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FINANCIAL PROVISION OF SMALL BUSINESS INNOVATIVE DEVELOPMENT

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The monograph examines theoretical, methodological and practical principles of financial support for innovative development of small business. The essence of the of financial support mechanism of small business innovative development is revealed, the features of its operation in Ukraine are revealed. Macroeconomic trends of small business innovation development in China and Ukraine and its dependence on financial support are analyzed. Based on the experience of small business support in China, prospective ways and specific ways of improving domestic small business innovative development financial support are determined. It is elaborated for scientists, specialists in innovation and entrepreneurship, politicians, entrepreneurs.

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ABBREVIATIONS LIST

USAID – US agency for international development.
GDP – gross domestic product.
GTFP – Global Trade Finance Program.
DPI – discounted investment return index.
DPP – discounted payback period for an innovation project.
EU – European Community.
EBRD (EBRD) – European Bank for Reconstruction and Development.
EU – European Union.
PI – the investment return index (innovation project).
IRMB – innovative small business development.
GPV – the integral present value.
PRC – China – People's Republic of China.
ARR – the profitability factor of an innovative project.
SMEs – small and medium-sized enterprises.
KPMG (KMPG) – international network of audit, tax and advisory firms.
IFC – international financial corporation.
MIRR – modified internal rate of return.
NRA – People's Rating Agency.
R & D – research and development work.
GDR – research work.
PP – payback period of an innovative project.
NEFCO – Northern Environmental Finance Corporation.
IRR – indicator of the internal rate of return (yield).
PMCU – microcredit programs in Ukraine.
UFPP – Ukrainian Enterprise Support Fund.
FR – Fundraising. F – franchising.
CCP – Central Committee of the Communist Party of China.
NPV – net discounted income.

PREAMBLE

The current stage of the world economy development is characterized by aggravation of economic competition, in which the countries that strongly encourage scientific research, provide favorable conditions for the development of innovative activity. The ability to innovate has become a major source of competitive advantage for individual market players, serves to strengthen their market position, and at the level of the national economy – an incentive to invest in innovative development, which contributes to the economic uplift of countries that support innovative entrepreneurship in their country.

In the environment of innovative entrepreneurship an important role is played by a small high-tech business, which persistently generates scientific ideas, develops and uses scientific and technical innovations, the latest information technologies, actively seeking the help of financial funds, hoping to get a reliable investor, who can stimulate innovation.

In developed countries, small innovative firms play a leading role in creating an efficient market economy. The acceleration of scientific and technological progress is of particular importance to small innovative businesses, the stimulation and development of economic competition, the formation of a new social layer of business owners, and in solving many other socio-economic problems. Unfortunately, Ukraine is still far behind the developed countries, where the small part of the working population is employed in the small business sector, and its contribution to the country's GDP is about 70 %. There are a number of unsolved problems in the path of innovative development of small business in Ukraine: immaturity of the financial market, macroeconomic instability, lack of demand for public and private sector R&D, lack of financial resources needed to introduce scientific and high-tech into the economic process. As a result, the domestic economy continues to be energy intensive and uncompetitive and its development is unstable, as it is almost unconnected and not driven by the innovation process.

Understanding the theoretical foundations of small business development and studying in detail the interest of the state and private investors in financing the innovation process, as well as identifying the conditions, factors and specific incentives for improving the efficiency of

financing small businesses' innovation activities are one of the important prerequisites for effectively reforming Ukraine's innovation economy.

Economic theory and practice are convinced that the imperative of modern innovative development and perhaps the only factor that is able in a short time to ensure an effective implementation of innovative projects is financial investment. In this regard, the formation of an economic base and conditions for the accelerated development of small innovative entrepreneurship in Ukraine, which cannot happen without proper financial support, is of special relevance and needs urgent solution. More and more researchers are finding that countries consistently attracting financial resources from a variety of sources: state and local budgets, commercial banks, venture capital funds, private investors (business angels) and other targeted sources of domestic and foreign funding for the development of innovative activities of small businesses, seek accelerated introduction of the latest technologies in all sectors of the national economy, which contributes to a significant increase in the production of competitive products. The financial factor plays a key role in enhancing the competitiveness of small businesses that: demonstrates exceptionally high innovative activity; form a competitive environment that helps to lower prices and improve the quality of goods; plays a significant role in the emergence and development of promising technological structures, thus being a significant driver of economic progress. Financial support for the innovative development of small business plays a decisive role in ensuring the sustainable development of national economies, contributes to the growth of citizens living standard, increases the scientific and technical level of production and the formation of the «middle class».

The study of financial support process for innovative development of small business as a holistic object of analysis, determining its place and influence on the effectiveness of the national economic system functioning requires a comprehensive systematic approach, provides a thorough study of theoretical, methodological and applied provisions on methods, methods and sources of financing and modeling of innovative development and modeling small businesses. Despite the fact that the methodological bases for the study of the financial support mechanism essence for innovative activity are laid in the works of various scientific schools representatives, many works of domestic and Western scientists economists devoted to various aspects of small business functioning, in particular, innovative, yet

generally in domestic science related to the revitalization of small innovative businesses in Ukraine, a number of issues connected with the various sources of financial support usage, innovative development and methods of the innovation effectiveness evaluating of small domestic enterprises remain to be discussed. In addition, over the time, new issues arise, which necessitates continuous updating of knowledge on financing of small business firms' innovative activity. The challenge for researchers in this area is a lack of practical skills, lack of management and production experience to address the effective financial support of innovative small business development that would adapt to today's management needs.

Awareness of the relevance, theoretical and practical significance of the problem, urgency of its solution and conditioned the writing of the monograph «Financial support for innovative development of small business in Ukraine and China». The purpose of it is the scientific study of the financial support mechanism for small business innovative development as an economic category and the development of theoretical and methodological principles of increasing the activity of innovative small business development in Ukraine by developing a multifactor model of its financial support. The research is based on study experience supporting small business People's Republic of China. This made it possible to identify promising ways and concrete ways of improving the financial support for domestic small business innovative development in the current conditions of reforming the Ukrainian economy.

The monograph consists of three interrelated sections.

The first section of the study, based on a critical analysis of domestic and foreign scientific sources, develops conceptual approaches to understanding the essence of the mechanism of financial support for innovative development as a holistic set of forms, methods and ways of attracting different sources of financing innovation. It has been proved that the innovative development financial support mechanism is an effective means of improving the investment economy climate, improving the efficiency of financial and economic activity and competitiveness of small business in China's innovative development, is the basis for achieving Ukraine's strategic goals in the field of innovation economy. A composite methodology for evaluating the effectiveness of small business innovation development has been elaborated, which includes six main components, according to which the indicators of innovation development efficiency are

distinguished by the variety of obtained effects from innovation activity, the priority of which varies depending on the micro or macro level of the economy.

The second section analyzes the main indicators that characterize the innovative development of Ukraine and the People's Republic of China and determines the ranking of these countries in the world by a number of innovative criteria, in particular, according to the Global Innovation Index. Areas where the Chinese experience can be most useful for Ukrainian innovation are identified. The leading role of the Chinese state as the main driving force of innovative development in the country is shown. The main points and factors of the transformation of China's scientific and technological system into a developed innovative economy are characterized. It is proven that technoparks and high-tech areas, mainly concentrated in North and East China, as well as Beijing, Tianjin, Jiangsu, Shandong, Guangdong, Shanghai and Fujian, stimulate technology transfer and attract investment in China's economy, and quality catalysts for the formation of regional markets for high-tech goods and services. Based on the identified factors of small business innovation development, it has been found that in Ukraine the common instruments of support for innovative development in which the state participates is the creation of technoparks, business incubators and IT clusters. It is proved that the limited state and regional support for small business enhances the role of such alternative instruments of financial and credit development of domestic small business structures as bank lending, leasing, factoring, franchising and venture financing. The theoretical and game model of interaction of financial structures and small business is developed, which allows to carry out self-regulation of the financial support system of small business innovative activity and its economic interpretation is presented.

The third section predicts the general trends of key economic indicators, including the cost of innovation, R&D, and innovative start-ups in Ukraine. Based on these expert assessments, the most promising areas of innovation development of small businesses in Ukraine were identified and a process model for forecasting the main tasks to be solved will be developed, as well as the main motives and goals for which the enterprise needs to achieve the forecasted tasks. Possible scenarios for innovative development of Ukraine for the period up to 2030 are forecasted according to optimistic, basic and pessimistic variants. Apart of it also a separate scenario for innovative

development of Ukraine based on the use of indicators of the European Innovation Scoreboard. According to the developed scenarios, the cost of innovation-active enterprises of Vinnysia region has been estimated. A multifactor model for optimizing the financial support of small business innovation has been developed, which can be adapted to any country when conducting relevant expert studies.

The scenario of innovative development of Ukraine will allow to carry out effective search of the necessary means for financing of small enterprises innovative activity from traditional and newest financial sources, which will help to get considerable economic effect at micro and macro levels.

Research methods are based on a systematic theoretical understanding of the problems of innovation development. To achieve this goal, the authors used methods of scientific abstraction, comparison, systematization, generalization, induction and deduction, analysis and synthesis. Based on morphological analysis refinement of the conceptual apparatus. The application of statistical, comparative methods and factor analysis contributed to the generalization of the current situation and problems of small businesses innovative development, to assess the sequence of market reforms in Ukraine. Adhering to the principle of logical and historical, the tendencies of small business innovative development in China and Ukraine in modern conditions of market relations are revealed, developed model application efficiency of small innovative enterprise functioning financial support is determined. The combination of micro and macroeconomic analysis made it possible to reveal organizational and economic aspects in the system of small innovative entrepreneurship, to determine the main directions of financial support for an effective institutional environment and the content and tasks of small innovative active enterprises state support.

The information base of the study was legislative and regulatory acts on entrepreneurship and innovation, analytical materials, results of domestic and foreign scientists' scholarly developments.

The monograph is elaborated for scientists, specialists in innovation and entrepreneurship, politicians, entrepreneurs.

SECTION 1 THEORETICAL-METHODICAL BASIS OF FINANCIAL PROVIDING SMALL BUSINESS INNOVATIVE DEVELOPMENT

1.1 The essence of financial support of small business innovative development mechanism

Innovative development is now a mainstream for the economies of both developed countries and countries with lower levels of scientific and technological development, and innovation is a direct component of any enterprise innovation development.

Competitiveness, and therefore the effectiveness of the national economy and the individual entity in terms of market relations, depends primarily on the ability to implement innovative projects that require considerable financial resources. Unfortunately, most Ukrainian businesses are currently experiencing a significant shortage of own funds, and attracting investment is problematic.

In order to ensure economic development, improve the investment climate, increase the efficiency of economic activity and the level of competitiveness of individual enterprises, regions and the country as a whole, sufficient financial support is necessary. The amount of financing depends on the quantitative and qualitative parameters of any economic phenomenon or process, and therefore the final results of economic activity.

Therefore, in order to function successfully in the market, every company is obliged to rationally form, distribute and use financial resources available funds. The most difficult is the formation stage of the necessary financial support amount for innovative development.

Financial support for innovative development includes:

- determining the overall need for financial resources;
- determining the amount of internal (own) financial resources for financing innovative development;
- determining the amount and value of external financial resources needed to finance innovative development;
- definition of forms and methods of financing;
- attracting the required amount of external financial resources.

As can be observed, financial security involves a whole set of measures aimed at concentrating on the enterprise necessary amount of funds to

perform certain types of work. In our case, we are talking about accumulating sufficient funds for the implementation of a certain innovative project that stimulates small business innovative development in Ukraine.

In scientific sources, the term «innovative development» is defined from different points of view, in particular as «the continuous process of qualitative changes in the structure of production or social sphere as a result of the creation, application and dissemination of new knowledge, machines, technologies» [1] or «the process of managing is based on continuous search and usage of new ways and spheres of realizing the enterprises potential». Also, «innovation development» is interpreted as «a continuous process of innovations being introduced, which are based on new information technologies» [3] and is «system (object) improvement on the basis of innovation» [4].

Thus, we can conclude that innovative development is a continuous process of finding, creating, implementing and using innovation in the enterprise.

Most Ukrainian economists understand the concept of «financial support for innovation development» as a set of methods and levers of influence on innovation activity, which is implemented in various forms through an appropriate system of financing [5]. Also, «financial security» is defined as a general method of investing through financial structures [6]. Ya.M. Buzdugandefines financial security as «a method of financial mechanism through which funds are formed and used and which characterizes the content of the impact of finance on various public relations aspects» [7].

This approach emphasizes that financial security is one of the methods of the financial mechanism.

Zyatkovsky I. V. defines financial security as «a system of sources and forms economic and social spheres of society financing development, which is implemented in three forms: self-financing, lending, budgetary allocations» [8]. Also, «financial security is a set of measures to ensure economic growth of financial resources through methods and forms, ways of financing» [9].

In other words, providing the enterprise with financial resources implies the creation of an appropriate system or mechanism for the cash organization and management [10].

There are different definitions of the terms «financial mechanism», «financing mechanism», «financial security mechanism» in the scientific and economic literature. According to the author, all these concepts can be considered as synonyms, but in determining their nature, various scholars focus on certain aspects of this mechanism [11].

Thus, V. M. Oparin considers the financial mechanism at the level of society, which is a set of financial methods and forms, instruments and levers of influence on the socio-economic development of society [12].

S. I. Yuri and V. M. Fedosovconsider the term «financial mechanism» in a broad and narrow sense. In a broad sense, it is a set of financial methods and levers of influence on the socio-economic development of society, and in a narrow sense – a set of specific financial methods and levers of influence on the formation and use of financial resources in order to ensure the functioning and development of state structures, economic entities and the population» [13].

Based on the above definitions of the financial security mechanism, we can formulate the concept of «financial support mechanism for innovative development» as a set of different forms, methods and ways of financing innovation, reflecting the use of specific sources of financing, in relation to the economic situation of the company, plans for its current activity and development [14]; with an appropriate regulation and ensuring their impact on the innovative development of all the spheres of the national economy [15]; taking into account the influence of internal factors, as well as strategic goals and priorities of innovation and investment activity [16, 17].

The mechanism of financial support of innovative development has a complex structure, which includes such basic components, reflected in Fig. 1.1.

All these components of the mechanism of financial support of innovative development are interdependent and together allow to achieve the desired effect. At the national level, such interdependence implies the close interaction of economic entities, state authorities and local self-government bodies, which financial, material, mineral, and intellectual and information resources are at their disposal to ensure efficient economic activity. And economic efficiency of economic activity in today's competitive conditions of a market economy is impossible without active entrepreneurial innovative development.

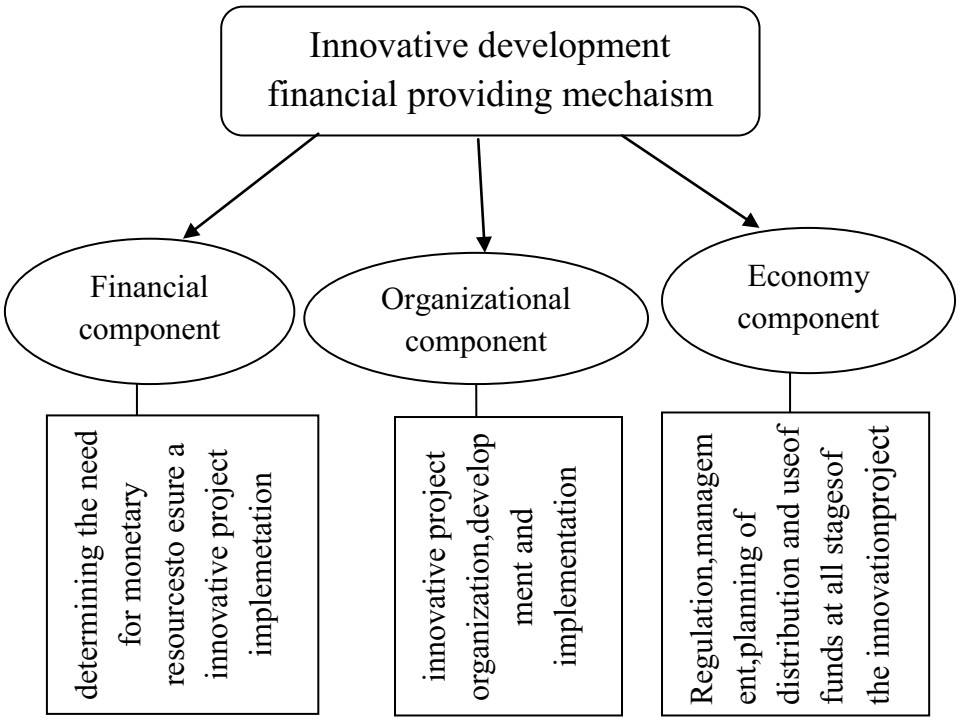

Figure 1.1 – Structure of the financial security mechanism innovative development

Only after providing the enterprise with the financial resources sufficient to carry out innovative development, its management (management) can proceed to the next task – to determine the directions of effective investment of distribution and use of own and attracted funds. If it is found that the available funds are still not enough to solve the task, it is necessary to concentrate again first on the identification of domestic reserves increase profits, and secondly on determining the amount of financial resources that the enterprise should additionally attract, building financial relations with the state, commercial banks and other counterparties, and to determine the conditions under which these financial resources can be obtained by the enterprise, and to set the terms of repayment of the loans received [18].

Thus, the financial security mechanism is an effective tool, which helps stimulate economic development, improves the investment climate in the economy, increase the efficiency of financial and economic activity of certain economic entities, and increase the level of competitiveness of individual enterprises, regions and the country as a whole. And the peculiarity of the financial support mechanism of innovative development

is that it is aimed at activating innovative entrepreneurship, in particular small business.

The most important in the implementation of the financial security mechanism is not so much its organizational and economic components, but the financial itself, which is characterized by the availability of cash resources, especially when implementing innovative projects characterized by continuous growth the cost of implementing the latest high-tech manufacturing processes, highly cost-effective risk developments, state-of-the-art technological upgrading of production and, in general, the costs required to ensure progressive change, both at the microeconomic and national levels.

Developed market economies widely involve the state budget's financial resources to support innovative development. The state incurs between 1/5 and half of the national research costs. In these countries, science spending over the past 10 years has been growing at an annual rate of 1–2 times higher than the growth of the world economy. If the world average scientific intensity GDP is 1.9 %, in the developed countries it reaches 5 % [18, 19]. In return, in Ukraine total R&D expenditure (from all sources) in the last 20 years has not exceeded 1.3 % of GDP. At the same time, the state budget funds never exceeded 0.5 % of GDP, and in some years of independence, financing amounted to 0.29 % of GDP [18, 19]. Specific costs for research per scientist in Ukraine amount to € 6.1 thousand, three times less than in Latvia, 5 times – in Poland, 11 – in Spain, 22 – in Austria, more than 25 – than in Sweden [8, 9].

Therefore, one of the main reasons for the low level of innovation activity of domestic small enterprises is the insufficient level of financial support for innovative development in general and the extremely low level of its state funding. The main source of innovation financing in Ukraine is the own funds of enterprises, which account for more than half of all expenditures on innovation. Given that most domestic enterprises today operate at a loss, and profit-makers are not in a hurry to risk it, because innovation has a high level of risk, it becomes clear reason for the low activity of innovative development of domestic enterprises. Due to the current crisis in the Ukrainian economy, the tendency for redistribution of financing towards growth of foreign investments and other sources of financing is not traced. And the extremely low share of state budget funds in financing innovation in our country puts small businesses in a situation

where they do not actually have a choice of sources of financing for innovative development.

The Ukrainian government has not yet changed the priorities of state support for the economic sectors, continuing to channel the main flow of financial resources to the materials and low-level industries, which naturally have relatively low potential for innovation and efficiency. It is in these industries that up to 70 % of the budget is invested, in particular in the fuel industry and ferrous metallurgy – more than 50 %.

In general, both state and non-state financial institutions in Ukraine are very poorly focused on investing in innovation, so domestic entrepreneurs have to rely mainly on their own financial resources, which in the conditions of lack of own funds and high interest rates borrowed finance is a significant impediment to innovative development.

When determining the overall need for financial resources to create an innovative project in an existing enterprise, consider such factors as available technical capacity, existing human capital, income from other activities of the enterprise, which reduces the overall need for financial resources. For a newly established enterprise, determining the overall need for financial resources to create an innovative start-up occurs at the stage of writing a business plan for the establishment of the enterprise [20], namely at the initial stage of financial support.

In determining the amount of internal and external financial resources to finance innovation development, some specific points should also be taken into account for start-ups and existing ones as well. In the former case, the share of external financial resources is generally smaller than in the case of a newly established enterprise. In the case of material-intensive production, the ratio of equity to attracted capital is recommended within 50 % [21], if it is a service sector, then the share of attracted capital is higher.

As modern small innovative enterprises tend to focus on IT or fintech projects [22], in particular, on start-ups in these areas, the share of attracted capital can reach almost 100 %, depending on specific project.

In order to improve the financing of innovative development of small enterprises in Ukraine, according to the author, it is necessary to actively involve such a source of financing as venture capital, which in the present conditions has become widespread in developed countries and traditionally focuses on small and medium-sized enterprises. Unfortunately, in Ukraine,

venture capital is only emerging, so it is necessary to borrow foreign experience of establishing venture capital enterprises, to study the peculiarities of foreign policy implementation to stimulate capital inflows, first of all, into knowledge-intensive small enterprises, which according to scientists, form the basis for a venture investor [18].

Venture funds are set up primarily to finance small, knowledge-intensive businesses. In developed countries, venture firms are supported by government and large companies, which are not always profitable to develop new technologies because of the significant risk of loss. Therefore, large companies often turn to venture financing, using it as a tool to expand their own scientific and technical potential.

The most receptive to technological advancement are venture firms that work in the stages of growth and saturation of inventive activity. Venture firms, or «risky» firms, are small but very flexible and efficient enterprises that are created to test, refine and bring to industry the realization of «risky» innovations. In some cases, venture capital firms are temporary organizational structures that are created to solve a particular problem. These enterprises are characterized by high activity, which is explained by the direct personal interest of employees of the firm and partners in the venture business in the successful commercial implementation of the developed idea, technology, inventions [23].

Venture business is represented by three types of companies:

- independent small venture capital firms specializing in research, development and production of new goods;
- venture capital firms that are subsidiaries of large firms;
- joint ventures that bring together small science-intensive firms and large companies [24, 25].

Venture financing has a number of features that make it a specific form of financial capital [24]:

a) venture financing is guided by the core principle of «approved risk», according to which capital investors agree in advance on the possibility of losing investments in the event of failure in return for high incomes if successful;

b) such investments provide for a long-term money contribution, the investor can be convinced of the project prospects within a period of three to five years and to receive profit from the investment and another five to ten years;

c) such risky financing involves a shareholder participation of the investor in the enterprise capital in direct or indirect form, more often using the legal status of partnerships, and the paid-in share of capital determines the amount of responsibility and future profits;

d) the venture entrepreneur, being a co-owner of the enterprise, takes an active personal part in its operation by providing consultations, management and other services, as he is interested in the development and successful activity of innovative projects;

e) there are no guarantees on the part of the investor for the invested funds in this type of financing;

f) the controlling stake in a funded enterprise is rarely sought after by venture capitalists, since once received, business owners are less interested in its successful development [24].

The main advantage of venture capital is that it provides not only financial support but also the experience of a venture capital investor usually effective for business development. As for the negative aspects, firstly, it is within the competence of the investor to make personnel changes, secondly, the process of obtaining financing is long and complicated, and, thirdly, the withdrawal of venture capital is a rather problematic process.

Ventures are most widely used in science-intensive industries, where they specialize in research and engineering. As a rule, they are not-for-profit, as they do not specialize in production, but are engaged in research, engineering development, creation and implementation of innovations, so they pass their results to firms – explants, patients, violators and commutants (Fig. 1.2) [26].

Due to the limited production capacity when implementing innovations, can interact with other manufacturing companies, as well as enter into partnerships and need to be transformed into, violet firms, patent firms and commutants. Note that examples of such companies are: Apple, Zenith and Osborne.

In targeting a narrow segment of the market, patent firms are created to meet the needs, for example, influenced by fashion, advertising or other means of increasing the demand or the buyer requirements. These firms operate at the stage of growth of output and simultaneously at the stage of inventive activity decline. The quality and volume requirements of these firms are linked to the challenges of conquering markets. There is a need to

make decisions about the timing of delivery for production and removal of products, carrying out or termination of development at the level of inventions, and the advisability of selling and buying licenses [27, 29, 31]. Usually these firms are profitable, however, there is a high probability of risk or danger of crisis. Examples of corporate clients: Cryresearch, Jaguar [30].

Expert companies that are promoting innovation in the market have created the conditions for scientific and technological shifts in today's western economy.

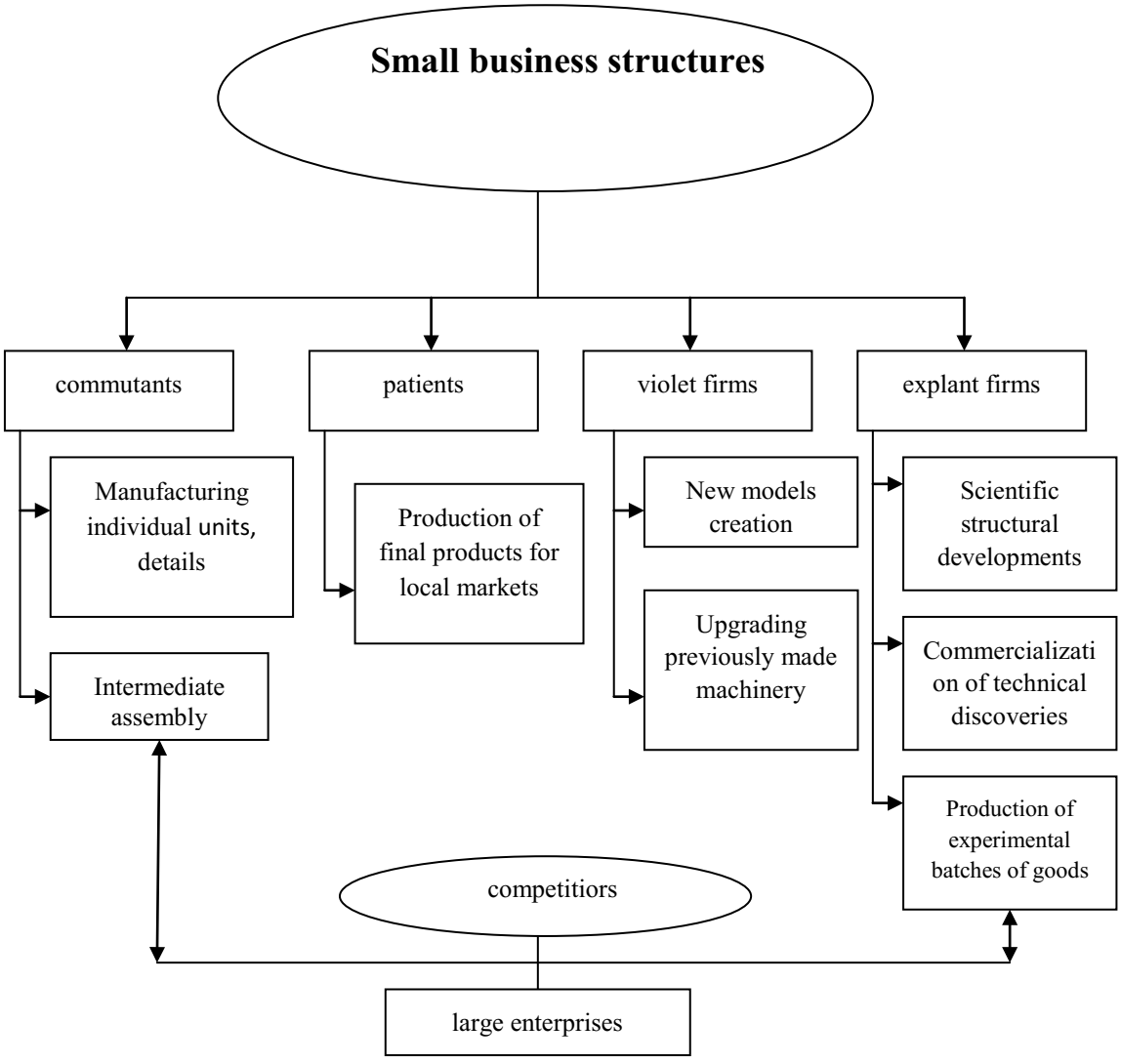

Figure 1.2 – Types of small business structures Source: Compiled by the author on materials [26–28]

Small in size and working capital, explants specialize in creating new products and radical innovations that lead to long-term competitive advantage. In their development, such firms are created as pioneer companies, whose main role is innovative and valuable, and is to create radical, «breakthrough» innovations [27, 29, 30].

In the sphere of large traditional (standard) business there are companies-violet, with a large capital and a high level of technology development. As a rule, they specialize in large-scale and mass production of goods for a wide range of consumers with average quality requirements and an average price level. Basically, violets are involved in the planned exploration and application of R&D and in the creation of new models and upgrades of previously manufactured equipment [29–31].

Violet science and technology policy requires making decisions on the timing of production adjustment (including the acquisition of licenses), the withdrawal of production, investment and expansion of production, as well as the replacement of equipment fleet. Examples of these companies are Toyota, Philips, Microsoft, Siemens, Marlboro and Samuel [31].

It should be noted that in the sphere of medium and small entrepreneurship, oriented to the satisfaction of national and local needs, there are switching firms. They individualize the approach to the client, but based on the use of the achievements of violet firms. Commutants work at the stage of falling production cycle. Their policy requires making decisions on timely introduction of products into production, technological features and expediency of changes according to the requirements of specific consumers [27, 20, 29–31]. The main task of switches is to increase the consumer value of goods not at the expense of high quality, but at the expense of meeting the small needs of customers. An example is McDonald's [30].

Unfortunately, in Ukraine, the government does not pay sufficient attention to venture capital, it does not encourage venture investors to invest in innovative projects. Venture funds in Ukraine are mainly focused on trading operations [32].

From our point of view, an effective way of state support for small innovative enterprises in Ukraine could become providing relatively low interest rates and long repayments to private venture firms, which in turn will directly finance prospective small enterprises. In some cases, these funds may be provided on a non-refundable basis. This approach was

applied in Finland, where the State Fund «Suomen Teollisuus-Sijoitus OY» was established in 1994, and in Germany, where in 1995 a scheme called «Beteiligungskapital für Kleine Tehnologieunternehmen» was developed, under which financing of small firms that produce innovative products or services in conjunction with private sector companies was carried out. Also interesting is the experience of Denmark, whose government also lends money to small firms to develop technology-oriented projects. It is stipulated that in case of failure the debts will be forgiven. Approximately the same scheme for providing loans for the technical development of enterprises exists in the Netherlands. It provides for the granting of ten-year loans to small companies that, in the event of a technical or commercial failure, may not return wherewithal to the state. And the largest shareholder is the Government of Sweden, which provides loans to start-ups for a period of 6–10 years, these loans are interest-free for the first two years and do not provide for repayment of principal over the first four years [8].

