

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KYIV NATIONAL ECONOMIC UNIVERSITY
NAMED AFTER VADYM HETMAN**

**Faculty of International Economics and Management
Department of International Economics**

BACHELOR DEGREE	«INTERNATIONAL ECONOMICS»
FIELD OF KNOWLEDGE	05 Social and behavioral sciences
SPECIALTY	051 «Economy»

Form of education full-time

BACHELOR THESIS

**Title «THE INNOVATIVE COMPONENT OF THE ECONOMIC
DEVELOPMENT OF THE «ASIAN TIGERS» (ON THE EXAMPLE OF
(HONG KONG, TAIWAN, REPUBLIC OF KOREA, SINGAPORE)»**

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Attestation Examination Commission (EC)**

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(Signature)

KYIV 2024

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AGREED

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full-time form of education

Bachelor Thesis

Title: **«THE INNOVATIVE COMPONENT OF THE ECONOMIC
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**The title of the Bachelor's thesis has been approved by the Rector's Order
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Plan of Bachelor Thesis and the terms of its submission to the Academic Supervisor

Chapter 1. Theoretical and methodological foundations of the economic development of countries

Chapter 2. Analysis of the economic development of «Asian tigers» and the implementation of the experience for the economy of Ukraine

Object of research:	The process of economic development of the «Asian tigers» - Hong Kong, Taiwan, the Republic of Korea and Singapore in the second half of the XX - early XXI century.
Subject of research:	The innovation component of the economic development of the «Asian tigers».
The purpose of the Thesis:	To analyze the innovation component of the economic development of the «Asian tigers» (Hong Kong, Taiwan, the Republic of Korea, Singapore) and to identify the factors of their success on the way to building innovation-oriented economies.

Specific tasks applicant has to accomplish to meet the objective:

In Chapter 1:

1. Analyze the essence, main concepts and indicators of countries' economic development.
2. Study the theoretical foundations of innovative development and the role of innovation in economic growth.
3. Examine methodological approaches to assessing national innovation systems and innovation ecosystems.

In Chapter 2:

1. Analyze the dynamics and key trends in the innovative development of the "Asian tigers" in the second half of the 20th and early 21st centuries.
2. Study the evolution of innovation strategies and policies used by Hong Kong, Taiwan, South Korea and Singapore at different stages of development.
3. Examine the role of state institutions in stimulating innovation, building innovation infrastructure and attracting foreign investment in the "Asian tigers".
4. Analyze the peculiarities of the formation of national innovation systems and the development of human capital in Hong Kong, Taiwan, South Korea and Singapore.
5. Determine the contribution of the innovation factor to the global competitiveness of the "Asian tigers" economies.

6. Summarize the experience of successful innovative transformations of the "tigers" and outline the possibilities of adapting their approaches for Ukraine.
7. Formulate recommendations for enhancing innovation development in Ukraine based on the practices of the "Asian tigers".

**The task has been set
by the Academic Supervisor**

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Review
on the bachelor's thesis
of the student of the bachelor's degree program "International Economics"
of the Faculty of International Economics and Management
Bobrov Oleksandr on the topic of

**“The innovative component of the economic development of the "Asian tigers"
(on the example of (Hong Kong, Taiwan, Republic of Korea, Singapore))”**

1. Relevance of the topic: In modern conditions of globalization, more and more countries of the world are reorienting themselves to innovative technologies that can change the structure of the economy and ensure economic development. “Asian tigers” belong to the group of countries that have chosen innovations in their development strategies. Therefore, the research of the problem of the innovative component of the economic development of the "Asian tigers" is relevant.
2. Positive aspects of the bachelor's thesis: a sufficient level of quality research on the theoretical and methodological foundations of the economic development of countries, in particular, the essence and main concepts of economic development, paradigms of innovativeness of economic development of “Asian tigers”. Systematization of methodological tools and indicators of economic development is important in the work.
3. Presence of author's independent developments: the student conducted an in-depth analysis of the economic development of “Asian tigers”, the key trends in the innovative development of Hong Kong, Taiwan, Republic of Korea, Singapore; innovative strategies for the development of “Asian tigers” in global markets were analysed. The independent author's developments include assessment of success factors and challenges of economic development of the “Asian tigers”. Statistical and informational data are widely used in the work. The work contains a large number of tables, figures, diagrams.
4. Value of theoretical conclusions and practical recommendations: identified key factors of success of the «Asian tigers» in the innovation sphere can be used to form innovation policy in Ukraine and they can be implemented in the innovative development strategy of Ukrainian companies.
5. Presence of drawbacks: Some provisions of the Thesis are descriptive in nature. In particular, the effects of the introduction of innovations in Ukraine defined in Table 2.10 do not have a methodological justification, which was chosen by the author of this study.
6. Overall assessment of the bachelor's thesis and its admission to defense: the research topic is fully disclosed, at a sufficient level, the work is written according to the requirements, it is allowed to be defended before the Examination Committee with an assessment of **42 points**.

Supervisor:

PhD in Economics, Associate Professor
of the Department of International Economics of KNEU

Moskalyuk N.

“ 08 ” June 2024 year

CONTENT

INTRODUCTION.....	3
CHAPTER 1	8
THEORETICAL AND METHODOLOGICAL FOUNDATIONS OF THE ECONOMIC DEVELOPMENT OF COUNTRIES	8
1.1 The essence and main concepts of economic development	8
1.2. Paradigms of innovativeness of economic development of «Asian tigers» 15	
1.3. Methodological tools and indicators of economic development	25
CHAPTER 2	33
ANALYSIS OF THE ECONOMIC DEVELOPMENT OF «ASIAN TIGERS» AND THE IMPLEMENTATION OF THE EXPERIENCE FOR THE ECONOMY OF UKRAINE	33
2.1. Key trends in the innovative development of «Asian tigers»	33
2.2. Innovative strategies for the development of «Asian tigers» in global markets.....	44
2.3. Assessment of success factors and challenges of economic development of the «Asian tigers».....	50
2.4. Adaptation of the experience of innovative development of «Asian tigers» for Ukraine	55
CONCLUSION	63
BIBLIOGRAPHY	67

INTRODUCTION

The example of the successful economic transformation of the «Asian tigers» is extremely relevant for understanding the causes and consequences of the rapid economic development of developing countries. Studying their past experience helps us recognize effective strategies and tools that can be transferred to other countries.

Relevance of the topic. The experience of the «Asian tigers» demonstrates the need for a balanced approach to policies that promote the development of a science-based ecosystem, a combination that includes measures aimed at supporting science, education, entrepreneurship, and attracting foreign investment. Learning from this experience can help promote balanced innovation policies in other countries. The successful transition from «Asian tigers» to innovation-based economies is of great importance for countries that want to overcome their technological disadvantage and move towards higher economic development. The study of the role of innovation in the economic growth of the Asian tigers contributes to a better understanding of the link between innovation, productivity, competitiveness and economic growth, which is relevant for most countries on the planet.

Analysis of recent research and publications. The experience of the tigers in the field of innovative development has aroused great interest among scholars both in Asia and abroad. In numerous scientific publications and studies, scholars discuss various aspects of innovation policies that have led to the economic growth of Hong Kong, Taiwan, the Republic of Korea, and Singapore. In particular, Singh's (2018) monograph explores the role of innovation in the long-term development of the Tigers and other countries in the Asia-Pacific region. Kim et al. (2019) examine the progress of South Korea's innovation system and the transition from imitator to innovator. Wong (2020) examines Singapore's successful example in creating a proper innovation climate through

particular the role of high-tech clusters. Yeoh and Li (2022) discuss the evolution of Hong Kong's innovation system and the challenges it poses. The World Bank (2019) provides a comparative analysis of the innovation systems of the «Asian Tigers» and other East Asian countries. UNCTAD (2021) examines the experience of these countries in the context of developing innovation strategies for other developing countries.

The purpose of this study is to analyze the innovation component of the economic development of the «Asian tigers» (Hong Kong, Taiwan, the Republic of Korea, Singapore) and to identify the factors of their success on the way to building innovation-oriented economies.

To achieve this goal, it is necessary to fulfill the following **tasks**:

- to study the theoretical foundations of innovation development, the role of innovation in economic growth, and approaches to the formation of innovation ecosystems;
- to analyze the economic dynamics and growth trajectories of the «Asian tigers» in the second half of the twentieth and early twenty-first centuries;
- to study innovation strategies and innovation policy instruments used in Hong Kong, Taiwan, the Republic of Korea and Singapore at different stages of their development;
- to study the role of state institutions in stimulating innovation, building innovation infrastructure and attracting foreign direct investment in these countries;
- to analyze the peculiarities of the formation of national innovation systems and human capital development in the «Asian tigers»;
- to determine the contribution of the innovation factor to the competitiveness of the economies of Hong Kong, Taiwan, South Korea and Singapore in global markets;
- summarize the experience of successful innovative transformations of the «tigers» and outline the possibilities of adapting their approaches for other countries;

- to formulate recommendations for enhancing innovation development in Ukraine based on the study of the practices of the Asian tigers.

The object of research in this thesis is the process of economic development of the «Asian tigers» - Hong Kong, Taiwan, the Republic of Korea and Singapore in the second half of the XX - early XXI century.

The subject of the study is the innovation component of the economic development of the «Asian tigers».

In the study of the innovation component of the economic development of the «Asian tigers», it is advisable to use a number of **methods**, in particular:

- statistical analysis - to study the dynamics of macroeconomic indicators, R&D investments, patent activity, indicators of innovative activity of enterprises, etc. in Hong Kong, Taiwan, the Republic of Korea and Singapore.
- historical method - to examine the evolution of innovation strategies and policies of these countries at different stages of their development.
- comparative analysis - to identify commonalities and differences in the innovative approaches of the studied countries, as well as to compare them with other countries.
- case study - for a detailed analysis of successful innovation projects, clusters, companies, etc.
- content analysis - for studying legislative acts, programs, strategies for innovative development in these countries.
- expert methods - to involve the opinions of specialists, business representatives, and scientists in assessing the effectiveness of innovation policy.
- systems analysis - to consider the innovation ecosystem as an integrated system with interconnected elements.
- strategic planning methods - to formulate recommendations for the implementation of successful tiger practices in Ukraine.
- benchmarking method - to identify the best global practices of innovative development.

- graphical and tabular methods - for visualizing statistical data and analysis results.

This study of the innovative factors that contributed to the rapid economic development of the «Asian tigers» (Hong Kong, Taiwan, South Korea, and Singapore) is of great theoretical, methodological, and practical importance. In theoretical terms, it helps to systematize and deepen knowledge about the key role of innovation as a driving force for the development of countries that are catching up with developed economies.

From a methodological point of view, the study offers a comprehensive approach to analyzing innovation **strategies and tools for stimulating innovation** at different stages of development. It also improves the methods for assessing the effectiveness of innovation policy and its impact on economic growth, and forms a system of indicators for monitoring innovation ecosystems.

The results have important **practical implications**, as the successful experience of the Tigers can be used to develop innovation strategies in Ukraine and other countries. The study formulates practical recommendations for improving the effectiveness of state innovation policy, attracting investment, building innovation infrastructure, training and integrating into global innovation networks.

Various information sources were used to study the **innovative component** of the development of the «Asian tigers». In particular, scientific works of domestic and foreign scholars on the issues of innovative development, formation of national innovation systems, and the role of innovation in economic growth. An important resource was the official statistical data of international organizations (World Bank, OECD, UNCTAD, UNECE) on innovation activity, R&D investments, and global innovation rankings. Legislative acts, strategies and program documents of the governments of Hong Kong, Taiwan, South Korea and Singapore on innovation policy were thoroughly studied. Materials from the official websites of the relevant ministries and agencies were used. Analytical reports of consulting companies, reports of international organizations on the innovation potential of «tigers» and the

effectiveness of their innovation strategies were used. The materials of scientific conferences, round tables, and expert discussions were analyzed.

CHAPTER 1

THEORETICAL AND METHODOLOGICAL FOUNDATIONS OF THE ECONOMIC DEVELOPMENT OF COUNTRIES

1.1 The essence and main concepts of economic development

Economic growth refers to the quantitative increase in the production of goods and services in an economy over a certain period of time. It is measured by the gross domestic product (GDP), whose growth in real terms characterizes the country's economic growth. Instead, economic development implies qualitative changes in the structure of the economy that accompany the process of economic growth. It is not limited to the increase in output alone, but includes fundamental institutional, technological, and structural changes in the economic system.

The key difference between these concepts is that economic growth focuses on quantitative changes, while economic development is concerned with qualitative transformations. GDP growth is an indicator of economic growth, but it does not always reflect economic development (Table 1.1). The latter involves structural changes, such as the transition from the agricultural to the industrial sector, the development of the service sector, and the introduction of innovations. In addition to increased production, economic development includes improvements in the welfare of the population, quality of life, education, and health care. It also requires institutional and cultural changes, legislative reform, fighting corruption, and transforming public consciousness.

Table 1.1 - Author's Approaches to Defining the Definition of «economic development»

Source: [1, 3]

Author	Definition
Michael Todaro	Defines economic development as «a multidimensional process that covers the reorganization and reorientation of the entire economic and social system».
Joseph Stiglitz	It considers economic development as «a process of transformation of society aimed at better realization of

	the values of freedom, opportunities and dignity of people».
Amartya Sen	It defines economic development as «the process of expanding the freedoms that people value - freedoms that help to lead the kind of life that people have reason to value».
Olivier Blanchard and Gerhard Achen	Describes economic development as «a process of gradual and sustainable increase in real national income accompanied by gradual structural changes».

