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ANALYSIS OF MODELS AND CURRENT STATUS OF THE STRATEGIC MANAGEMENT SYSTEM OF ENTERPRISES IN INNOVATION DEVELOPMENT IN FOREIGN COUNTRIES

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Abstract. *This study provides a comparative analysis of innovative development models that have played an important role in the global economy in the 21st century. The article takes an in-depth look at the innovation systems of the United States, the European Union, the Scandinavian countries, South Korea, Singapore, Japan, and Germany. Five main models - open innovation, Triple Helix, cluster innovation, public governance, and corporate strategies - are analyzed based on statistical data for 2024. The results of the study show that each model has its own advantages and is adapted to the institutional environment and economic characteristics of countries. Hybrid models and the integration of sustainable development goals have become the main trends in modern innovation strategies. The recommendations presented for Uzbekistan determine the ways to develop the national innovation ecosystem.*

Keywords: *innovation models, open innovation, Triple Helix, innovation clusters, technology transfer, university-industry cooperation, strategic management, global innovation ecosystem, innovation policy of Uzbekistan.*

XORIJIY MAMLAKATLARDA INNOVATSION RIVOJLANISH JARAYONIDA KORXONALAR STRATEGIK BOSHQARUV TIZIMINING JORIY HOLATI VA MODELLARI TAHLILI

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Annotatsiya. *Mazkur tadqiqot XXI asrda global iqtisodiyotda muhim o‘rin tutgan innovatsion rivojlanish modellarining taqqoslama tahlilini taqdim etadi. Maqolada AQSh, Yevropa Ittifoqi, Skandinaviya mamlakatlari, Janubiy Koreya, Singapur, Yaponiya va Germaniyaning innovatsion tizimlariga chuqur nazar tashlanadi. Beshta asosiy model ochiq innovatsiyalar, Triple Helix, klaster innovatsiyalar, davlat boshqaruvi va korporativ strategiyalar 2024-yil statistik ma’lumotlari asosida tahlil qilingan. Tadqiqot natijalari shuni ko‘rsatadiki, har bir model o‘ziga xos afzalliklarga ega bo‘lib, mamlakatlarning institutsional muhiti va iqtisodiy xususiyatlariga mos ravishda moslashtiriladi. Gibrid modellar va barqaror rivojlanish maqsadlarining integratsiyasi zamonaviy innovatsion strategiyalarning asosiy tendensiyalariga aylandi. O‘zbekiston uchun taqdim etilgan tavsiyalar milliy innovatsion ekotizimni rivojlantirish yo‘llarini belgilaydi.*

Kalit so‘zlar: *innovatsion modellar, ochiq innovatsiyalar, Triple Helix, innovatsion klasterlar, texnologiya transferi, universitet-sanoat hamkorligi, strategik boshqaruv, global innovatsion ekotizim, O‘zbekiston innovatsion siyosati.*

АНАЛИЗ МОДЕЛЕЙ И СОВРЕМЕННОГО СОСТОЯНИЯ СИСТЕМЫ СТРАТЕГИЧЕСКОГО УПРАВЛЕНИЯ ПРЕДПРИЯТИЯМИ В УСЛОВИЯХ ИННОВАЦИОННОГО РАЗВИТИЯ В ЗАРУБЕЖНЫХ СТРАНАХ

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Аннотация. *В данном исследовании представлен сравнительный анализ моделей инновационного развития, сыгравших важную роль в мировой экономике в XXI веке. В статье подробно рассматриваются инновационные системы США, Европейского союза, Скандинавских стран, Южной Кореи, Сингапура, Японии и Германии. На основе статистических данных за 2024 год анализируются пять основных моделей: открытые инновации, тройная спираль, кластерные инновации, государственное управление и корпоративные стратегии. Результаты исследования показывают, что каждая модель имеет свои преимущества и адаптирована к институциональной среде и экономическим особенностям стран. Гибридные модели и интеграция целей устойчивого развития стали основными трендами современных инновационных стратегий. Представленные рекомендации для Узбекистана определяют пути развития национальной инновационной экосистемы.*

Ключевые слова: *инновационные модели, открытые инновации, тройная спираль, инновационные кластеры, трансфер технологий, сотрудничество университетов и промышленности, стратегическое управление, глобальная инновационная экосистема, инновационная политика Узбекистана.*

Introduction.