In addition to venture capital enterprises, the financial structures of the innovation sector also include scientific and technical incubators, firms, technoparks, technopolis, engineering firms, etc., which on a preferential basis ensure the formation of innovative small and medium-sized enterprises.

Thus, incubators provide innovative firms for a certain period of the premises and the necessary equipment, on preferential terms, consult them on economic and legal issues, organize advertising, carry out scientific, technical, environmental and commercial expertise of innovative projects, search for investors, enable to use their pilot production.

Engineering firms are the link between research and development and innovation and production. Such firms carry out:

- technical forecasting of an innovative idea, new technology, utility model, invention;
- carry out refinements and bring innovations to industrial realization;
- provide services and advice in the implementation of the development object;
- carry out commissioning, testing works on behalf of industrial enterprises.

In Ukraine, engineering firms, as well as venture capital firms, have not gained the same scale as in industrialized countries. However, it must be said that domestic market for these services is still developing, though

mainly through attracting foreign capital. Today many well-known companies operate in the domestic economy whose activities are directly or indirectly related to the provision of engineering services both in Ukraine and abroad [23, 30, 31].

An important economic component of the mechanism of financial support for innovative development is the state authorities and management, which are responsible for the strategic management of innovative development of the country and its regions and are designed to regulate innovation processes in the country, to form external conditions (innovation policy) for business management, thereby ensuring sustainable development of national economy. To this end, the government uses universal tools for regulating innovative development – taxes, deductions, dotations and subsidies.

Therefore, the financial component of the innovation development mechanism includes such basic elements as government financing, bank and commercial lending, external investment, including venture capital, and self-financing, which involves the use of enterprises' own funds. Such a structure of this mechanism allows to mobilize all available sources of financial resources and to direct them to create conditions for effective innovative development and increase of the level of competitiveness of enterprises.

Given that the financing of innovative development at the expense of the state budget is being constrained for objective reasons now – due to the budget deficit, small enterprises should be more actively using the financial resources of venture funds, which should be promoted by the Ukrainian government, when financing innovative development. Also, the banking sector should be more involved in targeted investment in innovative development. Further research involves the development of organizational measures and methodological approaches to the small businesses financial support innovative development, the identification of the most promising innovative projects and effective sources of their financing.

1.2 The role of small innovative enterprises in the development of small businesses and the national economy

In modern conditions the development of science and technology is becoming a priority, the role of introducing innovations into the production

process without which no state can have a worthy future. Therefore, the state innovation policy of Ukraine should be formed on the basis of a careful analysis of the international tendencies of innovative development current state. And these trends show that the most effective institutions of the innovation system which are able to respond very quickly to the needs of the economy are small businesses.

The pioneers of research on innovative processes are such world-renowned scientists as J. Schumpeter [44] and M. Kondratiev. Among modern economists whose scientific works are devoted to the study of various aspects of the small innovative entrepreneurship contribution to the national economic systems growth processes, we should mention Z. Varnaliy [37, 39], A. Dagaev, V. Zianko [18, 32], V. Kell and others. However, a number of issues regarding the features of small businesses, identifying factors affecting their effectiveness, determining the place and role of small businesses in shaping the model of the Ukrainian economy innovative development remain debatable and need further study.

Before characterizing the peculiarities of small businesses, their role in the development of the national economy, place in the structure of entrepreneurship in general and innovative in particular, it is necessary to find out their economic content.

In the world practice there is a rich variety of criteria for the allocation of small business as a special form of business. In different countries, the criteria by which certain enterprises (firms) are classified as small businesses (small enterprise) are not the same. In addition, there are not only common quantitative but also qualitative criteria for identifying small business entities. At the same time, the definition of such criteria is necessary for the effective state policy of small business development, especially considering its inequality in the number of employees and differences in the values of economic activity related to industry specificity.

The most common quantitative indicators on which business entities are credited to small businesses are the following:

- average annual number of workers employed at the enterprise;
- size of the authorized capital of the enterprise;
- annual turnover (sales volume) or carrying value of the assets of the enterprise.

Among the qualitative criteria are the following:

- independence of the enterprise from other entities;
- performance of management functions by the enterprise owner.

Thus, in EU countries, small business is divided into medium-sized businesses, small businesses and micro-enterprises by the following basic criteria (Table 1.1):

1) the number of employees;

2) annual turnover or annual balance.

Table 1.1 – Criteria for listing SMEs in EU countries

Category of companies	Number of co-workers	Annual turnover	Annual general balance
Medium-sized enterprises	250 people	≤ € 50 million	≤ € 43 million
Small businesses	50 people	≤ € 10 million	≤ € 10 million
Micro enterprises	10 people	≤ € 2 million	≤ € 2 million

Source: Developed by the author on the basis of [33, 34].

It is necessary to tell that specified in Table 1.1 metrics are only used for individual businesses. If an enterprise is a part of an enterprise group, these indicators are not used.

Table 1.2 – Criteria for listing small businesses in China

Activity	Workers number	Total assets	Business income
Industry	<300	<40 million yuan	<30 million yuan
Construction	<600	<40 million yuan	<30 million yuan
Wholesale trade	<100		<30 million yuan
Retail	<100		<30 million yuan
Transport	<500		<30 million yuan
Communication means	<400		<30 million yuan
Hotel and Rest About Wounds	<400		<30 million yuan

Source: Developed by the author on the basis of [33, 39].

In Ukraine, the criteria for classifying businesses as small in the process of small business development have noted some changes. In the Table 1.3 the following criteria are presented for the period from 1991 to 2008.

Table 1.3 – Criteria for listing small enterprises for the period from 1991 to 2008

Years	Characteristics of small business entities	Workers number	Annual gross income	Basis
1991–1997	Small enterprises with a large number of employees differentiated by economy branches	In industry and construction – up to 200 people in other areas of the production sector – up to 50 people, in science and scientific services – up to 100 people, social services branches- up to 25 people, in retail- up to 15 people		Article 2 of the Law of Ukraine from 27.03.1991 № 887-XII «About Enterprises in Ukraine»
1998–1999	Small enterprises – are the enterprises regardless from the branch of the enterprise economy	Up to 50 people	Up to 1 million UAH	Paragraph 4 of the President of Ukraine Decree from 12.05.1998 № 456/98 «About Small Enterprises State Support»
2000–2002	To small enterprises belong- legal persons – subjects of business activity any organizational and legal forms and forms of ownership	Up to 50 people	Up to 500 thousand euros	Article 1 of the Law of Ukraine of 19.10.2000 No. 2063-III «About State Support for Small Business»
2003–2008	Small businesses include business entities, legal entities of any organizational and legal form of business	Up to 50 people	Up to 500 thousand euros	Item 7 of the Article 63 of the Economic Code of Ukraine

Source: Developed by the author on the basis of [35].

The International Organization for Economic Co-operation and Development (OECD) offers another size grouping of companies, based on the number of employees:

- very small – 1–19 employees;
- small – 20–99 employees;
- average – 100–499 employees;
- Large – 500 or more employees.

In the USA, small and medium-sized enterprises are considered to have fewer than 500 employees. No annual turnover limits have been set.

Currently, in accordance with the Economic and Tax Codes of Ukraine, the entities listed in Table1.4.

As can be seen from the data in Table 1.4, the Economic and Tax Codes of Ukraine differently determine the belonging of enterprises to small, which makes it impossible to compare the statistics and tax reporting.

Table 1.4 – Criteria for listing small businesses in Ukraine

	Economic Code of Ukraine		Tax Code of Ukraine	
	Workers Number	Annual income		
Entrepreneurs are individuals	10	2 million EUR		
Entities are legal entities	10	2 million EUR		
Individuals are small business entities	50	10 million EUR	20	€ 20 million
Small business entities are legal entities	50	10 million EUR	50	€ 20 million

Source: Developed by the author on the basis of [34].

Thus, in Ukraine small enterprises (regardless of ownership) are recognized, where the average number of employees does not exceed fifty persons during the financial year, and the gross income from the sale of products (works, services) during this period does not exceed the amount equivalent to five hundred thousand euros at the National Bank of Ukraine's average hryvnia rate [36].

Independent, systematic economic activity (industrial, commercial, financial, insurance, etc.) of small enterprises of any form of ownership and citizens-entrepreneurs (individuals), carried out at their own risk for profit, is characterized by the concept of «small business» or «small enterprise». In the economic scientific literature, the concepts of «small business» and

«small enterprise» are often identified [37], and we also consider them synonymous.

The economic activity of small business entities is directed primarily to profit, but the small business owner may pursue other goals of his economic activity, that is why some economists define the purpose of entrepreneurial activity more broadly – as the desire of the business entity to realize their own economic interest [39].

Small business (small enterprise) is considered by many economists as a very important market economy entity. In particular, this opinion is espoused by British economists J. Bennnock and W. Holder, who call for supporting the development of small business to combat unemployment, emphasizing the importance of small business for regional development. As a source of job creation consider small business professor of Cranfield School of Management P. Bernie, a teacher at the University of Warwick J. Dewhurst and professor at the European Institute of Business Administration L. Vickers [38].

Indeed, in solving employment problems, small business plays a very important role. This is especially true of the current state of affairs in Ukraine, in the context of the massive closure of state-owned enterprises and the rapid increase in unemployment. In fact, while the process of job cuts at large enterprises is underway, small firms not only retain but also create new ones. Not only are small businesses able to provide for themselves and their families with at least the minimum necessary livelihoods, but each of them still creates at least 1–2 jobs for other citizens of the country, and there are several million jobs in the country. Therefore, if a former unemployed person gets a job, he/she thus exempts the state from payment of unemployment benefits and thus reduces budget expenditures [23].

It should be noted that the ability of small business to create new jobs in all spheres of economic activity is a fundamental basis for the formation of the middle class in society, which is emphasized by Ukrainian economists [28].

Small businesses mitigate social tensions and help democratize market relations, weaken the tendency toward social differentiation inherent in a market economy [23]. J. A Zhalilo and L. S Lisogor believe that small business performs the important functions of the structure-forming element of the modern market economic system of Ukraine, a mean of overcoming

its structural imperfection and disproportionality, which should be taken into account when implementing the overall economic growth strategy [40].

The necessity and usefulness of small business is driven by the interests of production efficiency and socio-economic stability of the country's development – says Z. Varnaliy, who states that the enterprise is one of the basic structural elements of the formation and development of a free economy with a market mechanism of economy and plays an important competitive role in it. [37, 39]. The fact that the small business sector also significantly influences the formation of competitive environment is of paramount importance for our highly monopolized economy. After all, in a market economy, rivalry is a reflection of the relationship of competition between economic elements, when their independent activity effectively limits the ability of each of them to influence the general conditions of circulation of goods in this market. Then the activity of market participants becomes dynamic, because it is associated with economic responsibility and the risk of the entrepreneur, which transforms it into a kind of social engine of economic development [23]. Small entrepreneurship helps to foster competitive relations, because it is antimonopoly by its very nature and manifests itself in various aspects of its functioning.

Small business also has significant socio-psychological benefits, based on specific motivation for work and promotion. In addressing such personal problems, this sector of the economy acts as a «last resort» for the unemployed or for a person who is unable to realize himself within the framework of large-scale entrepreneurship and experience entrepreneurial skills and organizational talent [23].

As we can see, the small business sector contributes significantly to social development, as it saturates local markets with traditional and innovative goods and services, is an example of initiative and efficiency, providing employment growth and reducing social tensions. The small business sector also plays an important role in the economic growth of countries and the introduction of the latest technologies, which allow to ensure a high level of competitiveness of the national economy and to take a strong position in the international economic arena.

Based on the above, we distinguish the specific features of small business structures that distinguish them from large and determine the features of their economic activity (Fig. 1.3).

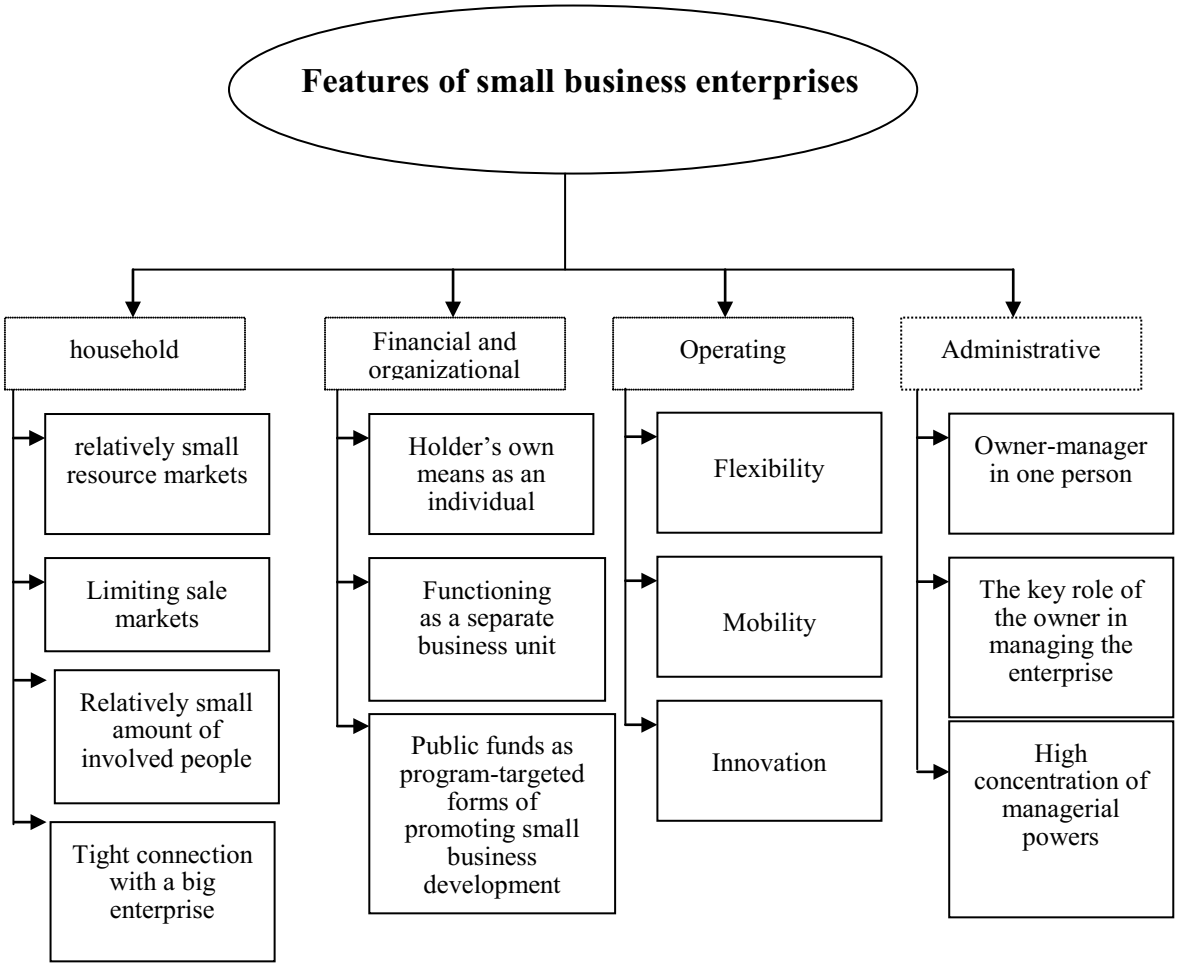

Figure 1.3 – Characteristic features of small business structures

Source: Developed by the author on the basis of [41]

Thus, small businesses are a significant driver of economic progress:

- their functioning not only contributes to the creation of a large number of jobs in the country, but also ensures the growth of the standard of living of citizens. In economically developed countries, small businesses are the largest employer;

- small firms provide fast cost recovery and wide freedom of market choice, making it a convenient form of business organization. Being one of the most important systematic elements of a country's financial system, small firms make a significant contribution to improving macroeconomic performance [42];

- due to the innovative activity of small firms, a competitive market environment is formed, which in turn increases the quality and assortment of products and services;

- small innovative enterprises play an important role in the emergence and development of industries of promising technological styles. In particular, the industries of the fifth technological institution were born and initially developed precisely in the environment of small high-tech firms. According to statistics, in the United States, about 90 % of computer software is created by small firms [37]. Small business is also an active agent in the creation and use of technology for recombinant DNA molecules (genetic engineering) [39].

It follows from the foregoing that small, innovatively active enterprises deserve special attention among small enterprises.

Basing small business on a risky and innovative basis is one of its most important features, according to V. E. Savchenko [48]. It is the small innovative and innovatively active enterprises that act as a leading sector of the national economy, as they demonstrate the expansion and updating of the supply on the market of goods and services, saturating them with the internal market; promote the growth of the gross product and the filling of the state budget; make a significant contribution to improving and diversifying the market structure in the economy [23, 44].

Despite the small scale of economic activity, the subjects of small business innovation are mobile respond to the expectations of the target markets and exhibit the flexibility and high ability to adapt quickly to new market circumstances. In the regional dimension, this has the effect of rationalizing the use of all types of resources, enhancing the accumulation of human resources capital and accumulation of scientific and technical potential [23, 45].

The fact that small business shows exceptionally high innovative activity and is an indispensable component of national innovation systems, which performs the functions in the initial stages of the innovation cycle is evidenced by the fact that according to statistics, the representatives of the small business sector are the authors of the vast majority (up to 95 %) of innovations implemented in advanced economic systems [46]. This confirms the statement that almost all the GDP growth of developed countries at the present stage is due to the use of innovations. Therefore, in today's market conditions, the small innovative business sector plays a leading role and acts as a guarantor of the stability of the national economy and raising the standard of living of its citizens.

Foreign statistics show that in developed countries, small business is more of a stabilizing factor than big industry. Due to its flexibility, this sector of the economy is able to efficiently carry out market and social restructuring in the country in a short period of time, to overcome virtually all economic and social consequences of such transformation and to ensure further economic growth and development of all branches of the national economy [23]. The conditions for the flexibility of small business production create a simple organizational structure, small numbers of employees and the ability to make quick decisions. Compared to large enterprises, small firms are easily adaptable to consumer requirements, with no unnecessary controls. Small business has the lowest investment needs, is characterized by the fastest turnover of capital.

In the process of overcoming the economic crisis at the national level in the global economy, the small business sector occupies a central place. From the point of view of the development of the national economy, small innovative and innovatively active enterprises are an effective tool for constant updating of all elements of production processes, ensuring high competitiveness of products, works and services. They are able to respond very dynamically and flexibly both on changes in consumer demand, and on new offers and prospects that are opened based on the results of research and design work.

Small innovative entrepreneurship in Ukraine is of particular importance today. The relevance of the problem of improving its development in Ukraine in the long term is determined by its significant contribution to the economy of developed countries and the lagging indicators of its development in Ukraine. Small innovative entrepreneurship is a market start-up mechanism and its development will contribute to:

- increased flexibility and openness of the Ukrainian economy, increased economic competition, and the formation of numerous market economy entities. S. K. Reverchuk [47] believes that having reached its critical mass (the average for the country per 10,000 people of the existing population accounted for 70 small businesses), this sector should promote normal, healthy competition, which in turn leads to irreversible the process of transition of Ukraine to the developed market;

- accelerating the processes of demonopolization, privatization and privatization of the domestic economy, since the development of small businesses is a source of increasing the share of private property [48];

- attraction of material, natural, financial, human and information resources to the economic turnover;

- releasing of large enterprises from the production of unprofitable small-scale and artificial products for them, which satisfies individual demand, which will help to increase the efficiency of their activity;

- providing additional jobs, overcoming hidden unemployment. Encouraging the increase of business activity of the population will promote the development of the middle class, which is the social base of economic reforms and ensures the stability of society;

- the process of democratization of society, rationalization of the system of economic and economic organization and management. The small business sector is complete to a degree characterized by the most democratic, rational forms of its organization and management, and the degree (s) of its development depends on the degree of democratization of society [49].

However, despite the fact that small business is one of the most effective means of solving the first socio-economic problems, in Ukraine, unfortunately, it is facing many obstacles. Its development is uneven, chaotic and contradictory, it is not given due attention by state bodies: support programs are declarative, there is no coherence in the actions of central and local authorities, poor financial assistance. It is necessary to state that favorable conditions for the development of innovative entrepreneurship and, in general, innovative development in Ukraine have not yet been created, the innovation activity of small enterprises in Ukraine is low and their activity is mainly focused on trading operations.

State support for the innovation development of small enterprises has not yet been fully implemented, despite the fact that the organizational, economic and legal principles of state regulation of innovative development have been largely developed. In particular, since July 2002, the main law regulating innovation activity in Ukraine – the Law of Ukraine «About Innovation Activity» [50], according to which state financial support can be provided when setting up business incubators, business centers, technology transfer centers, technology parks, innovation centers. Also, the national legislation in the field of innovative activity and

innovative development is based on the Constitution of Ukraine, Laws of Ukraine [50]: «About investment activity», «About scientific and scientific-technical activity», «About priority directions of development of science and technology», «About special mode of innovation activity of technology parks. In 2012, the Law of Ukraine «About Development and State Support of Small and Medium-Sized Entrepreneurship in Ukraine» was adopted, whereby small enterprises were entitled to receive irrevocable targeted subsidies from the state for the acquisition and introduction of new technologies, in particular, energy-efficient and environmentally friendly technologies. But market relations develop, conditions management is constantly changing, so the legal framework governing the functioning and taxation of small businesses, extending credit programs, attracting domestic and foreign investment in small business needs improvement.

In this regard, it is worth noting the ratification in March 2015 of the Agreement on Associated Participation of Ukraine in the EU Horizon 2020 program [51], which will envisage cooperation of Ukraine in the research and innovation activity of all spheres of public life – from the basic sciences to the implementation of innovations in the real economy. Measures to join Ukraine into the Small and Medium Enterprises Competitiveness Program – COSME, which has been operating in EU countries since 2014 and are planned for 2020, have been initiated. This will, of course, increase the ability of domestic small and medium-sized businesses to find new partners with the EU, will help to improve the competitiveness of their products, and thus not only the new European markets but also the markets of Asian countries.

However, if EU and PRC Member States have legislation in the field of innovation as a means of implementing policy documents, strategies, science and innovation development plans, Ukraine is characterized by an effort to adopt legislative acts with a view to providing impetus to innovation development [52]. This is one of the reasons why in Ukraine innovative development has not yet become a priority for their economic development for the vast majority of business entities.

If some large companies in Ukraine demonstrate their innovative activity to a certain extent, then small businesses have virtually no innovation orientation, which results in low competitiveness of Ukrainian enterprises not only in the international arena but also domestically. The reasons for this are not only internal but also external. In particular, Russia

continues to carry out armed aggression against Ukraine, which diverts considerable financial and human resources. However, if external challenges are objectively preventing the reform of the national economy at a rapid pace, then changes in national economic legislation to bring it into line with the European one are still too slow.

The experience of small business support for the People's Republic of China (PRC) should be borrowed from the Government of Ukraine [20, 53]. In particular, to develop, as it was developed by the Government of the People's Republic of China, a long-term State Program of Innovative Development Strategy. In China, such a program has been elaborated for the period 2020-2050, in which it is planned that by 2020 China will be included in the list of countries of innovative type, by 2030 – will enter the first ranks of innovative states, and by 2050 it will become the leading world power in the world technical innovations [54]. The program stipulates that innovation should become the main driving force for development. At the same time, scientific and technological innovations should be supported by innovations in the field of public institutions, culture, models of management and trade, which will allow to move to a higher level of economic development with a more rational structure of innovative expenses. The document sets out 8 strategic objectives, including, inter alia, the promotion of innovations in the industrial technology system, the enhancement of primary innovations, the optimization of regional innovative placement, the implementation of important scientific and technical projects, the training of highly qualified personnel [54].

Also, under this program, a Law on Encouraging the Development of Small and Medium-Sized Enterprises was adopted in China in 2002. This law provides for equal opportunities for small businesses in terms of lending, investing, improving production, introducing new high-tech technologies into China's economy.

In order to give small businesses an advantage over small enterprises and protect the interests of small businesses, China has created a State Small and Medium Business Enterprise Fund, funded by the state budget. This fund provides small businesses with certain tax breaks and additional funding for innovative projects.

The small business in China is also supported by the state-run CSMEO Information Service established in 2001, whose network extends to all

cities and regions of the PRC, providing timely information on technological innovations, recent developments in science and technology, and the state of the labor market.

Due to the actions of the Chinese government, since 2003, there has been a rapid increase in small business entities in the PRC and an increase in the profitability of enterprises, which has contributed to an increase in tax revenues to the state budget. In 2011, China came in first place in terms of exports of products, third in terms of imports and gross domestic product (GDP), and the GDP growth rate was 9.2 % [55]. China's small businesses export more than 60 % of the country's total output, accounting for 65 % of patents. The merit of small business in China is that it pays more than 50 % of all tax revenue [56]. Today, about 3 million small businesses and nearly 30 million private entrepreneurs operate in the PRC, allowing Chinese products produced by small firms to be found on the shelves of virtually every corner of the globe. About 60 % of the able-bodied population is employed in small business enterprises in China, and up to 80 % of innovative products and technical inventions are produced [53].

As we can see, in China, the vast majority of innovation is created in the small business environment, which is a significant driver of the national economy. The Chinese government continues to make every effort to facilitate small business development. Thus, in 2015, due to the slowdown in economic growth, the State Council of China decided to further extend the tax breaks for small companies. In particular, the income tax of companies with a tax base below 300 thousand yuan ($ 46.9 thousand), has been halved from 2015 to the end of 2017. Previously, only companies with an income of less than 200,000 yuan were subject to such weakening. In addition, small businesses with a monthly sales volume of 20–30 thousand yuan were exempt from taxes by the end of 2017, whereas earlier this benefit was due to expire at the end of 2015 [57].

Also, highly developed countries pay special attention to the mechanism of financial support for small businesses, because they provide the fastest cost recovery and broad freedom of market choice, demonstrate high innovative activity, form a competitive environment that contributes to lower prices and improve the quality of goods [20]. Thus, in EU countries, innovations are applied by 52.3 % of medium-sized companies with 50 to 249 employees and 33.4 % of small firms, i.e. employing fewer than 50 people [58].

Unfortunately, in the period 2012–2014, the share of innovative small enterprises with a number of employees from 50 to 249 persons in the period 2012–2014 was only 19.7 %, and in firms with fewer than 50 employees – 11.3 % [59], makes the issue of creation of new small innovative enterprises extremely important, and the problem of finding sources of financial support for innovative development of such enterprises is rather urgent.

According to a group of scientists of the National Institute for Strategic Studies under the President of Ukraine, in 2010–2013 the share of small and medium-sized enterprises in Ukraine was up to 6 % of the total number of enterprises. However, the contribution of small and medium-sized enterprises to the Ukrainian economy by main indicators of economic entities' activity has become sustainable and, in the aggregate, has far outweighed the importance of large enterprises in the national economy. In addition, the share of tax payments in the structure of tax levies from the group of small and medium-sized enterprises has increased rapidly from 38.8 % to 49.7 % of total payments. At the same time, tax revenues from large enterprises dropped significantly from 57 % to 47 %. This means that, in the face of external challenges caused by the effects of the global financial and economic crisis, medium and small enterprises are capable of flexible manufacturing policies and, at the same time, provide significant employment (46.4 % of total employment) against the general background of redundancies among other enterprises [60].

The Ukrainian government should use the experience of becoming a small business in the PRC. The Chinese government is aware that it is thanks to small businesses that many jobs are created. It gives it the necessary support of the state, promotes the attraction of investments into this sector and expanding credit programs. The Chinese authorities are trying in various ways to promote the economic growth of small businesses, also improving legislation aimed at regulating the economy and taxing small businesses.

Today, small business in China operates in accordance with the Small and Medium Business Promotion Act, adopted in 2002, provides for equal opportunities for small businesses in lending, investing, improving production, and introducing new technology-intensive technologies into China's economy.

In China, state-owned funds for the support and development of small and medium-sized enterprises are active. Their main focus is to provide guarantees and mortgages to small businesses in order to obtain bank credit for business development. To this end, the Chinese Communist Party has developed and approved a provision for the creation of a State Small and Medium-Sized Enterprise Development Fund, financed from the state budget. This fund helps to protect the interests of small business entities in comparison with big business entities in all economic areas and provides certain tax benefits and additional financing for small businesses.

China's economic development programs envisage economic growth and improvement of the economy through the overall development of the country's economy, both by large and small and medium-sized enterprises. The government has approved programs aimed at improving China's economy by 2020–2050. One of these programs was adopted in 2003 and is aimed at the socio-economic development of China by 2020, and by 2050 complete improvement and restructuring of all sectors of the country's economy. Since 2003, there has been a rapid development of small business in China, an increase in the profitability of enterprises, and an increase in tax revenues to the state budget. This development was mainly achieved by increasing the number of small business entities.

According to the State Statistics Committee of the People's Republic of China: in 2015, there were 3 million small businesses and about 30 million entrepreneurs in China. Therefore, small business is the vast majority of the total number of Chinese enterprises. After all, about 60 % of the working population of the country is employed at small enterprises.

China's small business can be called the scientific engine of the country, due to the fact that small businesses produce the largest number of innovative products and technical inventions. Most of the exported products in the country are made by small enterprises.

Support for small business in China is handled by the Chinese Center for Business Coordination and Cooperation, whose main task is to create special conditions for cooperation between Chinese and foreign small business support organizations.

Another important body contributing to China's economic development is the CSMEO State Information Service, which was established in 2001. This service is engaged in providing information consulting services to the population and entrepreneurs on the activities of small and medium

enterprises through its website. The CSMEO network covers all regions of China, enabling the population to be informed in a timely manner about the state of the labor market, changes in current legislation, recent developments in science and technology, the development and status of small and medium-sized enterprises.

A comparative table on individual indicators of Ukraine and China in terms of small business development and innovation is given in Appendix A (Table A.1).

Thus, taking advantage of small business can give the national economy a rather positive effect directly in the context of the current stage of transformational change. All the aforementioned features of small business show that its development is a powerful factor in reforming the national economy, creating a socially oriented market mechanism, overcoming the current downturn in production and providing the preconditions for economic recovery on the basis of building an innovative model [23].

Refinement of the features and importance of small business has allowed us to create, perhaps, a new understanding of this sector of the economy and thus, to pay special attention to its development, further financial support and government regulation.

The situation of the small business sector and its role in the socio-economic development of Ukraine on an innovative basis is evidenced by the integrated indicators, which will be considered in the second section of the thesis.

1.3 Classification of methods for evaluating the efficiency of small business innovation development

Highly developed countries pay particular attention to the mechanism of evaluation and efficiency of innovative enterprises, since it is enterprises that start-ups and other innovative activities provide not only faster return on investment, but also the highest profitability of projects. Innovative businesses are also actively shaping a mobile competitive environment that responds quickly to changes in the preferences of potential buyers and helps to lower prices and improve the quality of goods, through the introduction of the latest technologies and NTP results.

The Ukrainian state also notes that its main priority is the focus on building a new innovative economy [61]. However, unfortunately, most

Ukrainian innovative enterprises are currently experiencing a significant shortage of their own resources, and attracting investment is problematic, as a rule, inefficient for the enterprise itself [18]. An example of such financial sources is loans from commercial banks and various credit unions at very high interest rates, which immediately makes them inefficient and unprofitable [20].