Continuation of the table 1.1

Most definitions of economic development provided by well-known researchers emphasize qualitative transformations in the economy and society, structural changes, improved welfare and expanded freedoms. They emphasize that economic development is a broader and more multidimensional process than just the growth of production or national income.

In particular, it is about the need to reorganize and reorient the entire economic and social system, as Michael Todaro notes. Amartya Sen emphasizes the expansion of people's freedoms to make life choices they value. Oliver Blanchard and Gerald Eichen emphasize the gradual but sustainable structural changes that accompany economic development.

In addition, economic development implies a transformation of society aimed at better realization of the values of freedom, equal opportunities and dignity of people, according to Joseph Stiglitz. Robert Bado points out the need for changes in the institutional and technological spheres.

Michael Blaut emphasizes that development is not only about growth, but also about changing lifestyles, improving education, productivity, living standards, and social equality. According to Paul Streeten, economic development requires a multidisciplinary approach and is aimed at improving welfare in a broad sense.

Assessing the level of economic development of countries is an important task that requires the use of various indicators and approaches [3]:

1. GDP and GDP per capita. The most common indicators of economic development are gross domestic product (GDP) and GDP per capita. However, the use of these indicators alone has certain limitations, as they do not take into account the qualitative aspects of development, uneven distribution of income, and the environmental and social impacts of economic growth.
2. Human Development Index (HDI). This indicator, calculated by the United Nations Development Program (UNDP), is a more comprehensive measure of development that combines estimates of GDP per capita, education, and life expectancy. The HDI provides a broader picture of development than the economic dimension alone.
3. The Inclusive Development Index. Developed by the World Economic Forum, this indicator assesses economic progress in terms of its effects on income distribution, labor market inclusiveness, and social service coverage.
4. Competitiveness indices. Indices such as the Global Competitiveness Index are calculated to measure the ability of national economies to achieve sustainable economic growth over the medium term. They assess the key factors of productivity and competitive advantage of countries.
5. Indicators of economic innovation. The Global Innovation Index, the European Innovation Scoreboard and other similar metrics are used to measure the level of innovation in countries, which is an important driver of their economic development. These indices assess innovation capabilities, investments, and results.

To ensure the correctness, comparability, and reliability of indicators of socio-economic development of countries, they are calculated using clearly defined methodologies. Let us consider methodological approaches for a number of key indicators. GDP per capita at purchasing power parity is calculated by dividing a country's GDP for the year by its resident population. GDP is measured in national prices and converted into US dollars at a special exchange rate that seeks to level out price differences between countries.

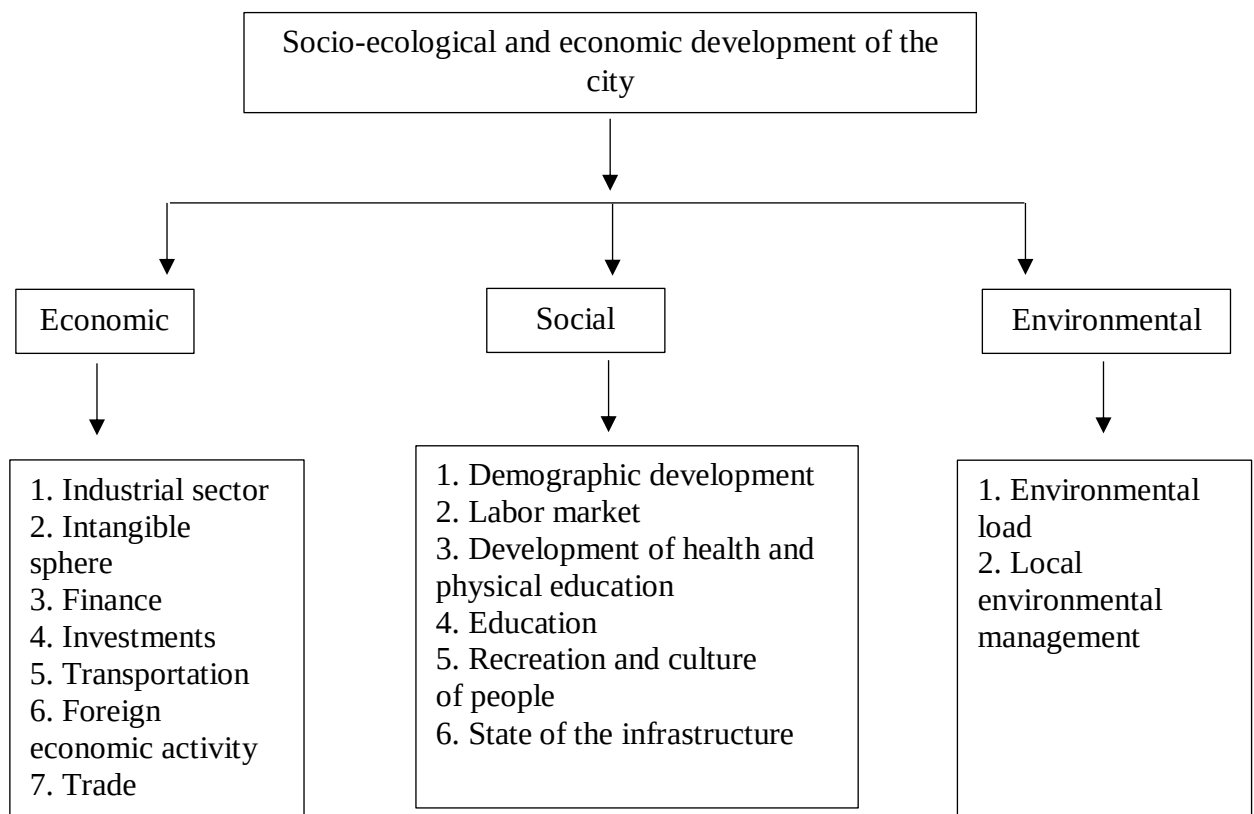
The Human Development Index is based on three components: life expectancy at birth, education level (average and expected years of schooling), and standard of living (GNI per capita at purchasing power parity). All components are normalized to values between 0 and 1, and then averaged to determine the final HDI.

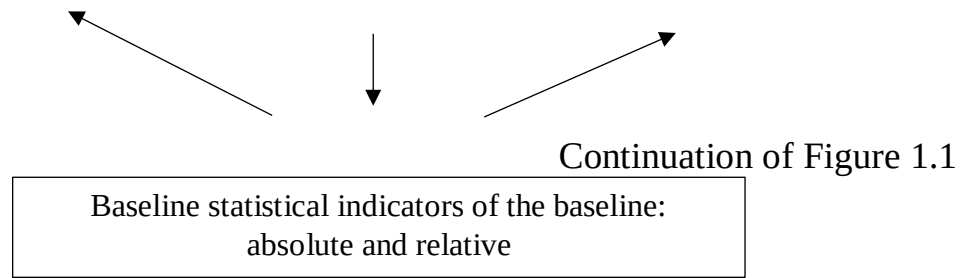
The Inclusive Development Index is calculated using factor analysis based on 12 indicators grouped into three sections: growth and development, inclusiveness, and future opportunities for prosperity. The Global Competitiveness Index is based on 12 components that determine a country's productivity, including institutions, infrastructure, macroeconomic stability, education, market efficiency, technological readiness, and innovation potential. Its calculation involves collecting statistical data and interviewing respondents [5].

The Global Innovation Index consists of two sub-indices: innovation resources (institutions, human capital, infrastructure, market and business development) and innovation outcomes (knowledge, technological and creative achievements). The sub-indices are formed by aggregating 81 individual indicators. Strict adherence to the methodology ensures the reliability of indicators of socio-economic development of countries for comparative analysis.

Figure 1.1 - Hierarchical system of statistical indicators, partial criteria and integral indicators of socio-ecological and economic development of the city

Source: created by the author on the basis of [7]





To comprehensively monitor the economic development of countries, systems of statistical indicators are used to cover various aspects of this multidimensional process. In particular, the system of national accounts provides consistent macroeconomic statistics on GDP, investment, consumption, and foreign trade. The system of productivity indicators tracks the efficiency of labor, capital, and other resources. Employment indicators reflect the state of the labor market, unemployment, and employment conditions. Price indices help monitor inflationary processes.

Structural statistics illustrate sectoral shifts in GDP, employment, and corporate assets. Environmental indicators assess the impact of the economy on the environment and the efficiency of natural resources management. Social indicators characterize demographic development, poverty, inequality, education, and healthcare. Innovation statistics include data on R&D investments, patents, and innovation activities of firms. The use of a comprehensive system of indicators provides a thorough tracking of quantitative and qualitative aspects of economic development (Table 1.2).

For a comprehensive comparison and assessment of the achievements of countries in various areas of economic, social and innovative development, specialized global rankings are used, calculated by reputable international organizations on the basis of a large number of indicators. These ratings are an important tool for monitoring the progress of countries, identifying their strengths and weaknesses, and determining priority policy areas [5].

Table 1.2 - Using specialized global rankings to compare the development results of countries

Source: [4]

Rating	Developer	Scope of coverage	Key indicators/components
Human development index	United Nations Development Program (UNDP)	Living standards, health, education	- Life expectancy - Literacy rate - Gross national income per capita
Global Competitiveness Index	World Economic Forum	Productivity and competitiveness	- Institutions - Infrastructure - Macroeconomic stability - Health - Skills - Commodity markets - Labor market - Financial system - Market size - Business dynamics - Innovation potential
Global innovation index	WIPO, Cornell University, INSEAD	Innovative development	- Institutions - Human capital and research - Infrastructure - Development of the domestic market - Business development - Knowledge and research results - Creative goods and services
Corruption Perceptions Index	Transparency International	Level of corruption	- Expert opinions
Environmental performance index	Yale and Columbia Universities	State of the environment	- State of the environment - Ecosystem viability - Biodiversity - Air quality

			- Sanitation - Resources
Prosperity Index	Legatum Institute	Welfare and development	- Economic quality - Business environment - Public administration - Education - Health - Security - Personal freedoms - Social capital - Natural environment

Continuation of Table 1.2

The global rankings presented in the table cover a wide range of aspects of economic and social development, from living standards, education and health to competitiveness, innovation, the environment and corruption. They are based on a large number of indicators and are calculated by recognized international organizations using transparent methodologies. The use of these rankings helps countries to objectively assess their achievements and challenges on the path to sustainable development in comparison with other countries. The analysis of global rankings is an important tool for developing effective development strategies at the national and international levels.

Ensuring the reliability of data and the correctness of calculations of country development indicators is critical to obtaining objective and relevant results. Leading international organizations follow a number of best practices in this area. First, they use reliable data sources - official national statistics and data from reputable international institutions, which are carefully collected and verified. Strict input data quality criteria, error correction procedures, and missing data compensation are applied.

Calculations are based on a clear and transparent methodology that is subject to public discussion and expert review. Scientifically based statistical methods are used, including multivariate analysis and econometric modeling. Methodologies are

periodically revised to reflect new trends and a better understanding of development processes [6].

It is important to involve independent experts to verify and assess the relevance of indicators, as well as to ensure transparency of processes and impartiality of assessments. Openness of data and results for verification by other researchers is also the norm. In addition, independent audit and evaluation of methodologies, training for staff on global standards of data collection and analysis, and international coordination of efforts of different organizations are used.

1.2. Paradigms of innovativeness of economic development of «Asian tigers»

Innovative development is a process of systemic transformations in the economy and society, driven by the continuous generation, implementation and dissemination of new ideas, knowledge, technologies, products, services and business models. Such development ensures sustainable economic growth, increases labor and capital productivity, opens up new markets and areas of activity, and improves the quality of life of citizens.

Innovative development plays a crucial role in economic progress for several key reasons. First, the introduction of innovations in technology, production processes, and ways of organizing work leads to an increase in resource productivity. Secondly, innovations ensure the creation of new types of products and services, expanding their range and quality in line with changing consumer needs. Thirdly, innovation opens up entirely new industries, markets, and business areas, stimulating long-term economic growth. Fourth, the development of human capital, knowledge and competencies of employees is becoming a key source of competitive advantage in an innovative economy. Fifth, innovative solutions allow for more efficient use of limited natural resources through the application of energy and resource-saving technologies. Sixth, innovations open up opportunities for solving global problems in the areas of healthcare, climate change, and food supply. Finally, innovation

processes ensure the structural modernization of national economies and strengthen their competitiveness in the global market [6].

