups (16,500). The opposite is true for funds received from the household account. Large research societies have less funding than Titel groups. Only the Fraunhofer Research Society has more funds from the economy than other large companies.

At the same time, scientific activities are carried out in the fields of information communications, optics and laser technologies, materials, biotechnology and chemical technologies, planning of energy-saving technologies and environmental protection.

For example, as one of the nine "Johannes Rau" research institutes of North Rhine-Westphalia, Germany, the RIF- Institute for Research and Transfer **(**RIF eV**) at the Technical University of Dortmund** serves to transfer knowledge and technologies in the economy and society. RIF was established in 1990 as a program of the "Dortmund Initiative for Integrated Manufacturing" by professors and teachers from various technological fields of this university.

With the experience of its employees, which has been held for many years, the "RIF" scientific research institute is of great importance for the Technical University of Dortmund and other universities. For many years, the RIF together with its employees has been an important bridge between the industry and the Technical University of Dortmund **.**

CONCLUSION

In the context of the globalization of the world economy, the role of scientific research in the creation and introduction of new technologies, financing mechanisms and methods of sustainable economic development is increasing. One of the main components of economic development is the transfer of technologies, and the level of participation of a country in this process significantly determines the possibilities of its technological development and competitiveness.

Economic development is related to the availability of innovative potential and the conditions for its implementation.

In terms of innovative capabilities and results of countries such as Singapore, Switzerland, Sweden, Germany, Finland, the Republic of Korea, Japan, China and India, the experiences of leading countries in technology transfer can be considered as an example for Uzbekistan.

Although Uzbekistan has not yet entered the global innovation index, Uzbekistan is set to become one of the 50 countries in the global innovation index ranking by 2030. All the criteria used in the creation of the innovation index were distributed among the responsible state bodies.

Although Uzbekistan does not yet have a law on innovation and innovative activities, as well as a law on science and scientific activities, there are laws and regulations related to these activities and the innovative development strategy of our republic. relevant terms and concepts in legislative documents are legislated based on international innovative practice, they are being improved and are aimed at eliminating existing problems.

There is a positive correlation between economic growth and the ITTKIM factor in Uzbekistan.

At the same time, the relationship between the volume of innovation financing and economic growth (positive sign) and gross investment (negative sign) and the volume of innovation financing, economic growth (positive sign), gross investment (negative sign) and gross income (negative sign) is correlated. Similarly, there is a relationship between the volume of GDP and gross savings (with a negative sign), gross investments (with a negative sign), and economic growth (with a positive sign). There is also a relationship between the volume of GDP and economic growth (positive sign), gross investment (negative sign), gross savings (negative sign) and IK (positive sign).

Economic growth or innovation growth depends on two factors: internal innovation capacity and external innovation capacity.

The experience of developed and some developing countries shows that the factor of innovation plays a decisive role in the development of the economy in the long term. Innovations in a specific field not only increase the productivity of this field, but also have a multiplier effect on the entire economy.

Uzbekistan still cannot compete with the start-up centers of leading foreign countries. The country's startups should find their main competitive advantage and create a unique product based on this.

Today, Uzbekistan has smart technical experts capable of creating products, and their wages are lower than in the world, that is, there are conditions for generating ideas and creating a minimum viable product, but the infrastructure to help create startups is not perfect.

In other words, in Uzbekistan, based on the available opportunities, measures should be directed to the development of the system of support and financing of startups at the first stage of the life cycle. At this stage, startups are launched to help investors from developed countries enter their markets. It is necessary to establish and develop relations with developed foreign countries. It would be a good idea to connect with accelerators in developed countries who can help with expertise and contacts.

to support and protect any initiatives related to the innovative business sphere, as well as to develop programs to attract scientific research centers of international companies to Uzbekistan.

Implementation of the above recommendations and suggestions will help the effective formation of the national innovation development system, which will ensure the formation of favorable business, investment and innovation environments in Uzbekistan.

List of used literature

[1]. Madsen Jakob "Can Second-Generation Endogenous GrowthModels Explain The Productivity Trends and Knowledge Production In the Asian Miracle Economies?" Monash University, 2009. - 31 p .;

[2]. Heribert Meffert /Christoph Burmann, 2012, p.396

[3]. Tuychiyev, AG. International and regional trends and problems of financing innovation and transfer and financial business. Financial management, (5), 62-71.

[4]. Tuychiev Abdurakhmon Gafurovich/ and a. CLASSICAL TERMINOLOGICAL AND THEORETICAL BASIS OF FINANCING TRANSFER OF INNOVATION TO SMALL BUSINESS (BIBLIOGRAPHICAL ANALYSIS) Page No: 131-144 https://doi.org/10.37896/JXAT13.5/30913

[5]. Shoha'zami Sh.Sh. Theoretical foundations of property, value and price. Textbook. - T.: Economy and Finance, 2018. - 492 p.

[6]. Shoha'zami Sh.Sh. Systematic Finance Ijiniringi. Monograph. -T.: Science and technology, 2012.-796 p.

[7]. Vahabov A.V., Puzankov D.V., Kutuzov V.M., Muravev A.V., Shestopalov M.Yu., Ryzhov N.G., Terenteva I .S., Shoha'zamiy Sh.Sh. Model of scientific and innovative business management.