It should be noted that in modern science there are many approaches to defining the category «efficiency». Against this background, the urgent question of classifications arises the most common interpretations of this concept and its rational definition in terms of innovative development of enterprises. In particular, efficiency as an economic category has been the subject of research by scholars of foreign and domestic classical schools [62–66], and has been further developed in the works of modern scholars [67–73]. In recent decades, the views of scholars and practitioners on the nature of efficiency as an economic category have become more one-sided, but many questions remain sufficiently debatable.

The same applies to the methods of evaluating the effectiveness of implementing innovation and evaluating the innovative development of the enterprise as a whole. The work of such scholars as Yu. V. Sotnikova and O. L. Politanska [71], O. I. Maslak and L. A. Kviatkovska [72], T. I. Kuzhda [73], L. E. Malyuta [74], I. V. Captain [75], V. V. Kavetsky, L. O. Nikiforova [76], O. B. Zhikhor [77], V. V. Zianko, I. Yu. Epifanova, V. V. Zyanko [78] and others. Scientists propose different methods of effectiveness of innovation and innovative development evaluating the of the enterprise based on different criteria, the importance of which is determined in accordance with the object and the necessary objectives of evaluation, so some questions about the feasibility of using these or other methods of evaluation are still quite debatable.

Given that the objective and comprehensive evaluation of the effectiveness of innovative development of any enterprise is impossible without determining the essence of the fundamental category of «efficiency», without exploring its content and basic approaches to its definition, without highlighting the its manifestation features in the innovative field of activity, it is expedient to examine the existing views of leading scholars in this economic category.

In the course of the evolution of the study of the concept of «efficiency», scientists have identified various approaches presented in Fig. 1.4 [28; 62–64, 68–70], each of which interpreted it in its own way:

whether from the standpoint of alternative value, or the Pareto optimum, or based on the effect of the declining productivity law of the production factors, or using in the process of research a resource, result, target, needful and static-dynamic scientific approaches.

As can be seen from the definitions of the term «efficiency» in Fig. 1.4, its meaning is polymorphic. Each of these interpretations characterizes the term «effectiveness» in various aspects, the importance of which is formed in accordance with the object and purpose of the study. However, the versatility of the approaches presented to determine the content of the category «efficiency» defines some complexity in the study of the effectiveness of innovative development of the enterprise.

In modern science, there are also many approaches to classifying performance by type or feature. Types of efficiency are usually distinguished by the variety of effects obtained from the activities of enterprises [28].

Most scientists distinguish economic and social efficiency [29, 79], but others attribute economic and social efficiency not to individual types of efficiency, but to some of its classification features: M. A. Kovzel – by consequences [29], V. A. Kharchenko – by the result obtained [79]. And scientists O. V. Oliynyk and Y. V. Chibisov [80] consider this kind of efficiency as «organizational efficiency». And O. M. Ratz also identifies technological, environmental, legal, psychological, political and ethical types of efficiency [81].

At the same time, having carried out a detailed analysis of scientific works of such scientists as O. V. Oliynyk, M. A. Kovzel, I. A. Markina, V. A. Kharchenko, O. M. Ratz, B. Ryan and others on efficiency classification [79–81] it can be stated that they do not have a fundamental difference in certain types of efficiency.

O. I. Maslak and L. A. Kvyatkovskaya research [72] highlight such specific types of efficiency in evaluating innovative development of an enterprise as: production efficiency of scientific and technical measures, financial efficiency of scientific and technical measures, investment efficiency of scientific and technical measures. However, most scientists [28, 29, 81] emphasize that the achievement of economic and social efficiency is of particular importance for the enterprise, and for the innovative enterprise, the indicator of commercial efficiency from the implementation of innovative projects at the enterprise is especially important.

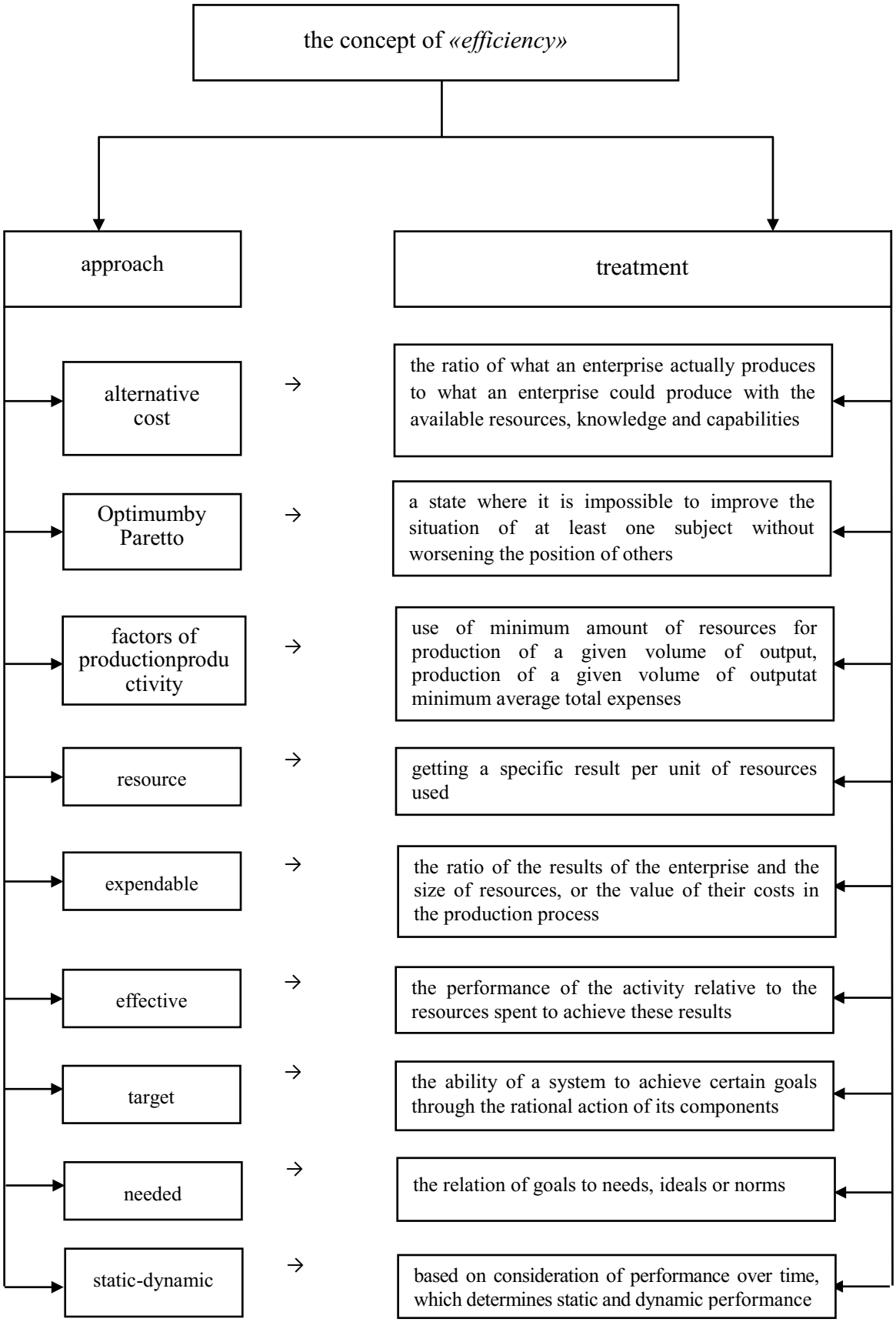

Figure 1.4 – Basic Approaches to Defining Performance

Note: made by the author on the basis of processed sources [28; 62–64, 68–70]

The classification of the concept of «efficiency» on various grounds is given in Table 1.5.

Table 1.5 – Classification of the concept of «efficiency» on various grounds

Classification feature	Performance name	The essence of the concept
by the degree of effect increase [29, 80, 82]	primitive	obtaining a one-off effect from the introduction of any measures at the enterprise
	multiplicative	is cumulative in nature and is determined on the basis of a multiplicative effect calculation
by calculation methods [29, 76, 81]	absolutely	on all resources and expenses of the enterprise
	comparative	in terms of resource and cost options
depending on the interaction with the environment [28, 80, 81]	internal efficiency is classified according to the scale of production: - firm level, - branch level, - organizational unit level, - production level, - level of production.	displays performance based on cost / performance ratio.
	external	shows the share of the enterprise in the market, the possibility of creating new areas of entrepreneurship, the potential of the enterprise.
by place of production [29], by origin [80], by scope [28]	economic	is determined overall by the enterprise
	local	by stages of production, consumption
by calculation methods [28, 29]	absolutely	is determined by all the resources and costs of the enterprise
	comparative	it is determined by the use of resources and costs.
by the objects of definition [28, 83–85]	operating production	using the minimum amount of resources to produce a given volume of output
	capital investments	production of a given volume of output at minimum total capital investment
	development of science and technology	characterizes the growth of new scientific knowledge aimed at further development of science and technology

Continuation of Table 1.4

Classification feature	Performance name	The essence of the concept
	foreign economic relations	quantitative view of the benefits of exercise projecting foreign markets or involving foreign partners
	environmental protection	improving environmental protection which is produced and reduce consumption of natural resources per unit
depending on resources consumed [28]	resource	getting a specific result per unit of resources used
	expendable	the ratio of the results of the enterprise and the value of resources, or the value of their costs in the production process
in terms of time [81]	static	is evaluated for a short period of time when operational and tactical issues are addressed
	dynamically	assumes higher results through flexible variation of resources and change of technology over the long term
depending on purpose [28]	needed	the relation of goals to needs, ideals and norms
	effective	the ratio of the result achieved to the intended goals
	expendable	the ratio of results to costs
depending on the type result tattoo [86]	interim	is formed on the basis of intermediate results and costs
	finite	it is calculated based on the final performance metrics and costs
	mixed	synthesis of intermediate and final performance indicators

Note: Prepared by the author based on the references provided

In our opinion, the concept of «economic efficiency» characterizes the effectiveness of economic activity, the implementation of economic measures and is determined by the ratio of the received economic effect (result) to the cost of resources that led to the receipt of this result. Accordingly, social efficiency reflects the effectiveness of social activity, that is, the relevance of social effect and costs incurred to the goals and social interests of society [87].

Commercial efficiency from the implementation of innovative projects, in our opinion, should be considered as a kind of economic efficiency, the

result of which is the commercial effect of the implementation of certain innovations in the enterprise, which is calculated as the ratio of the revenue received in (profits) from a specific innovation project to the value the material and intellectual resources spent on it [87, 98].

The study of the criteria for evaluating the effectiveness of innovative development revealed that there is a wide range of evaluation criteria in the scientific literature [68–72, 76–79, 86–92].

Most scientists [43, 71, 76, 88, 90], as well as the United Nations Industrial Development Recommendations [43], determine the criterion of economic efficiency as the main criterion for evaluating an enterprise's innovative development.

V. G. Fedorenko [90], along with the criterion of economic efficiency, indicates the need to take into account the competitive environment in which the innovative enterprise is located.

V. A. Zubenko [91] proposes to take into account, in addition to the criterion of economic efficiency, the criterion of compliance with long-term strategic goals, which will ensure the competitiveness of enterprises in competitive conditions.

T. I. Kudzha [73] offers a combination of the main criteria of two separate types of performance evaluation – economic and social. Such a combination is defined on the basis of an integral indicator, which is characterized as «the result of evaluating the socio-economic indicators of enterprise development, which is based on the definition of generalized indicators by the way of application of the system of partial indicators and the method of expert interrogation» [73].

Analysis of scientific sources [28, 68, 70, 83, 84, 92] showed that the main problem of formation of criteria for evaluating the efficiency of innovative activity and innovative development of the enterprise is the lack of a clear definition of criteria and indicators that relate to them. Thus, in the study of R. A. Fathudinov [92] states that the criterion for the effectiveness of an innovation project is an indicator of overall economic efficiency. V. G. Fedorenko [90] defines the following criteria for evaluating the effectiveness of innovations: qualitative parameters of innovations; the volume of work performed using new methods; level of prices, tariffs, conditions of remuneration; time and risk factor for the implementation of innovative projects.

A review of the scientific and methodological literature on the evaluation of the efficiency of innovative development of enterprises in modern conditions has shown the existence of different methodological approaches to the identified problems. In particular, Ukrainian scientist L. Ya. Malyuta proposed a model that provides a comprehensive assessment of the effectiveness of innovative development of the enterprise with the help of an integral indicator of the level of innovative development. By this indicator, a scientist is understood as «the result of the evaluation of the main technical and economic indicators of the enterprise, which is based on the definition of generalized indicators through the use of partial indicators and the method of expert survey» [74].

Noteworthy are the studies of V. V. Zaychikova and S. V. Voitko [93, 94], which provide an in-depth analysis of the justification of performance criteria and the systems of indicators for them.

Thus, in the study of V. V. Zaychikova [93] identified such criteria for evaluating efficiency as scientific and technical; industrial; market; financial and economic; social and environmental.

In the work of S. V. Voitko [94] the following criteria of enterprise activity innovative efficiency evaluation are distinguished: criterion of knowledge-intensiveness of production, criterion of innovative production competitiveness quality, criterion of production innovativeness, criteria of technical and economic production level, criterion of exportability, criterion of export inventory updates and technical gap ratio.

The scientist T. I. Kudzha [73] uses three main groups of indicators of efficiency as criteria for evaluating the efficiency of an enterprise innovative development, each of which has its own set of coefficients that are tied into the generalized system of economic and social evaluation of the enterprise innovative development, namely :

- the first group of indicators include production-technological, scientific-technical, financial-economic and labor, which assess the level of innovation potential of enterprise development (UPIP);
- the second group of indicators include a system of marketing indicators that evaluate the level of effective marketing support for innovative development of the enterprise (UPMZIP);
- to the third group of indicators belong indicators of humanization of labor, social guarantees of personnel, safety and labor protection, corporate responsibility, which evaluate the social level of effective innovative development of the enterprise (UPSR).

And the general level of efficiency of innovative development of the enterprise T. I. Kudzha suggests to calculate according to the formula of geometric mean [64]:

$$ИП_{ІР} = \sqrt[3]{УП_{ІП} \cdot УП_{МЗІП} \cdot УП_{СР}}. \quad (1.1)$$

According to formula (1.1) change of the integral index from 0 to 1 corresponds to stable effective innovative development of the enterprise, and in itself:

- when the value is within the range from 0 to 0.4 – the enterprise has low development rates;
- 0,4 from 0.4 to 0.7 – average;
- 0 0.7 to 1 – high rates of innovative development [73].

Scientists Yu. V. Sotnikova and O. L. Politanska [71] completely identify the criteria and indicators for determining efficiency. In their opinion, the criteria for evaluating the innovative developmenteffectiveness are payback period, profitability index, internal rate of return, net present income, and the stated costs.

Scientists O. I. Maslak and L. A. Kvyatkovskaya also offer the following qualitative indicators as criteria for evaluating the efficiency of innovation activity and innovation development at the enterprise [72]:

- integral effect indicator (net discounted income): it represents «an integral estimate of project cash flows, taking into account the time value of the funds (Time Value), the essence of which is that the hryvnya spent or received today is not equal to the hryvnya that will participate in the project's financial flows tomorrow»;

Internal Rate of Return Indicator (IRR), which «represents the maximum possible discount rate of investment at which the project does not become unprofitable (IRR is defined as the root of the NPV equation = 0)»;

PI Return on investment in an innovation project – PI (Profitability Index), which «is calculated as the ratio of the results to the expenses, should be greater than or equal to one»;

- payback period indicator: «this indicator allows the expert to get distracted from the specific completion of the project and, with some other parameters, to characterize the efficiency and dynamics of the business».

The team of Ukrainian scientists [76], in their work on the economic evaluation of innovative solutions in the enterprise, as the main indicators of the evaluation of the effectiveness of innovation projects, which are an integral part of innovation and innovation development of the enterprise,

proposes to use the following five key indicators: net present value (NPV), profitability (yield) index (Eid) with discounted present and future value of money, payback period and indicative for internal rate of returns (Internal Rate of Return, IRR).

Ukrainian scientist O. B. Zhihor in his research summarized modern methods of evaluating the effectiveness of innovative projects from the point of view of evaluating the investment process, which allowed him to rank appropriately these methods. Thus, in his opinion, «the following basic methods should be used to evaluate the effectiveness of an individual innovation project: NPV, IRR, PP, DPP, PI, ARR, GPV and MIRR, as having the highest ranks» [77].

Of interest is the position outlined in the study by O. O. Maslak [26]. The scientist identifies two sets of criteria for assessing the effectiveness of innovation: local and global. Local criteria cover the commercial effect of innovation, and global criteria are formed from different spheres of government influence and responsibility. Global criteria may or may not have an economic evaluation. However, the scientist does not determine what criteria belong to each of the groups and immediately classifies the indicators without referring to any of them.

The only criterion for evaluating the effectiveness of innovation and innovation development, which the scientist I. V. Captain distinguishes in his research [75] is the criterion of novelty, which is that new products must be different from existing ones. However, the scientist does not provide indicators that should reflect the degree of difference of new products, and does not emphasize whether he meant brand new products, renovated or upgraded.

In order to formulate criteria for evaluating the effectiveness of innovative development, it is advisable to address the basic requirements of the criteria for evaluating the effectiveness.

According to the author, performance evaluation criteria should have such characteristics as the ease of measuring the quantitative evaluation of the indicator; ease of obtaining information on the basis of which this indicator is constructed and evaluated; uniqueness of interpretation of the received information. Criteria for evaluating the effectiveness of innovative development should also reflect a comprehensive approach to determining performance. The author considers that the main criterion for evaluating the efficiency of innovative development of the enterprise is the criterion of commercial efficiency. However, evaluating the effectiveness of an

enterprise's innovation development should be done not by one system, but by a system of interrelated criteria and indicators. The generalized system of criteria and corresponding indicators of efficiency of innovative activity and innovative development of the enterprise are presented in the Table 1.6 [87].

Table 1.6 – Generalized system of criteria and relevant indicators of innovation performance and innovation development

№	Criteria	Index
1	Economic efficiency	Increase in sales volumes, improvement of utilization of production capacities, acceleration of the process of capital construction, increase of productivity of PVP and decrease of the index of turnover of personnel at the enterprise, increase of efficiency of use of material and intangible resources, acceleration of process of turnover of circulating assets.
2	Commercial efficiency	Profit from licensing and patent activity, profit from the introduction of inventions, utility models and know-how, profit from the realization of new ideas, reduction of the cost of production due to the introduction of innovative ideas and modernization of equipment.
3	Financial and economic efficiency	Increase in the share of borrowed capital in intensive innovation activity, increase in the efficiency of the self-financing indicator of innovation, increase of the R&D results efficiency of obtained from third parties, increase in the investment activity profitability index, increase in the profitability index of realized products.
4	Marketing effectiveness	Increase in market share, increase in performance of pre-sales preparation and change of sales volume, increase of the indicator of bringing the new product to the end consumer, increase of efficiency of advertising activity, use of public relations efficiency increase.
5	Social efficiency	Increase in the level of remuneration, increase of satisfaction of physiological, social and spiritual employees needs, the participation index increase of the enterprise in social support of employees, increase of the share of the newly created jobs at the expense of realization of innovative projects, the number of jobs dynamics.
6	The effectiveness of humanization of labor	Improvement of the employees qualification level, increase of indicator efficiency, of expenses for training of personnel, increase of the indicator employees' self-development and their professional and creative growth, social tension and conflict in the team indicator reduction, index of active participation of employees in the enterprise management increase.

Continuation of Table 1.5

№	Criteria	Index
7	The effectiveness of the safety and health system	Compliance index increase of workplaces with sanitary and hygienic requirements, the safety level indicator increase and labor protection at the enterprise, ergonomic index of production increase.
8	Eco-efficiency	Increasing the of production greening efficiency, reducing the harmful impact of production processes involved in the innovative project implementation, on the environment, reducing the amount of harmful emissions into water, soil and air in the implementation of the project, increasing the environmental performance of innovative goods, compliance of the innovation project with sanitary and hygienic standards , radiation, environmental, architectural, established by the legislation of Ukraine, increase in penalties for violation of environmental legislation of Ukraine.
9	Production and technological efficiency	Increase in indicators of updating of production and basic production assets, increase of return index on productivity and material intensity index decrease of innovative production, increase of automation indicators and innovative production computerization, progressiveness of technologies indicator increase.
10	Scientific and technical efficiency	Increase of the science content index, increase of the share of employees with scientific degree involved in the project implementation, increase of the efficiency of research and experimental laboratories and departments, increase of the number of intellectual property rights objects for which there are corresponding documents; the amount of research indicators increase and development works carried out under the project during the reporting period, indicating the degree of completion of the works and concrete results; works on development efficiency increase, modernization and reconstruction of scientific-technological and experimental-industrial base.

Note: compiled and improved by the author on the basis of processed sources [28, 73, 95, 96].

Considering that the end result of innovation development is the development and implementation of innovative programs and projects, which usually require significant resources, and given that innovation is carried out in uncertainty, especially when it is decided to implement new

technologies and the expansion of the core business of an enterprise in a new technical base, new market, etc., should be clearly defined by methods of evaluating its economic or commercial efficiency, which, in the author's opinion, provide the most accurate, specific and clear evaluation of this or that project in particular, or evaluate the innovative activity of the enterprise as a whole. In this regard, in the author's opinion, it is advisable to use the methods presented in Table 1.7 in the practical use of enterprise innovation performance assessment. [87, 97].

Table 1.7 – Critical analysis of methods for evaluating the effectiveness of innovation in the enterprise

№	method	method essence
1	Use of two rates of return on capital	It is assumed that bringing one-off expenses to the accounting year will show the rate of return guaranteed by the bank to the holder of the money invested in the deposit calculation. On the other hand, the rate of return on capital, which is achieved to reconcile the interests of investors and producers, when receiving income from the sale of innovative products or services, will be used.
2	Methods for comparing profits, costs, and profitability	These methods are the simplest and limited to one selected period. At the same time, costs and revenues are distributed over the life cycle unevenly and after a large outflow of funds related to investing there are revenues from the sale of products or services, which increase in the subsequent stages. The limitation of one period will not allow to take into account this dynamics and it is difficult to say which of the segments of time is representative, which necessitates the use of the average characteristic, which equals the result regardless of the trend.
3	Net discounted cost method	It is assumed that this method allows to determine the summary of payments at the beginning of the planned horizon.
4	Method of internal rent	It is assumed that this method will characterize the return on investment.
5	Annuity method	It is assumed that this method will characterize the results of income and expenses over an average of one time period.
6	Payback method (based on timing of payments)	This method is assumed to take into account the time structure of payments over several periods
7	The method of ultimate cost of capital	It is assumed that this method will allow to determine the summary of payments at the end of the planned horizon. This method is mainly used to build a financial investment plan.

Note: made by the author on the basis of processed sources [71, 76, 82, 95, 96].

Based on the analysis of the most common methods of evaluating innovation performance, we can conclude that despite the wide variety of criteria and indicators of performance evaluation, all assessment methods can be divided into two fundamental groups: static and dynamic methods. Each of these groups has its advantages and disadvantages [97, 98]. Let us consider them.

According to the author, the first group of methods – static – does not take into account the influence of time factor on the value of payments. This group, among the most common methods used in the modern world, include: the method of comparing profits (net income), the method of comparing costs, the method of calculating the integral effect, the method of comparing profitability, the method of return, the method of calculating the growth of income in compared to the analogue. These methods reflect the different consequences of investment processes and have their own criteria to justify the feasibility of investing. The methods of this group should also be allocated depending on the coverage of the time period. Yes, the estimates provided by the methods of comparing profit, cost and profitability are one-period, and only the payback method is considered to be multi-period, because it reflects the temporary result of the compensation process, which may cover different terms. The limited duration of payments in one period does not reflect the dynamics of payments, and it is therefore difficult to say which of the intervals is representative.

Thus, static methods do not provide an opportunity to take into account the time factor: they do not reflect the time priority of payments and the time structure, trends of their change, the size of fluctuations. In addition, when comparing investment options with different project life, these disadvantages lead to limited opportunities to use static metrics. And the advantages of static methods are that they are characterized by simple mathematical calculations and require little information support.

The second group consists of dynamic methods for evaluating the economic efficiency of innovative development. They are based on a dynamic approach that takes into account the time factor, which significantly reduces the disadvantages inherent in static methods. Dynamic methods include: the method of internal rent, annuity method, method of evaluating innovation efficiency by useful life, payback method (taking into account time structure of payments), net discounted value method; the

ultimate cost of capital method and the compounding method. Focusing dynamic methods on time factor considerations can lead to solutions that are not static. The difference is also exacerbated by unequal approaches to accounting for the acquisition of innovation. In dynamic methods, they are treated as specific payments at the beginning of the period, while in static methods these costs are recorded as fixed depreciation, which offset the cost of innovation. In addition, the design of dynamic methods allows flexible consideration of the conditions of raising capital from sources used for financing and the scheme of its return; to introduce instruments of additional investments and additional financing; to reflect changes in interest rates that occur during the analyzed period.

Taking into account all the advantages and disadvantages of the methods outlined above, it is advisable for small businesses engaged in innovative activities to launch start-up products, a synthesis of two methods, namely the static method of comparing profit, cost and profitability, as the easiest way to calculate and dynamic payback method, taking into account the time structure of payments, which will give an opportunity not only to calculate in short term and compare profits and costs incurred, but also taking into account the time factor and the life curve of the innovation to obtain the specific value of the full payback period of the developed innovation, which is especially important for the potential investor.

Therefore, the section presents the classification of the concept of efficiency and its evaluation in terms of innovative development of the enterprise. It should be noted that in the course of this problem study evolution, scientists have identified various approaches presented in Fig. 1.3. In modern science, there are also many approaches to the classification of performance on various grounds, the main of which are presented in table. 1.4. The types of efficiency are also distinguished by the variety of effects obtained from the activities of enterprises. The main ones are economic, social and environmental effects. In the course of the research, we also highlighted the commercial effect as a kind of economic in terms of innovative development of the enterprise. The generalized system of criteria and corresponding indicators of innovation development efficiency are presented in Table. 1.5 of this section. And the table. 1.6 provides a critical analysis of methods for evaluating the effectiveness of innovation in the enterprise, which briefly presents their essence, advantages and disadvantages.

As a final result, the section proposes the dependence of the term «effectiveness» on strategic purpose of development of innovative enterprise and on the basis of it, the classification of concept of efficiency is developed. This allows to choose the optimal methods of measuring the efficiency of both individual innovation projects and innovative development of the enterprise as a whole. The use of the obtained results in the current conditions of development of the innovative sector of the Ukrainian economy will allow to consciously choose the best methods for measuring the efficiency of innovative development of the enterprise in terms of individual innovative projects depending on its strategic goal, which will allow to choose the most profitable of the projects, as well as to interest a wider range of potential investors, including foreign ones.

1.4 Conclusions to Section 1

The financial security mechanism is an effective tool that helps stimulate economic development, improve the investment climate in the economy, increase the efficiency of financial and economic activity of certain economic entities and increase the level of competitiveness of individual enterprises, regions and the country as a whole. The peculiarity of the mechanism of financial support for innovative development lies in its focus on the activation of innovative entrepreneurship, in particular small businesses.

The financial mechanism for providing innovative development includes the following basic elements: public funding; banking and commercial lending; external investment, including venture capital; self-financing, which involves the use of enterprises' own funds. Such a structure of this mechanism allows to mobilize all available sources of financial resources and to direct them to create conditions for effective innovative development and increase enterprises’ the level of competitiveness.

In order to ensure sustainable economic development, the Ukrainian state needs to create, under the example of developed countries, the proper conditions for accelerating innovative developments, introducing technological innovations at enterprises, enhancing the innovation activity of small and medium-sized enterprises.

Thus, the results of the study in the first section formulate the following main conclusions:

1. On the basis of generalization of domestic and foreign literary sources theoretical approaches have been developed in understanding the essence of the mechanism of financial support of innovative development, as a complex of certain forms, methods and ways of attraction of various sources financing for innovations, including public financing; banking and commercial lending; venture investment, external investment and self-financing, with the aim of stimulating the development of innovative entrepreneurship, in particular small business, improving the investment climate in the economy, improving the efficiency of financial and economic activity of economic entities. The structure of this mechanism allows to mobilize all available sources of financial resources and to direct them to create conditions for effective innovation activity and increase the level of competitiveness of enterprises. Thus, the financial security mechanism is an effective tool to stimulate economic development, improve the investment climate in the economy, improve the efficiency of financial and economic activity of certain economic entities, achieve the level of competitiveness of individual enterprises, regions and the country as a whole. The peculiarity of the mechanism of financial support for innovative development lies in its focus on the activation of innovative entrepreneurship, in particular, small businesses.

2. Based on the analysis, it was found that small innovative enterprises play an important role in the development of the national economy of both Ukraine and China. The evolution of small business listing criteria in Ukraine during its independent existence was analyzed and comparative analysis of current small business listing criteria in Ukraine and China was conducted. It is proved that in the current conditions of development of science and technology, the role of introduction in the production process of innovation is increasing, therefore, the state innovation policy of Ukraine should be formed based on a careful analysis of the international trends, current state of innovation development, which show that the most effective institutions of the innovation system, which are capable very quickly to respond to the needs of the innovation economy are small businesses.

According to the theoretical and analytical scientific materials, it is revealed that today small innovative entrepreneurship in China operates in accordance with the Law «On stimulating the development of small and medium-sized enterprises», adopted in 2002, which provides equal opportunities for small enterprises for lending, investing and production

improvement, implementation of innovative technologies in the Chinese economy. In China, state-owned small business start-up funds are active, as small businesses produce the largest number of innovative products and technical inventions, and the government helps protect their interests and provides certain tax breaks and additional financial resources for small businesses.

3. Improved classification of modern approaches to assessing the effectiveness of innovative small business development, which in contrast to the existing ones, takes into account not only common but also specific features of interpreting efficiency in modern conditions of formation of innovative economy in Ukraine and its definition based on these features, which will allow consciously choose the best methods for measuring the efficiency of an enterprise's innovation activity in the context of individual innovation projects depending on its strategic goal and choice you are the most profitable of the projects, and you are also interested in a wider range of potential investors, including foreign ones. The end result is the dependence of the definition of the term «efficiency» on the strategic goal of innovation enterprise development and, on the basis of this, the classification of the concept «efficiency» is developed, which allows to choose the optimal methods of measuring the efficiency of both individual innovation projects and innovative activity of the enterprise as a whole.

4. In the evolution process of this problem study, scientists have identified various approaches to the set of key indicators formation of the activation effectiveness of small business innovative development. Also activation efficiency indicators of innovative development are distinguished by a variety of the received effects from the enterprise innovative activity. The main ones are economic, social and environmental effects. In the process of research, the commercial effect was also highlighted as the efficiency key indicator of small business innovative development activation, which is a kind of economic effect in terms of innovation activity of a small enterprise. Thus, based on the conducted research and critical analysis of methods of evaluating the enterprise innovations effectiveness, the complex of key indicators formation of the activation effectiveness of small business innovative development was improved, which differs from the existing possibilities to identify the main technological, social, foreign economic and economic-organizational factors, as well as strategic orientation of managing innovation processes at both macro and macro levels.