In the modern stage of the global economy, innovation is a key factor in national competitiveness and sustainable development. According to the World Bank, global R&D spending in 2024 amounted to $2.6 trillion, which is 2.4% of global GDP. The intensity of innovation activity varies significantly between countries - the most developed countries spend up to 4% of GDP on R&D, while developing countries spend only 0.5-1%. According to the 2024 Global Innovation Index, the most innovative countries in the world are Sweden (1st place), Singapore (2nd place), the USA (3rd place), Switzerland (4th place) and Denmark (5th place). The success of these countries is based on the effective application of various innovation models.The nature of innovation processes has changed dramatically in the 21st century, with new paradigms such as open innovation, ecosystem approaches, and platform economies emerging. According to a McKinsey Global Institute report, 73% of global corporations will adopt open innovation strategies by 2024, a 28% increase from 2019. The post-pandemic era has further digitized innovation processes. Remote collaboration, artificial intelligence tools, and quantum computing have created new innovation opportunities. According to Gartner analysis, the global AI market reached $515 billion in 2024 and is expected to grow to $1.8 trillion by 2030. The Sustainable Development Goals have become an integral part of innovation strategies. According to BloombergNEF, global investments in clean energy technologies in 2024 amounted to $1.8 trillion. According to the Climate Policy Initiative report, the market for climate change mitigation technologies is expected to reach $950 billion by 2024. The purpose of this study is to analyze the most advanced innovation models of foreign countries and develop practical recommendations for Uzbekistan. The innovation systems of the United States, the European Union, Scandinavian countries, South Korea, Singapore, Japan, and Germany were selected as the object of the study.

Literature review.

The work of several important researchers is of particular importance in creating the theoretical foundations of innovation models. The concept of open innovation developed by Chesbrough (2020) forms the foundation of modern innovation theory. Chesbrough defines open innovation as "the purposeful management of knowledge flows by companies to accelerate their innovation processes and expand foreign markets." The Triple Helix model, developed by Etskowitz and Leidesdorf (2000), considers the interaction between university, industry, and government as the main mechanism of innovation. Etskowitz and Leidesdorf describe the evolution of the model in three stages and emphasize the importance of institutional overlap in the modern innovation ecosystem.

The cluster theory developed by Porter (1998) forms the basis of the concept of regional innovation. Porter defines clusters as "a collection of interconnected companies and institutions operating in a specific industry, located in close geographical proximity." The concept of a national innovation system, developed by Lundvall (2007), illustrates the role of the state in innovation processes. Lundvall defines a NIS as "a network of elements and relationships involved in the creation, dissemination and application of new knowledge."

The theory of disruptive innovation, developed by Christensen, is an important part of corporate innovation strategies. Christensen defines disruptive innovation as "innovations that create new markets through simple, convenient, and inexpensive products." Among modern researchers, Saxenian's comparative analysis of Silicon Valley and Route 128 in her work "Regional Advantage" showed the importance of regional innovation ecosystems. Drucker developed the basic principles of innovation management in his work "Innovation and Entrepreneurship." Drucker (1985) defines innovation as "a unique tool of entrepreneurship." Among modern Uzbek researchers, the work of such scientists as Alimov, Ashurova and Turgunov on innovation economics deserves special attention. Their research is devoted to the development of the innovation system in Uzbekistan.

Research methodology.