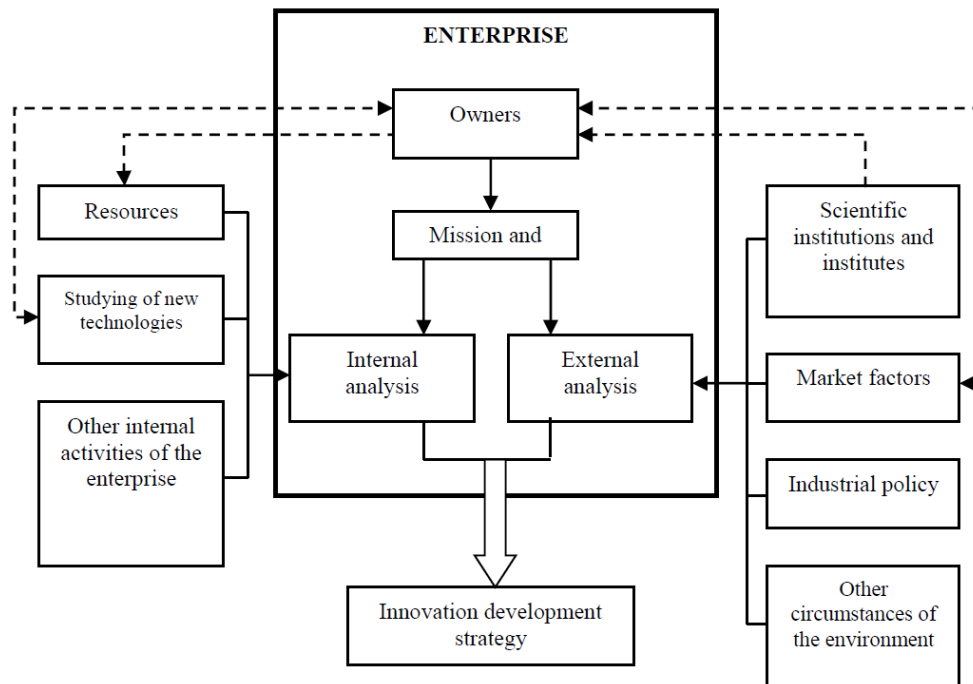


Figure 1.2. The main elements of the strategy of innovation development in international business

Source: [4]

The «Asian Tigers» (Hong Kong, Taiwan, the Republic of Korea, and Singapore) have made a gradual transition from an import-substituting to an export-oriented development model, and subsequently to the formation of the preconditions for an innovative economy. This process can be divided into several stages (Table 1.3):

1. Import-substituting industrialization (1950s-1960s). In the early years of their formation, the Tigers pursued a policy of import substitution, protecting the domestic market and developing labor-intensive industries (textiles, food, etc.) aimed at meeting domestic demand.
2. Transition to export-oriented industrialization (1960s-1970s). Recognizing the limited domestic markets, these countries began to stimulate export

- production by attracting foreign investment, creating export zones, and reducing trade barriers. The focus shifted to exports of labor-intensive goods.
3. Development of high-tech industries (1980s-1990s). An active industrial policy was aimed at importing advanced technologies, building human capital, and developing R&D infrastructure. This contributed to the growth of high-tech exports.
 4. Formation of an innovative economy (2000s - present). There is a shift from importing technology to developing its own innovative capabilities. Emphasis is placed on building national innovation systems, stimulating research, venture capital investment, and commercialization of innovations [6].

Table 1.3 - Key paradigms, strategies and instruments of innovation policy

Location	Hong Kong	Taiwan	Republic of Korea	Singapore
1950s-1960s (Import substitution)	- Policy of openness to foreign investment - Development of education and infrastructure	- Protection of the domestic market - Public investment in industry - Borrowing of foreign technologies	- Import-substituting industrialization - State subsidies to priority industries	- Attracting foreign investment - Tax incentives for industry - Development of education
1970s-1980s (Export orientation)	- Reduction of tariffs - Export zones - Development of labor-intensive industries	- Export orientation strategy - Subsidies and privileges for exporters - Development of high-tech industries	- Export orientation - State investments in R&D - Support for large conglomerates	- Export orientation - Infrastructure development - Stimulation of high technologies
1970s-1980s (Export orientation)	- Liberal innovation policy	- Acceleration of R&D - State programs of	- National innovation system	- Public investment in R&D - Attracting talent

	- Promoting technology transfer - Development of clusters	science development - Innovation clusters	- Public-private partnership in R&D - Innovation clusters	- Development of innovation hubs
2010s - present (Deepening innovation)	- Development of biotechnology - Financing of start-ups - Smart innovations	- Financing of start-ups - Stimulating investments in R&D - Talent development programs	- Strategy of the creative economy - Stimulating radical innovations - Large state R&D projects	- Venture capital investment - Financing of start-ups - Innovation platforms

Continuation of the table 1.3

Source: [10]

As can be seen from the table, the «Asian tigers» moved from import substitution policies and attracting foreign investment to active export orientation of production. At later stages, they focused on building innovation capacity through R&D incentives, the creation of innovation clusters, public-private partnerships, and talent attraction. In the most recent period, the emphasis is on deepening innovation, financing start-ups, radical innovation, and building a creative economy.

In the Republic of Korea, the government played a leading role as the «architect» of the innovation system through targeted R&D funding, subsidizing priority industries, and establishing public research institutes. At the same time, large private conglomerates (chaebols) were key players in commercializing innovations and building corporate R&D centers. Universities provided training for researchers.

In Taiwan, the government emphasized the formation of innovation clusters in the fields of information technology, semiconductors, and communications. This was accompanied by tax preferences for R&D, the establishment of technology parks and incubators for small businesses. Leading universities were actively involved in applied research in close cooperation with companies.

In Singapore, the key role was played by the government's targeted policy of attracting foreign direct investment in high-tech industries, as well as the creation of a powerful state research base. Considerable efforts were made to build human capital and attract foreign talent.

Hong Kong has chosen a more liberal strategy, relying on market forces and creating a favorable business environment for innovation. At the same time, the government has invested in education, infrastructure, and clustering in priority areas, including biotechnology (Table 1.4).

Table 1.4 - Mechanisms for attracting foreign direct investment, technology transfer, and the creation of high-tech industries

Mechanism	Hong Kong	Taiwan	Republic of Korea	Singapore
Tax incentives	Low income tax rates, tax exemptions for certain industries	Tax holidays and benefits for high-tech companies	Tax incentives for R&D, special economic zones with preferential treatment	One of the lowest corporate tax rates, tax incentives for strategic industries innovation
Financial incentives	-	Grants, subsidized loans for innovative companies	Interest-free loans, state investment funds for high-tech startups	R&D grants, venture capital financing
Special economic zones	-	Science parks, export zones with preferential treatment	Free economic zones with developed infrastructure	Numerous specialized technology parks
Favorable business environment	Free market economy, minimal government intervention	Simplified procedures for starting a business, liberal trade policy	Deregulation, protection of intellectual property rights	Simple tax system, high freedom of entrepreneurship
Human resources	Open door policy for talents	State programs for training	Large-scale public investment in	Active involvement of foreign

		scientific personnel	education and science	specialists and scientists
R&D support	Indirect through the creation of a business environment	State laboratories, cooperation between universities and industry	State research institutes, financing of corporate R&D	Large public investments in science and innovation

Continuation of the table 1.4

Source: [11]

The key mechanisms for attracting investment and developing high technologies were tax and financial incentives, the creation of specialized economic zones, the formation of a favorable business climate, human resource development, and government support for research and development. The emphasis varied depending on the chosen development strategy, but in general, the tigers used a wide range of tools.

The development of innovation clusters and related infrastructure has played a key role in the innovative development of the Asian tigers.

In the Republic of Korea, the government actively encouraged the formation of innovation clusters in strategic industries such as electronics, automotive, shipbuilding, and chemicals. Specialized technology parks and research centers have been established to concentrate resources and synergies between companies, universities, and government laboratories. Examples include the Daejeon Research Center, Gwangju Automotive Cluster, etc.

In Taiwan, the formation of innovation clusters was centered around the IT sector, semiconductors and electronics. The leading role was played by the Hsinchu Science Park, which brought together the capacities of technology companies, startups, incubators, and research institutions. Clusters in Taipei and Xinzhou were also important. The government provided financial and organizational support for the development of this innovation ecosystem [8].

In Singapore, the cluster policy focused on the areas of electronics, biotechnology, chemical industry, and precision engineering. Numerous technology parks were established, including the Singapore Science Park, Bio-One Capital, and

Tech Innovation. The state actively attracted foreign direct investment in these clusters, supporting them with the necessary infrastructure and benefits.

In Hong Kong, the government promoted the creation of clusters in telecommunications, financial technologies, and biotechnology. In particular, the Hong Kong Science Park and the information technology cluster in Kibun have become platforms for the concentration of companies, startups, and R&D centers.

The cluster policy has allowed the Tigers to maximize positive externalities from collaboration between participants in the innovation process, ensure knowledge transfer, and establish horizontal and vertical links along the value chain in high-tech sectors [36].

«The Asian Tigers» paid great attention to strategies for developing human capital and training skilled professionals for innovation, recognizing their key role in ensuring economic progress. These strategies included:

1. Large-scale investments in the education system at all levels, from primary to higher education. Efforts have been made to improve the quality of education, especially in STEM (science, technology, engineering, and mathematics) fields.
2. Compulsory free secondary education was introduced and access to higher education was gradually expanded. This ensured the formation of a critical mass of qualified personnel.
3. Involvement of foreign teachers and experts, use of advanced curricula to improve the quality of educational services.
4. Large-scale support for students to study abroad, especially at leading universities, with the subsequent return of the knowledge and experience gained.
5. Creation of specialized scientific and technical universities and retraining centers to develop research and train personnel for knowledge-intensive industries.
6. Establishing close ties between universities, research institutes and industry for the practical training of innovative specialists.

7. Actively attracting foreign talent, scientists, and engineers through special programs and preferences.
8. Creation of appropriate infrastructure, laboratories, and technology parks for practical innovation activities.
9. Financial incentives, grants, scholarships to motivate people to choose innovative professions.

One of the key factors in the innovative development of the Asian tigers was the targeted selection of priority research areas and high-tech industries to concentrate limited resources and maximize the impact of efforts. Although priorities varied between countries, there were both common and specific areas of focus (Table 1.5).

Table 1.5 - Priority areas of research and development of high technologies

Country	Priority areas
Hong Kong	Biotechnology, information and communication technologies, financial technologies, new materials
Taiwan	Semiconductor industry, ICT, precision mechanics, electronics, telecommunications
Republic of Korea	Electronics, automotive, shipbuilding, mechanical engineering, chemicals, new materials
Singapore	Life sciences, electronics, chemical industry, information and communication technologies, precision engineering

Source: [13]

As we can see, there were certain common priorities for the «Asian tigers», particularly in the areas of electronics, information and communication technologies (ICT), biotechnology, and new materials. These shared focus areas reflected the global trends in scientific and technological progress that were shaping the world economy at the time. Countries like Hong Kong, Taiwan, South Korea, and Singapore recognized the immense potential and strategic importance of these cutting-edge sectors for driving future economic growth, enhancing productivity, and gaining a competitive edge in international markets.

However, beyond these common themes, each of the «Asian tigers» also had its own specific emphasis and priorities when it came to targeting specific high-technology domains for development. These unique focal points were determined by a combination of factors, including the countries' existing competencies, technological capabilities, available human capital and research infrastructure, as well as their specific strategic objectives and long-term economic development goals.

For instance, Taiwan's emphasis was heavily tilted towards the semiconductor industry, precision machinery, and telecommunications, building upon its early strengths and establishing itself as a global powerhouse in these fields. South Korea, on the other hand, prioritized sectors such as electronics, automotive manufacturing, shipbuilding, and chemical industry, reflecting its industrial base and ambitions to become a diversified economic powerhouse. Singapore's priorities included biomedical sciences, chemicals, and precision engineering, leveraging its strategic location and strong focus on attracting foreign direct investment and talent [21].

Such tailored prioritization allowed these countries to concentrate their often-limited resources in areas where they could realistically achieve a competitive advantage and maximize the returns on their investments. It also enabled them to create specialized innovation ecosystems, nurture relevant talent pools, and develop robust supply chains catering to their chosen priority sectors.

By striking a balance between aligning with global technological trends and capitalizing on their unique strengths and capabilities, the «Asian tigers» were able to chart their own distinct paths towards becoming innovation-driven, knowledge-based economies while avoiding excessive overlap or direct competition with one another. Focusing on priority areas made it possible to mobilize and coordinate limited resources more effectively, and to achieve a critical mass of investment and staffing. This became the basis for the formation of powerful innovation clusters that ensured technological breakthroughs and global competitiveness of the «Asian tigers» in their respective sectors.

In the process of innovative transformation of their economies, the Asian tigers used a wide range of instruments of state support for innovation and stimulation of private sector innovation. In the Republic of Korea, this included direct targeted funding of R&D through state research institutes, subsidies and tax breaks for innovative projects of private companies, state venture capital funds for start-ups, formation of public-private technology alliances, and coordination of efforts of large conglomerates in strategic innovation programs.

In Taiwan, the key role was played by the creation of specialized science parks, incubators and innovation clusters, the introduction of tax holidays and preferences for high-tech firms, government grants and subsidized loans for innovative projects, programs for training scientific personnel and stimulating cooperation between universities, state laboratories and businesses.

Singapore used a strategy of attracting foreign direct investment in high-tech industries, made large-scale public investments in building its own research base and human capital development, provided grants for commercialization of research and implementation of innovations, provided financial support for start-ups through venture capital funds, and created a preferential regime for scientific and technological development zones [12].

Hong Kong chose a more liberal approach of indirect support by creating a favorable business environment, investing in the development of innovation infrastructure - technology parks, incubators. Tax incentives for innovative businesses were also applied, as well as funds to support early-stage start-ups and programs to attract highly qualified foreign specialists.

The «Asian Tigers» have achieved remarkable success in transforming their economies through innovation. The key drivers of these achievements have been prudent and consistent government policies that have considered stimulating innovation as a strategic priority for economic development. Effective interaction between the state, private business, academia, and educational institutions within national innovation systems also played a crucial role. In the early stages, active

attraction of foreign direct investment and transfer of advanced technologies were critical.

Huge efforts were made to develop human capital through large-scale investments in training highly qualified personnel for innovation. Innovation clusters in priority industries were purposefully formed through the integrated use of financial, tax, and infrastructure tools to support innovation. The Tigers were gradually moving away from a policy of catch-up development to generating their own innovative breakthroughs.