SECTION 2 ANALYSIS OF THE CURRENT SITUATION OF THE MECHANISM OF FINANCIAL SUPPORT FOR SMALL BUSINESS IN UKRAINE AND CHINA

2.1 Macroeconomic trends of innovative development of Ukraine and the People's Republic of China

Innovation management is the basis of any national innovation strategy and proves effectiveness even in a crisis economy. An example of the effective use of the global crisis for its own purposes is the strategy of China, which has profitability acquired innovations and innovative personnel around the world during the global crisis of 2008–2009.

China after experiencing economic chaos during the cultural revolution of 1966–1976 and impoverishing the population, places stability in the conduct of economic policy on the first place. As a result, this poor agrarian country has taken a fantastic path in several decades and today is firmly on the leading position in the world. As early as 1979 China's GDP was 2.7 times less than the GDP of the Soviet Union today, and today in terms of economics China is ahead of all European countries. It confidently deserved second place after the US [100]. It has never happened in the world history that in such a short period of time a country made such a rapid breakthrough. Such a jump is due, first of all, to the competent strategic steps of the country's leadership, the use of available advantages such as: territorial location, availability of raw materials, cheap labor and so on.

Since 2008, the Ukrainian government has also prioritized building a new innovative economy [88], but unfortunately, the path Ukraine has taken over this period, and generally during its independence period, has not led to the adoption of an innovative economic development model. This is due primarily to the fact that, unlike the authoritarian China, Ukraine had to make transformations in two planes – not only economic but also political. However, studying China's experience for Ukraine is very useful.

The analysis of the economic situation in Ukraine and China, the study of innovative development of these countries is engaged in many domestic and foreign scientists, among which it is necessary to highlight N. M. Shostakivska [99], Z. S. Varnaliy, V. V. Zianko [101], O. V. Komelina, D. Sh. Musostova [102], D. I. Bisaev, M. I Krupka [15], T. Honson, L. Liu Lidzian [17]. However, a comparative analysis of the

dynamics of the main economic indicators of these countries from 1980 to 2017 with the further possibility of their forecasting was not conducted.

China was one of the first countries to realize what innovations are, what properties they possess and what laws they develop. Even the United States and the European Union, considering technical and technological innovation first, are losing out to China's holistic innovative development strategy.

No wonder the spring of 1978 in China is called the «Spring of Science», because at this time the process of innovative development was launched, reform of science and technology in China. The National Science Conference, held in Beijing in March 1978, announced the state's policy of supporting science and technology. During the conference, Dan Xiaopin put forward his thesis that «science and technology are the drivers of progress,» and uttered for the need to remove political barriers to scientific and technological development after ten years of chaos. This presentation set the stage for the creation of a strategy for the country's revival by developing science and education and strengthening the nation through the development of human resources. The participants of the conference discussed and approved the «National Science and Technology Development Plan for 1978–1985», which became the road map for the transformation of China's science and technology system. In 1992 China proclaimed a policy of openness to the outside world [100, 1-2]. The country purposefully created the conditions for maximum use of resources, finances, attracting foreign innovations, created more than 60 special free economic zones, which started the inflow of foreign investments. These investments have served as a source of creation and development of modern production, innovations in the field of IT technologies and HR-methods of doing business. China has also set up special IT zones where foreign investors have been granted unprecedented tax breaks and lands.

Today, China has launched a consistent, large-scale, comprehensive program of innovative development, which is reflected in the long-term National Program of Innovation Strategy 2020–2050, which plans that by 2020 China will be included in the list of innovative countries, by 2030 – will enter the first ranks of innovative states, and by 2050 it will become the world's leading state of scientific and technological innovations [101]. The program stipulates that innovation should become the main driving force for development. At the same time, scientific and technological innovations should be supported by innovations in the field of public

institutions, culture, models of management and trade, which will allow to move to a higher level of economic development with a more rational structure of innovative expenses.

The rapid development of the Chinese economy at the turn of the century was largely driven by Dan Xiaoping's strategic outlook. He is called the architect of Chinese reform. Dan Xiaoping outlined a clear blueprint for the country's modernization [100]: to increase GDP from $ 250 to $ 500 in the 1980s per capita. In the 1990s – double the GDP again, i.e. raise it from $ 500 to $ 1,000 per capita. And then to the 100th anniversary of the proclamation of China to increase GDP four more times – up to $ 4 thousand per inhabitant.

As can be seen from the data in Table 2.1 and the graph in Fig. 2.1 China's GDP reached a value of $ 4000 per capita GDP by 2010, 39 years earlier than planned by Deng Xiaoping [100, 101].

Table 2.1 – China's GDP per capita 1980–2017

Date	Value, $	Change,%	Date	Value, $	Change,%
2017	8 643	6.50	2009	3 838	10.70
2016	8 116	–0.62	2008	3 467	28.27
2015	8 167	6.04	2007	2 703	28.07
2014	7 702	8.77	2006	2 111	211.1
2013	7 081	11.87	1998	1000	200
2012	6 329	13.37	1993	500	77.3
2011	5 583	23.40	1986	282	12.8
2010	4 524	17.88	1980	250	–

Note : prepared by the author based on ODA and tsovanyh sources [103–105]

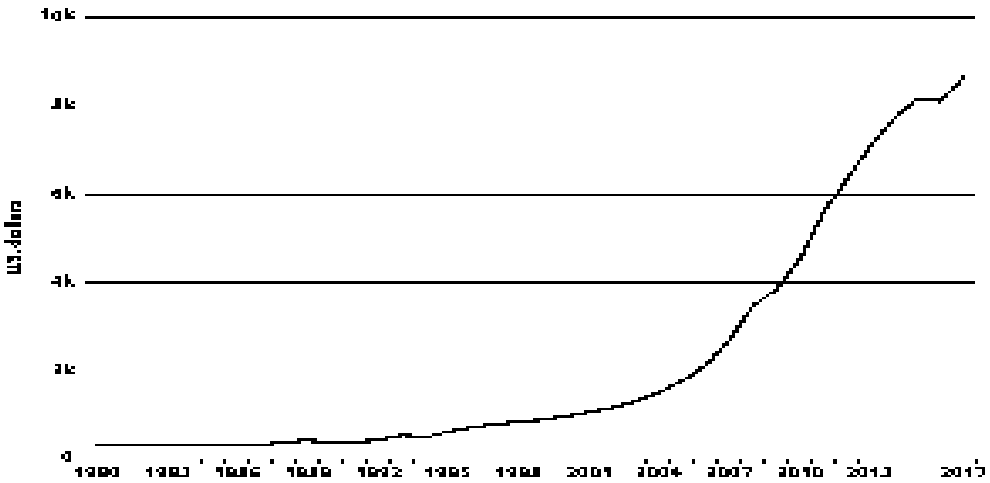

Figure 2.1 – China's GDP per capita dynamics 1980–2017 (note: k = 1000, «kilo»)

The change in GDP per capita in Ukraine is presented in Table 2.2 and Graph 2.2.

Table 2.2 – Ukraine's GDP per capita 1992–2017

Date	Value, $	Change, %	Date	Value, $	Change, %
2017	2 583	17.46	2010	2 983	12.35
2016	2 199	2.98	2009	2 655	–35.17
2015	2 135	–31.01	2008	4 095	27.19
2014	3 095	–22.02	2007	3 220	33.72
2013	3 969	2.49	2006	2 408	131.98
2012	3 873	7.88	1997	1 038	142.52
2011	3 590	20.34	1992	428	–

Note: Prepared by author based on processed sources [103-105]

As we can see, the results of Ukraine's GDP growth per capita in Ukraine are not as iridescent as in China, which is in the author's opinion, primarily due to the global economic crisis of 2008 and the anti-terrorist operation launched in 2014.

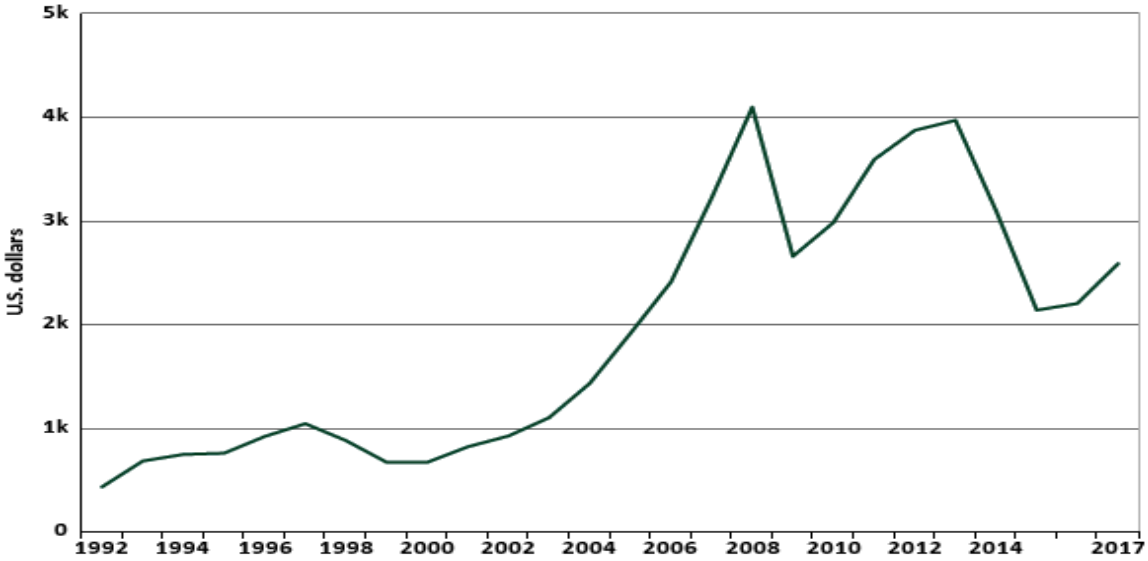

Figure 2.2 – GDP dynamics of Ukraine per capita 1992–2017 (note: k = 1000, «kilo»)

In Fig. 2.3 Ukraine and China's GDP per capita is shown to simplify the benchmarking.

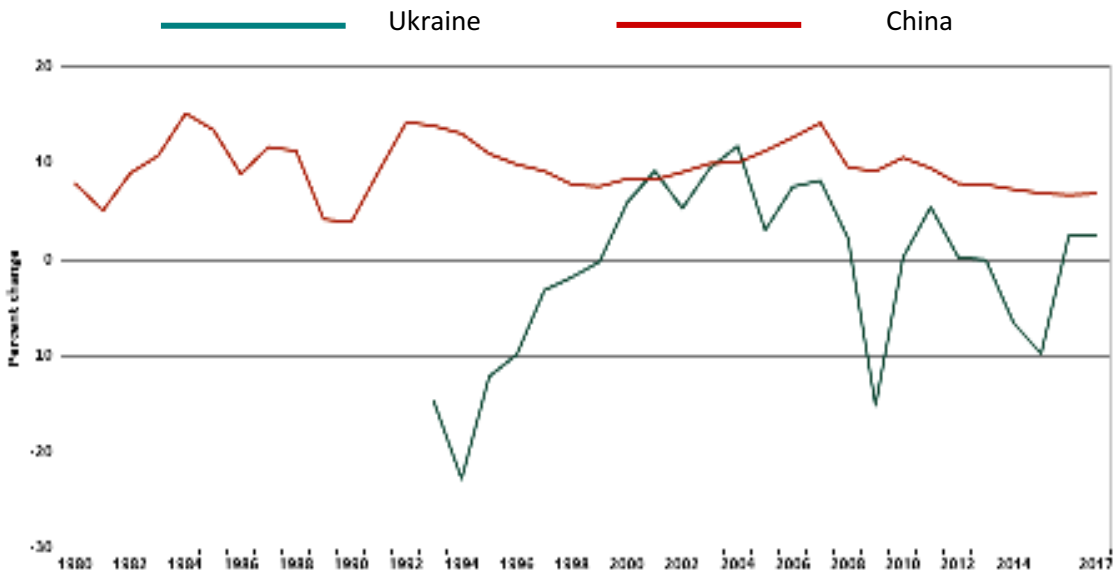

Figure 2.3 – Comparative analysis of GDP of Ukraine and China per capita
(note: k = 1000, «kilo»)

As can be seen from Chart 2.3, in 2008, before the onset of the global economic crisis, Ukraine's GDP per capita was higher by USD 628, or 18.1 % more than in China.

In terms of total GDP, in the author's view, considering it in absolute terms is incorrect due to the incomparable number of able-bodied population in both countries. Therefore, let us analyze, shown in Chart 2.4, GDP growth in% in both countries.

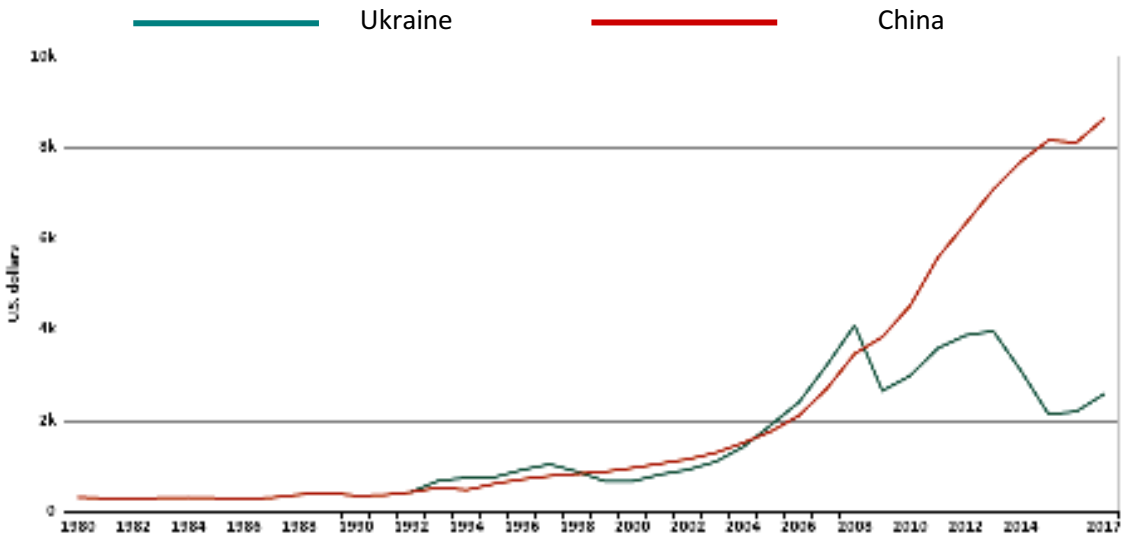

Figure 2.4 – Comparative analysis of GDP growth of Ukraine and China

The numerical value of the GDP growth rates of Ukraine and China and the last ten years are presented in Table 2.3.

Table 2.3 – GDP growth of Ukraine and China 2007–2017

Date	Value, %	Change, %	Date	Value, %	Change, %
Ukraine			***China***		
2017	2.5	+4.17	2017	6.9	+2.99
2016	2.4	+124.49	2016	6.7	–2.90
2015	–9.8	–48.48	2015	6.9	–5.48
2014	–6.6	–24544.44	2014	7.3	–6.41
2013	0.027	–88.75	2013	7.8	–1.27
2012	0.24	–95.64	2012	7.9	–16.84
2011	5.5	+1733.33	2011	9.5	–10.38
2010	0.3	–101.99	2010	10.6	+15.22
2009	–15.1	–786.36	2009	9.2	–4.17
2008	2.2	–73.17	2008	9.6	–32.39
2007	8.2	+8.52	2007	14.2	+11.81

Note: Prepared by author based on processed sources [103–105]

Although China's gross domestic product growth of 6.7 % in 2016 has been the lowest in the past 25 years, it is still one of the highest among the world's largest economies. Besides, the additional absolute output generated by this 6.7 % of GDP growth is now much higher than that observed in China in those years when GDP growth was much higher.

As for Ukraine, from 2008 to 2017, GDP growth is ambiguous, which is related to the global economic trends: the global crisis of 2008–2009, which led to a 2009 GDP decline of a record –15.1 %. As well as with internal problems of both economic and political nature: the beginning of the ATO in 2013 had a negative impact on the economic environment of Ukraine.Iin particular, an active outflow of foreign investors who were not satisfied with the unstable military situation in Ukraine began, which led to a decline in growth GDP for 2014 and 2015 by –6.6 % and –9.8 % respectively. Also, the negative fact that led to such a deterioration in GDP growth was the self-declaration of the Lugansk People's Republic and the Donetsk People's Republic, as well as the annexation of Crimea – it is impossible to take into account the GDP in these territories, especially in the Crimean peninsula, which is under Russia Federation control. But since

2016, there has been an increase in GDP growth, which testifies to the stabilization of the economic, political and, partially, military situation in Ukraine, which is a positive trend.

As can be seen from the graph in Fig. 2.4, in 2017, China's GDP growth increased from 2016 to the 2015 level comparing with 2016, amounting to 6.9 %, which, according to the author, indicates that China made a transition from a growth model in 2011–2016, mainly export-oriented and characterized by a high volume of investments, to a model based on consumption and innovation. This transition is clearly visible in the dynamics of foreign direct investment in the country (Fig. 2.5) and China's direct investment in other countries (Fig. 2.6).

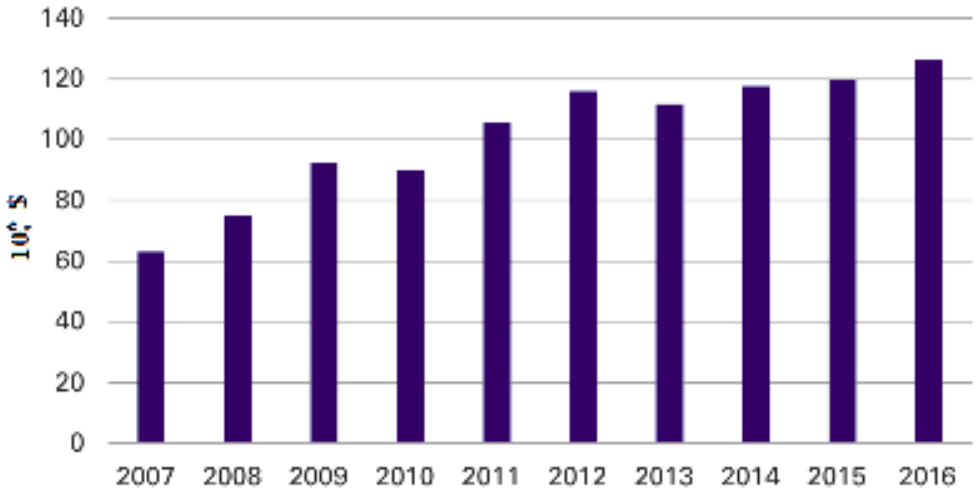

Figure 2.5 – Direct investment flows into China's economy

2016, despite the widely discussed slowdown in economic growth, the difficult stock market situation and exchange rate volatility, was marked in China as a year of steady growth in foreign direct investment. Moreover, foreign direct investment in China's economy reached a historic high of $ 126.3 billion, up from $ 118.7 billion. in 2015, which corresponds to an increase of 6.4 % compared to the previous year (Fig. 2.5) [105, 106]. These statistics show that, despite the slowdown in economic growth, foreign investors still have opportunities to make profit in key sectors of the economy. The dynamics of foreign direct investment over the last ten years is in line with the government's efforts to ensure China's transition to

a high-value-added economy, based more on the services sector than on domestic consumption driven growth.

With regard to China's direct investment in other countries, they grew by 14.7 %, reaching a historic maximum of $ 118.02 billion in 2016, as shown in the diagram in Fig. 2.6.

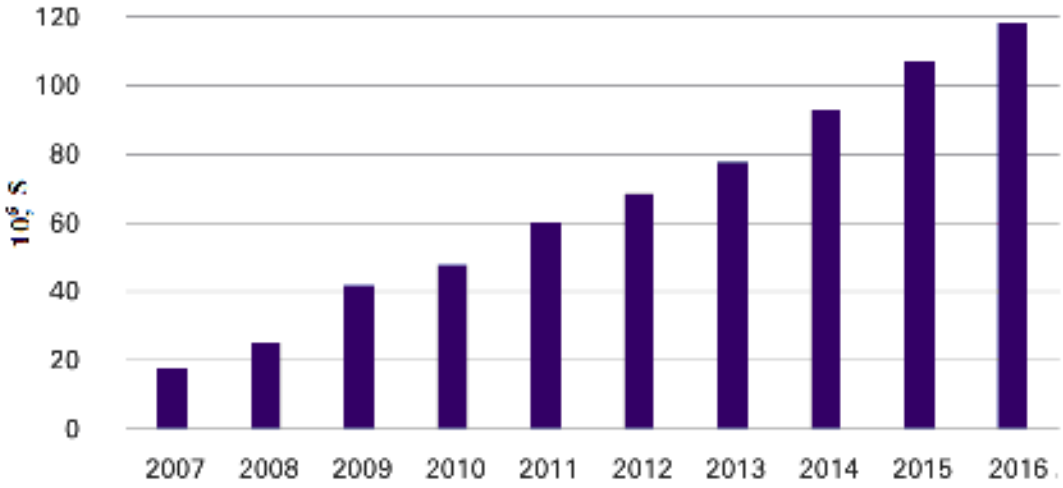

Figure 2.6 – China's FDI flows to other countries

It should be noted that the actions of foreign investors contribute to the formation of a bilateral economy in China, in which services, advanced industrial production and consumer markets show growth opportunities, while basic industrial production and heavy industry face the need for comprehensive restructuring and optimization. Despite the fact that the second direction is going through difficult times, the first direction, on the contrary, shows good potential. In the future, in our view, the bi-directional development of the Chinese economy will continue to determine its growth, which will have a corresponding impact on the dynamics of investment in China and Chinese investment in other countries. Although GDP is likely to continue to show low growth rates, it is rather viewed as a positive trend, a prerequisite for China's transition to a high value-added economy [107]. Gradually, both the needs of Chinese population and the priorities of the government will become increasingly complex, which in turn will change the motivation and strategy of foreign investment firms in China, as well as Chinese investors abroad. Also important for the rapid growth of GDP is the factor of completeness of employment and the unemployment rate, quantified in Table 2.4.

Table 2.4 – Official unemployment rate of Ukraine and China 2007–2017

Date	Value, %	Change, %	Date	Value, %	Change, %
Ukraine			***China***		
2017	9.4	+1.075	2017	3.900	–2.985
2016	9.3	+2.198	2016	4.020	–1.229
2015	9.1	–2.151	2015	4.070	–0.732
2014	9.3	+29.167	2014	4.100	+0.861
2013	7.2	–4.000	2013	4.065	–0.974
2012	7.5	–5.063	2012	4.105	0.000
2011	7.9	–2.469	2011	4.105	–0.941
2010	8.1	–7.955	2010	4.144	–4.516
2009	8.8	+37.500	2009	4.340	+2.358
2008	6.4	0.000	2008	4.240	+4.950
2007	6.4	–6.74	2007	4.040	–2.440

Note: Prepared by author based on processed sources [103–105]

In Fig. 2.7 presents a comparative analysis of the official unemployment rate in China and Ukraine. As we can see from Chart 2.7, the official unemployment rate in Ukraine is the highest in the last ten years and reaches 9.4 % according to official figures, that is, almost every tenth able-bodied person registered with the state employment service is in active job search, which in 2,5 times higher than the unemployment rate in China, which, incidentally, is the lowest since 2003 at 3.9 %.

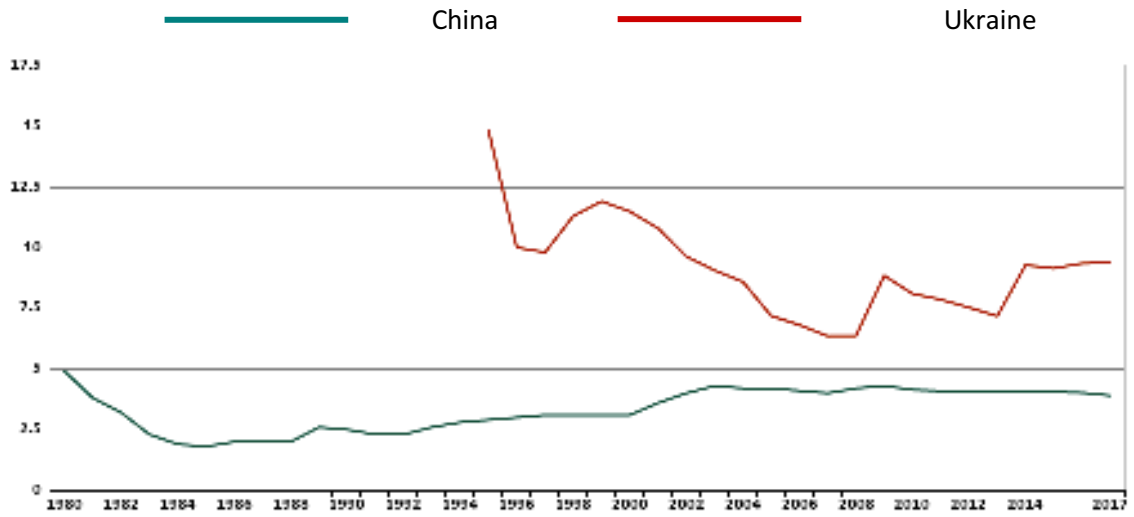

Figure 2.7 – Comparative analysis of the unemployment rate of Ukraine and China

Regarding the indicator of full employment of the population (Table 2.5), it is reflected by the employment rate of the population, which is calculated as a percentage of the working-age population aged 15 years.

Table 2.5 – Employment rate of Ukraine and China 2007–2017

Date	Volume, %	Change, %	Date	Volume, %	Change, %
Ukraine			***China***		
2017	49.1	–0.61	2017	65.7	–0.61
2016	49.4	–0.40	2016	66.1	–0.60
2015	49.6	+0.81	2015	66.5	–0.45
2014	49.2	–4.47	2014	66.8	–0.45
2013	51.5	+1.38	2013	67.1	–0.45
2012	50.8	–0.20	2012	67.4	–0.44
2011	50.9	+0.79	2011	67.7	–0.44
2010	50.5	+0.80	2010	68.0	–0.58
2009	50.1	–2.34	2009	68.4	–0.44
2008	51.3	–0.19	2008	68.7	–1.29
2007	51.4	+0.32	2007	69.6	–0.42

Note: Prepared by author based on processed sources [103–105]

Graphically comparative analysis of the full employment of the population in Ukraine and China is shown in fig. 2.8.

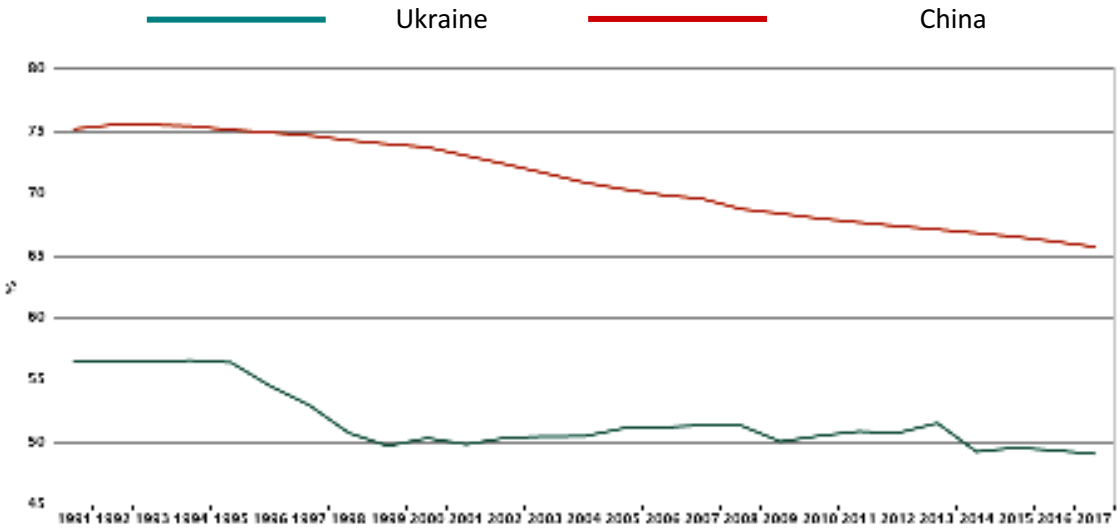

Figure 2.8 – Comparative analysis of Ukraine and China population employment completeness

Therefore, as can be seen from Fig. 2.8 in Ukraine as of 2017 the employment rate of the population is the lowest and reaches only 49.1 %, which is the lowest indicator for all years of independence of Ukraine. A sharp decline in the employment rate in Ukraine has been observed since

the beginning of 2014 and coincides with the period of annexation of Crimea and the beginning of the ATO. During this period, the employment rate declined from 51.5 % to 49.2 %, down almost 5 % from the previous year. In 2015 this indicator increased slightly to 49.6 %, and in 2016–2017 gradual decrease to a minimum of 49.1 %, which is a negative tendency. With regard to China, this indicator also has a downward tendency – to decline, and has been the least significant in the last 25 years at 65.7 %, which is primarily due to some slowdown in the development of the Chinese economy [100, 107].

Analyzing the state of the economy, it is impossible not to analyze and compare the dynamics of such global economic macro indicators as exports and imports in these countries.

In the Table 2.6 the quantitative values of the Ukrainian and Chinese exports over the past ten years are presented.

Table 2.6 – Exports of goods and services of Ukraine and China 2007-2017

Date	**Volume,$**	**Change, %**	**Date**	**Volume,$**	**Change, %**
Ukraine			***China***		
2017	53 776 000 000	+16.88	2017	2 422 911 001 954	+10.24
2016	46 008 000 000	–3.87	2016	2 197 922 469 130	–6.87
2015	47 862 000 000	–26.86	2015	2 360 152 452 309	–4.17
2014	65 436 000 000	–19.94	2014	1 462 902 030 661	+4.56
2013	81 729 000 000	–5.53	2013	2 355 594737 798	+8.30
2012	86 516 000 000	+3.42	2012	2 175 092 012 376	+8.28
2011	83 652 000 000	+27.47	2011	2 008 852 448 487	+25.24
2010	65 626 000 000	+26.01	2010	1 603 944 171 443	+28.34
2009	52 080 000 000	–36.86	2009	1 249 723 531 707	–16.42
2008	82 480 000 000	+34.31	2008	1 495 317 001 222	+18.95
2007	61 412 000 000	+27.00	2007	1 257 052 625 430	+26.75

Note: made by the author on the basis of processed sources [15, 17, 18, 105]

As can be seen from Table 2.6 and Fig. 2.9 the positive trend of export of goods to China from 2007 to 2017 is traced. There is a steady increase in exports from 5 % to 28 %, the troubled years of 2009 – due to the global economic crisis, and 2015 and 2016, when exports decreased by –16 %, –4 % and –6 % respectively, but starting from 2017 again began to increase +10.24 %.

For Ukraine the trend is ambiguous: there is a sharp increase in exports to 34.31 % in 2008, and a sharp drop to –36.86 % in 2009 due to the global economic crisis, and from 2013 to 2016 due to the ATO. Only in 2017, things started to improve and exports grew by almost 17 %, a positive tendency.