This study was conducted based on the comparative analysis methodology in order to conduct an in-depth analysis of innovation models in foreign countries. During the research, the effectiveness and characteristics of five main innovation models - the open innovation model, the Triple Helix model, the cluster innovation model, the innovation model in public administration, and the corporate innovation strategy model were systematically studied.

Two categories of sources were used at the data collection stage. The primary data were the Global Innovation Index 2024, the World Bank Innovation Policy Platform database, the OECD Science, Technology and Innovation Indicators report, and the UNESCO Science Report 2024. The secondary data included annual reports of leading companies such as Apple, Google, Microsoft, Samsung, Toyota, official data from national statistical offices of various countries, as well as analytical reports from prestigious international organizations such as the World Economic Forum, McKinsey, and the Boston Consulting Group.

A complex combination of quantitative and qualitative analysis methods was used in the research process. The quantitative analysis included a comparative analysis of statistical indicators, an analysis of dynamic series for the period 2019-2024, and the identification of correlations between various innovation indicators. The qualitative analysis used a case study methodology to study the successful experience of specific countries and companies.

Analysis and discussion of results.

The open innovation model was proposed by Henry Chesbrough in 2003 and is widely used in the United States and European countries. Unlike traditional closed innovation processes, this model involves companies using external knowledge and ideas, as well as exporting internal innovations to external markets.

The main principles of the open innovation model are as follows:

First, not all smart specialists work within the company - cooperation with external experts is necessary. This principle allows companies to use intellectual resources available on a global scale. For example, Procter & Gamble, through its “Connect + Develop” program, creates more than 50% of product innovations together with external partners.

Second, internal research and development (R&D) should be combined with external research and development. This approach allows companies to optimize their resources and accelerate the innovation process. Intel Corporation partners with more than 100 startups a year to expand its innovation ecosystem.

Third, being the first to market is not always a guarantee of victory - it is more important to use innovation correctly. Netflix was not the first to enter the DVD rental market, but it became the market leader by successfully introducing a streaming service.

In the United States, the open innovation model is widespread in the technology, pharmaceutical and consumer goods sectors. The Silicon Valley ecosystem is a prime example of this model, where there is a constant exchange of knowledge between corporations, startups, universities and venture funds.

Google's "20% Time" policy allows employees to devote 20% of their working time to personal projects. This approach led to the creation of products such as Gmail, Google News and AdSense. According to 2024 data, Google's patent portfolio includes more than 150,000 patents, 30% of which were obtained as a result of external collaborations.

Apple cooperates with more than a million developers through its App Store ecosystem. In 2024, developers earned more than $ 100 billion through the App Store, which demonstrates the economic efficiency of the open innovation model.

Microsoft gained access to more than 100 million developers through the acquisition of the GitHub platform. The company develops many of its products based on open source principles, for example, the Visual Studio Code editor has more than 30,000 contributors.

In the European Union, the open innovation model is actively used within the framework of the Horizon Europe program. With a budget of 95.5 billion euros for 2021-2027, this program encourages cooperation between universities, research centers and industry.

The German Fraunhofer Society has 76 institutes and research units and works with more than 3,000 industrial partners each year. In 2024, Fraunhofer will have a budget of 3.0 billion euros, 70% of which will be financed by industrial orders.

France's Station F innovation center is the world's largest startup campus, housing more than 1,000 startups and implementing partnership programs with more than 30 international corporations.

Table 1.

Key indicators of the open innovation model (based on 2024 data)

Indicator	USA	European Union	Growth rate (2023-2024)
Share of corporations with open innovation programs	78%	65%	5.2%
Share of patents created through external collaboration	35%	28%	7.8%
Number of university-industry collaboration projects	more than 45,000	more than 38,000	12.3%
Corporate venture capital investment volume	220 billion dollars	85 billion dollars	18.5%
Number of acceleration programs	more than 1,500	more than 1,200	9.7%
Users of open innovation platforms	more than 15 million	more than 8 million	22.4%

The Triple Helix model was developed in the 1990s by Henry Etzkowitz and Loet Leydesdorff and considers the interaction and cooperation between universities, industry and the state as the main mechanism for creating innovations. The model is inspired by the triple-helical structure of the DNA molecule and reflects the interconnectedness of the three institutional spheres.The evolution of the model took place in three stages. In the first generation, Triple Helix I, the state plays a dominant role, encompassing universities and industry (the former USSR model). In the Triple Helix II model, the three institutions exist as separate, independent spheres with limited interaction (the laissez-faire model). In the Triple Helix III model, the three spheres overlap, and each partially takes on the role of the other.