At the same time, they faced a number of critical challenges on the way to innovative transformation. These included limited domestic markets and resources, which required export orientation, a weak research base at the beginning and dependence on imported technologies, insufficient private investment in innovation, and a lack of experience in government regulation of the innovation sector [9].

1.3. Methodological tools and indicators of economic development

Economic analysis is an important tool for researching and justifying management decisions in the economic sphere. Its essence lies in a comprehensive, systematic study and evaluation of economic processes, phenomena and results of business entities' activities in order to identify existing problems, reserves and areas for improving the efficiency of their operation.

The main purpose of economic analysis is to obtain objective, reliable and timely information for making informed management decisions to improve the competitiveness, profitability and sustainability of economic entities at various levels of management. The key objectives of economic analysis also include diagnosing the current state, identifying trends and patterns of development, assessing the impact of various factors, forecasting dynamics and justifying measures to optimize operations [5].

Uses of Economic Analysis

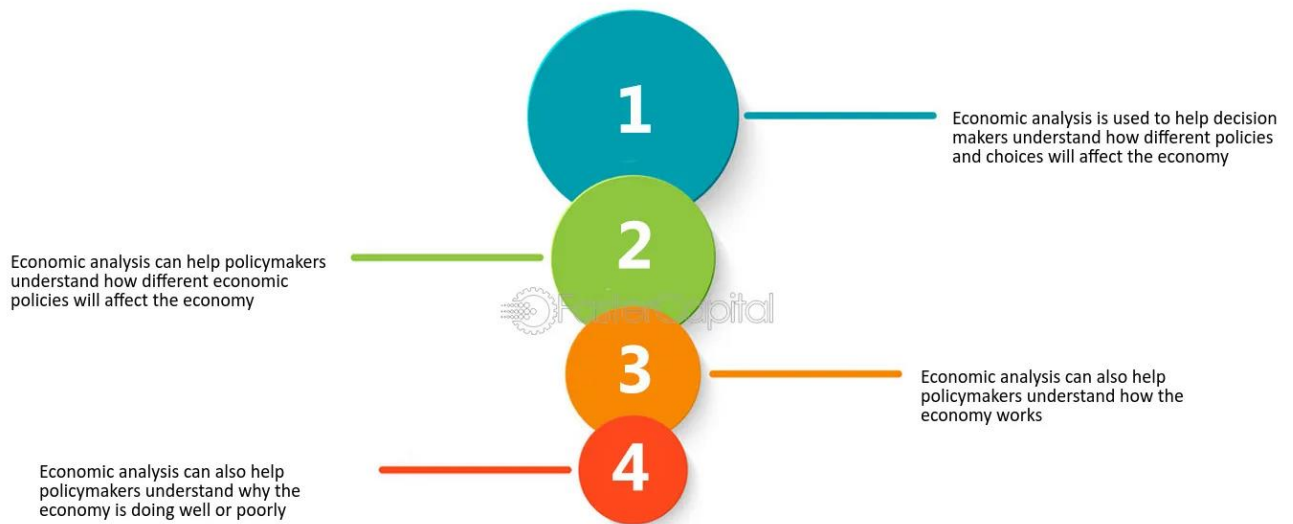


Figure 1.3. Using economic analysis

Source: [15]

Economic analysis is based on the following fundamental principles:

1. Scientificity - the use of modern scientific methods, approaches and research models.
2. Systematic approach - consideration of economic objects as integral, interconnected systems.
3. Comprehensiveness - a comprehensive study of various aspects of economic activity.
4. Objectivity - impartiality, reliability and accuracy of the results obtained.
5. Efficiency - focus on identifying and implementing efficiency improvement reserves.
6. Efficiency - timeliness of analysis and recommendations.
7. Schedulability - consistency with the overall planning and management system.

Assessing the economic efficiency of projects and programs is an important stage in analyzing and justifying management decisions. There are two main approaches to such an assessment: static and dynamic performance analysis.

Static analysis methods are based on the calculation of performance indicators for a single period, without taking into account the time factor. These include calculating the return on investment, payback period, and capital efficiency ratio. Although these methods are easy to apply, they have limitations because they do not take into account the time value of money.

In contrast, dynamic analysis methods are based on discounting cash flows over the entire project life cycle. The most common of these is the calculation of Net Present Value (NPV), which determines the excess of discounted benefits over discounted costs. Other indicators, such as the Internal Rate of Return (IRR) and the Modified Internal Rate of Return (MIRR), also allow for the time factor. These methods are more reasonable because they take into account the time value of money [16].

A wide range of methodological approaches and tools are used to gain a deeper understanding of the economic environment and manage risks in economic activities.

One of the key elements of the analysis is the methods of forecasting and assessing economic dynamics. This involves the use of mathematical and statistical methods, such as regression, trend, and exponential analysis, to identify patterns of economic processes in the past and extrapolate them into the future. Econometric models are also widely used to quantify the relationships between economic variables and to substantiate forecasts.

At the same time, a thorough analysis of macroeconomic trends and cyclical development is carried out. The study of the dynamics of key indicators, such as gross domestic product, employment, and inflation, allows us to identify the phases of the economic cycle, identify changes in market conditions, and respond to them in a timely manner.

An important tool is also the assessment and management of risks in economic activity. This involves qualitative (SWOT analysis, brainstorming) and quantitative (sensitivity analysis, simulation modeling, game theory) risk analysis techniques. Determining the probabilities and consequences of risk events allows us to develop effective strategies to minimize and hedge them.

In addition, economic and mathematical modeling, including optimization, simulation, and balance sheet models, is widely used. They allow quantifying alternative development scenarios, analyzing the effects of various management decisions, and determining the best options for action in the face of constraints and uncertainty.

Economic analysis plays a key role in the management decision-making process at all levels of the economy. Its results help to identify problems, diagnose the current state, evaluate performance, forecast trends and justify strategic and operational management decisions [13].

The use of a system of economic indicators and targets is an important tool for assessing the effectiveness of the economic policy of public authorities. Monitoring of macroeconomic, sectoral, social, innovation, and other indicators allows tracking the effectiveness of regulatory, fiscal, monetary, and structural policies, etc. This helps to improve the validity and effectiveness of management decisions at the state level.

Modern economic research involves a combination of quantitative and qualitative methods of analysis. Along with statistical, mathematical, and econometric methods that provide accurate quantitative estimates, expert, sociological, comparative, and situational methods are important, as they allow for a comprehensive consideration of socioeconomic, organizational, and institutional factors. This mixed approach enhances the objectivity and practical orientation of economic research.

In the current context of globalization, digitalization, and growing uncertainty, areas for improving the methodological tools of economic analysis include: the development of forecasting and analytical models, consideration of socio-

environmental aspects, use of big data, artificial intelligence, and cloud technologies, and strengthening of interdisciplinary approaches. These areas will improve the accuracy, speed, and adaptability of economic analysis in the face of dynamic changes [17].

The modern economic development of countries increasingly depends on the ability to create, implement and commercialize innovations. Innovation has become a key factor in increasing the competitiveness of both individual enterprises and national economies in general. That is why monitoring and analyzing key economic indicators related to innovation is an important task for governments and researchers.

The key indicators characterizing a country's innovative development include:

1. Gross domestic product (GDP) - the total amount of value added produced in the country. This indicator reflects the overall economic condition of the state.

$$GDP = C + G + I + NX \quad (1.1)$$

where:

C - personal consumption;

G - government procurement;

I - gross private investment;

NX - net exports (exports - imports).

Gross Domestic Product (GDP) is one of the key indicators characterizing the economic development of a country. It is important for assessing the efficiency of the state's economic activity and its place in the system of global economic relations.

For a country, GDP means the total amount of value added produced in the country. GDP reflects the aggregate value of all final goods and services produced in the country over a certain period (usually a year). It is an indicator of the total amount of economic activity in the country. High and growing GDP indicates the economic well-being of a country, while low GDP or its decline indicates economic stagnation and crisis. GDP per capita is used as an indicator of the standard of living in a country, demonstrating how efficiently the available resources are used to meet the needs of citizens. The size of GDP and its dynamics affect the country's position

in international economic cooperation, including its negotiating power, investment attractiveness, and export potential. GDP is the basis for calculating state budget revenues and determining the amount of a country's contributions to international organizations.

2. The share of innovative products in GDP shows the contribution of the innovation sector to the country's economic growth.

$$\text{Share of innovative products in GDP} = (\text{Volume of innovative products sold} / \text{GDP}) * 100\% \quad (1.2)$$

The share of innovative products in GDP is an important indicator that reflects the role of the innovation sector in the country's economic development. A high share of innovative products in GDP indicates that the introduction of new technologies, processes and products is a driving force for the development of the national economy, ensuring increased productivity, competitiveness and added value. This indicator reflects the level of innovation activity of a country, demonstrating how efficiently it generates, commercializes and implements innovations in production, giving an idea of the country's innovation potential. A high share of innovative products in GDP indicates that the country is focused on the development of knowledge-intensive industries, high technologies and intellectual activity, and increases its competitiveness in global markets. An analysis of the dynamics of this indicator allows us to assess the effectiveness of government programs and incentives aimed at supporting innovation [33].

3. Export of innovative products in global markets - characterizes the competitiveness of national innovations in the global market.

$$\text{Exports of innovative products} = \text{Volume of innovative products sold in foreign markets} \quad (1.3)$$

Exporting innovative products to global markets is important for a country in several ways. The ability of a country to produce and successfully export innovative goods and services indicates a high level of its technological development,

availability of advanced knowledge and competencies, which increases the country's competitive position in the global market. Exports of innovative products allow a country to occupy more profitable niches in the international division of labor, receiving a larger share of added value from the sale of high-tech products. This helps to diversify exports, reducing the country's dependence on exports of raw materials or traditional products with low added value. Successful exports of innovations also increase the country's attractiveness for foreign direct investment in new production and R&D, and provide foreign exchange earnings that increase resources for financing socio-economic development. In addition, a high share of innovative exports creates a positive international image of the country as a technologically advanced and globally competitive one.

4. Foreign direct investment (FDI) in the innovation sector - indicates the attractiveness of the country for external financing of innovation activities.

$$\text{FDI} = \text{Value of shares and units held by foreign investors} + \text{Reinvested earnings} + \text{Other long-term capital} \quad (1.4)$$

Foreign direct investment (FDI) is essential for a country's economic development. FDI provides an inflow of additional capital into the country, contributing to the increase of production capacity, renewal of fixed assets and introduction of the latest technologies. Foreign investors usually bring advanced technologies, management practices, and business competencies, which contributes to the modernization of the national economy. Foreign investment stimulates the growth of labor productivity and output, improves the quality and expands the range of goods and services, increasing the country's competitiveness. FDI is directed to high-tech industries oriented to foreign markets, which increases the country's export capacity. Foreign investment helps to create additional jobs, reduce unemployment and improve the welfare of the population. Foreign investors can provide local companies with access to new foreign markets through their sales channels and established relationships. The activities of foreign companies also generate

additional revenues for the state budget in the form of taxes and other mandatory payments [37].

5. The share of FDI in GDP shows the importance of foreign capital for the development of the economy's innovation potential.

$$\text{Share of FDI in GDP} = (\text{FDI/GDP}) * 100\% \quad (1.5)$$

The share of foreign direct investment (FDI) in a country's GDP is important in several ways. A high FDI share indicates that a country is successfully integrated into the international investment system and is attractive to foreign investors. FDI provides the country's economy with not only financial capital, but also new production capacities, managerial knowledge, advanced technologies, and know-how.

Foreign investment contributes to the modernization of production, the introduction of innovations, and the development of export potential, thereby increasing the country's productivity and competitiveness. FDI inflows can also stimulate economic growth by providing additional investments, creating new jobs, and increasing budget revenues. In addition, FDI is often directed to high-tech industries, contributing to the transition to a more innovative and knowledge-based model of economic development.

CHAPTER 2

ANALYSIS OF THE ECONOMIC DEVELOPMENT OF «ASIAN TIGERS» AND THE IMPLEMENTATION OF THE EXPERIENCE FOR THE ECONOMY OF UKRAINE

2.1. Key trends in the innovative development of «Asian tigers»

The evolution of the innovation policy of the Asian tigers from borrowing foreign technologies to creating their own innovation potential was a gradual and multi-stage process that took place in parallel with the economic development of these countries.

In the early stages of their development in the 1960s and 1970s, the Tigers focused on import substitution policies and attracting foreign technology and direct investment. This allowed them to build an industrial base, gain experience, and begin to develop their own production capabilities.

For example, South Korea and Taiwan actively attracted foreign licenses, invited foreign experts, and created joint ventures for technology transfer in the fields of electronics, engineering, and more. Singapore and Hong Kong offered tax and other preferences to attract technological multinational companies.

In the 1980s and 1990s, there was an increased emphasis on developing domestic research capabilities. State research institutes and innovative infrastructure were created, training programs were launched, and cooperation between universities and businesses was established.

The state played a leading role by funding R&D and providing incentives for innovative companies. National innovation systems were formed to commercialize research results [14].

Since the 2000s, the «tigers» have moved on to generate their own breakthrough innovations, especially in the areas of ICT, electronics, and biotechnology. A critical mass of human and institutional capital was achieved. The internationalization of innovations and integration into global value chains intensified (Table 2.1).

The transition of the «Asian tigers» from an emphasis on import substitution and export-oriented industrialization to the development of a knowledge and innovation economy is clearly illustrated by the data on the change in the structure of their economies and the growth of the innovation component.