Figure 2.9 – Comparative analysis of exports of goods and services in Ukraine and China

In the Table 2.7 The quantitative values of the import index of Ukraine and China over the last ten years are presented.

Table 2.7 – Volume of imports of goods and services of Ukraine and China 2007–2017

Date	Volume,$	Change, %	Date	Volume,$	Change, %
Ukraine			***China***		
2017	62 386 000 000	+18.92	2017	2 212 182 564 781	+13. 90
2016	52 461 000 000	+4.45	2016	1 942 185 380 887	–3.00
2015	50 224 000 000	–28.29	2015	2 002 281 688 028	–10.68
2014	70 042 000 000	–28.05	2014	2 241 602 783 714	+ 5.73
2013	97 353 000 000	–3.48	2013	2 120 215 176 194	+9.11
2012	100 862 000 000	+7.53	2012	1 943 247 135 628	+6.37
2011	93 797 000 000	+34.75	2011	1 826 948 709 575	+32.3
2010	69 608 000 000	+28.82	2010	1 380 920 299 730	+34.12
2009	54 037 000 000	–44.20	2009	1 029 593 130 340	–10.20
2008	96 848 000 000	+39.26	2008	1 146 484 468 068	+20.81
2007	69 543 000 000	+35.23	2007	949 016 596 646	+21.23

Note: Prepared by author based on processed sources [103–105].

As Table 2.7 shows, the trend towards an increase in imports of goods to China from 2007 to 2017 inclusively, with the exception of 2009 – due to the global economic crisis, imports decreased to –10.2 %, and in 2015 and 2016 respectively by –10.68 % and – 3 %, but in 2017 it increased again by almost 14 %.

For Ukraine the trend is ambiguous: there is a rapid increase in imports to 39.26 % in 2008, and a sharp fall to –44.2 % in 2009 due to the global economic crisis, and from 2013 to 2015 due to the ATO. Only in 2016, imports increased by 4.45 % and in 2017 by almost 19 %, indicating a relative stabilization of the economy.

A graphical comparative analysis of imports of goods and services of China and Ukraine is presented in Fig. 2.10.

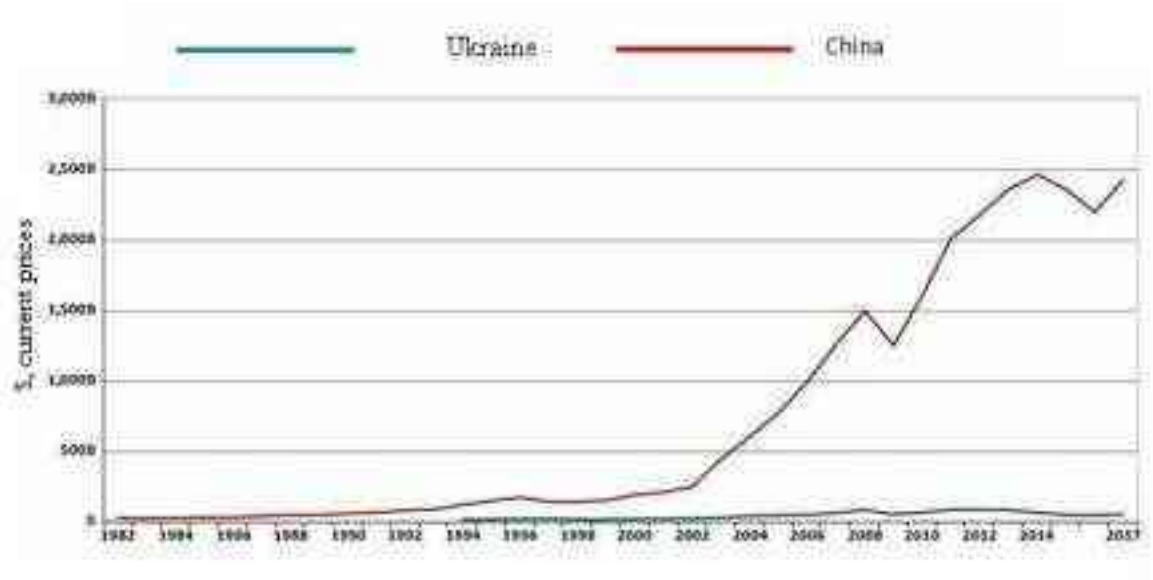

Figure 2.10 – Comparative analysis of imports of goods and services in Ukraine and China

As we can see from the graph in Fig. 2.9 and 2.10, China's integration into the world economy is rapidly increasing, while Ukraine is not actually changing its status. Integration into the world economy is an important component of the country's national security, that is why China is rapidly increasing this level, while Ukraine is essentially losing control of the indicator.

One of the modern indicators that assess the level of economic development of the country is the indicator of economic freedom. Economic freedom is a fundamental right of every citizen to control his or

her own work and property. In an economically free society, people are free to work, produce, consume and invest in any way, provided that they enjoy this freedom, both protected by the state and not restricted by the state. In economically free societies, governments allow labor, capital and goods to move freely, and to refrain from being forced or restricted by freedom against the background necessary to protect and maintain freedom itself. It measures this percentage from 0 % to 100 %, where 100 % means complete economic freedom. In Fig. 2.11 reflects the dynamics of the economic freedom indicator in China and Ukraine.

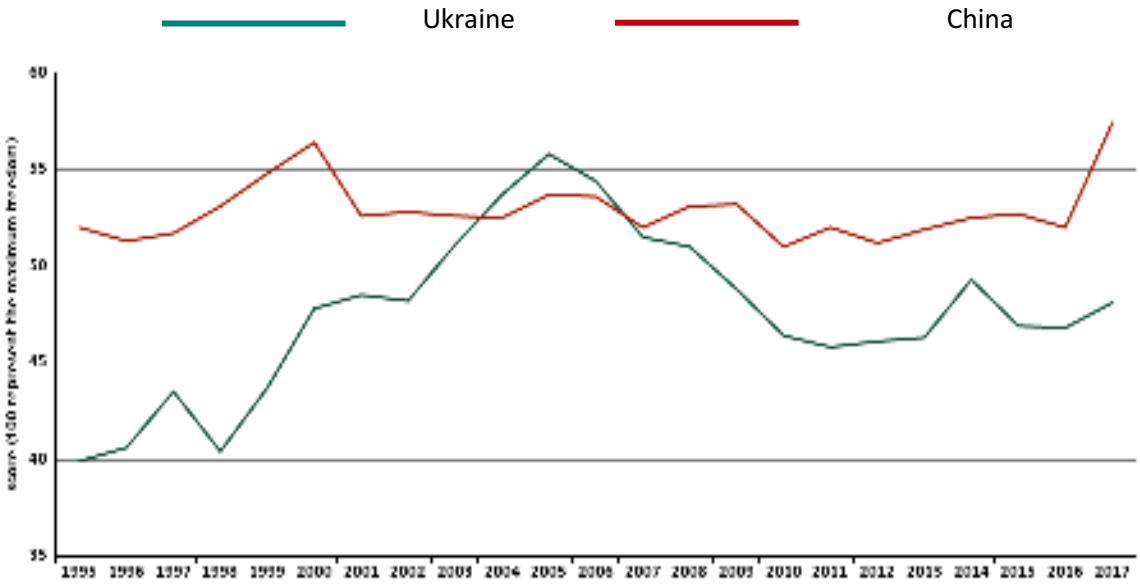

Figure 2.11 – Comparative analysis of the economic freedom index in Ukraine-China

Given the data of Fig. 2.11 shows that economic freedom in Ukraine is higher than in China. However, the results of this freedom are not reflected in the economy of Ukraine. This is probably due to the difference in institutional conditions of the economies of the two countries. We emphasize that the index of economic freedom is an important indicator for innovative development. And so fig. 2.11 demonstrates that the institutional environment for the development of innovative entrepreneurship in Ukraine needs improvement. It is probably in this area that China's experience may be extremely relevant to Ukraine.

Let us analyze the number of economic entities (Table 2.8) in Ukraine at large, small and medium-sized enterprises in 2010–2016according to the State Statistics Committee of Ukraine [104], as well as their deviation from the previous year.

As can be seen from Table 2.8, the change in the indicators during these years is not uniform. Thus, 2014 was the worst year for small and micro-enterprises, when enterprises started to close down massively as a result of the ATO and unstable situation in the country, and 2016 turned out to be negative for both small and micro-enterprises and individuals-entrepreneurs of the small and micro enterprises subject. This situation may have been due to the non-compliance with the Minsk agreements and the destabilization of the Ukrainian economy.

Table 2.8 – Number of economic entities, units

Year	total	Including							
		enterprises				individual entrepreneurs			
		large	medium-sized	small	among them	Total	medium-sized enterprise subjects	small enterprises subjects	among them
					micro-enterprises				micro-enterprises subjects
2010	2183928	586	20983	357241	300445	1805118	355	1804763	1793243
2011	1701620	659	20753	354283	295815	1325925	306	1325619	1313004
2012	1600127	698	20189	344048	286461	1235192	361	1234831	1224315
2013	1722070	659	18859	373809	318477	1328743	351	1328392	1318703
2014	1932161	497	15906	324598	278922	1591160	712	1590448	1580965
2015	1974318	423	15203	327814	284241	1630878	307	1630571	1626589
2016	1865530	383	14832	291154	247695	1559161	281	1558880	1553041

Note: Prepared by the author based on processed sources [103, 104]

Continuation of the table 2.8

small enterprises			micro–enterprises			small enterprises subjects			micro–enterprises subjects		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–	–	–	–	–	–	–	–	–	–	–	–
–2958	–0.83 %	0.99	–4630	–1.54 %	0.985	–479144	–26.55 %	0.735	–480239	–26.78 %	0.732
–10235	–2.89 %	0.97	–9354	–3.16 %	0.968	–90788	–6.85 %	0.932	–88689	–6.75 %	0.932
29761	8.65 %	1.09	32016	11.18 %	1.112	93561	7.58 %	1.076	94388	7.71 %	1.077
–49211	–13.16 %	0.87	–39555	–12.42 %	0.876	262056	19.73 %	1.197	262262	19.89 %	1.199
3216	0.99 %	1.01	5319	1.91 %	1.019	40123	2.52 %	1.025	45624	2.89 %	1.029
–36660	–11.18 %	0.89	–36546	–12.86 %	0.871	–71691	–4.40 %	0.956	–73548	–4.52 %	0.955

Note: Made by the author on his own, using Excel

If we analyze the relative and absolute deviations of the indicators, as well as their growth rates (Table 2.8), we can conclude that the worst

situation with small enterprises was observed in 2014 – their reduction reached –13.16 %, micro-enterprises, in turn, decreased by –12,42. Slightly better is the situation with individual entrepreneurs: small and micro-entities. The worst for them was 2011, when the reduction reached 26.55 % and 26.78 %, respectively, since 2012, there was a positive tendency to increase steadily, but the number of 2010 small and micro-entrepreneurs did not reach.

Let us analyze the number of employees (Table 2.9) in Ukraine at large, small and medium-sized enterprises for 2010–2016according to the State Statistics Committee of Ukraine [104], as well as their deviation from the previous year.

Table 2.9 – Number of employees, thousand people

Year	total	Including							
		enterprises				individual entrepreneurs			
		large	medium-sized	small	among them	total	medium-sized enterprise subjects	small enterprises subjects	among them
					micro-enterprises				micro-enterprises subjects
2010	10772.7	2400.3	3393.3	2164.6	832.6	2814.5	20.5	2794.0	2708.1
2011	10164.5	2449.0	3252.6	2091.5	788.9	2371.4	20.9	2350.5	2241.5
2012	9957.6	2484.2	3144.2	2051.3	788.2	2277.9	44.0	2233.9	2062.8
2013	9729.1	2383.7	3012.1	2010.7	795.3	2322.6	42.1	2280.5	2119.8
2014	8796.7	1915.1	2696.5	1686.9	723.5	2498.2	69.9	2428.3	2253.4
2015	8180.0	1708.6	2604.7	1576.4	691.4	2290.3	28.0	2262.3	2187.2
2016	8108.3	1586.6	2622.8	1591.7	642.7	2307.2	27.1	2280.1	2172.0

Note: Prepared by the author based on processed sources [103, 104]

Continuation of the table 2.9

small enterprises			micro–enterprises			small enterprises subjects			micro–enterprises subjects		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–73.1	–3.38 %	0.97	–43.7	–5.25 %	0.948	–443.5	–15.87 %	0.841	–466.6	–17.23	0.828
–40.2	–1.92 %	0.98	–0.7	–0.09 %	0.999	–116.6	–4.96 %	0.950	–178.7	–7.97 %	0.920
–40.6	–1.98 %	0.98	7.1	0.90 %	1.009	46.6	2.09 %	1.021	57	2.76 %	1.028
–323.8	–16.10 %	0.84	–71.8	–9.03 %	0.910	147.8	6.48 %	1.065	133.6	6.30 %	1.063
–110.5	–6.55 %	0.93	–32.1	–4.44 %	0.956	–166	–6.84 %	0.932	–66.2	–2.94 %	0.971
15.3	0.97 %	1.01	–48.7	–7.04 %	0.930	17.8	0.79 %	1.008	–15.2	–0.69 %	0.993
–73.1	–3.38 %	0.97	–43.7	–5.25 %	0.948	–443.5	–15.87 %	0.841	–466.6	–17.23 %	0.828

Note: Made by the author on his own, using Excel

After analyzing the data in Table 2.9, it can be concluded that there is a steady downward trend in the number of employed workers both at small

and micro-enterprises and among individual entrepreneurs of small and micro-enterprise entities.

We analyze in Table 2.10 volume of sales (goods, services), in million UAH at large, small, medium-sized enterprises and micro-enterprises of Ukraine for the years 2010–2016, as well as their deviation from the previous year.

Table 2.10 – Volume of sales (goods, services), million

Year	total	Including							
		enterprises				Individual entrepreneurs			
		large	medium-sized	small	among them: micro-enterprises	total	medium-sized enterprise subjects	small enterprises subjects	among them: micro-enterprises subjects
2010	3596646.4	1401596.8	1396364.3	568267.1	181903.1	230418.2	19487.5	210930.7	190055.3
2011	4202455.2	1775829.0	1607628.0	607782.4	189799.1	211215.8	11221.2	199994.6	181697.8
2012	4459818.8	1761086.0	1769430.2	672653.4	212651.2	256649.2	13015.4	243633.8	225449.1
2013	4334453.1	1717391.3	1662565.2	670258.5	216111.4	284238.1	20778.9	263459.2	244546.0
2014	4459702.2	1742507.9	1723151.5	705000.5	230729.3	289042.3	12742.7	276299.6	255906.0
2015	5556540.4	2053189.5	2168764.8	937112.8	307450.0	397473.3	15612.0	381861.3	358275.8
2016	6726739.8	2391454.3	2668695.7	1177385.2	361784.0	489204.6	14607.8	474596.8	449762.4

Note: Prepared by the author based on processed sources [103, 104]

Continuation of the table 2.10

small enterprises			micro–enterprises			small enterprises subjects			micro–enterprises subjects		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–	–	–	–	–	–	–	–	–	–	–	–
39515.3	6.95	1.07	7896	4.34	1.043	–10936	–5.18	0.948	–8357.5	–4.40	0.956
64871	10.67	1.11	22852.1	12.04	1.120	43639.2	21.82	1.218	43751.3	24.08	1.241
–2394.9	–0.36	1.00	3460.2	1.63	1.016	19825.4	8.14	1.081	19096.9	8.47	1.085
34742	5.18	1.05	14617.9	6.76	1.068	12840.4	4.87	1.049	11360	4.65	1.046
232112	32.92	1.33	76720.7	33.25	1.333	105562	38.21	1.382	102370	40.00	1.400
240272	25.64	1.26	54334	17.67	1.177	92735.5	24.29	1.243	91486.6	25.54	1.255

Note: Made by the author on his own, using Excel

If we analyze in Table 2.10 the absolute and relative deviation of the volume of sold products (goods, services), as well as their growth rate during the mentioned years, it is possible to observe a positive tendency to their constant increase. But one of the variants of such a positive tendency may be that the State Statistics Committee of Ukraine does not take into account the level of inflation and the publication of statistical information in absolute and not relative prices. Table 2.11 presents the dynamics of innovation activity of industrial enterprises of Vinnitsa region from 2007 to 2017, as well as their deviation from the previous year.

Table 2.11 – Innovative activity of industrial enterprises of Vinnytsia region, thousand UAH

Year	Percentage of enterprises engaged in innovation	Total sum of expenses	Including branches					
			research and development	including		acquisition of other external knowledge	purchase of machinery, equipment and software	Other expenses
				internal GDR	external GDR			
	%	thousand UAH						
2007	23.9	355336.6	8492.4	6344.8	2147.6	379.9	340971.0	5493.3
2008	16.2	133751.2	18832.9	16914.0	1918.9	326.7	111664.9	2926.7
2009	12.2	336997.4	3080.5	776.9	2303.6	2865.1	329188.0	1863.8
2010	14.7	90085.0	1943.3	1617.8	325.5	486.9	79227.4	8427.4
2011	15.8	44481.4	2470.8	2099.2	371.6	19.6	40745.8	1245.2
2012	18.0	419277.6	2440.5	1509.3	931.2	63.6	347900.6	68872.9
2013	19.4	694945.9	1782.7	988.5	794.2	156.3	690543.6	2463.3
2014	14.2	796493.5	1073.0	931.9	141.1	115.7	788728.3	6576.5
2015	14.7	575261.6	2398.5	2184.2	214.3	–	554508.2	18354.9
2017	15.4	100437.3	3820.7	1640.2	2180.5	352.8	92087.9	4175.9

Note: by author based on processed sources [104]

Continuation of the table 2.11

Percentage of enterprises engaged in innovation			expenses on research and development			expenses on internal GDR			expenses on external GDR		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–	–	–	–	–	–	–	–	–	–	–	–
–7.7	–32.22	0.68	10340.5	121.76	2.218	10569.2	166.58	2.666	–228.7	–10.65	0.89
–4	–24.69	0.75	–15752	–83.64	0.164	–16137	–95.41	0.046	384.7	20.05	1.20
2.5	20.49	1.20	–1137.2	–36.92	0.631	840.9	108.24	2.082	–1978.1	–85.87	0.14
1.1	7.48	1.07	527.5	27.14	1.271	481.4	29.76	1.298	46.1	14.16	1.14
2.2	13.92	1.14	–30.3	–1.23	0.988	–589.9	–28.10	0.719	559.6	150.59	2.51
1.4	7.78	1.08	–657.8	–26.95	0.730	–520.8	–34.51	0.655	–137	–14.71	0.85
–5.2	–26.80	0.73	–709.7	–39.81	0.602	–56.6	–5.73	0.943	–653.1	–82.23	0.18
0.5	3.52	1.04	1325.5	123.53	2.235	1252.3	134.38	2.344	73.2	51.88	1.52
0.7	4.76	1.05	1422.2	59.30	1.593	–544	–24.91	0.751	1966.2	917.50	10.16

Note: Made by the author on his own, using Excel

Analyzing absolute and relative deviation of innovative activity of industrial enterprises in Vinnitsa region in Table 2.11, as well as their growth rate, we can conclude that the most negative in terms of reduction of the percentage of enterprises engaged in innovation were 2008, 2009 and 2014 when the reduction reached respectively –32.22 %; –24.69 % and –26.8 %, which was a negative trend. But since 2015 the situation has improved with an increase in innovation firms by 3.52 % and 4.76 % respectively, which is a positive indicator. In terms of R&D expenditures, internal and external R&D expenditures, the years of reductions in all these

indicators are 2012–014, which can be caused by the distant effects of the global crisis and the beginning of the anti-terrorist operation and the destabilization of the Ukrainian economy in connection with the military aggression.

It should be noted that since 2015 the direct comparison of data with similar data from previous years is incorrect due to changes in the organization and conducting of the state statistical observation on innovative activity of an industrial enterprise. The periodicity of the state statistical observation on innovation activity which is a direct component of the innovative development of an industrial enterprise, changed from «annual» to «once every two years», starting in 2015.

Let us analyze the sources of financing the innovation activity of industrial enterprises for 2007–2017 in Ukraine.

Table 2.12 – Sources of funding for industrial innovation of enterprises, thousand UAH

Year	Total sum of expenses	Including at the expense of wherewithal			
		Own	domestic investors	foreign investors	other sources
2007	355336.6	168803.7	90.2	78828.9	107613.8
2008	133751.2	111862.7	–	–	21264.5
2009	336997.4	230715.9	–	–	106281.5
2010	90085.0	88465.0	–	–	1620.0
2011	44481.4	44281.4	–	–	200.0
2012	419277.6	418454.4	–	–	823.2
2013	694945.9	661107.4	–	–	33838.5
2014	796493.5	787353.8	–	–	9139.7
2015	575261.6	575261.6	–	–	–
2017	100437.3	97322.2	115.1	–	3000.0

Note: by author based on processed sources [104]

Continuation of the table 2.12

own wherewithal			domestic investors			foreign investors			other sources		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–	–	–	–	–	–	–	–	–	–	–	–
–56941	–33.73	0.66	–90.2	–100	0	–78829	–100	0	–86349	–80.24	0.198
118853	106.25	2.06	0	0	0	0	0	0	85017	399.81	4.998
–142251	–61.66	0.38	0	0	0	0	0	0	–104662	–98.48	0.015
–44184	–49.94	0.50	0	0	0	0	0	0	–1420	–87.65	0.123
374173	844.99	9.45	0	0	0	0	0	0	623.2	311.60	4.116
242653	57.99	1.58	0	0	0	0	0	0	33015.3	4010.6	41.106
126246	19.10	1.19	0	0	0	0	0	0	–24699	–72.99	0.270
–212092	–26.94	0.73	0	0	0	0	0	0	–9139.7	–100	0.000
–477939	–83.08	0.17	115.1	0	0	0	0	0	3000	0	0

Note: Made by the author on his own, using Excel

After analyzing the results of Table 2.12, the relative and absolute deviation of the indices of financing the innovative activity of industrial enterprises, we can conclude that, since 2008, there was no inflow of financing from domestic or foreign investors, and the own resources of the enterprises remained the main source.

The dynamics of implementation of innovations at industrial enterprises of Ukraine are presented in Table 2.13, as well as their deviation from the previous year.

Table 2.13 – Implementation of innovations at industrial enterprises

year	the share of innovation-driven enterprises. %	the number of new technological processes and units implemented	including low-waste. resource-saving	number of names of introduced innovative types of products. units	including new types of machines. equipment. appliances. devices	share of innovative products sold in total. %
2007	17.5	79	32	124	33	6.6
2008	14.3	58	24	91	23	1.0
2009	10.7	69	21	82	21	0.7
2010	12.1	39	13	65	10	2.0
2011	11.4	24	2	82	11	2.2
2012	13.7	27	1	75	11	1.6
2013	15.2	32	1	78	13	2.3
2014	11.8	38	1	76	14	2.3
2015	12.9	26	17	69	27	0.6
2017	9.6	15	8	52	14	0.9

Note: Prepared by the author based on processed sources [103, 104]

Continuation of the table 2.13

% enterprises that implemented innovations			implemented new technical process. units			name of introduced innovative types of products. units			% sales of innovative products in total		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–	–	–	–	–	–	–	–	–	–	–	–
–3.2	–18.2 %	0.82	–21	–26.58	0.73	–33	–26.61	0.73	–5.6	–84.85	0.15
–3.6	–25.1 %	0.75	11	18.97	1.19	–9	–9.89	0.90	–0.3	–30.00	0.70
1.4	13.0 %	1.13	–30	–43.48	0.57	–17	–20.73	0.79	1.3	185.71	2.86
–0.7	–5.7 %	0.94	–15	–38.46	0.62	17	26.15	1.26	0.2	10.00	1.10
2.3	20.18	1.20	3	12.50	1.13	–7	–8.54	0.91	–0.6	–27.27	0.73
1.5	10.95	1.11	5	18.52	1.19	3	4.00	1.04	0.7	43.75	1.44
–3.4	–22.37	0.78	6	18.75	1.19	–2	–2.56	0.97	0	0.00	1.00
1.1	9.32	1.09	–12	–31.58	0.68	–7	–9.21	0.91	–1.7	–73.91	0.26
–3.3	–25.58	0.74	–11	–42.31	0.58	–17	–24.64	0.75	0.3	50.00	1.50

Note: Made by the author on his own, using Excel

Regarding the introduction of innovations at industrial enterprises, according to the results of Table 2.13 in general, there is a negative tendency to decrease all indicators, including the introduction of new technical processes, innovative types of products and the percentage of realized innovative products.

The dynamics of expenditures for the implementation of research and development by type of work in Ukraine, namely, basic scientific research, applied scientific research and scientific-technical (experimental) developments are presented in Table 2.14.

Table 2.14 – Expenditure on research and development by type of work, thousand UAH.

Year	Volume of expenses, total	Including time for implementation		
		fundamental scientific research	applied scientific research	scientific and technical developments
2010	44168.8	8900.7	11950.2	23317.9
2011	37772.3	8918.7	10478.4	18375.2
2012	37226.6	16576.3	7737.3	12913.0
2013	28986.4	14400.2	7658.6	6927.6
2014	33182.5	14148.6	9966.3	9067.6
2015	26912.9	13677.0	8699.4	4536.5
2016	39473.3	19563.8	11052.4	8857.1
2017	44803.0	13625.1	22226.3	8951.6

Note: by author based on processed sources [104]

Continuation of the table 2.14

Volume of expenses, total			fundamental scientific research			applied scientific research			scientific and technical developments		
+/–	%	rate	+/–	%	rate	+/–	%	rate	+/–	%	rate
–	–	–	–	–	–	–	–	–	–	–	–
–6396.5	–14.48	0.86	18	0.20	1.00	–1471.8	–12.32	0.88	–4942.7	–21.20	0.79
–545.7	–1.44	0.99	7657.6	85.86	1.86	–2741.1	–26.16	0.74	–5462.2	–29.73	0.70
–8240.2	–22.14	0.78	–2176.1	–13.13	0.87	–78.7	–1.02	0.99	–5985.4	–46.35	0.54
4196.1	14.48	1.14	–251.6	–1.75	0.98	2307.7	30.13	1.30	2140	30.89	1.31
–6269.6	–18.89	0.81	–471.6	–3.33	0.97	–1266.9	–12.71	0.87	–4531.1	–49.97	0.50
12560.4	46.67	1.47	5886.8	43.04	1.43	2353	27.05	1.27	4320.6	95.24	1.95
5329.7	13.50	1.14	–5938.7	–30.36	0.70	11173.9	101.10	2.01	94.5	1.07	1.01

Note: Made by the author on his own, using Excel

If we analyze the relative and absolute expenses deviations of research and development by type of work, as well as their growth rate (Table 2.14) we can conclude that since 2011 the trend is almost negative in all

indicators, and only since 2016, total R&D spending has started to increase, especially in the area of R&D applications, which is a positive trend in the commercialization of research and development. As for the costs of basic rather than applied research, the situation remains negative.

It should be noted that the data on the cost of R&D for the years 2010–2015 were recalculated in accordance with the new methodology for the organization and conduct of the state statistical survey «Implementation of research and development», which has been introduced since 2016 (excluding the costs for the implementation of scientific and technical services).

The number of employees involved in the implementation of research and development by staff category is presented in Table 2.15. It should be noted that the data for 2010–2015 contain permanent and temporary workers (part-time workers and persons working under contracts of civil nature, including scientific-pedagogical workers), and since 2016, the data are given without scientific-pedagogical workers.

Table 2.15 – Number of R&D staff by categories of personnel, persons

Year	Number of workers – total	Including				
		including with scientific degree		scientists	techniques	Additional personnel
		Doctor of Science	Doctor of Philosophy/ Candidate of Sciences			
2010	1265	105	231	826	232	207
2011	1277	84	242	805	264	208
2012	939	54	195	663	181	95
2013	796	54	184	585	140	71
2014	842	61	202	614	151	77
2015	652	54	175	510	100	42
2016	704	62	193	491	123	90
2017	627	65	194	445	98	84

Note: by author based on processed sources [104]

In 2015 expenditures of Ukrainian enterprises on technological innovations decreased by 16.5 % to UAH 9.6 billion. In 2015 Ukrainian enterprises spent 9.6 billion UAH on technological innovations. This was reported by the State Statistics Service of Ukraine [104]. At the same time, in 2014 innovation expenditures amounted to UAH 11.5 billion. Thus, in 2015 Ukrainian enterprises spent 16.5 % less on innovation than in 2014. The share of funds for the purchase of machinery, equipment and software

decreased to 58 %, but for internal and external R&D rose to 17.1 % (respectively 13.7 % and 3.4 %). As in previous years, a rather small share of funds (0.9 %) is spent on the acquisition of other external knowledge (the acquisition of new technologies). The main source of financing for innovation activity is own funds of enterprises – 72.9 % of the total amount of expenditures (against 63.9 % in 2014), financial support of the state – 1.9 % (2.2 %), funds of domestic and foreign investors – 1.3 % and 13.1 % respectively (1.3 % and 8.7 %); the share of loans decreased significantly and amounted to 6.6 % (21.0 %). In 2015, 1715 enterprises engaged in innovative activity in industry, or 16.8 % of surveyed industrial enterprises (in 2014–1758 enterprises, or 17.4 %). The implementation of innovations in 2015 was carried out by 1,312 enterprises (77 % of the total number of innovatively active). Innovative types of products were introduced by 683 enterprises, the number of such types amounted to 3138 names, of which 809 – machines, equipment, apparatus, devices. New technological processes introduced 557 enterprises in the reporting period; the number of processes amounted to 1576, including low-waste, resource-saving – 502. In 2015, 1031 enterprises sold innovative products for UAH 35.9 billion, or 3.3 % of total industrial production (in 2014, respectively, 36.2 billion UAH and 3.3 %). The sales of products outside Ukraine were carried out by 344 enterprises, the volume of which amounted to 44.7 % of the total sales of innovative products, including to the CIS countries – 25.3 %. Almost every fourth company sold products that were new to the market. The volume of such products amounted to UAH 12.4 billion, more than half of which (53.0 %) of 102 enterprises were exported.

It should be noted that the majority of enterprises in the reporting period (86.0 %) sold products that were new exclusively to the enterprise. It amounted to UAH 23.5 billion, 40.4 % of which 271 enterprises sold outside Ukraine.

In Ukraine, the Law of Ukraine «On Priority Areas of Innovation Activity in Ukraine» is strategic priorities for 2011–2021 [50, 188]:

1) development of new energy transportation technologies, implementation of energy efficient, resource-saving technologies, development of alternative energy sources;

2) development of new technologies of high-tech development of the transport system, rocket and space industry, aviation and shipbuilding, weapons and military equipment;

3) mastering of new technologies of materials production, their processing and connection, creation of nanomaterials industry and nanotechnologies;

4) technological renewal and development of the agro-industrial complex;

5) introduction of new technologies and equipment for quality health care, treatment, pharmaceuticals;

6) widespread use of cleaner production technologies and environmental protection;

7) development of modern information, communication technologies, robotics.