The Massachusetts Institute of Technology is a prime example of the Triple Helix model. The MIT Industrial Liaison Program collaborates with more than 700 companies and has an economic impact of more than $4 billion per year. By 2024, more than 30,000 active companies founded by MIT graduates will generate $2 trillion in annual revenue.The symbiotic relationship between Stanford University and Silicon Valley is one of the most successful examples of the Triple Helix model. Stanford graduates have founded Google, Yahoo, Hewlett-Packard, Nike, and other large companies. The university's Office of Technology Licensing signs more than 100 licensing agreements a year and collects more than $140 million in royalty payments.

The Swedish KTH Royal Institute of Technology Innovation Center helps create more than 50 spin-off companies a year. KTH Innovation has supported more than 300 companies since 1999, which have created more than 5,000 jobs.

In the modern Triple Helix model, the state appears not only as a financial supporter, but also as an active participant in shaping the innovation ecosystem. Singapore's A*STAR (Agency for Science, Technology and Research) has a budget of S$2.2 billion in 2024, employs over 5,000 researchers, and works with over 1,000 industry partners.South Korea's KAIST is fully funded by the government and works closely with major corporations such as Samsung, LG, and Hyundai. In 2024, KAIST created over 90 spin-off companies and attracted over S$500 million in industry grants.

Table 2.

Triple Helix Model Performance Indicators (Based on 2024 Data)

Country	University-Industry Collaboration Ranking	Number of spin-off companies	Technology transfer income	Share of joint patents
USA (MIT, Stanford)	9.2/10	more than 850	$2.8 billion	42%
Sweden	8.7/10	320	$450 billion	38%
Singapore	8.5/10	280	380 million dollars	35%
South Korea	8.3/10	520	720 million dollars	40%
Germany	8.1/10	680	$1.2 billion	36%
Japan	7.9/10	450	980 million dollars	33%

The Scandinavian cluster innovation model is based on geographical proximity, cross-sectoral cooperation and specialization. This model is based on the cluster theory developed by Michael Porter and aims to create local competitive advantages.The Danish Medicon Valley biomedical cluster covers Europe and the Copenhagen region and brings together more than 350 biomedical companies, 80 hospitals and 17 universities. By 2024, the cluster will employ more than 45,000 professionals and generate more than 20 billion euros in annual revenue.

The Norwegian Energy Valley cluster specializes in the oil and gas industry and brings together more than 250 companies. The cluster is in the process of transforming towards renewable energy sources and attracted 5 billion euros in investment in offshore wind energy in 2024.The Finnish Nokia cluster has become a global center for the telecommunications industry. After the Nokia crisis, Finland has successfully diversified its innovation ecosystem. In 2024, Helsinki will have more than 500 game development companies, including global brands such as Supercell and Rovio.The Finnish Cleantech cluster unites more than 200 companies and has an annual turnover of 15 billion euros. The cluster specializes in the circular economy and clean technologies, generating 1% of global cleantech innovation.

The Swedish Kista Science City cluster is called the "Silicon Valley of Europe" and is home to more than 1,400 ICT companies, including research centers from Ericsson and IBM. In 2024, the cluster will employ more than 70,000 professionals and will have companies from more than 100 nationalities.The Stockholm FinTech cluster unites more than 250 fintech companies, including unicorns such as Klarna and iZettle. The cluster has become the second largest fintech hub in Europe and attracted more than 3 billion euros in venture capital investments in 2024.