Table 2.1 - Structural changes in the economy

Country	Share of industry in GDP, %.		Share of services in GDP, %.	
	1970	2023	1970	2023
Hong Kong	32%	7%	64%	93%
Taiwan	32%	36%	48%	63%
Republic of Korea	27%	38%	48%	59%
Singapore	30%	21%	58%	79%

Source: [25]

As we can see, the «Asian tigers» have undergone significant structural shifts in their economies, indicating their gradual transition from an industrial-export model to the formation of knowledge and innovation-based economies. This process has been accompanied by a decline in the share of industry in gross domestic product in favor of rapid growth in the service sector.

This trend is typical for economically developed countries, where value creation is increasingly dependent on intangible assets, intellectual capital, and innovation rather than traditional industrial production. The development of knowledge-intensive services in the fields of information technology, finance, consulting, research and development has become the driving force behind the economic growth of the «tigers» (Table 2.1).

Table 2.2 - Growth of the innovation component

Country	R&D expenditures, % of GDP		Number of patents by residents	
	1970	2023	1970	2023
Hong Kong	0,15%	0,89%	27	865
Taiwan	1,16%	3,46%	2 159	63 232

Republic of Korea	1,89%	4,64%	5 505	238 839
Singapore	0,59%	1,94%	40	1 737

Continuation of Table 2.2

Source [25]

The rapid increase in the number of patents registered by residents of the «Asian tigers» is also evidence of increased innovation activity. This indicates an intensification of the processes of generating, commercializing, and protecting new technological developments and innovations.

Thus, the structural changes in the economy, the growing funding of research and development, and patent activity clearly reflect the emphasis that the «tigers» have gradually shifted towards innovative development and the formation of knowledge-based economies, which has become the key to their technological leadership and global competitiveness.

The growing role of the state in the formation of national innovation systems, setting priorities for innovation development and implementing relevant programs and strategies has become one of the key trends for the «Asian tigers» on the way to building innovation-oriented economies. In the early stages of their economic growth, these countries mainly relied on borrowing foreign technologies and attracting foreign direct investment. However, over time, they realized the need to develop their own scientific and technological competencies and a systematic approach to innovation management at the national level.

The state took on the role of the main architect of national innovation systems, combining the efforts of various actors - government agencies, universities, research institutes and the private sector. Specialized agencies for science, technology and innovation were established. Tiger governments have begun to play a leading role in setting strategic priorities for innovation development, focusing on industries with high growth potential and the ability to provide technological leadership. Examples include electronics, ICT, biotechnology, new materials, etc [19].

To implement these priorities, large-scale government programs were developed to stimulate research and development, human resource development, and the creation of innovative infrastructure. Various instruments of direct and indirect support for innovation were introduced. The state also played a key role in coordinating the efforts of various stakeholders, forming public-private partnerships, building clusters, and providing the necessary funding for innovation projects.

The «Asian Tigers» realized that large-scale investments in human capital development, education and science are critical prerequisites for innovation and the formation of knowledge-based economies. This trend is clearly evident in their economic development strategies (Table 2.3).

First, enormous efforts were made to build a strong education system at all levels, from primary school to university. Governments introduced compulsory free secondary education and gradually expanded access to higher education.

Table 2.3 - Indicators of education coverage of the population

Country	Gross share of population coverage, %.		
	Primary education	Secondary education	Higher education
	2023	2023	2023
Hong Kong	106%	100%	27%
Taiwan	99%	100%	29%
Republic of Korea	94%	97%	26%
Singapore	110%	100%	10%

Source: [22]

Secondly, special attention was paid to improving the quality of education, especially in the fields of science, technology, engineering and mathematics (STEM). Foreign teachers were attracted, advanced curricula were introduced, and the necessary infrastructure was created. Third, students were actively encouraged to study abroad, particularly at the world's leading universities. This made it possible to acquire relevant knowledge and practical experience, improving the quality of human capital. Fourth, large-scale funding was provided for scientific research and

the development of a strong research base, as evidenced by the growing R&D expenditures.

Specialized research institutes were created and reforms were implemented to strengthen the links between research, education, and industry. In addition to financial resources, governments have used various non-price incentives to encourage careers in science, education, and innovation.

In the early stages of their economic development, the Asian tigers pursued an active policy of attracting foreign direct investment, advanced technologies and knowledge transfer, realizing the critical importance of these factors for building their own industrial base and technological potential.

In particular, Singapore and Hong Kong initially focused on creating the most favorable investment climate for foreign companies. They offered low tax rates, simplified regulatory regimes, developed infrastructure, political stability, and a skilled workforce. This allowed them to quickly attract foreign direct investment (FDI) in labor-intensive and low-tech industries, which became the starting point of industrialization. Over time, the focus shifted to attracting FDI in more knowledge-intensive sectors, such as electronics, computers, and semiconductors. For this purpose, specialized industrial parks and technology clusters were created, and access to skilled labor was provided. South Korea and Taiwan initially pursued a policy of import substitution, protecting their domestic markets. However, later they also realized the need to attract foreign investment and technology by opening up their economies, simplifying regulations, and providing tax preferences (Table 2.4).

An important tool was technology transfer through licensing mechanisms, joint ventures, and the involvement of foreign specialists and engineers. This allowed the Tigers to gain experience with modern technologies and adapt them to local conditions [16].

Table 2.4 - Formation of innovation clusters and development of the necessary infrastructure

Country	Key innovation clusters	Infrastructure
---------	-------------------------	----------------

Hong Kong	- Kiburna cluster of information technologies - Biotechnology cluster in Science Park	- Hong Kong Science Park - Hong Kong Cyberport - Incubators and accelerators
Taiwan	- Hainan cluster of IT, semiconductors, telecommunications - Science parks in Taipei, Hsinchu	- Hainan Science Park - Incubators and technology transfer centers
Republic of Korea	- Electronics cluster in Daejeon - Automotive cluster in Gwangju - Other industry clusters	- Specialized technology parks - State research institutes - Technology transfer centers
Singapore	- Electronics and semiconductors cluster - Biomedical cluster - Precision Engineering Cluster	- Singapore Science Park - Biopolis - Fusionopolis - Areas of scientific development

Continuation of Table 2.4

Source: [25]

As can be seen from the table, the Asian tigers have purposefully formed innovation clusters in priority sectors such as information technology, electronics, biotechnology, and precision engineering. This was accompanied by the development of the necessary infrastructure - specialized technology parks, incubators, and technology transfer centers.

The goal was to create a favorable environment for the concentration of innovative companies, startups, and research institutes and to ensure their close interaction and synergy. The clusters also became points of attraction for foreign direct investment and the latest technologies.

One of the key trends in the innovative development of the «Asian tigers» was a gradual shift in the emphasis of their policies to the development of knowledge-intensive industries, high technologies and the service sector, which accompanied the transformation from industrialized to innovation-oriented economies.

In the early stages of their economic development, these countries tended to focus on developing labor-intensive industries with low and medium technology, such as textiles, footwear, and food. This provided employment and export earnings for the accumulation of initial capital.

However, over time, priorities shifted toward high value-added and knowledge-intensive industries. In particular, electronics, information and communication technologies, semiconductor industry, biotechnology, precision engineering, aerospace industry, and new materials became the focus industries.

This required enormous investments in the development of the research base, training of highly qualified personnel, creation of a specialized innovation infrastructure, and attraction of advanced technologies.

In addition to industrial sectors, the development of knowledge-intensive services in the areas of information technology, telecommunications, finance, consulting, research and development has become more relevant. These activities became the engines of innovation-driven growth in the economies of the tigers [23].

This sectoral shift was accompanied by a corresponding reorientation of government support policies that prioritized the development of high-tech industries and knowledge-intensive services through favorable regulation, financial incentives, proper infrastructure, and targeted human resource training.

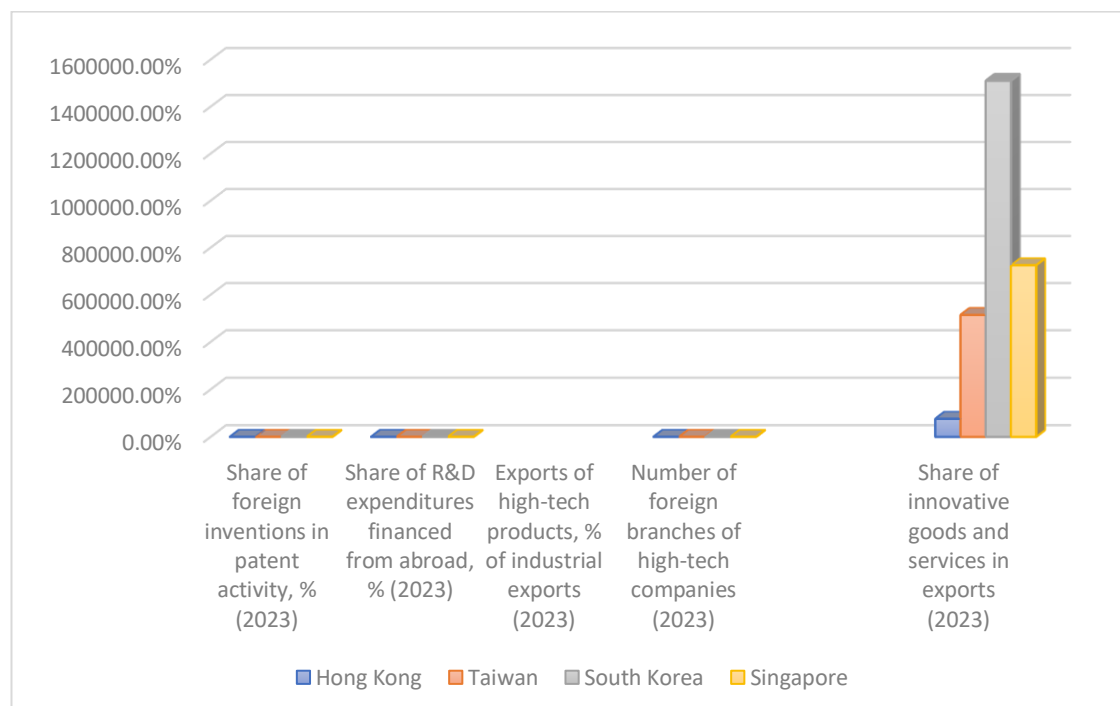


Figure 2.1. Growing internationalization of innovation activities of «Asian tigers»

Source: created by the author on the basis of [27]

In the context of the Fourth Industrial Revolution and the digital transformation that has swept the global economy, the Asian tigers have faced a whole range of challenges in adapting their innovation policies. One of the key tasks is to develop advanced digital skills and retrain the workforce to meet the needs of digital technologies, automation, and artificial intelligence, which requires a radical modernization of education and training systems.

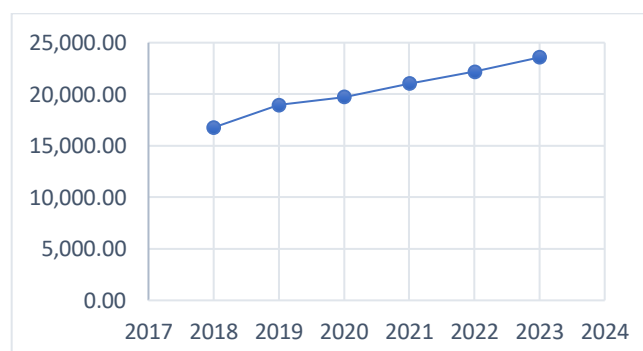
The growing digitalization of business processes raises the issue of cybersecurity, data privacy and integrity, which requires enhanced regulation in these areas. In addition, the overall regulatory environment needs to be adapted, making it flexible and adaptive to facilitate rather than hinder digital innovation.

An important challenge is to build the appropriate digital infrastructure - developed ICT networks, access to high-speed Internet, cloud computing, etc. - which requires significant investment. Against this backdrop, the task of stimulating innovative digital startups and entrepreneurship by creating a proper support ecosystem is emerging [18].

Digitalization naturally requires close international cooperation and coordination of standards, norms, and regulatory approaches. The proliferation of artificial intelligence and big data analytics raises ethical challenges, such as the need to develop clear ethical standards and ensure privacy. Finally, the Tiger governments should review sectoral priorities and support mechanisms to adapt industry, healthcare, and transportation to digital realities.

Figure 2.2. Growth dynamics of research and development (R&D) expenditures in 2018-2023

Source: created by the author on the basis of [27]



The dynamics of research and development (R&D) expenditures in Ukraine in 2018-2023 shows a general upward trend. The highest growth rates were observed in 2018-2019, when they exceeded 12% annually. After 2019, the growth rate slowed slightly, but still remained at a positive level of 5-7% annually. It is forecasted that in 2023, R&D spending in Ukraine will reach UAH 23.6 billion, which is 6.3% more than in 2022. Thus, the dynamics of research and development expenditures demonstrates a gradual increase in investment in the innovative development of the Ukrainian economy during the analyzed period.