These priorities formed the basis of specific state targeted programs, however, 28 of these programs were discontinued in mid-2011 and only some new programs were launched in 2012. One of the two remaining targeted programs that have been preserved is the Program for the Development of the Information and Analytical Support System for the Implementation of the State Innovation Policy, which was initially approved in 2008. The main purpose of the program is to create effective monitoring tools for national innovation policy at central and regional levels. The second program is the «Program for the creation of innovative infrastructure in Ukraine» [186]. It was designed for five years and a budget of 280 million UAH. Unfortunately, none of the programs received sufficient funding.

According to the analysis of the current legislation of Ukraine, the general list of incentives for innovative activity include:

- full interest-free lending to priority innovation projects, technology park projects;

- partial (up to 50 %) interest-free lending of innovative projects, incl. technological park projects, provided that the necessary funds of the project contractor and / or other entities of innovation activity are attracted to the financing of the project;

- in accordance with the Law of Ukraine «On special regime of innovative activity of technological parks» [50] full or partial compensation of interest paid by the subjects of innovation activity is provided, including: technology parks, commercial banks and other financial and credit institutions for lending to innovative projects;

- providing support for the promotion of technoparks through the establishment of a special mode of innovation. It consists of exemption from import duties on import into Ukraine for the implementation of projects of technological parks of new machinery, equipment and components, as well as materials that are not produced in Ukraine.

- granting state guarantees to commercial banks, which provide lending to priority innovation projects;

- direct financing: implementation of individual innovation projects, implementation of state, sectoral, regional and local innovation programs, support for the functioning and development of modern innovation infrastructure; state order, incl. priority order of consideration of scientific park applications regarding state procurement of product supply, performance of works and provision of services to ensure priority state needs.

According to the Law of Ukraine «On Value Added Tax» [50] upon importation of new machinery, equipment and components, a tax bill for the amount of a tax liability with a maturity of 720 calendar days is issued, and for the import of materials not produced in Ukraine from the maturity of 180 calendar days from the date of issuing the bill to the customs control authority. Important to stimulate innovation is that technology parks do not transfer the amount of income tax to the budget, but are credited to the special accounts of technology parks. Special accounts of participants of technological parks and joint ventures that are implementing the projects of technological parks shall be credited with half of the indicated amounts of taxes, and the rest shall be credited to a special account of the governing body of the respective technological park.

As an experiment since 2013, privileges for IT entrepreneurs have been introduced for ten years in Ukraine. Thus, software delivery operations were temporarily exempted from VAT, and the income tax rate was set at 5 % [50, 187].

As for China, during 2015–2017 the Chinese government has taken a number of major initiatives aimed at promoting the modernization of the country's production facilities and assisting companies in creating high-tech products [93]. The announced in 2015 «Made in China – 2025» and «Internet Plus» programs encourage the development of certain industries, including IT and communications, R&D, smart manufacturing, equipment and green technologies. Despite the fact that overall in the manufacturing

sector, growth in 2015 was sluggish, some of the sub-brunches of the sector, on the contrary, showed good results: following this way the added value of manufacturing aerospace vehicles and equipment, as well as high-tech production increased by 26.2 % and 10.2 % respectively. In addition, according to Minister of Science and Technology of China Wang Wan, Chinese investment in R&D in 2015 was estimated at 1.43 trillion yuan – 9.9 % more than a year earlier.

Another clear priority for Chinese authorities was the development of entrepreneurship and innovation. In his «Government Work Report» presented at the third session of the 12th National People's Congress, Prime Minister Lee Keqiang emphasized that China needs to develop two interconnected driving forces – mass entrepreneurship and innovation. Three months later, the State Council issued a document entitled «Point of View» aimed at enacting more detailed policies to achieve this goal. The document presents specific measures aimed at supporting entrepreneurship and innovation, including the optimization of administrative processes, innovation fund institutions, and the introduction of a preferential tax regime [108]. Apparently, these initiatives have come to fruition: 4.38 million new companies were registered in China in 2015, up 20 % from 2014. In addition, a number of initiatives in academia and the private sector were adopted according to startup and entrepreneurship support sector. In October 2015, KPMG established a KPMG Innovation Startup Center in China in the Zhongyangkun District (also known as the Silicon Valley of China) in China to accelerate the growth of startups [108].

It should also be noted that over the past three years, China's newly registered private enterprises have shown annual growth rates in excess of 21 %. At the end of 2015, there were 4.7 million new registered businesses in China, which means that about 11,500 new private companies were registered daily. At the end of 2016, there were 19.1 million private enterprises in total (an increase of 23.4 % compared to the previous year); authorized capital reached 90.5 trillion yuan (52.9 %), total employment amounted to 164 million jobs (an increase of 13.9 % compared to the previous year). Among the newly established enterprises, high-tech companies play an important role. In particular, in 2016more than 240,000 IT companies were registered (an increase of 63.9 % compared to the previous year), more than 73,000 newly registered enterprises in the financial sector (60.7 %).

Thirty or even twenty years ago, the Chinese economy was at a low level of development, and innovative infrastructure simply did not exist [106]. Today, however, China is a country that boasts advanced industrial and innovative infrastructure. The provinces of China have developed into highly developed industrial centers with industry specialization and significant socio-economic disparities. The results of the implementation of the development strategy, as well as the impact of special economic zones and technoparks are clearly reflected in the map of China's industrial potential (Fig. 2.12).

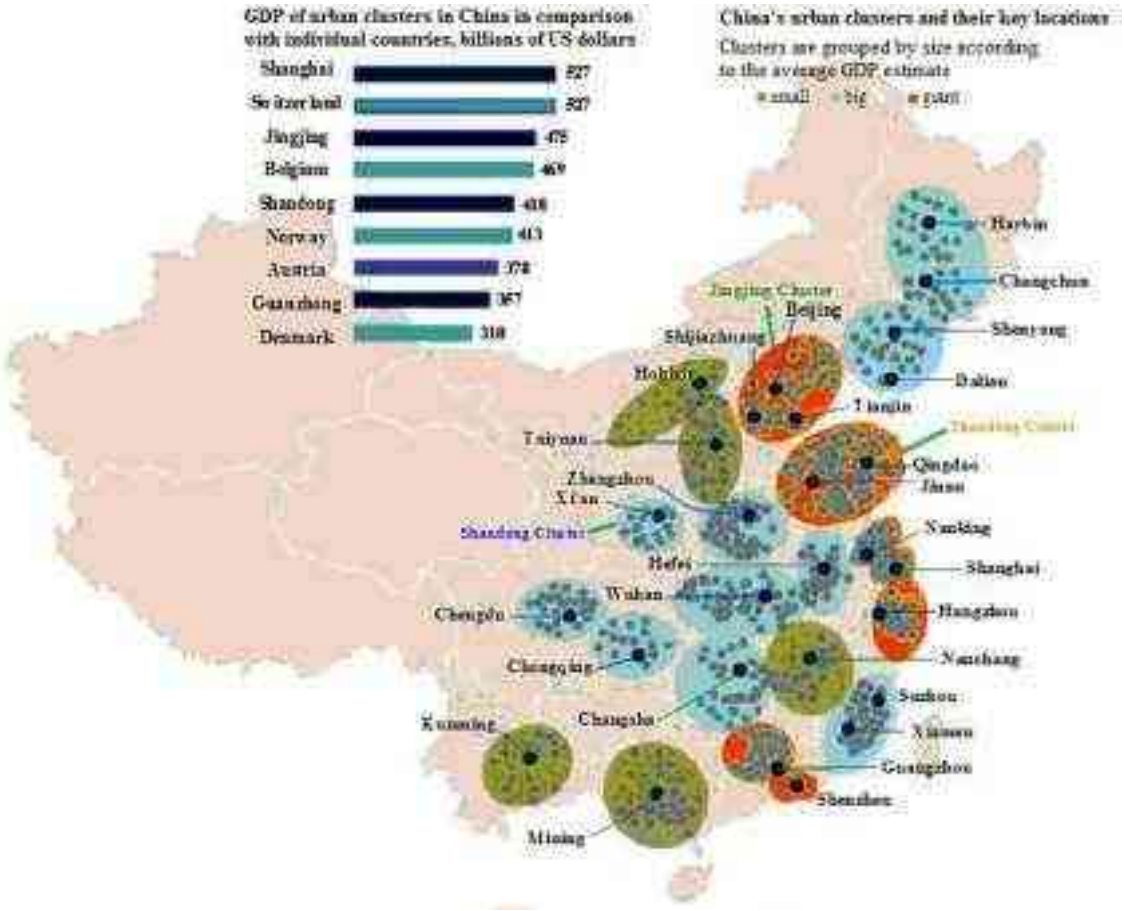

Figure 2.12 – GDP of China's urban clusters compared to selected European countries

In addition, some industrial and innovative GDP clusters now reach or even exceed the GDP of a number of European countries.

A huge contribution to this dynamic growth was made by China's small business, which was booming along with the country's overall economic growth. In the Chinese economy, small businesses play a significant roles

evidenced by the fact that these companies now account for 75 % of patented developments and 82 % of the total jobs in the country [100, 106].

Particularly noteworthy are the measures to support entrepreneurs as the population of over 1.3 billion does not simply take advantage of the potential of private enterprise development. Government investment in various research organizations (including educational institutions) and funds is increasing. Visitors can request tax breaks for educational institutions if they cooperate with SMEs.

Tax privileges (including tax exemptions) are provided to SMEs engaged in the development of new technologies, the release of new products. Loans and guarantees are provided to innovative SMEs. SMEs' innovativeness is confirmed by a special certificate issued by the Ministry of Science and Technology of the PRC. An example of tax exemptions that were in effect in China until the end of 2016 was the ability to not pay VAT and sales tax for small businesses, provided that their monthly income was less than $ 3.2 thousand per month.

A few years ago Chinese government shifted the country's economy from resource-intensive enterprises to small businesses. A radical modernization of the country's economy should be completed by 2050, which should bring it among the leaders in terms of economic development [100, 107]. But the result of small business can be seen right now. Entrepreneurs in China are actively involved in the development of innovative technologies, 75 % of patents and more than 80 % of the country's new products are owned by small businesses. Small business accounts for about half of tax revenue, 60 % of exports. It should be noted that most of the small businesses in this state have fewer than 100 employees.

Small business in China is actively supported by the CSMEO state information service established in 2001, which network extends to all cities and regions of the PRC, providing timely information on technological innovations, recent advances in science and technology and the state of the labor market [105].

Therefore, any policy aimed at finding innovative mechanisms for solving economic problems should be based on the development of an effective innovation strategy for the development of the country as a whole, and of individual components of its economy in the form of consistent and strong support for small and medium-sized businesses, which is the basis

innovative activities, as evidenced by its rapid development, the People's Republic of China, whose experience is useful to take in Ukraine to create an innovative and economically stable state.

Finally, briefly summarize China's and Ukraine's key innovations in 2018 [107, 109, 110]:

1. According to the Global Innovation Index (GII), China is ranked the 17th, having risen by 5 positions from the previous year. As for Ukraine, it ranks the 43rd in GII-2018, rising 7 positions from the previous year.

2. China is ranked the 1st among 34 high-income countries. Ukraine ranks the 1st among 30 low- and middle-income countries.

3. The Chinese economy is ranked the 5th among 15 countries in Southeast Asia and Oceania. Ukraine's economy ranks only the 30th among 39 European countries.

4. Over the last three years, China has improved its ranking in terms of innovation, ranked in the top ten in the Sub-Index of Innovation Production, ranking the 10th this year.

5. Innovative deposits are steadily growing and their Sub-Index has reached the 27th position, rising from the 31st in 2017. As for Ukraine, in 2018 it improved its position, having risen by 2 points compared to last year and reached position number 75.

6. China's innovation efficiency ratio is also consistently high, demonstrating that China is effectively commercializing its innovations. This year, as in 2017, China ranks 3rd in the world, rising from the 7th position in 2016. As for Ukraine, in 2018 it improved its position, having risen by 5 points compared to last year and reached the 35th position.

7. In Human Capital & Research, China ranked the 23rd in 2018, Ukraine ranked the 43rd in the world.

8. China is ranked the 2nd in the world in business-funded research and development, and Ukraine is only the 40th in terms of global R&D spending.

9. In the field of business development, China ranks the 9th, demonstrates a high level of knowledge of workers – in the «Knowledge workers» ranked the 1st, in the «Firms offering formal training» ranked the 1st, and in terms of imports of high-tech goods the 3rd place in the world.

10. In 2018, Ukraine is ranked the 46th in business development, the 27th in Knowledge & Technology Outputs. At the indicator level, Ukraine has a high level of five indicators: productivity growth – the 15th place,

computer program costs –the 17th place, IT services exports – the 15th place, patents – the 15th place and utility models – the 1st place in the world.

Therefore, the section briefly describes the main moments of transformation of China's scientific and technological system and its transition to a developed innovative economy.

Also a comparative analysis of the main economic and innovation indicators dynamics of countries such as Ukraine and China has been conducted in the period from 1992 and 1980 to 2017. Seven major economic indicators have been selected for comparative analysis and Ukraine and China ranked in the world by a number of innovative indicators, the main one being the Global Innovation Index. The comparative analysis of the dynamics of the above indicators was carried out not only in quantitative but also in graphical terms, which greatly simplifies its visual perception and allows not only to trace the trends of the values of the selected indicators, but also to trace the parallels of the two countries economy development with the further possibility of their forecasting with minimal error due to the use of a large array of data.

The change in the number of innovative enterprises in Ukraine and China and the volume of innovative products sold and the costs incurred for innovation activities were also analyzed. Areas where China's experience can be important for Ukraine's economy and innovative entrepreneurship are identified.

The study showed that Ukraine's economic and innovation potential is not being fully utilized due to the likely underdevelopment of relevant institutions. China's experience in setting up the institutions necessary for the rapid and stable development of innovative entrepreneurship can be extremely important for Ukraine today.

2.2 Analysis of the effectiveness of development and financial support for innovation in China

By supporting high rates of innovation over several decades, China has been able to reform its economy and transform itself from manufacturing into one of the largest innovation hubs in the world [111]. The success of China's innovative development would not have been possible without purposeful state support. The state has encouraged the development of

innovation for more than thirty years by combining economic and industrial policy, as well as significant investment in education and research infrastructure. State support has helped to create a national innovation system with the necessary number of specialists and effective institutional mechanisms to achieve the ambitious goals of innovative development. It is important to note that the development of the national innovation system was carried out simultaneously with the reform of China's economic system as a whole. That is, the process of transition to the innovative model of development was synchronized with the introduction of market mechanisms, attracting foreign investments, technology transfer and gradual development of the internal market of innovative products and services.

Economic reforms in China 1978–1985 began in the spring. The spring of 1978 in China is called the «spring of science» [106], because it was the period when the country started the process of innovative development, reform of science and technology. The National Science Conference held in Beijing in March 1978 announced the state's policy of supporting science and technology. During the conference Dan Xiaoping put forward the thesis «science and technology are the drivers of progress» and out spoke the need to remove political barriers to scientific and technological development after ten years of chaos. This presentation set the stage for the creation of a strategy for the country's revival by developing science and education and strengthening the nation through the development of human resources. The participants of the conference discussed and approved the «National Science and Technology Development Plan for 1978–1985» (project) which became the road map for the transformation of China's science and technology system. The plan envisaged China's scientific and technological development objectives for the next 8 years, including the formation of a base of 800,000 researchers and the creation of a national scientific and technological system. The Plan also noted 108 key national scientific and technological research projects (the number of national research projects in 1982 was adjusted to 38). As a part of the priority development, 8 key science and technology sectors have been identified, including agriculture, energy, materials science, computer technology, lasers, space research, high energy physics, and genetic engineering.

Along with the revitalization of the scientific and technological sector, China's economic system has embarked on a path of deep transformation

and liberalization, called the beginning of a policy of reform and openness. The new policy included a number of institutional reforms as well as the development of government programs for infrastructure development. The new course was announced in December 1978 at the 3rd Plenum of the Central Committee of the Communist Party of China of the 11th convocation. This event is widely recognized as a turning point in the development of the Chinese economy after the events of 1949, which marked the beginning of economic reforms across the country.

The first phase of economic reform, carried out in the late 1970s and early 1980s, opened up foreign investment and created opportunities for entrepreneurship. Institutional reforms were accompanied by organizational changes aimed at developing industrial infrastructure and strengthening economic cooperation by creating the first special economic zones, opening coastal cities and districts, and identifying inland and coastal zones of economic and technological development. In August 1980 the National Assembly of People's Representatives adopted the «Rules of the Special Economic Zone». The first Special Economic Zones were established in cities such as Shenzhen, Zhuhai and Shantou in Guangdong, and Xiamen in Fujian. In addition, the entire Hainan province was declared a special economic zone. Initially, special economic zones focused on industrial development, including facility construction, infrastructure development, and technology transfer.

The six-year period, which lasted until 1984, was marked by the creation of subsidiaries of state research organizations for the commercialization of research results and the narrowing of the gap between research and practice. Lenovo (formerly Legend) and Founder Group, founded by Beijing University, later became recognized leaders in China's information technology field. The government also focused on human capital development. These activities included the reform of schools and colleges to link education and the market, and to foster scientific exchange with the US and other developed countries.

In 1985 structural reforms in science and technology intensified. Following the government's decision to reform the economic system, another set of deep institutional reforms in this area was launched. The second phase of the reform and openness policy involved the privatization of many state-owned enterprises and the subsequent implementation of free market mechanisms. A key structural problem in the Chinese system of

scientific and technological research was the gap between research and industrial production. The reforms aimed at closing the gap and envisaged the implementation of the following measures: introducing mechanisms for allocating public funding for R&D. Transformation of research institutes in applied fields into commercial companies and / or service organizations, as well as the inclusion of large research organizations in the composition of industrial groups. Creating markets for technology. Reforming the system of human resources management in state research institutes. These reforms stimulated the introduction of market-based mechanisms and practices of competition, which made it possible to intensify the development of the research sector and to orient it towards the achievement of economic indicators. In addition to changing the focus of the research sector, the state has improved management mechanisms and implemented a number of targeted programs for competencies in research and innovation. The programs also focused on creating markets for advanced technology. As a result, government research organizations have increased the volume of private funding involved and involved in the implementation of research projects for industrial companies.

Government programs as development tools were highlighted in the 1980s by the implementation of a series of government programs aimed at developing China's competitiveness in science and technology. The National Key Technology Development Program, «863» Program and «973» Program have made a significant contribution to developing the country's technological potential. Later Spark and Torch programs followed. The National Key Technologies R&D Program (NKTRDP), launched in 1982, was the first and largest technology program in China in the 20th century. The program covered a number of areas, including agriculture, the environment, medicine and health.

In March 1986 China launched «863» Advanced Technology Development Plan», proposed by the government by engineers Wang Ganchang, Wang Dayan, Yang Jiachi and Chen Fanyun, and approved by Deng Xiaoping. «863» program provided for the development of China's internal innovation potential in breakthrough areas. Its implementation began during the seventh Five Year Plan, but the program continued to operate during the next two Five Year Plans. Public funding amounted to about 11 billion yuan, resulting in the obtaining of 2,000 patents (national and international). The program initiated the development of 20 fields of

research in biology, as well as in the fields of space flight, information technology and telecommunications, lasers, automation, energy and new materials [135]. In 1996 the program was expanded to include a new industry «Marine Technology». The decision to include new industries in the programs was made by scientists after discussion, and the decision on specific projects was made by an expert committee.

«973» program was created as a Chinese target program for the development of basic research. It was launched in 1998 and included a multidisciplinary integrated study of important scientific issues in agriculture, energy, information technology, natural resources, health, and materials, providing in-depth professional knowledge for science-based innovation.

In 1988 the Chinese government approved funding for national R&D zones. In particular, in August 1988 two new programs were launched – «Torch» and «Spark». «Torch» has been a major player in the high-tech industry and national roadmap. It included the creation of areas of high-tech industrial development, as well as the implementation of research projects in new technological fields, such as new materials, biotechnology, electronic materials, integrated electromechanical technologies, advanced energy-saving technologies. And «Spark» program was aimed at reviving the economy of the agricultural regions through the implementation of advanced technological projects.

The transition to a model focused on industrial enterprises and the development of a knowledge economy. In 1995 the Chinese government embarked on a «revival strategy through science and education» aimed at institutionalizing innovation through the implementation of «Spark» and «Torch» programs and enhancing China's competitiveness in the global knowledge economy with expected entry into the World Trade Organization. The measures of the strategy envisaged the construction of a national innovation system focused on industrial enterprises, as well as the development of competencies of companies in the field of innovation and commercialization of technologies.

The success of China's institutional reform during this period been driven by an active exchange of knowledge from the Chinese Academy of Sciences and the implementation of best practices in the management of OECD innovation activities.

At the 1995 National Conference on Scientific and Technological Research a programmatic document on the second stage of reforms, known as the «Decisions on deepening scientific and technological progress, adopted by the CCP Central Committee and the State Council» was published. The paper emphasized that China should create a new development strategy and rely on the advancement of scientific and technological research, and emphasized the need for the development of science and culture across the country [106, 135]. And in 2006 the National Science and Innovation Conference adopted the National Program for Medium and Long-Term Development (2006–2020) prepared by a panel of the State Council, which included more than 2,000 leading experts in science, technology, economics and education. The program, which took about three years to prepare, defined an innovation policy that can be described as «independent innovation, significant progress, development support and leadership for the future». It provides for a set of infrastructure development measures; support of entrepreneurial activity aimed at the development of innovations among the masses («Mass Entrepreneurship, Comprehensive Innovation»); measures for financial support of entrepreneurship and innovation, in particular, the creation of investment funds and the provision of various tax breaks and subsidies to the subjects of innovative business activity.

In 2015 more than 10.5 billion yuan was invested in more than 200 investment funds operating in 26 provinces and cities across the country. SASAC4-controlled state-owned enterprises contributed to the creation or provision of funds to 179 funds with a total capital exceeding RMB 160 billion [94, 96]. The Ministry of Finance jointly with the State Tax Administration and other organizations approved a number of tax benefits, including deferral of VAT payments, deductions from income tax, accelerated depreciation of fixed assets and tax deductions for R&D expenditures. Support measures also include the provision of government guarantees on loans and reduced interest rates and subsidies [106]. Second, the Chinese government has focused on developing a multi-level capital market. Activities include developing local capital markets and promoting access to advanced technology companies on the stock exchange within Growht Enterprise Markets (GEM). Financial institutions are developing special offers for start-ups. The government also supports the development of financial Internet companies and crowd funding projects [106, 108].

Third, the government is developing institutional mechanisms to promote mass entrepreneurship and innovation. Support measures are aimed at creating better conditions, developing service infrastructure and promoting knowledge sharing. A network of demonstration centers is being developed to provide services to small and medium-sized enterprises, as well as to promote educational and scientific and technological reform. Demonstration Centers should facilitate the commercial use of new technologies. The pilot project involves the deployment of a network of 28 centers established by 2018 [108].

Today Chinese tech parks and high-tech areas are well-known elements of innovative infrastructure. Their rapid development was stimulated by government policies aimed at developing corporate innovation and attracting foreign investment and technology. Numerous technoparks and special areas stimulate technology transfer and attract investment into China's economy and serve as catalysts for the formation of regional markets for high-tech goods and services and play an important role in the development of innovation, contributing significantly to regional GDP. Total production in high-tech areas is about 10 percent of China's GDP [106, 108]. In 2016 total revenue of enterprises operating in high-tech clusters amounted to 20.3 trillion yuan, while value added exceeded 5.8 trillion yuan [106]. It should be noted that clusters have been showing revenue growth of more than 20 % per year for many years and their contribution to the economic development of the regions in which they are located is increasing even faster [105, 106, 108]. In 2016 there were 46 high-tech areas in China with a share of GDP in local cities or regions exceeding 30 %, and 35 high-tech zones with a contribution exceeding 20 %. [108] 25 high-tech export-oriented production sites have already been created in national high-tech areas, including Beijing Zhongguancun Science Park. Export venues is a place where many Chinese leading innovative companies appear, such as Lenovo, Huawei, ZTE, Haier, Datang [106, 108].

In 2016 enterprises in the high-tech areas participated in the implementation of more than 180 thousand research projects. Of the 53 692 enterprises 783 were listed companies including 489 high-tech enterprises licensed on the basis of new standards, which corresponds to 62.5 % of total Chinese enterprises [106, 108].

High-tech areas are concentrated mainly in the north and east of China, as well as in the relatively advanced economies of the southwest coast, such as Beijing, Tianjin, Jiangsu, Shandong, Guangdong, Shanghai and Fujian. High technology zones have the following geographical distribution: 58 zones in the Eastern region, 27 zones in the central region, 29 in the Western region and 15 in the Northeast region (Fig. 2.13).

Figure 2.13 – State-level Science Technology Parks in China [106]

As it is well known, a recognized indicator of the scale of innovation development is R&D Intensity. In recent decades this figure has been steadily above the 2 % mark in China's high-tech areas. Total R&D expenditures in high-tech areas rose from 1.5 billion yuan in 1992 to 432.5 billion yuan ($ 64.8 billion) in 2016 (Figure 2.14).

A new trend in the last decade has been the increasing innovation activity of small and medium-sized enterprises in China.

State policy of «Mass Entrepreneurship, Comprehensive Innovation» was aimed at attracting entrepreneurs to innovation and led to the emergence of new elements of China's innovative infrastructure – business incubators and hackspaces, as well as new sources of support for innovation – business angels and venture capital investors mainly in small and medium-sized enterprises.

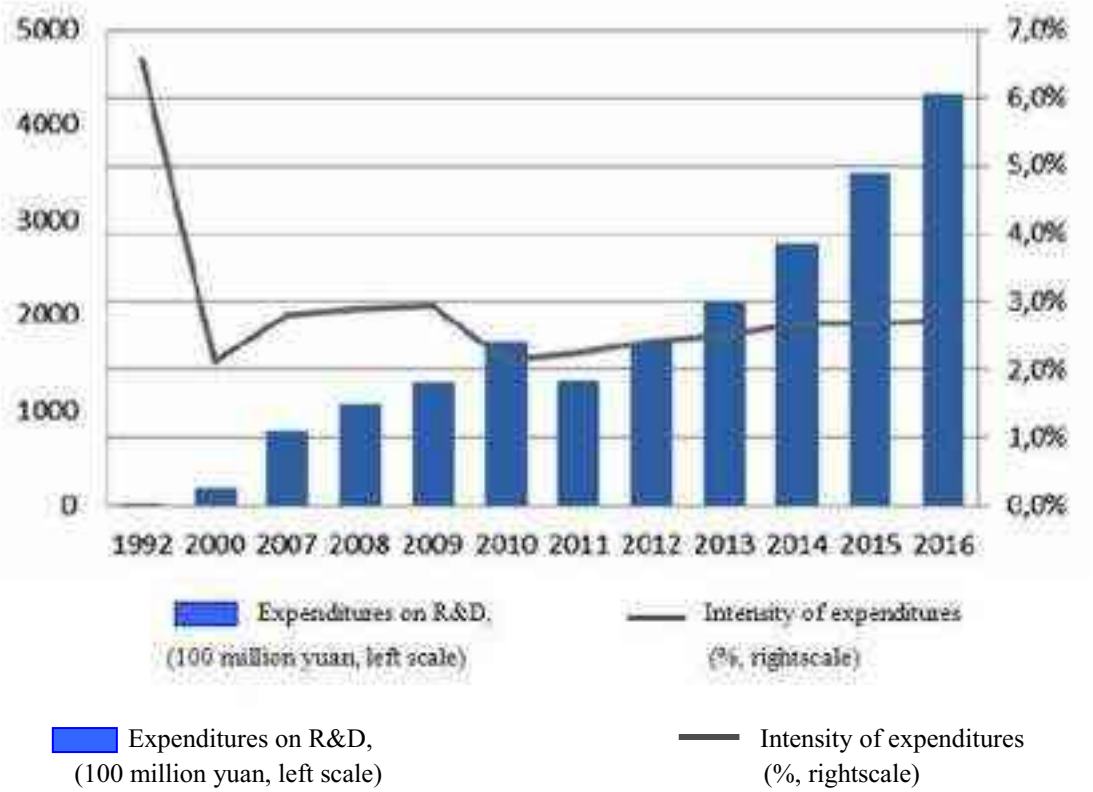

Figure 2.14 – Expenditures on research and research intensity of state-of-the-art technology parks in China [106]

It should be noted that significant regional differences between the provinces of China remain. Thus, the Eastern Region is still the key in the number of start-ups: it accounts for more than half of new businesses. Beijing and other developed cities show particularly high rates of high-tech start-ups [106, 108]. The level of innovative development in the Chinese provinces also reflects the clear regional distribution of China's national business incubators, most of which are located in the southeastern coastal zone, which is characterized by high levels of economic development and more favorable business conditions.

The regional distribution of China's national business incubators is shown in Fig. 2.15. As can be seen from Fig. 2.15, Beijing, Shanghai, Tianjin and Guangdong are the four most important provinces and cities. In particular, Beijing has 18,000 science and technology enterprises, growing by 25 % each year, and more than 10,000 high-tech enterprises, accounting for 20 % of the country's total [105, 106].

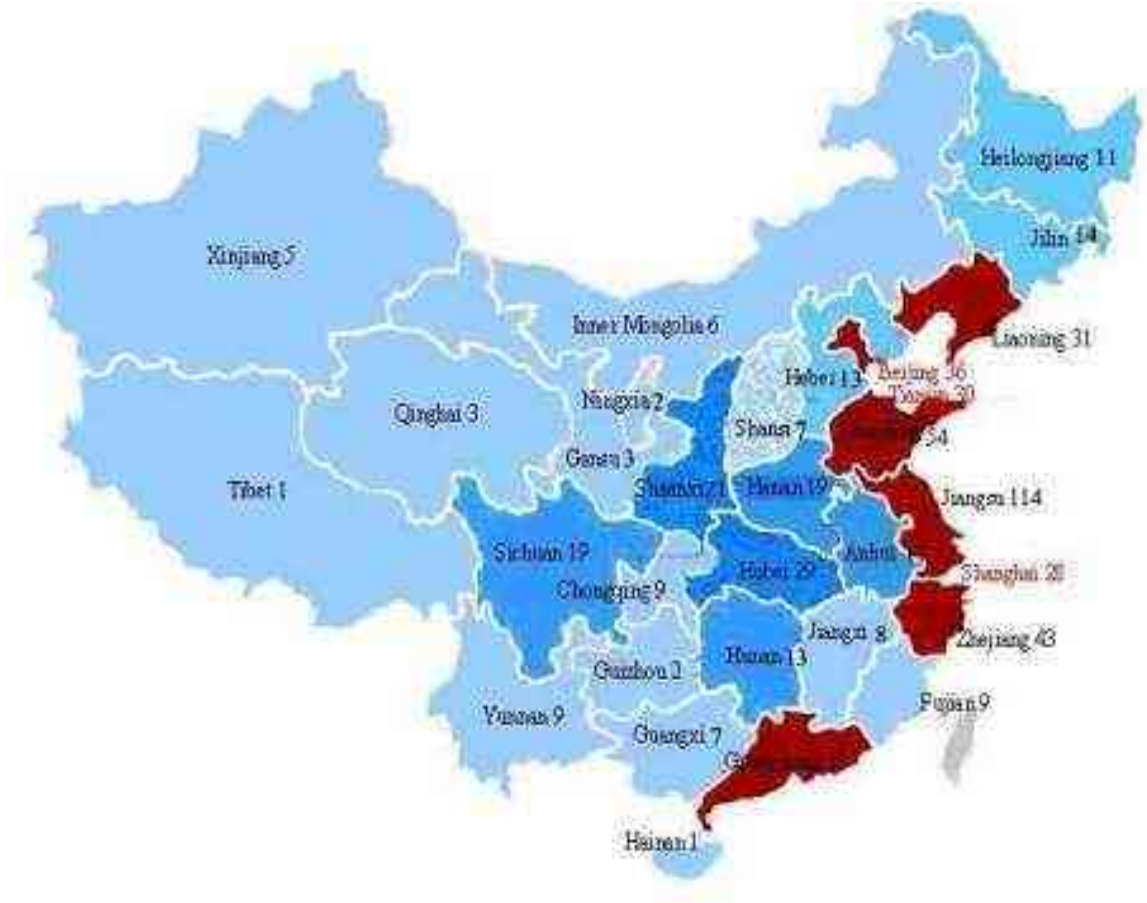

Figure 2.15 – Distribution of Chinese National Technology Business Incubators [106]

There are 468,000 new businesses in Hangzhou, an increase of 20.9 % annually. Newly established enterprises in Shanghai, Wuhan, Chengdu, Xi'an and other cities also show a significant growth trend [106, 108].