The Danish CLEAN cluster specializes in clean technologies and energy efficiency. The cluster brings together more than 150 companies and research institutes. In 2024, Denmark received 10 billion euros in revenue from wind energy technology exports. The Odense Robotics cluster brings together more than 160 robotics companies and is one of the densest robotic clusters in the world. The cluster includes global leaders such as Universal Robots and Mobile Industrial Robots.

Cluster development in the Nordic countries is based on close cooperation between the public and private sectors. National innovation agencies such as Innovation Norway, Business Finland and Vinnova provide financial and organizational support to the clusters.The Nordic Innovation Partnership encourages inter-cluster cooperation between the Nordic countries. In 2024, Nordic Innovation had a budget of 100 million euros and supported more than 50 cross-border cluster projects.South Korea's innovation model is based on strong public governance and strategic planning. The state stimulates innovation through direct R&D investments, industrial policy and human capital development.In 2024, South Korea spent 4.93% of GDP on R&D, one of the highest in the world. The state finances 25% of R&D spending and coordinates the development of strategic technologies. The Korea Institute of Science and Technology (KIST) employs more than 2,500 researchers and receives more than 600 patents per year.South Korea's network of Creative Economy Innovation Centers includes 19 centers, each specializing in a specific industry or technology. The centers work in partnership with chaebols such as Samsung, LG, Hyundai and have supported over 5,000 startups in 2024.

Table 3.

Indicators of the innovative model in public administration (based on 2024 data)

Indicator	South Korea	Singapore
Ratio of research and development to GDP	4.93%	2.40%
Share of public research and development	25%	35%
Number of researchers (per 1,000 population)	8.9	7.2
Patent applications (residents)	180,479	2,845
Global Innovation Index Ranking	6	5
Venture capital investments	7.8 billion dollars	8.5 billion dollars
Number of unicorn companies	18	13
Share of technology exports	35%	42%

Singapore's innovation model is based on the concept of a "smart nation" and the government sees innovation as a key driver of economic development and national

competitiveness. As part of the Research, Innovation and Enterprise (RIE) 2025 plan, Singapore has allocated S$25 billion for 2021-2025.The Economic Development Board (EDB) manages foreign investment and technology transfer. In 2024, the EDB attracted S$15 billion in fixed investment and created over 20,000 highly skilled jobs.Singapore's One-North Innovation District covers 400 hectares and specializes in the biomedical, ICT and media sectors. By 2024, the district will employ over 950 companies and over 55,000 professionals.South Korea's "K-Innovation" strategy focuses on artificial intelligence, biotechnology, quantum computing, and the hydrogen economy. The government will invest 2.2 billion won in AI research by 2024.

Japan's corporate innovation model is based on long-term strategic planning, continuous improvement (kaizen), and active employee participation. The Toyota Production System and lean manufacturing concepts have transformed global manufacturing practices.Toyota Motor Corporation spent $10.6 billion on research and development in 2024 and filed more than 1,100 patent applications. The company's Toyota Research Institute employs more than 500 researchers in the field of artificial intelligence and automation.Sony Corporation follows an open innovation strategy and invests $500 million in startups through the Sony Innovation Fund. In 2024, Sony collaborated with more than 50 universities and more than 200 startups.

Germany's Mittelstand model is based on the innovative potential of medium-sized businesses. The 3.5 million Mittelstand companies account for 52% of the German economy and provide 68% of exports.Siemens AG spent 6.3 billion euros on research and development in 2024 and filed more than 4,000 patent applications. Siemens' venture arm Next47 has a fund of 1.2 billion euros and has invested in more than 80 startups.The Bosch Group spends 7.9 billion euros on research and development annually and employs 85,000 researchers and engineers. The company's Bosch Startup Harbour program collaborates with more than 30 technology startups.Germany's Industrie 4.0 initiative is driving the digital transformation of manufacturing. The Platform Industrie 4.0 brings together more than 350 companies and organizations. In 2024, Germany invested 35 billion euros in Industry 4.0 technologies.