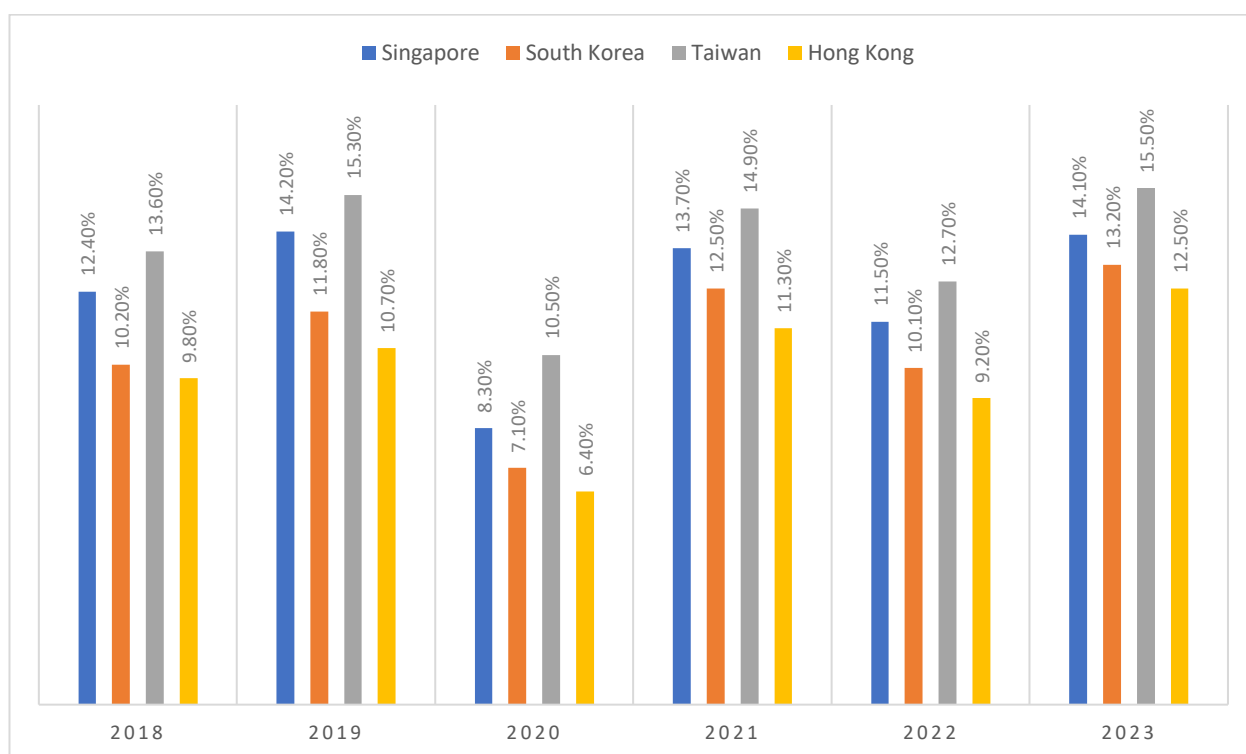


Figure 2.3. Growth dynamics of IT spending in Asian tigers in 2018-2023

Source: created by the author on the basis of [27]

As we can see, all four Asian «tigers» - Singapore, South Korea, Taiwan, and Hong Kong - demonstrate a steady increase in investment in the IT sector during 2018-2023. This indicates that these countries consider the development of digital technologies as one of the key priorities of their economic strategy.

The highest growth rates in IT spending are observed in Taiwan, with figures ranging from 10.5% in 2020 to 15.6% in the projected 2023. It is followed by

Singapore with growth rates ranging from 8.3% to 14.1% and South Korea - from 7.1% to 13.2% during the analyzed period.

Hong Kong, although showing slightly lower, but also steadily growing rates - from 6.4% to 12.5%. This shows that this economically developed Asian country also pays considerable attention to the development of digital technologies and IT infrastructure [26].

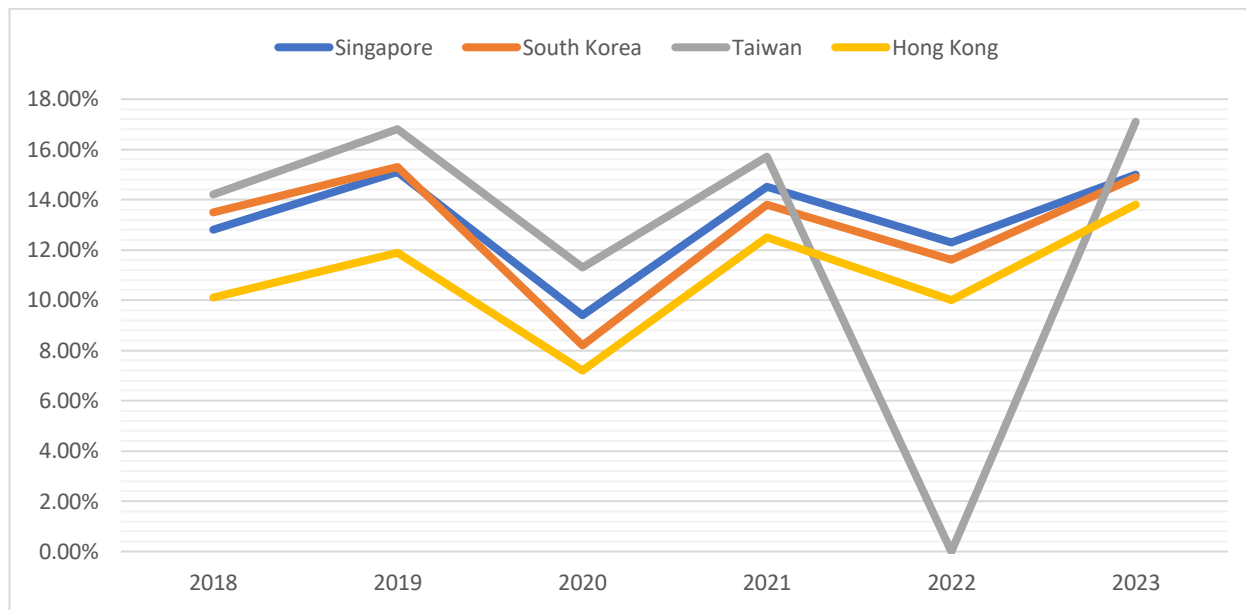


Figure 2.4. Dynamics of growth of investment costs in the innovation sector of Asian tigers for 2018-2023

Source: created by the author on the basis of [27]

The analysis of dynamics shows that all four Asian «tigers» demonstrate stable and intensive growth of investments in the innovation sector of the economy during 2018-2023. The highest growth rates are observed in Taiwan, followed by South Korea and Singapore. Hong Kong is also characterized by consistently high, but slightly lower rates than other countries. This trend indicates the priority of innovative development and the high investment attractiveness of the technology sector in the Asian «tigers».

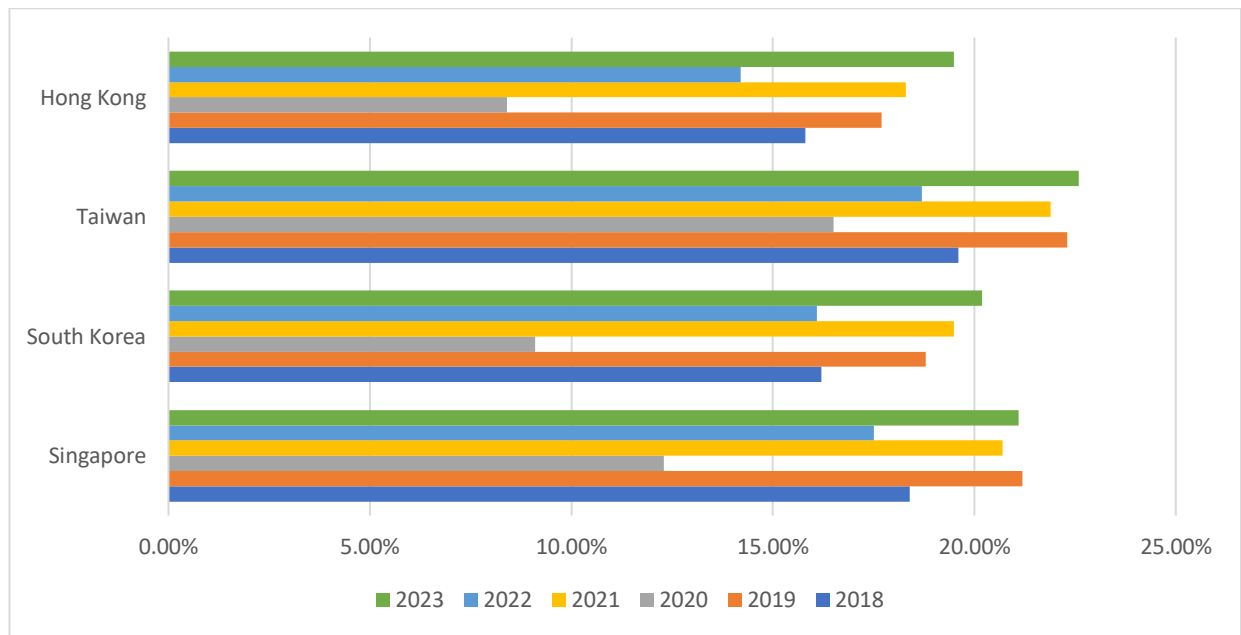


Figure 2.5. Growth dynamics of startup costs in Asian tigers in 2018-2023

Source: created by the author on the basis of [27]

Analyzing the dynamics of growth in startup spending in the Asian tigers over 2018-2023, the following conclusions can be drawn:

All four countries-Singapore, South Korea, Taiwan, and Hong Kong-show significant growth in startup investment during this period. The highest growth rates are observed in Taiwan, with figures ranging from 16.5% to 22.6%. This is followed by Singapore with rates ranging from 12.3% to 21.1% and South Korea with rates ranging from 9.1% to 20.2%.

Hong Kong, although somewhat lower, also showed high rates, ranging from 8.4% to 19.5% during the analyzed period.

It is worth noting that the highest growth rates occurred in 2018-2019 and 2021-2023. In 2020, under the influence of the COVID-19 pandemic, the pace slowed somewhat, but then resumed an upward trend.

2.2. Innovative strategies for the development of «Asian tigers» in global markets

The «Asian Tigers» have consistently implemented a strategy of integration into global high-tech value chains as an effective mechanism for attracting advanced technologies, knowledge, and access to global markets.

At the initial stages of their development, these countries sought to join the lower links of global production chains, specializing in labor-intensive assembly operations and the production of components for leading multinational companies. This allowed them to gain access to the latest technologies, master modern production practices, and gain a share of global markets.

Over time, as they built up their own technological capabilities and competencies, the «tigers» began to move up the chain, taking on more high-tech and knowledge-intensive links - from component manufacturing to product design, engineering, and marketing.

This required the development of national innovation ecosystems, the formation of qualified human capital, and the attraction of foreign investment in high-tech industries. The state played a key role by creating a favorable business environment, building infrastructure, and stimulating R&D [28].

An example of successful integration is the electronics and semiconductors sector, where «tiger» companies have taken leading positions in global chains by accumulating the necessary knowledge and technologies from world leaders.

This strategy allowed them to first borrow foreign technologies, adapt them, and then generate their own world-class innovations. At the same time, it retains the challenges of ensuring sufficient flexibility and technological autonomy for the "tigers" in the face of growing trade confrontations.

Realizing the limitations of domestic markets, these countries focused on conquering foreign markets for the products of such knowledge-intensive industries as electronics, semiconductor industry, information and communication technologies, biotechnology, etc. To achieve this goal, governments implemented a

comprehensive cluster policy. Priority high-tech sectors were identified and efforts were focused on building powerful territorial clusters in these industries.

The necessary infrastructure was created, including specialized technology parks, incubators, and technology transfer centers. Various incentives - financial, tax, and regulatory - were used to attract the world's leading companies and encourage research and innovation. Much attention was paid to personnel training and human capital development to meet the needs of specific clusters. Close cooperation was established between companies, universities, and research institutions on the basis of public-private partnerships.

Successful innovation clusters have become points of concentration of production, innovation, and export capabilities of countries. For example, Singapore's electronics cluster, information technology clusters in Taiwan, the automotive cluster in Gwangju (South Korea), etc. At the same time, the most favorable conditions for doing business were created, including deregulation, protection of property rights, simplified taxation, developed infrastructure and logistics, and access to financing [14].

The Asian Tigers have developed effective strategies for commercializing innovations, patenting and transferring technologies to global markets, which have become key elements in enhancing their global competitiveness:

1. Creating a favorable regulatory environment for the protection of intellectual property rights, including strengthening patent legislation in line with international standards. This stimulated innovation and foreign direct investment.
2. Development of state systems for patenting and commercialization of research results. Specialized agencies and technology transfer centers were established at universities and research institutes.
3. Introduce tax and financial incentives for companies that actively patent their innovations, invest in R&D, and commercialize technologies.

4. Financial support for the creation of start-ups for the commercialization of inventions through government grants, venture capital funds, and university incubators.
5. Facilitate the integration of national innovators into global value chains through mechanisms of technology transfer to multinational corporations.
6. Stimulating the development of licensing and technology transfer platforms to ensure interaction between researchers, companies and investors.
7. Targeted training of specialists in commercialization of innovations in business schools and technical universities.
8. Active patenting activities of state research institutes and state-owned corporations, including abroad.
9. Public-private partnership programs for joint commercialization of innovations and risk sharing between participants.
10. Branding and marketing strategies to introduce the technological developments of the «tigers» to global markets.

The «Asian Tigers» realized the critical importance of reliable protection of intellectual property rights and prevention of innovation leakage to ensure innovative development and global competitiveness of their economies. Therefore, they introduced a set of interrelated mechanisms to achieve this goal. First of all, national intellectual property protection regimes were harmonized in accordance with international agreements and standards, in particular, through the improvement of patent and copyright legislation. Specialized patent offices and courts were established to effectively handle disputes in this area [20].

An important element was the establishment of severe sanctions for infringement of intellectual property rights and the fight against piracy and counterfeiting. At the same time, tax and financial incentives were introduced for companies actively involved in patenting innovations, investing in R&D, and commercializing technologies. States subsidized the costs of patenting and legal support for startups and small businesses.