Thus, as we can see, the activity of entrepreneurial activity in China is supported by targeted activities and the development of market infrastructure. According to statistics from the Torch Center's High-Tech Industry Development Center, in 2016, there were 1,748 science and technology incubators in China, including 601 national and 1,147 regional incubators, as well as approximately 79,000 business- incubation (Fig. 2.16).

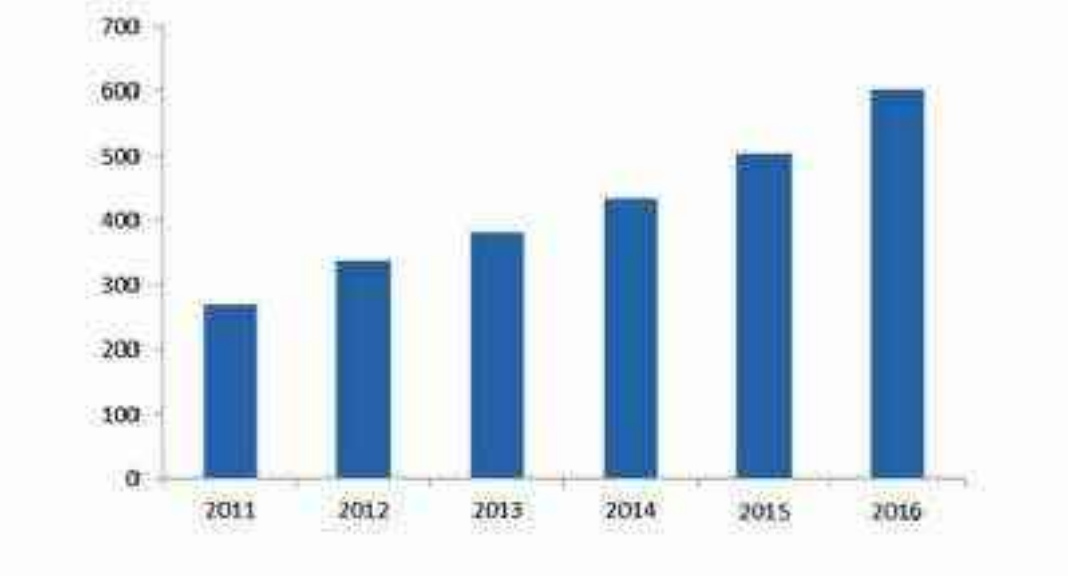

Figure 2.16 – National incubators: total amount [105, 106]

Also known as HackSpace Tech Creativity Clubs, which can be defined as open access labs (paid or free) that provide infrastructure and equipment to stakeholders. The dynamics of hackspace development in China is shown in Fig. 2.17.

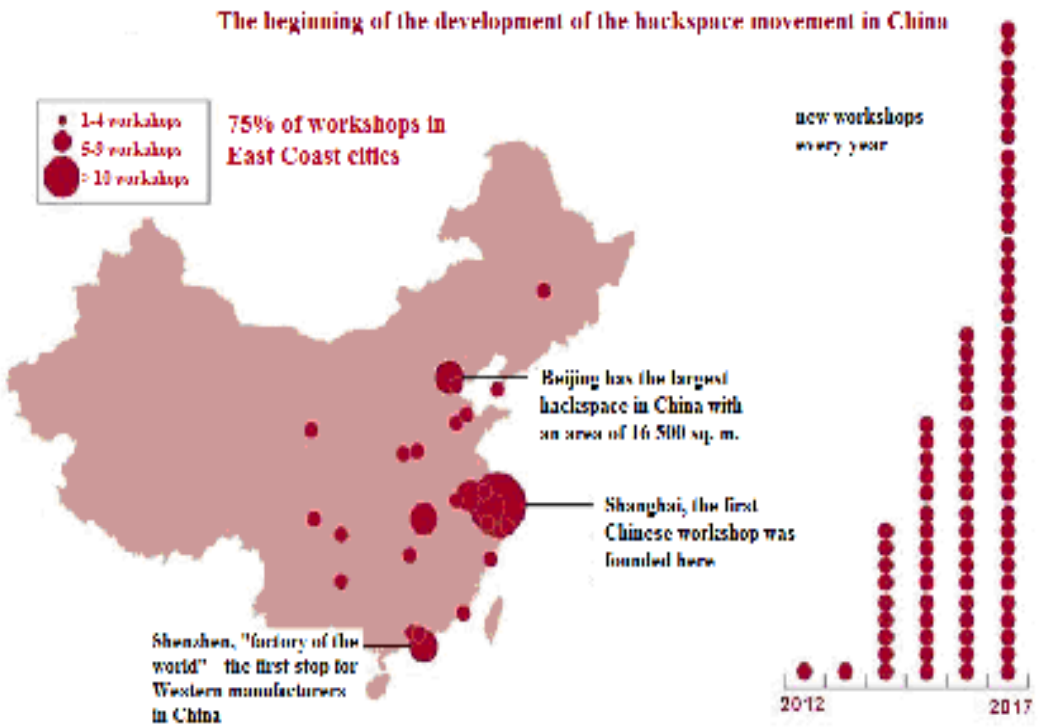

Figure 2.17 – Dynamics of Hackspaces development in China

The first public hackspace workshop opened in China only in 2010. Although the first hackspaces appeared in Europe in the 1990s and soon, in the early 2000s, they spread to the United States. In 2001 a network of branded workshops emerged on the basis of the Massachusetts Institute of Technology and named the Fablab Laboratory Network [106, 109].

The implementation of the policy of «Mass Entrepreneurship, Comprehensive Innovation» has led to the rapid spread of such workshops across the country has the government and regional authorities have considered hackspaces as catalysts for mass innovation and entrepreneurship.

The Chinese government supports the proliferation of hackspaces that contribute to the development of mass innovation and technology entrepreneurship, and views them as a driving force for the next phase of innovative development in China. Hackspaces provide a good opportunity to develop the creativity and entrepreneurial skills that are required to move from an established China-made scheme to a new China-made approach.

Recently the Chinese government has stepped up financial support for entrepreneurship and innovation at various levels, continuously improving existing ones and creating new tools for such support. In particular, the Chinese government has now shifted from direct support to the use of more market-based instruments, such as sovereign wealth funds and the provision of investment guarantees. Thus, as of the end of 2017, China has set up 780 state-owned investment funds with a total capital of more than 2180 billion yuan ($ 330 billion). This amount is almost five times the amount raised by venture capitalists last year worldwide, and according to the consulting company Preqinis the largest amount of funding for start-ups in the world [105, 106].

Developing a government-led fund infrastructure Chinese government seeks to complement market-based capital allocation mechanisms and channel funds into startups on the early stages of development. The dynamics of government investment funds in China are shown in Fig. 2.18.

The rapid development of publicly traded investment funds reflects the rapid growth of China's private sector. Thus, according to Bloomberg11agency about 15,857 companies have invested in venture funds totaling 6.1 trillion yuan ($ 900 billion) [105, 106].

The business angel investment market in China is gaining momentum and is beginning to play an increasingly prominent role. The rapid growth of business angel investment in China can be explained by a number of factors.

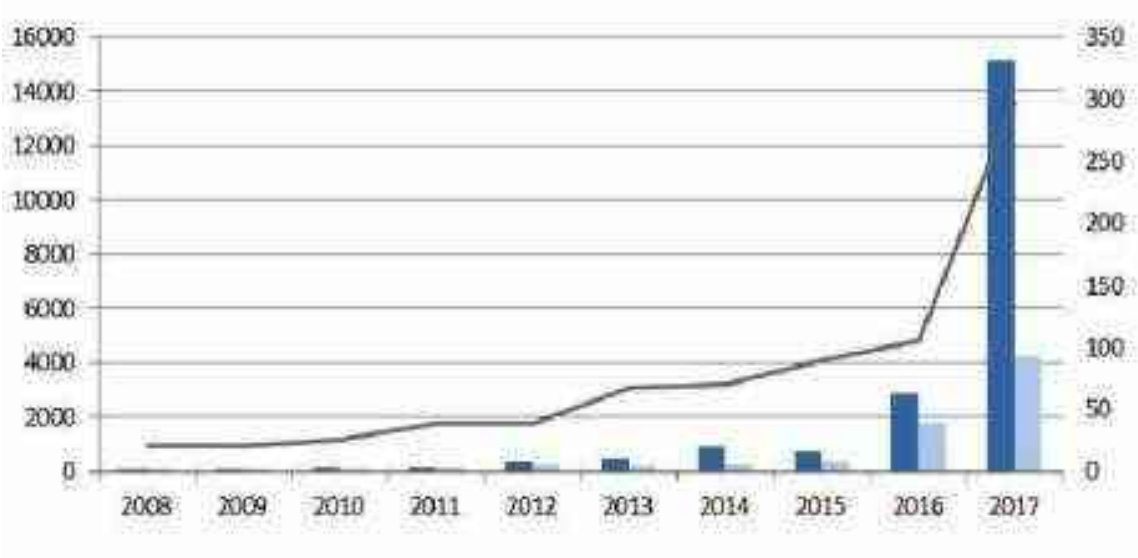

Figure 2.18 – Dynamics of government investment funds in China [105, 106]

Above all, decades of vigorous growth, especially in the development of innovative industries such as IT, biotechnology and alternative energy contributed to the growth of HNWI. According to a recent survey conducted by the consulting company Bain and China Merchant Bank12, the total number of wealthy people in China exceeded 1 million in 2016, double more than it was in 2012. And China's total private equity market grew in 2014–2016, reaching 112 trillion yuan in 2016 [106, 108].

Second, the transition of the Chinese economy to the New Normale State has led to a slowdown in growth and a decline in return on assets. In previous years, as China's economy grew rapidly, local investors had little incentive to work with startups. However, now the situation has changed, and declining returns have prompted investors to include more risky projects in their portfolios. According to a study by the consulting company Bain, many high-income Chinese people are adjusting their strategies following the reforms. More than a third of those surveyed (36 %) said they were planning to increase their investment in innovative industries such as IT, biotechnology and alternative energy [106, 108]. The accelerated growth of innovative industries forms a chain of positive feedback: high incomes in new industries stimulate the emergence of new private investors who, in turn, invest in innovative industries. Many entrepreneurs who have

successfully attracted funding from Business Angels or Venture Funds Round «A» have also joined the Business Angels Group. China's angel investment market is shifting towards greater institutionalization. Many business angels form clubs that help diversify risks and expand the range of investment opportunities available. The market for angel investment institutionalizing and increasing in volume.

At the same time, the number of new investment funds (Fig. 2.19) and the number of concluded investment agreements (Fig. 2.20) are increasing.

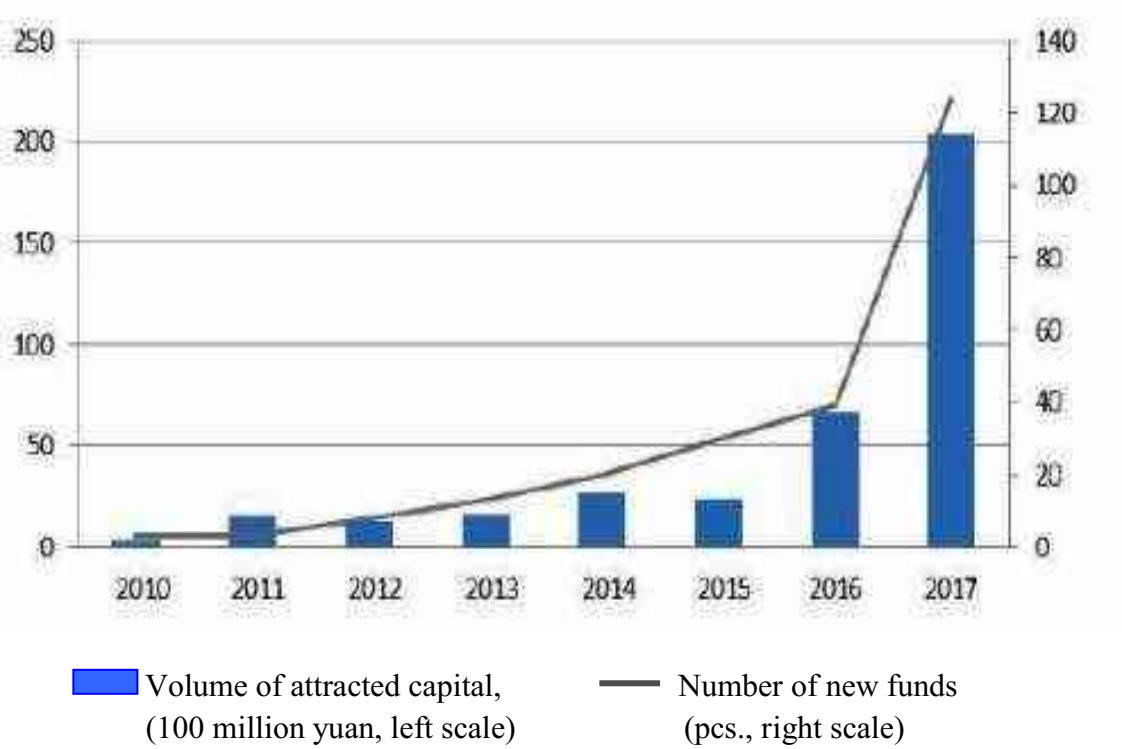

Figure 2.19 – Chinese Business Angels: Number and raising capital [105, 106, 108]

At the end of 2017, there were more than 350 business angel clubs in China (including more than 150 active investing clubs), with assets under management exceeding RMB 60 billion (US $ 9 billion). In 2017, a business angel investment of 20.4 billion yuan ($ 3.1 billion) was raised in 124 funds (up 200 % year-on-year) [108]. According to a report from TusPark and Tsinghua University14, in 2017, 2075 business angel deals were registered in China, with a total investment of about $ 10.2 billion ($ 1.5 billion) disclosed. The cost and number of transactions has doubled compared to the previous year.

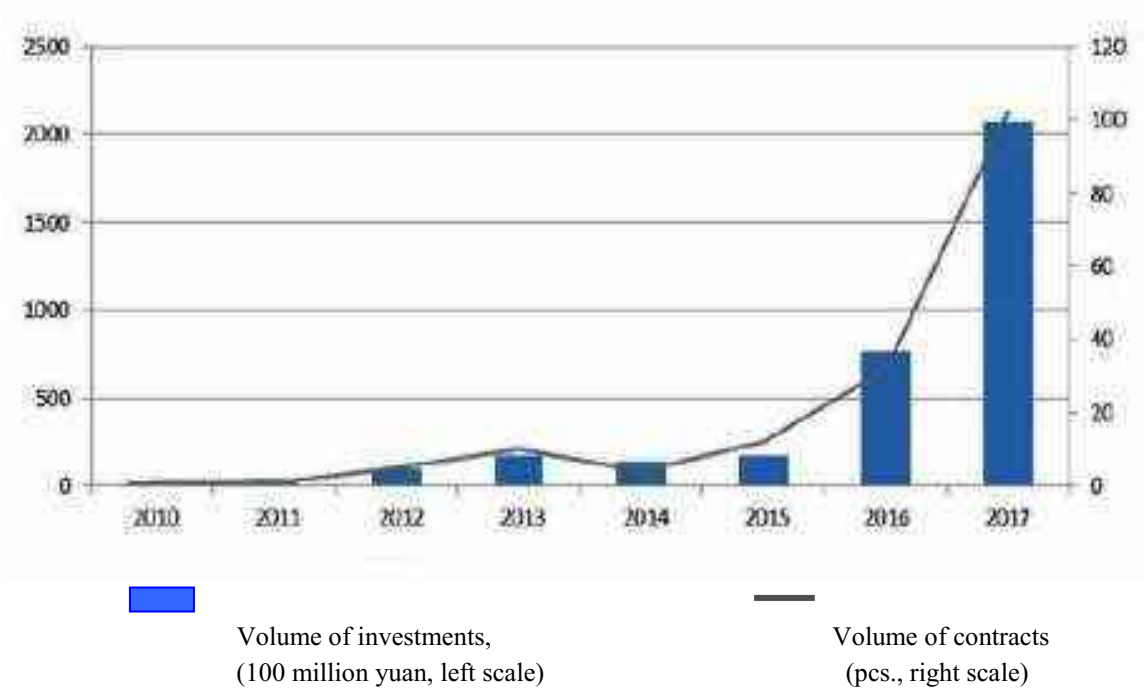

Figure 2.20 – Chinese Business Angels:
number of transactions and their investment volume [105, 106, 108]

Beijing, Shanghai, and Shenzhen are the regions with the most active business angel movements (Table 2.16).

Table 2.16 – Chinese Business Angels: Top 5 Regions [105, 106]

Region	Number	Share in total, %	Volume (RMB 100 million)	Volume in (%)
Beijing	902	43.47	43.14	42.61
Shanghai	341	16.43	14.89	14.62
Shenzhen	185	8.92	9.46	9.29
Zhejiang	184	8.87	10.91	10.71
Guangdong (without Shenzhen)	105	5.06	6.06	5.95
Sichuan	66	3.18	2.26	2.22
Others	292	14.07	15.16	14.88
Total	**2075**	**100**	**101.88**	**100**

According to published data, more than 900 agreements totaling 4.3 billion yuan ($ 0.65 billion) belongs to Beijing, accounting for 43.5 % of all agreements in the country [105, 106].

According to a study by TusPark and Tsinghua University, there are now more than 8,000 active investment agencies in China, with assets under management of more than 5 trillion RMB ($ 750 billion), operates over 2,800 venture capital funds (over 1,000 in the investment phase) with assets under management of more than 1 trillion yuan [105, 106]. The dynamics of Chinese venture capital funds and the volume of their attracted capital and concluded investment agreements for the period from 2007 to 2017 are shown in Fig. 2.21 and Fig. 2.22.

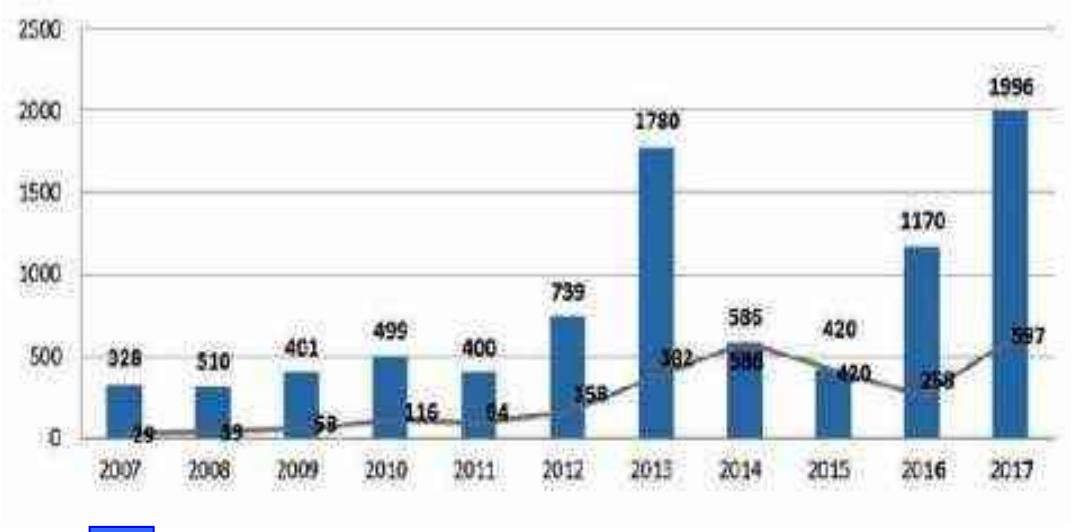

Figure 2.21 – Chinese Venture Funds: Quantity and Capital Raising [105, 106]

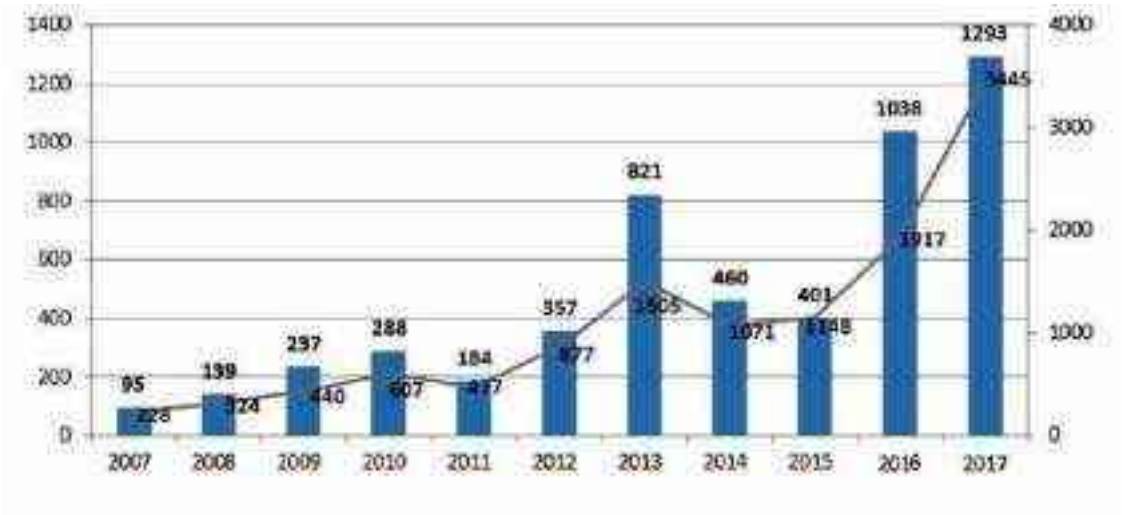

Figure 2.22 – Chinese Venture Funds: Number of Transactions and Their Investment Volume [105, 106]

As can be seen from Fig. 2.21 in 2017, 597 venture capital funds were launched to target mainland China with a newly raised capital of around 200 billion yuan ($ 30 billion) [105, 108]. In the same year, investment agreements at the sowing stage amounted to 22.3 %, and early-stage agreements – 32.6 % of the total number of venture fund transactions, which in total corresponded to 54 % of the total number of transactions for 2017 [106, 108]. Exactly how venture capital investments are allocated by maturity stage of the projects are shown in Table 2.17.

Table 2.17 – Distribution of venture investments by project maturity stages in 2017 [106, 108]

The stage of maturity of the project	Number of agreements	%	Investments (RMB 100 million)	%	Average transaction volume (RMB 100 million)
Seeding art and performance	768	22.3	129.92	10 %	0.19
The early stage	1122	32.6	352.30	27.2 %	0.35
Stage of growth	963	28.0	412.14	31.9 %	0.48
Stage of maturity	484	14.0	371.21	28.7 %	0.82
Missing data	108	3.1	27.76	2.1 %	0.28
Total	***3445***	***100 %***	***1293.34***	***100 %***	***0.42***

As can be seen from the table 2.17, the increase in the number of seed and early stage deals by 11.5 % in 2017 compared to 2016 shows a shift in the focus of venture investors to early stage investing, which more fully satisfies entrepreneurs in venture capital. Seed and start-up projects occupy a relatively large share of the total number of transactions, but have a significantly smaller average investments. Thus, according to table 2.17 the average investment in sowing and early stages was 19 million yuan (about $ 2.9 million) and 35 million yuan (about $ 5.4 million), respectively, well below the figures for growth-stage projects and maturity. According to the given data in table 2.17 according to the volume of investments, investments in seed and early stage projects made up about 37.2 % of the total investments of venture investors [106, 108].

2.3 Factors and tools for financial support for innovative small business development in Ukraine

Small business in Ukraine is actively developing and optimistic for 2018, despite the unfavorable business climate. The study revealed strong optimistic sentiment in the expectations of business for 2018 [112]:

- 76.2 % of respondents expect that the situation in their business will improve in the next six months;
- 87 % predict profit growth in 2018.

Entrepreneurs are showing great optimism in their business plans this year. In particular:

- 54,2 % – plan to increase the number of employees,
- 57.3 % – raise the level of salaries of employees,
- 64.3 % – intend to increase their business financing in 2018.

Also, the results of the study indicate the orientation of small businesses to exports:

- 27 % of companies surveyed have already entered foreign markets,
- 30.3 % – plan to release this year.

Companies are keen on developing their businesses and reinvesting their earnings into their own businesses, but the difficulty of obtaining credit is holding back small business development. According to a study [112], 82 % of Ukrainian companies require credit. At the same time, 65 % of those polled have difficulties with this, 15.5 % of them think that it is absolutely impossible to get loans.

Overall, the economic situation in Ukraine is not conducive to small business development, according to 68.2 % of those polled. Only 3 % of respondents are completely satisfied with the business climate in Ukraine. These are the findings of the Small Business Attitudes Index, first conducted by the European Business Association in conjunction with LIGA: LAW within the Unlimit Ukraine project [112]. The purpose of the study is to work with small and microbusinesses and analyze the growth points that will stimulate its development. The survey surveyed 278 small business owners and directors in all areas of activity. About 40 % of the companies surveyed were founded in the crisis of 2015–2017.

Analyzing the factors that influence the innovation activity of small businesses in Ukraine, five main problems were identified that hinder the process of creating new small and medium-sized enterprises. These are:

1) unavailability of loans (65 %),

2) inflation (56.3 %),

3) the level of tax burden (42.24 %),

4) high level of corruption (41,9 %),

5) lack of qualified specialists (39.3 %).

At the same time, only 4 % of respondents believe that inflation is hindering business development. About 21.6 % of those polled named the tax system a major area in need of change. 14.7 % of respondents are most concerned about the availability of credit, while 9 % are the most unacceptable of the level of corruption. 6.1 % of the respondents would first like to change the situation with state support for business and solvency of the population in favor of their enterprise.

According to the research, the overall Small Business Attitudes Index is 3.2 out of 5, which is neutral [112]. At the same time, such components of the Index as the assessment of the current state of business, the dynamics of its development over the last 6 months, the forecast of the situation for the next 6 months and the assessment of the business climate have revealed radically opposite sentiments on the part of entrepreneurs.

Today, one of the factors that influence the innovation activity of small businesses in Ukraine is the mission of the European Business Association, which is to improve the investment environment in Ukraine and to sustainably support small businesses. A few years ago, a very important Unlimit Ukraine project was launched [112]. The idea behind the project is that big businesses can share their experiences with small businesses. Therefore, within the framework of the project, small business consulting and selection of mentors from experienced SEOs (search engine optimization) of large companies, generously sharing their expertise with young and ambitious Ukrainian entrepreneurswas started. The next stage of project development is the creation of the Unlimit Ukraine platform for the development of small and micro businesses based on the European Business Association. The project provides comprehensive support for small and microbusiness through educational events and consultations, participation in special projects, diagnostics of business problems and discussion of issues relevant to it. The participant of the project can become a small and micro-business with a form of ownership of Individual proprietorship without limitation of activities.

The scarcity of state and regional support for small business enhances the role of such alternative instruments of financial and credit development of domestic small business structures as bank lending, leasing, factoring, franchising and venture financing.

Bank loans are the fastest way to get the financing you need, but the problem is the high interest rates on ordinary loans and the lender's high financial collateral. For young startup entrepreneurs who, for the most part, do not have the necessary financial or material support for the necessary credit, such conditions are a barrier to the implementation of their innovative ideas in the form of start-up projects. Commercial banks, as a rule, are fairly conservative about the terms of funding for start-up projects, as there is a high risk of non-repayment [20, 95, 113]. But, on the other hand, if a start-up project is successful, then its revenues exceed its financial costs by tens, hundreds, and sometimes thousands of times [115, 116]. This is the reason why financing a successful start-up project is desirable for financial institutions. Therefore, the main problem today is to optimize the interaction of financial structures and start-ups in small businesses.

The problem of interaction between financial structures and small business is devoted to many scientific works of both blighty and foreign scientistssuch as Z. Varnalii [37], Y. Dropa [46], V. Zianko [18, 20, 101], T. Shcherbata [117], D. Ocheretnyi [114], B. Feld and J. Mendelson [118], J. Loywen [119], R. Wallace [120] and others, which raise the issues of creation and operation of small innovative enterprises and the world experience of organizing small innovative business, highlights the main ways of financial support for small business in Ukraine, examines the origins of creation the most successful start-ups in the world and the methods of their financial support, the main sources of small business financial and credit developmentand sources of ofsmall business innovative activityfinancial support are investigated, models of organization of small innovative business are analyzed. But the question of developing a quantitative model for optimizing the interaction between commercial financial institutions and small businesses in terms of financing start-up projects remains to be fully addressed.

First of all, it should be noted that the development of a game-theoretic model for optimizing the interaction of financial structures and start-ups in small businesses requires a well-defined condition under which such

financing is possible and beneficial to any financial commercial structure [113].

As a specific example, consider the condition for a commercial bank lending a start-up project that offers a small business. Therefore, a generalized condition for a commercial bank, which would be profitable for him to finance a start-up, can be expressed by equation 1 [113]:

$$N_+(\overline{V_c}+\overline{\Delta V})+N_-\overline{V_c}>\overline{V_c}(N_++N_-)+\overline{V_c}q\cdot(N_++N_-)\cdot\tau, \quad (2.1)$$

where N_+ is the number of effective projects, pc.; N_- is number of unsuccessful projects, pc.; $\overline{V_c}$ is body of credit, gryvnas (gr.), units; $\overline{\Delta V}$ is average profit from start-up for the news period of existence of start-up, gr. units; q is annual bank loan rate, %; τ is a loan term that coincides with a start-up period of years.