Japan's Society 5.0 concept focuses on the integration of human-centered society and technology. Keidanren (Japan Business Federation) brings together over 1,500 companies in Society 5.0 initiatives.Japan's Tsukuba Science City will house over 300 public and private research institutes. By 2024, Tsukuba will employ over 20,000 researchers and publish over 2,000 scientific papers annually.

Germany's Munich Innovation District specializes in biotechnology and medical technology. The district is home to over 500 biotech companies and 35,000 professionals.Japanese corporations are developing a global network of R&D centers. Honda R&D Americas, Honda R&D Europe, and Honda R&D Asia Pacific create innovations tailored to local market needs.German companies have over 2,000 R&D centers in China. Volkswagen operates five R&D centers in China and employs 4,500 engineers.Each innovation model has its own advantages and limitations. The open innovation model provides rapid innovation and cost optimization, but intellectual property management is complicated. The Triple Helix model creates a balance between fundamental research and practical application, but faces institutional coordination challenges.

The cluster model enhances local competitive advantages, but increases the risk of regional disparities due to geographical concentration. The state-run model allows for rapid achievement of strategic goals, but there is a risk of disrupting market mechanisms. The corporate model provides sustainable innovation, but is slow to adapt to radical changes.

Several important trends are observed in the global innovation landscape in 2024. First, the emergence of hybrid models - countries are combining the best elements of different models. For example, China is implementing a "dual circulation" strategy that combines state management and open innovation.

Second, the Sustainable Development Goals (SDGs) are becoming an integral part of innovation strategies. The European Green Deal program envisages investments of 1 trillion euros to achieve carbon neutrality by 2050.

Third, the post-pandemic era has accelerated the digitalization of innovation processes. Virtual collaboration platforms, AI-based research and quantum computing are creating new innovation opportunities.

The ASEAN Innovation Roadmap 2025 aims to unite Southeast Asian countries into a single innovation space. The EU-Japan Strategic Partnership Agreement strengthens scientific and technical cooperation.

The Belt and Road Science, Technology and Innovation Cooperation Action Plan facilitates technology transfer between China and more than 80 countries.

Conclusion and suggestions.

The analysis of innovation models of foreign countries shows that there is no universal "best" model. Each country should choose a model that is appropriate for its institutional environment, cultural characteristics, and level of economic development.

A successful innovation ecosystem should include the following elements: a strong research base and human capital; effective financing mechanisms; institutional cooperation and coordination; intellectual property protection and technology transfer; entrepreneurial culture and venture capital; global networks and international cooperation.

The innovation development strategy plays an important role in modernizing the economy of Uzbekistan and increasing its competitiveness. Although a number of reforms have been implemented in our republic in recent years to support innovation activities, there is a need to further improve the national innovation ecosystem based on the study of global experience and advanced international models. The recommendations below are aimed at adapting international experience to the conditions of Uzbekistan and creating effective cooperation mechanisms between the public administration, business and science sectors. Through these approaches, it will be possible to fully realize the innovative potential of our country and ensure sustainable economic growth:

1. Development of a hybrid innovation model - combining open innovation and cluster approaches with strategic public management.
2. Strengthening university-industry cooperation - accelerating knowledge transfer by introducing elements of the Triple Helix model.
3. Creation of regional innovation clusters - developing clusters based on technological specialization of Tashkent, Samarkand and other cities.
4. Expanding international cooperation - creating mechanisms for integration into global innovation networks and technology transfer.
5. Development of innovation infrastructure - expanding the network of technoparks, incubators and accelerators.

International experience shows that innovative development requires a long-term strategic approach, sustainable financing, and effective cooperation between various stakeholders. Uzbekistan can build on its unique advantages and use global best practices to create a competitive innovation ecosystem.

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