Insurance funds were created to protect innovative firms from infringement of intellectual property rights. Customs control over such violations in foreign trade was strengthened. Leading foreign experts were engaged to provide advice. International cooperation in the field of intellectual property protection was intensified. The Tigers also pursued a policy of retaining innovative talent and highly qualified personnel to prevent brain drain and loss of innovation.

To effectively promote their innovative products and services in global markets, the Asian tigers used a variety of branding and marketing tools. At the state level, special programs were implemented to brand and support the international expansion of national innovative companies and promote their technological developments. An example is the Korean program «Korean Brand» to facilitate the entry of corporations into foreign markets.

An important means of presenting the innovative achievements of the «tigers» was the organization of national pavilions and branded presence at leading international exhibitions, fairs, and industry conferences on innovation. This allowed them to demonstrate the latest solutions and attract partners and investors. Large-scale global marketing campaigns were also initiated to popularize top innovative products and companies.

Governments engaged leading international agencies and branding experts to develop effective strategies and communication campaigns. Significant innovation hubs and global events were formed to present national achievements. Foreign offices and support centers were established to promote innovative companies abroad. Digital marketing tools were actively used in the online space and social networks.

Innovative products were popularized through their use by well-known international organizations and personalities. The state also funded the participation of national innovators in global competitions and acceleration programs abroad. Such comprehensive branding and promotion efforts have become an important mechanism for reinforcing the international image of the Asian Tigers as leading centers of innovation.

In order to increase the global competitiveness of their companies, the "Asian tigers" actively used approaches to form international innovation alliances and clusters on the basis of national enterprises. In particular, they encouraged the conclusion of transnational strategic alliances between innovative leaders of countries and leading global corporations to exchange technologies, conduct joint research and integration into global value chains [19].

International consortia were created to develop and commercialize radical innovations in promising industries with the participation of government agencies, universities, and large and small innovative firms. International innovation clusters were formed around leading export-oriented national companies, with foreign partners, suppliers, and startups integrated into them.

Foreign branches of multinational corporations were involved in national clusters to transfer knowledge and technologies and integrate into global innovation networks. Joint research centers and laboratories of national firms with foreign partners were established to conduct advanced research.

The state encouraged innovative leaders to acquire high-tech assets and companies abroad to expand their competencies and global reach. Support was provided for the participation of national enterprises in international innovation programs, consortia, and cooperation networks. Commercial and institutional presence at key global innovation platforms was ensured to establish contacts.

Leading foreign universities and research centers were involved in the development of innovation ecosystems. International innovation brands were formed on the basis of national technologies and products. Such comprehensive integration into global innovation flows has become a critical factor in increasing the competitiveness of Asian tiger companies in global high-tech markets.

Thus, the main innovation strategies used by the «Asian tigers» for economic development can be systematized as follows:

1. Integration into global high-tech value chains:
 - Joining lower-level production chains initially to gain access to technology and markets.

- Gradual movement up the value chain to more high-tech and knowledge-intensive activities.
 - Developing national innovation ecosystems and human capital to support this transition.
2. Cluster development:
- Identification of priority high-tech sectors and creation of specialized territorial clusters.
 - Developing the necessary infrastructure, incentives and partnerships to support clusters.
 - Promoting cooperation between companies, universities and research institutions.
3. Commercialization of innovations:
- Strengthening the protection of intellectual property rights.
 - Establishing state systems for patenting and commercializing research results.
 - Providing tax and financial incentives for innovation.
 - Supporting the creation of innovative start-ups and technology transfer.
4. Branding and marketing of innovations:
- Development of national branding and marketing strategies for innovative products and companies.
 - Organization of national pavilions and participation in global innovation events.
 - Use of digital marketing and promotion of innovative achievements.
5. Formation of international innovation alliances and clusters:
- Encouraging strategic alliances between national and global corporations.
 - Creation of international innovation consortia and clusters around leading export-oriented companies.
 - Integration of foreign branches of multinationals and research centers into national ecosystems.
 - Facilitating the acquisition of foreign high-tech assets by national companies [37].

Thus, the key factors in the successful economic development of the Asian Tigers were an effective innovation-oriented public policy, the development of powerful national innovation systems, targeted attraction of foreign investment and technology, systematic development of human capital, as well as stimulation of entrepreneurial activity and the formation of favorable innovation ecosystems.

These countries have managed to organically combine strategic integration into global markets with the development of their own innovation potential, ensure reliable protection of intellectual property rights, and actively develop international cooperation in the innovation sector.

Thanks to this multifaceted approach, Hong Kong, Taiwan, South Korea, and Singapore have become recognized centers of innovation and world-class high-tech manufacturing, significantly strengthening their global competitiveness. Their experience is valuable for other countries seeking to achieve an innovative model of economic growth.

2.3. Assessment of success factors and challenges of economic development of the «Asian tigers»

The rapid economic growth and successful transition of a number of Asian countries, known as «Asian tigers», to an innovative model of development is of considerable interest to research. The experience of countries such as South Korea, Taiwan, Hong Kong, and Singapore demonstrates an example of dynamic transformation that deserves a detailed analysis.

Over the past decades, these countries have managed to make an impressive leap in their economic development, transforming from relatively poor states into modern high-tech economies. This has raised them to the level of the most developed countries in the world and has become a subject of admiration and study by both scholars and politicians [28].

Rapid GDP growth, significant exports, investment in innovation, and human capital development are just some of the characteristics of the «Asian miracle» that

has amazed the world. Each of these countries has followed its own unique path of transformation, but there are certain common factors that have ensured their success (Table 2.6).

Table 2.6 - Determinants of the success of the «tigers» in ensuring rapid economic growth

Factor	Description
The role of effective public policy and institutions	- Clear strategic vision and consistency in reforms - Effective state regulation and control
Attracting foreign direct investment and technology transfer	- Creating favorable conditions for foreign investors - Stimulating the inflow of advanced technologies and know-how
Focus on export-oriented industrialization	- Development of export-oriented industries - Improving the competitiveness of national products
Systemic investments in human capital development	- Large-scale educational reform and training of qualified personnel - Development of research and development potential
Creating a favorable business environment	- Deregulation and simplification of doing business - Access to financial resources and markets
Targeted policy of innovation capacity building	- Stimulating the introduction of innovations and commercialization of scientific developments - Investments in technological modernization of production

Source: [24]

The small size of domestic markets and the lack of natural resources in the «Asian tigers» forced these countries to actively enter foreign markets and attract imported resources.

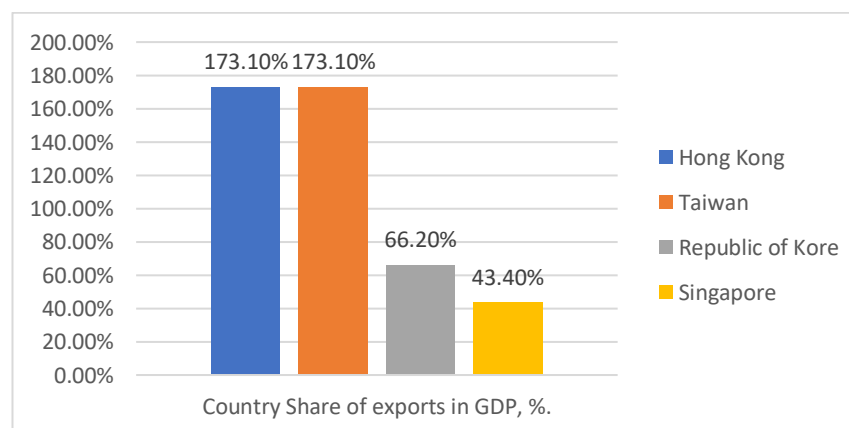


Figure 2.6. Share of exports in GDP in 2022 in selected «Asian tiger»

Source: created by the author on the basis of [27]

At the start of their economic transformation, these countries also had relatively underdeveloped scientific and technological potential. Thus, R&D expenditures in GDP in the 1980s amounted to 0.9% in South Korea, 0.4% in Singapore, and 1.2% in Taiwan. This forced them to actively attract foreign technologies through foreign direct investment and know-how transfer.

The transition from an agrarian and raw material-based to an industrial, and later post-industrial, model of development required significant structural changes in the economies of the Asian tigers. This was accompanied by the risks of a «brain drain» - highly developed countries often «intercepted» the most talented specialists from these countries.

In addition, rapid industrialization and urbanization led to a significant burden on the environment in the «tiger» countries. They were forced to take measures to mitigate the environmental consequences of accelerated economic growth.

As they developed, the Asian tigers faced increased competition from other fast-growing Asian economies. This posed an additional challenge to further maintain their leading positions.

South Korea relied on a strong state industrialization policy, the development of large diversified corporations (chaebols), and significant investments in education, science, and R&D. However, these successes were accompanied by certain problems, such as monopolization of markets by large corporations, the need to restructure the economy, and rising income inequality.

Taiwan has succeeded thanks to an effective system of training highly skilled personnel, the development of small and medium-sized businesses, and close integration with mainland China. However, it has faced geopolitical tensions with China, limited natural resources, and high levels of external debt [31].

Hong Kong has taken advantage of its favorable geographical location, free port status, efficient tax system, and high level of financial infrastructure. At the same time, it has been affected by its dependence on foreign trade and investment, rising income inequality, and problems with affordable housing.

Singapore has relied on a strong government development strategy, active attraction of foreign investment, investment in human capital, and effective anti-corruption policies. However, it faced challenges related to limited territory and natural resources, as well as dependence on the global economy and an aging population (Table 2.8).

Table 2.7 - The Impact of Geopolitical Factors, Trade Contradictions, and Threats of Technological Dependence on the Further Development of the Tigers

Factor	Impact on the «Asian tigers»
Geopolitical factors	- The escalation of the geopolitical confrontation between the United States and China creates additional risks for Taiwan and Hong Kong - The need to diversify foreign policy and economic ties to reduce dependence on a single center of power
Trade contradictions	- The aggravation of trade conflicts between the United States, China and other leading economies threatens to limit the access of «tigers» to foreign markets - The need to reorient export-oriented strategies to diversify markets and develop domestic demand
Threats of technological dependence	- Risks of losing technological advantages due to protectionist policies of leading countries and restrictions on technology transfer - The need to strengthen Ukraine's own scientific and technological potential and innovative capabilities to reduce dependence on technology imports

Source: [25]

Geopolitical factors, in particular the escalating conflict between the United States and China, pose additional risks to such «Asian tigers» as Taiwan and Hong Kong, which have close ties to both sides. This is forcing these countries to diversify their foreign policy and economic relations.

Against the backdrop of trade contradictions between the world's leading economies, the «tigers» face the threat of limited access to foreign markets. This requires them to reorient their export-oriented strategies and develop domestic demand.

In addition, the Asian tigers face the threat of technological dependence due to protectionist policies and restrictions on technology transfer by leading countries. This pushes them to strengthen their own scientific and technological potential and innovation capabilities.

To maintain their economic leadership in the face of new global challenges, the Asian tigers must improve their innovation strategies in key areas.

First and foremost, it is necessary to increase investment in research and development (R&D). This involves increasing public and private R&D funding to build up their own technological capabilities, developing research infrastructure, supporting research centers and technology parks, as well as attracting the world's leading scientific talent and stimulating international cooperation.

Human capital development is also important. This includes reforming educational systems to train qualified, creative professionals, investing in continuous training and retraining, and creating favorable conditions for attracting, retaining, and developing talented personnel [28].

Stimulating the innovation ecosystem is equally important. The key role here will be played by developing public-private partnerships in the innovation sector, simplifying the regulatory environment and removing barriers to entrepreneurship, as well as supporting startups, venture capital financing, and commercialization of new developments.

It is also necessary to diversify the technological specialization of the Asian tigers. This implies expanding the range of industries where they seek technological leadership, searching for new promising areas (green technologies, biotech, artificial intelligence, etc.), and preventing technological dependence on individual countries or industries.

Finally, it is important to strengthen international cooperation. This includes participation in global value chains, formation of strategic alliances, exchange of knowledge, technologies and experience with the world's leading innovation centers, and adaptation to changes in the global technological order.

2.4. Adaptation of the experience of innovative development of «Asian tigers» for Ukraine

To effectively adapt the experience of innovative development of the «Asian tigers» in Ukraine, it is important to analyze the current socio-economic and innovative situation of the country over the past 5 years. This will help identify key trends, challenges, and potential for implementing an innovation-oriented growth model.

Table 2.8 - SWOT – analysis Ukraine in the context of innovative development

Strengths - Availability of highly qualified scientific personnel, engineers, programmers - Developed system of higher education and research institutions - Traditions in basic science, space industry, and IT - Growing number of technology startups and innovative companies - Relatively low labor costs in high-tech sectors - Geographical location at the intersection of European and Asian trade routes	Weaknesses - Chronically low level of R&D funding (less than 1% of GDP) - Outdated material and technical base of scientific and educational institutions - Weak links between science, education, business and the state - Imperfect regulatory framework in the field of innovation - Outflow of highly qualified personnel abroad («brain drain») - Low commercialization of research results - Mismatch between the structure of the economy and the needs of innovative development
Opportunities - Attracting investments and technologies from developed countries - Integration into European and global scientific and innovation networks - Development of IT, robotics, green technologies and bioeconomy	Threats - Increased geopolitical tensions, military conflicts - Ineffective state policy, high level of corruption - Macroeconomic instability (inflation, devaluation, debt problems)

Export diversification through high-tech products Development of innovative infrastructure (technology parks, business incubators) Introduction of effective mechanisms of public-private partnership Reforming the education and science system to meet innovation needs	Increased competition in global high-tech markets Growing gap with technologically advanced countries Technological dependence on certain foreign centers and blocs Preservation of a conservative model of the economy focused on raw material exports
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Continuation of Table 2.8

Source: created by the author on the basis of [30]

The success of the «Asian tigers» in the innovation sphere was largely based on effective government policies and strong institutions. The key aspects of this were a strategic vision and sequence of reforms, effective government regulation and control, targeted investment in innovation development, the creation of a favorable business environment, and the development of an innovation ecosystem.

Clear long-term national development strategies focused on innovation, consistency in the implementation of agreed reforms, and adaptability to external changes provided strategic vision and policy continuity. A well-developed legal system, protection of intellectual property rights, transparency of regulatory mechanisms, and effective antitrust control contributed to effective state regulation and control.

Significant public investment in research and technological development, incentives for private investment in R&D, and direct support for promising industries and companies ensured targeted investment in innovative development. Deregulation, business facilitation, development of financial infrastructure, and cooperation between the government, business, science, and education created a favorable business environment [33].

Creation of technology parks, business incubators, technology transfer centers, support for startups, venture capital financing and commercialization of innovations, as well as stimulation of international cooperation and attraction of foreign talent contributed to the development of the innovation ecosystem.

In addition to effective government policies and institutions, the Asian tigers have relied on a number of other key factors to ensure their success in innovation. These include attracting foreign investment and technology, human capital development and training, and stimulating entrepreneurial activity and the innovation ecosystem.

Table 2.9 - Key factors of success of the «Asian tigers» in the innovation sphere

Factor	Characteristics
Attracting foreign investment and technology	- Creating favorable conditions for foreign direct investment - Encouraging the transfer of advanced technologies and know-how from foreign companies - Stimulating the creation of joint ventures with foreign partners
Human capital development and training	- Large-scale investment in the education system, including technical and engineering education - Training of highly qualified specialists focused on the needs of the innovation economy - Creating conditions for the return and retention of national scientific talent
Stimulation of entrepreneurial activity and innovation ecosystem	- Development of technology parks, business incubators, and technology transfer centers - Support for small and medium-sized innovative businesses, including startups - Developing venture capital financing and establishing effective interaction between science, business and government

Source: created by the author on the basis of [31]

The integrated use by the Asian Tigers of strategies to attract foreign investment and technology, systemic human capital development, and stimulate entrepreneurial activity and the innovation ecosystem has become an important

complement to effective public policy. These factors provided a powerful impetus for innovative development and transformation of their economies.

Creating favorable conditions for foreign direct investment allowed the Asian tigers to attract modern technologies, know-how, and management practices. Encouraging the transfer of advanced technologies from foreign companies, including by promoting joint ventures, has contributed to rapid technological upgrading.

Large-scale investments in the education system, especially in technical and engineering education, have ensured the training of highly qualified specialists focused on the needs of the innovation economy. In addition, conditions were created for the return and retention of national scientific talent, which played an important role in the development of innovation potential.

The development of technology parks, business incubators, technology transfer centers, support for small and medium-sized innovative businesses, including startups, and the development of venture capital financing stimulated entrepreneurial activity and the formation of a powerful innovation ecosystem. Effective interaction between science, business, and government ensured the commercialization of scientific developments.

When considering the potential for adapting the experience of the Asian Tigers for Ukraine, it is important to identify opportunities to implement their best practices and models, taking into account the national context [32].

The key opportunities for adapting the experience of the «tigers» in Ukraine are to adopt effective models of public policy and institutional support, attract foreign investment and technology, build a national human capital development system, and create a strong innovation ecosystem.

Forming a clear strategic vision and sequence of reforms focused on innovation development, improving the legal system, protection of intellectual property rights, antitrust regulation, and introducing effective mechanisms of public-private partnerships in the field of innovation - these steps can become important elements of adapting the experience of the «Asian tigers».

Creating favorable conditions for foreign direct investment, especially in high-tech sectors, stimulating the transfer of advanced technologies and know-how from foreign companies, and developing joint ventures with foreign partners to jointly develop innovations - these areas also have great potential for Ukraine.

Reforming the education system, especially technical and engineering education, to meet the needs of the innovation economy, creating conditions for the return and retention of talented national scientific and technical personnel, and encouraging continuous learning and retraining of employees can be important steps in building a national human capital development system.

Building a strong innovation ecosystem, including the creation of a network of technology parks, business incubators, technology transfer centers, development of venture capital financing, support for innovative small and medium-sized businesses, and establishing effective interaction between science, education, business, and the state - these elements also have great potential for adaptation in Ukraine [24].

Recommendations for implementing an innovation-oriented development model in Ukraine include strategic directions of state policy, measures to develop innovation infrastructure and ecosystem, mechanisms for financing innovation and supporting technological entrepreneurship, as well as the role of education, science and international cooperation.

The key strategic directions of the state policy should include the development of a clear long-term national strategy for innovation development with specific goals and priorities, ensuring consistency and synchronization of reforms at all levels of government, improving the regulatory framework aimed at stimulating innovation, as well as strengthening the protection of intellectual property rights and effective antitrust regulation.

The development of the innovation infrastructure and ecosystem requires the creation of a network of innovation clusters, technology parks, business incubators, technology transfer centers, stimulating interaction between research institutions, educational institutions, innovative companies and the state, promoting the

development of venture capital financing and other instruments to support innovative entrepreneurship, and establishing effective commercialization of research results.

In the area of innovation financing and support for technological entrepreneurship, it is important to increase public spending on R&D to a level close to 2% of GDP, introduce tax incentives for private investment in innovation, create specialized funds and programs to financially support innovative projects, and develop innovative infrastructure and provide preferences for technological startups [34].

Education, science, and international cooperation also play a key role. It is necessary to reform the system of higher technical and engineering education in line with the requirements of the innovation economy, stimulate interdisciplinary research, commercialization of scientific developments and technology transfer, attract leading foreign scientists and engineers, develop academic mobility, and intensify Ukraine's participation in European and global scientific and technological integration processes.

The introduction of innovative practices borrowed from the experience of the «Asian tigers» has significant potential for Ukraine. Assessing the projected effects of such measures in the economic, technological, and social spheres will allow us to form a holistic view of the prospects and benefits for the country.

Table 2.10 - Expected results and effects of implementing innovative practices of «Asian tigers» in Ukraine

Indicator	Estimated effect
Economic effect	- Annual GDP growth by 1-2% over 5 years - Increase in exports of high-tech products by 20-30% in 3 years
Technological effect	- Increase in labor productivity by 10-15% in 5 years - Increase in the number of patented inventions and utility models by 25-30% in 3 years - Increase in the share of enterprises implementing innovations by 12-15% in 5 years
Social effect	- Creation of additional 50-70 thousand highly skilled jobs within 5 years

	- Reducing the outflow of qualified personnel abroad by 20-25% in 3 years - Increase in average wages in innovative sectors by 18-22% over 5 years
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Continuation of Table 2.10

Source: created by the author on the basis of [37]

A comprehensive analysis of the expected results and effects of the implementation of innovative practices of the «Asian tigers» in Ukraine shows a significant potential for a positive impact on the country's economic, technological and social development. Implementation of these initiatives will help to increase competitiveness, technological upgrades, create high-paying jobs, and reduce the brain drain and increase the overall welfare of the population.

The implementation of innovative practices of the «Asian tigers» in Ukraine, despite the significant potential for positive effects, is also associated with certain risks, barriers and constraints that need to be taken into account [37]:

1. Macroeconomic and political risks:
 - high volatility of economic development and unstable political situation;
 - significant public debt and budget deficit, which limits the ability to finance innovations;
 - geopolitical tensions and risks of military conflict.
2. Institutional and regulatory barriers:
 - weak rule of law, corrupt public administration;
 - unstable legal framework, frequent changes in legislation;
 - ineffective antitrust regulation that hinders competition.
3. Limited financial resources:
 - low level of R&D funding from the state and private sector;
 - insufficient development of venture capital and startup support tools;
 - limited access to bank lending for innovative companies.
4. Problems in education and human capital development:
 - the education system lags behind the needs of the innovation economy;

- high rates of brain drain and difficulties in returning Ukrainian talent;
- insufficient motivation of young people to choose high-tech professions.

5. Shortcomings of the innovation infrastructure:

- limited number of technology parks, business incubators, transfer centers;
- weak links between science, education, business and the state;
- insufficient commercialization of research and innovation.

The successful implementation of innovative practices of the «Asian tigers» in Ukraine opens up significant potential for transforming the country into an innovation-oriented economy. This will help achieve a number of promising results.

First, the introduction of advanced technologies will help increase the competitiveness and efficiency of the Ukrainian economy. It is expected to increase labor productivity and GDP, boost exports of high-tech products with high added value, and improve investment attractiveness and foreign direct investment.

In the area of technological modernization and innovative development, the government plans to intensify research and development, successfully commercialize innovations, create a powerful innovation ecosystem with a developed infrastructure, and increase the share of high-tech industries in the economy.

The development of human capital and the growth of the population's welfare will be achieved through the training of highly qualified specialists for innovative sectors, the creation of new high-paying jobs in knowledge-intensive industries, as well as the reduction of the outflow of talented personnel abroad and the return of the brain drain [41].

CONCLUSION

The study led to the following key conclusions:

1. Theoretical analysis shows that innovations play a key role in ensuring economic growth, increasing competitiveness and welfare of countries. Modern economic theories, such as the theory of endogenous growth, emphasize that technological innovation, productivity growth, human capital improvement, and efficient use of resources are the main drivers of long-term economic development.

The formation of effective national innovation ecosystems, which include the interaction of universities, research organizations, innovative companies, financial institutions and government agencies, is an important task for achieving sustainable development. Such ecosystems create favorable conditions for the generation, commercialization and diffusion of innovations, which, in turn, leads to increased productivity, competitiveness and quality of life.

Successful examples of countries such as the «Asian Tigers» demonstrate how the targeted formation of national innovation systems based on strategic public administration, human capital development, and entrepreneurial ecosystems can serve as a key to economic prosperity and social well-being. Studying their experience is important for understanding the mechanisms of innovation development and the possibilities of their adaptation in other contexts.

2. The «Asian tigers» - Hong Kong, Taiwan, South Korea, and Singapore - demonstrated impressive economic growth rates and successful transformation from relatively poor and underdeveloped countries to highly developed economies based on innovation and high technology in the second half of the twentieth and early twenty-first centuries.

Back in the postwar years, these countries were characterized by low per capita incomes, agrarian and raw material specialization, and a significant

technological gap with the world's leading countries. However, thanks to prudent government policies, effective management, large-scale investments in human capital development, and targeted innovation incentives, they were able to make an impressive economic breakthrough.

3. The study of innovation strategies and policies applied in the Asian tigers revealed the key role of effective public policies and strong institutions, targeted attraction of foreign investment and technology, systematic human capital development, as well as stimulating entrepreneurial activity and building strong innovation ecosystems.
4. Government institutions in the Tigers have provided a clear strategic vision, consistent reforms, effective regulation, investments in R&D and the development of innovation infrastructure, which has made a significant contribution to their innovation development.
5. The formation of national innovation systems in Hong Kong, Taiwan, South Korea, and Singapore was based on close cooperation between science, education, business, and the state, which ensured the commercialization of innovations and transformation into high-tech economies.
6. The innovation factor played a key role in the growth of the global competitiveness of the «Asian tigers», allowing them to significantly increase exports of high-tech products and successfully integrate into global value chains. By deliberately focusing on the development of innovation-driven industries, these countries were able to shift their economic structures away from low-value-added, labor-intensive manufacturing towards more knowledge-intensive, technology-driven sectors. The targeted investments in research and development, the establishment of world-class scientific and technological infrastructure, as well as the cultivation of highly skilled human capital, enabled the «Asian tigers» to develop innovative products and services that could compete on the global market. This, in turn, boosted their export performance, particularly in advanced technology goods, and facilitated their integration into global production networks and supply chains.

The transformation of Hong Kong, Taiwan, South Korea and Singapore into high-tech powerhouses was further reinforced by their ability to attract foreign direct investment, which brought in not only capital but also cutting-edge technologies, managerial expertise and access to international markets. The close collaboration between the public and private sectors, as well as the strong linkages between academia, industry and the government, played a crucial role in ensuring the effective commercialization and diffusion of innovations. Generalizing the experience of the Asian tigers has revealed significant potential for adapting their approaches in other countries, including Ukraine, subject to national peculiarities and overcoming existing barriers.

7. To enhance innovation development in Ukraine, the author offers comprehensive recommendations covering strategic directions of state policy, measures to build innovation infrastructure and ecosystem, mechanisms for financing innovation and supporting technological entrepreneurship, as well as the key role of education, science and international cooperation.

At the level of public policy, it is recommended to develop a clear long-term national strategy for innovation development with specific goals and priorities, ensure consistency and synchronization of reforms at different levels of government, improve the regulatory framework to stimulate innovation, and strengthen the protection of intellectual property rights and introduce effective antitrust regulation.

To develop the innovation infrastructure and ecosystem, it is proposed to create a network of technology parks, business incubators, and technology transfer centers, to stimulate the interaction of science, education, business, and the state, and to promote venture capital financing and other instruments to support innovative entrepreneurship.

In the area of innovation financing, it is recommended to increase public spending on R&D, introduce tax incentives for private investment, create

specialized funds and programs to support innovative projects, and develop innovative infrastructure and provide preferences for technology startups.

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