For the economic interpretation of inequality (2.1), we make a series of mathematical transformations above it:

$$N_+\overline{V_c}+N_+\overline{\Delta V}+N_-\overline{V_c}>N_+\overline{V_c}+N_-\overline{V_c}+\overline{V_c}q\cdot(N_++N_-)\cdot\tau, \quad (2.2)$$

$$N_+\overline{\Delta V}>+\overline{V_c}q\cdot(N_++N_-)\cdot\tau, \quad (2.3)$$

$$\frac{N_+}{N_++N_-}\cdot\frac{\overline{\Delta V}}{q\overline{V_c}\tau}>1. \quad (2.4)$$

Since the expression $\frac{N_+}{N_++N_-}$ is a positive probability of success in relative units, then replace it with p:

$$p\cdot\frac{\overline{\Delta V}}{q\overline{V_c}\tau}>1. \quad (2.5)$$

After all the transformations we get the following condition:

$$p\overline{\Delta V}>q\overline{V_c}\tau. \quad (2.6)$$

Thus, inequality (2.6) proves that a financial institution, in our case, a commercial bank, will only benefit from a start-up loan if the probability of successful completion of the start-up is the average amount of money back

to the financial institution upon successful completion of the start-upwill be greater than the profit received from the provision of a normal credit transaction, taking into account the time factor.

Let us present a decision on granting or not granting a loan to a small business to finance a start-up in the form of a static game-theoretic model, based on Fig. 2.23, and prove that the choice of a financial institution to provide start-up financing is a Nash equilibrium [121].

	give	*refuse*
success	$p\overline{\Delta V}$ Nash equilibrium V_1	$-(p\overline{\Delta V})'$ V_2
failure	$-(q\overline{V_c}\tau + \overline{V_c}')$ γ	$\overline{V_c}$ 0

Figure 2.23 – Theoretical and game model of optimization of interaction of financial structures and start-ups in small business

The Nash equilibrium was chosen as a tool of game theory, since it is a method of self-regulation of any complexity systems, unlike the Parette optimality used as a tracking apparatus [122].

So, in Fig. 2.23. We see vertically two possible decisions of a financial institution (commercial bank) – to provide financing or to refuse it. For its part, the innovator also has two possible final options for its start-up project: the project can be successful and the innovator will profit from V_1 or V_2, or the project may fail and the innovator will go bankrupt and be liquidated. In this case, we are considering small innovators who either do not have the capital to implement their idea or it is so small that they will not be able to strengthen the financial condition of the company in case of project failure.

That is, we are talking about innovator companies the share of borrowed capital in which is from 90 % and above.

If the company has a successful start-up project, as mentioned above, it earns a profit of V_1 or V_2. It should be noted that the following condition is fulfilled:

$$V_2 \le V_1. \tag{2.7}$$

This discrepancyarises because if the first financial institution approached by the innovator decided not to finance the submitted project and the innovator was forced to seek financing in another institution, having spent time and extra effort. Also it should be noted that the profit received by the innovator firm V_1 is not the total profit from a successful start-up project, since the condition is fulfilled:

$$V_1 = V_{tot.} - \overline{\Delta V}, \tag{2.8}$$

where $V_{tot.}$ is the total profit, and V_1 is the difference between it and the profit share that the financial structure that provided the project will receive.

It should be noted that when financing start-up projects, the funds are provided by various commercial financial institutions, as a rule, not as a percentage of the loan body, but as a project partner on the revenue share [20, 101]. This is due to the fact that the risk of failure of start-up projects is more than 95 %, but successful projects are so financially successful that they not only compensate for failed projects but also generate significant financial returns that are not comparable to the initial financial costs [95, 113 , 115, 116].

In case of failure of the start-up project upon receiving financing, the innovator firm goes bankrupt and receives losses in the amount of the share, which is returned to the bank in case of liquidation of the enterprise. In case of refusal of financing, the innovator does not lose anything, because the project was not started.

Considering the possibility of making a decision by a commercial financial structure, in the case of providing financing with the success of a start-up project, the commercial bank earns an average profit from the start-up over the West period of existence of the start-up with probability. In this

case, the average profit is considered profit , which is calculated as the arithmetic mean of the profits from successful projects financed by the bank. If the commercial bank refuses to finance the start-up project in case of its success, the financial institution has a lost profit in the amount of:

$$-(p\overline{\Delta V})' = -p\overline{\Delta V} \cdot \tag{2.9}$$

However, if a financial institution favors regular lending at an appropriate percentage, then the undelivered income must be adjusted for the income earned from the loan:

$$-(p\overline{\Delta V})' = -p\overline{\Delta V} + q\overline{V_c}\tau . \tag{2.10}$$

Provided that the start-up project is financed by a financial institution in case of its failure, the commercial bank incurs losses in the form of interest it would receive on providing a regular loan, and adjusted to the share of γ that is returned to the enterprise in the event of the bankruptcy of the innovator :

$$\overline{V_c}' = \overline{V_c} - \gamma . \tag{2.11}$$

In the case of failure of financing by a commercial institution in case of failure of the project, the financial institution receives as a result losses in the form of a credit body. It should be noted that it is calculated as an arithmetic mean of all (both successful and unsuccessful) small business start-up projects financed by a given commercial bank over a fixed period equal to the period used to calculate the average profit.

If Nash equilibrium is applied, as shown in Fig. 2.23, this equilibrium will be present only in one case – when a financial institution agrees to finance the project with the probability of success. According to game theory, this situation is optimal for self-regulation of the interaction of financial structures and start-ups in small business.

Therefore, the use of bank credit is a classic technology of borrowing the necessary financial resources for the development of small businesses and the pursuit of innovation. However, banking institutions are not always willing to engage with small businesses, particularly those that are innovative. This situation is due to the lack of sufficient liquidity collateral,

too small loan size and low earnings in absolute terms compared to lending to large borrowers. At the same time, the lending rates on the markets for small businesses are too high, which makes them less accessible to this sector of the economy.

In 2013, with the weakening of the monetary policy of the NBU, there was an increase in the wave of bank lending. Not only large universal banks but also smaller ones showed increased interest in lending, which enabled them to diversify their loan portfolio and increase their level of profitability.

For a number of reasons that have increased the interest in lending to small business entities, we consider it expedient to count short-term lending (since most of the deposits attracted are short-term, as a result of which banks lose the opportunity to use «long» money), as well as customer base services.

According to a survey conducted by the «CASE Ukraine» Center for Social and Economic Research, the volume of small business loan portfolio in 2016 was more than 30 % lower at most banks than in the previous ATO 2013. [123-125]. However, in 2017 the volume of the loan portfolio increased by UAH 12.02 billion (or 1.89 %) to UAH 647.27 billion as of 2016 (Fig. 2.24).

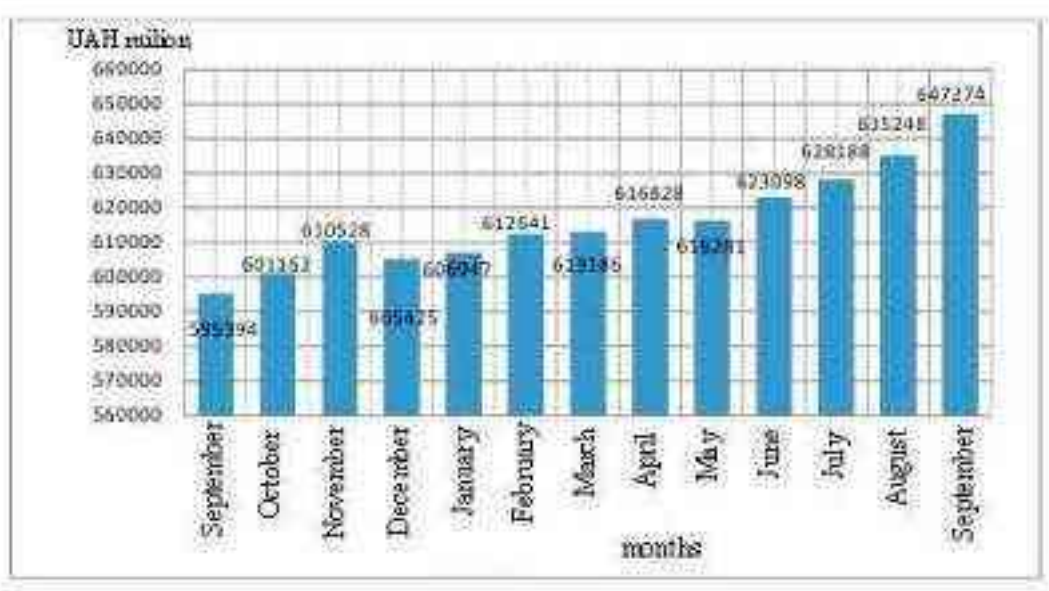

Figure 2.24 – Dynamics of the portfolio of loans to small business entities from banks in September 2016 – September 2017

Source: Based on data [124–125]

It should be emphasized that nowadays, banks lend to small business entities mainly in such areas as micro-credits, loans for the purchase of commercial vehicles, commercial real estate, equipment and replenishment of working capital.

As for the structural characteristics of small business lending as of 2016, 64.4 % of loans to small business entities accounted in national currency, 30.7 % – for US dollar, 4.3 % – for euro, while the share of loans in Russian rubles and other currencies did not exceed 1 % of the banks' credit portfolio to enterprises (0.6 % and 0.1 % respectively) (Fig. 2.25).

The largest share of loans tosmall business entities as of 2016 was issued for a period of up to 1 year – 50.1 % of the size of the credit portfolio of Ukrainian banks, slightly less than 38 % – for a term from 1 to 5 years, and only 11.8 % – for a period of 5 years.

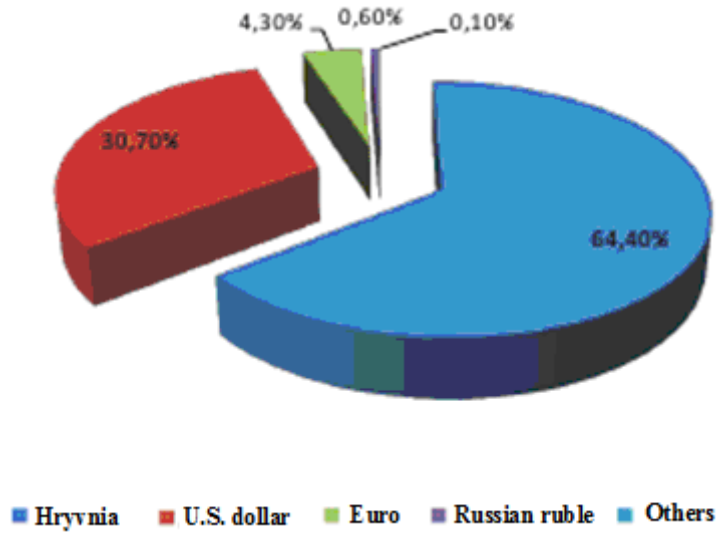

Figure 2.25 – Breakdown of the share of loans granted to small business entities by the currency of lending as of 2016

Source: Compiled by the author on the basis of data [124, 125]

It should be noted that during the analyzed period, the share of loans for investment purposes with respect to loans for replenishment of working capital significantly decreased. Today, the most interesting for the banks are services, trade and light industry, the state companies, the oil and gas sector and the electric power industry being considered as promising. Banks, in turn, limit lending to the construction industry and innovative construction projects.

In general, banking institutions have the right to lend to small businesses at their own expense, or at the expense of open credit lines of international organizations, by implementing special small business lending programs in Ukraine.

As a result of the joint efforts of the European Bank for Reconstruction and Development and the German-Ukrainian Fund, a microcredit program in Ukraine (PMCU) was created to support the development of micro and small enterprises by creating favorable conditions for them to access bank loans [113]. The program is supported by the US Agency for International Development – USAID, the European Community – the EU and the European Bank for Reconstruction and Development [128]. Today the Program works in almost all regions of Ukraine. Over the course of its existence, the Program has issued more than 600,000 loans worth about $ 4.6 billion. The dynamics of the loans granted by the partner banks since the beginning of the Program is shown in Fig. 2.26.

PMKU's partner banks issue 14,000 loans each month for more than $ 160 million. Most of the loans in the current portfolio are «express» loans (approximately 60 %). The share of «micro» loans is 30 %, «small» and «agro» loans – 5 %. Within the framework of the CMCU, enterprises are active in trade (76 %), manufacturing (6 %), services (15 %) and agriculture (3 %). The average amount of current credit to one client is $ 7800. USA, which is a clear confirmation that the partner banks are consistently approaching this target group [126, 127].

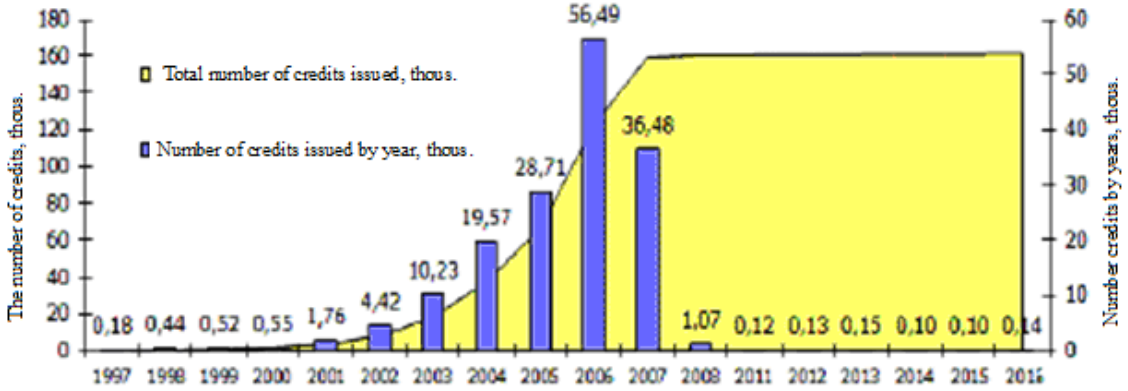

Figure 2.26 – Loans issued by partner banks since the beginning of the Microcredit Program in Ukraine (PMCU)

Source: Compiled by author [124]

Selected banking institutions participating in the Microcredit Program include PJSC CB PrivatBank, PJSC RaiffeisenBank-Aval, PJSC Ukrgasprombank, PJSC Kreditprombank, and JSC ProCredit Bank that control up to 60 % of the market [128]. In total, there are 323 microcredit departments in Ukraine, 62 of which are located in small towns and rural areas [128].

Not only banking institutions are ready to provide microcredit. Recently, small business finance services have started offering credit unions. This type of lending has several advantages after the Law on Credit Unions of Ukraine came into force [129]. First, the credit union, unlike a bank, is quite open-ended and works in public sector. Each member of the union has a legitimate reason to control the association. Secondly, there is an opportunity to develop a positive credit history outside the bank. Third, if the credit union status is liberal, the loan can be obtained even without collateral.

Note that resuming 2016, the number of members of credit unions decreased by 10.5 % (115 thousand people) and amounted to 980.9 thousand people, of which 233.6 thousand persons or 23.8 % – members of credit unions with existing credit agreements and 40.3 thousand (4.1 %) – members of unions with contributions (deposits) [130, 131]. During 2016, contributions in deposit accounts increased to UAH 42.6 million (3.3 %); loans to members of credit unions increased by 1.54 % (UAH 39.8 million). In general, the total amount of debt of 233.6 thousand members of credit unions that had credit agreements in force as of 2016 amounted to UAH 2349, 1 million [131].

As of 2016, the assets of other credit institutions amounted to UAH 8137.8 million, compared to last year it increased by UAH 3698.8 million or by 83.3 %. Equity of other credit institutions increased by 32.6 % in 2016 (UAH 2,434.4 million). The volume of loans granted to other credit institutions amounted to UAH 3981.7 million and increased 2.1 times over 2016 compared to 2014.

Given this, it can be noted that other credit institutions are gradually and confidently gaining their place in the financial services market. The dynamics of the key performance indicators of their development and increased demand for financial services provided by these institutions.

The problem of innovative development of small business can be partially solved by means of the universal tool of financing of working

capital – factoring. Over the last year, there has been a tendency to increase the volume of factoring operations by financial companies. In our view, this is due to the fact that, unlike financial companies, banks must form reserves under factoring operations, which reduce the attractiveness of this instrument for them. Banks also lost a large amount of money during the financial crisis due to massive defaulting on factoring, which, unlike lending, is a non-collateral service.

As of 2016, 163 Ukrainian companies were entitled to factoring services, which is 17 institutions more than as of 2015. During 2016, 70,819 factoring agreements totaling UAH 10039.5 million were concluded. 5315 factoring agreements remain in force at the end of 2017 [125].

It should be noted that during the year there was a tendency to significantly increase the number of concluded contracts while reducing their value. According to the results of 2016, compared to the corresponding period of 2015, there was a decrease of 14.2 % of factoring transactions in value terms, while the number of concluded transactions increased 3.5 % times. In our opinion, the reason for this is the intensification of the struggle in the market of factoring services between banking institutions, which, as mentioned, are actively developing this type of business, and factoring companies.

The exacerbation of the struggle is also due to the fact that, unlike in previous years, when banks served predominantly large and medium-sized business entities, banking institutions began to actively cooperate with small entities. It should also be noted that banking institutions have the advantage of having a significant amount of credit, and the ability to provide clients with non-collateral financing products, which in turn combine factoring operations and other banking services. However, the advantage of factoring companies remains greater flexibility and responsiveness in decision making.

An important indicator that characterizes factoring services is the sources of their financing. Generalized data on sources of financing for factoring services are given in Table 2.18.

Analyzing the presented in Table 2.19 data we note that the total volume of financing of factoring operations decreased by the results of 2016 compared to the same period of 2015 by 14.2 % (or by UAH 1,663.3 million) and amounted to UAH 10039.5 million. At the same time, the

decrease in financing at the expense of own funds was rapid in absolute and relative terms – UAH 1995.1 million (or –24.4 %). At the same time, the volume of attracted bank loans for financing activities increased by UAH 1,695.9 million.

Table 2.18 – Volume of Factoring Services

Sources of finance at ing	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bank loans	36.2	47.9	261.9	362	890.4	1192.6	905.3	1643.0	3338.9
Own funds	277.4	365.6	325.7	373.6	405.3	3908.7	3505.6	8179	6183.9
Borrowed wherewithal	763.3	84 8.2	887.6	1922.2	1828.4	1662.4	1275.3	1584.4	367.7
Other sources	173.4	185.2	112.7	12	53.5	64.3	108.4	296.4	149
Total	1250.3	1446.9	1587.9	2669.8	3177.6	6828	5794.6	11702.8	10039.5

Source: Compiled by the author on the basis of data [130].

Analyzing the volume of financing of factoring operations by industry, the size of the share of financing attributable to the service sector has grown significantly (1.52 %), but the largest share (96.6 %) continues to cover «other» industries. The category «other» of the National Financial Services Commission in its reports is not detailed, but, according to the analysts of the RIA Rurik, it is mainly covered by small enterprises in the trade industry (trade financing). It should be noted that according to the results of 2014, factoring agreements did not take place in such fields as chemical and light industry, metallurgy. And in 2016, there was a slight decrease in the share of factoring services in the food industry, which at this time stands at 1.15 % [130].

The creation of technoparks and business incubators are an effective tool for supporting innovative development. Thus, in 1999, such technoparks as the Institute of Electric Welding named after M. Sc. EO Paton (Kyiv), Institute of Single Crystals (Kharkov), Semiconductor Technologies and Materials, Optoelectronics and Sensor Technology (Kiev). At present, in Ukraine, the special regime of activity extends to fifteen technoparks, but only eight of them function effectively [189]. The special mode of operation of technoparks is state support, represented by the following forms: preferential taxation, priority lending of innovative projects, budget financing, privileges in the currency sphere, with the payment of duties, etc. Main technoparks of Ukraine [189]:

1. Semiconductor technologies and materials, optoelectronics and sensor technology (Kyiv).

2. Institute of electric welding them. E. O. Patona (Kyiv).

3. Institute of single crystals (Kharkiv).

4. Vuglemash (Donetsk, 2014).

5. Institute of Technical Thermophysics (Kyiv).

6. Kyiv Polytechnic (Kyiv)

7. Intelligent Information Technologies (Kyiv).

8. Ukrinfotech (Kyiv).

9. Agro-technopark (Kyiv).

10. Eco-Ukraine (Donetsk).

11. Scientific and educational devices (Sumy).

12. Textiles (Kherson).

13. Ukrainian Microbiological Center for Synthesis and Advanced Technologies (UMBICENT) (Odessa.

14. Yavoriv (Lviv region).

15. Mechanical Engineering Technologies (Dnipro).

In addition, there are technoparks in Ukraine that are not covered by the special innovation regime. These are, for example, Lviv Polytechnic and technological parks operating in special economic zones (SEZs): Azov, Donetsk [190].

With regard to business incubators, the creation of the first business incubators in Ukraine was stimulated by international financial assistance [191]. So in the late 1990s, the United States Agency for International Development (USAID) funded the implementation of the Business Incubator Development Program in Ukraine (BID). Within the framework of this program, such business incubators were created, such as technological business incubator «Kharkov Technologies», business incubator of the Kherson Chamber of Commerce and Industry, business incubator of the Joint Trade Union of Chornobyl NPP in Slavutych and others.

Ukrainian Association of Business Incubators and Innovation Centers has launched the project «Creating an Information and Communication Environment for Effective Business Incubation Development in Ukraine (UBICA – ICT)» and «Creating an Information and Communication Entrepreneurial Network for the Development of Business Incubation in the Kharkiv Region (Kharkiv-East). These projects are being implemented

within the framework of the InfoDev program of the World Bank for Reconstruction and Development (WBRD). The projects aim to promote the development of business innovation in the small and medium-sized enterprises sector to improve the capacity of business incubators through the effective use of information and communication technologies in the process of business development. However, it should be noted that the disadvantage of the existing organizational and economic infrastructure of innovative business activity in Ukraine is uneven distribution of its existing objects across the regions of Ukraine. Thus, in Kiev and Kiev region there are 12 business incubators, in Odessa region – 9; 18 of the 27 regions in the country have 1–2 bi-incubators. Of the 255 existing innovation funds, 175 operate in Kyiv [191].

The leasing instrument of financial support of innovative development of small business is leasing as a way of activation of innovative activity for the purpose of technological development, sales of products and scientific and technological achievements. This type of financing is very popular, widespread worldwide, and is one of the most reliable investment tools in the form of advanced manufacturing equipment. This is how small innovative enterprises that have significant financial difficulties in acquiring the necessary equipment can obtain it through leasing on favorable terms.

It is worth noting that the Association of Ukrainian Lessors Association and the State Financial Services Commission summarized the leasing market activity for 2016, which shows that the industry shows significant prospects after the crisis 2014 and 2015 – during 2016 there was a rapid growth of new business, and the overall portfolio of existing agreements also showed steady growth [130]. In the structure of sources of financing leasing operations, the total amount of own funds of legal entities – lessors and financial companies, increased by UAH 2,720.4 million (from UAH 1,110.9 million as of 2015 to UAH 3,831.3 million as of 2016). According to the results of 2016, the total volume of borrowed funds increased by UAH 10016.0 million [130].

Recently, a franchising system can be considered a rather important tool and a powerful impulse for innovative development of small business, as it is the form of business organization produced by world practice that, in combination with other market structures, could stimulate the further development of small business in Ukraine.

As of 2017, there were approximately 250 companies in Ukraine promoting their franchise offer and involving at least one franchisee. In total, these companies combine over 6,000 points and partner with more than 3,000 franchisees. The franchise network employs more than 361,000 small business employees, with an average of almost 9 people per network entity. For comparison, in France this figure is 1658, in Turkey – 1888, in China – 4000 franchises [125].

Overall, according to market experts, franchise turnover in Ukraine is estimated at approximately $ 1.5 billion, which is about 3 % of the country's turnover. Taking into account that in developed countries of the world franchising turns from 40 to 60 % of the total turnover, then we can understand what high potential we have.

Analyzing the development of franchisors in 2006–2016, we see that in Ukraine it is rapidly developing. Thus, in 2006 the number of franchisors was only 70, and already in mid-2012, this figure increased significantly and reached the mark of 411 enterprises. The positive trend was broken in 2014 and 2015, when the unstable situation in eastern Ukraine affected all sectors of the economy and franchisees in particular, becoming a kind of test of the concepts of endurance and profitability [125, 131]. However, it should be noted that with the advent of an increasing number of franchisors, the number of franchisees in the Ukrainian market is increasing. For example, in 2006 there were 400 such businesses, and as of 2016, there were already 22,639 units. Similar figures prove that the franchise-based way of business organization is becoming more and more attractive in Ukraine, with both franchisors and potential franchisees [131].

As for the branch, franchise relations in our country are developing in the fields of trade (supermarkets, trade in industrial and food products), catering (fast food, restaurants, healthy food, sushi), providing services to individual consumers (tourism, sports services, car service, training, dry cleaning services, beauty salons, etc.), and the same to entrepreneurs (consulting) as toproduction [131].

Let us note that the leading position in the scope of franchise development has been occupied by the trade sector for many years, covering 36 % of the industries. On the second place there are enterprises that provide a variety of services to the population and show the highest increase in the number of brands (by 47 %). Among the largest domestic franchisors in the sphere of services it is advisable to mention the tourist

franchise network of «Voyage-Kyiv» (trade mark «Gallop through Europe»), «Soft Service Holding» (trade mark «Decor Service») and the network of agencies «Hot tours» and «Akkord»[132]. The top three leaderscloses quite popular among participants in franchising relationships – the food industry. This industry is the leader in the number of operating franchises, which is explained by the situation and trends of the domestic fast food catering market [132].

The vast majority of franchise points are the restaurant business, which accounts for the largest share – about 55 % of all brands. In total, about 40 franchisees operate in the field of catering in Ukraine today. Among Ukrainiancompanies the absolute leader isLviv Fast Food System (FFS), proving that franchising can be an effective and efficient business activity not only when it is involved in international concerns. Also, according to Forbes magazine, for the third year in a row «NashaRyaba» has been the leader in the ranking of the most expensive Ukrainian brands, with thousands of outlets operating in the system. This fact indicates that Ukrainian companies may become competitors to foreign franchises in the future [131, 132].

It should be noted that the most dynamic in terms of investment is the hotel business market. This was greatly facilitated by Euro 2014 in Ukraine and the desire of real estate owners to fill their own hotels as soon as possible by entering the world-famous hotel chains.

In recent years, there has been an increase in the number of foreign companies that show interest in working with Ukrainian partners based on franchising. At the same time, domestic entrepreneurs are more willing to engage in franchise relations, assessing the above listed benefits of such cooperation. Franchise networks from Poland, Russia, the Netherlands, France, the USA, Germany, the United Kingdom and other countries are represented in our country [130, 131].

The largest foreign franchisors operating in the territory of Ukraine, related to the trading of petroleum products through the system of «pocketing» («TNK-Ukraine», «Lukoil-Ukraine» and «Alliance-Ukraine»), as well as classic restaurants and fast food establishments (Pizza Chelentano, «Potato House», «Maxmak», «Two Geese», «Kozyrna Karta», «Pan Pizza», «Rostik's», Baskin-Robbins). In addition, retailers are represented by fundraising: clothing – Sensus, Gregory Arber, VD One, Argo Trading and Sela; shoes – «Monarch» and «Econica». Also, this

mechanism is used by dry cleaners American Clearens International and Un Momento, Kodak photo services network, Bosch Auto Service station network, «Planet Fitness» Club, «1C Franchising», cosmetics and household chemicals production, «Henco», «JandJ», «Procter and Gamble» and others [131].

However, despite all the advantages of franchising and the prospect of its application in the economy of Ukraine, it will be an exaggeration to state that in our country all the conditions necessary for the development of franchising relations are created. After all, there are a number of factors that impede its development, and sometimes make it impossible to fully function.

Today, the introduction of a venture investment mechanism to support the innovative development of small business is becoming more and more urgent. Moreover, the current growth of venture financing in our country cannot be considered satisfactory. The number of venture investors in Ukraine is too small today, and there are no venture capital funds at all. This situation in Ukraine is due to a number of reasons [101, 133, 134]:

- instability of economic and political environment;
- contradiction of legislation in the field of business law;
- a rigid tax system;
- lack of prerequisites for creation of venture infrastructure;
- inertia of the state in support of venture business;
- underdevelopment of the securities market;
- not understanding domestic entrepreneurs of the mechanism of venture investment, fear of losing control of the case, allowing the management of their business third-party co-owner.

Among the countries providing financial and technical assistance to Ukrainian small businesses, the most active are the USA, Germany, the United Kingdom, Canada. It should be noted that since 1999, Switzerland, Germany, Sweden and Poland have contributed $ 4.39 million to the development and support of this sector of the economy [134].

International organizations take a unique position in regulating and facilitating the foreign economic activity of small businesses, carrying out effective communication processes with a wide range of countries and institutions.

The main functions of international agencies are as follows:

1. Financial support. International organizations are implementing financial support projects for entrepreneurship in developing and transitional countries. Thus, according to the program organizers, more than 4 thousand loans for the amount of more than $ 50 million were granted through the EBRD alone, according to the organizers of the Program. The World Bank, the United States Agency for International Development and others have similar projects.

However, it should be noted that one of the largest lenders and investors of the Ukrainian economy – the European Bank for Reconstruction and Development – has been cutting funding for Ukrainian projects for the second year in a row. In particular, in 2015, EBRD financial investments in Ukraine amounted to EUR 820 million. As the Bank invested EUR 934 million in 2014, the volume of financing for the year decreased by 12.2 %. It is noteworthy that in 2016, the EBRD also reduced its investment volume (–8.4 %), although it may allocate investments and loans to Ukraine by EUR 1 billion per year.

The EBRD's main investment in 2015 was a € 300 million loan to «Energoatom» for the implementation of a program to improve the safety of operating NPPs. Another € 163 million is directed to lending to the agricultural business – from grain traders to retail; EUR 56 million – in support of municipal projects; € 54 million to support various renewable energy and energy efficiency projects, including the construction of the «Novoazovsky» Wind Farm in Odesa region. In total, the bank financed 32 projects in Ukraine [124, 125].

2. Information support consisting in providing small businesses with the necessary information regarding sources of funding, incentives from the exporting country, the importing country, their political, socio-economic and industrial characteristics. Of course, the government can provide these services on its own, but in the context of increasing globalization, the more rational way is to cooperate with international organizations, which helps to significantly reduce government expenditures on the provision of foreign partner search services, technology transfer and information on foreign markets.

3. Intermediary services, such as foreign partner search services.

4. Export services, including assistance to governments of individual countries in the development and implementation of policies to promote the

development of foreign economic activity of small businesses, including through the accumulation and dissemination of positive experience of industrialized and emerging industrial countries.

Similar cooperation:

- facilitates the exchange of information on small business support initiatives and enables governments to draw adequate conclusions and learn from the mistakes of others, while minimizing them in themselves;

- contributes to the reduction of program implementation costs through the efficient distribution of information and infrastructure;

- helps to harmonize regulation and simplify regulatory barriers to small business foreign economic activity: taxation, standards, customs procedures, business registration and protection of intellectual property rights [134].

Due to the credit lines of international financial organizations, small business entities were granted loans worth USD 7.6 billion in 2014, USD 11.5 million, € 2.4 million. In 2015 – 7.6 billion UAH, 13.2 million USD,€ 1.6 million [135]. These organizations cooperate with domestic banks as part of small and medium-sized business lending programs. Within these programs, Ukrainian banks apply project financingwhich envisages the participation of the bank in financing investment projects.

Ukraine needs to use foreign aid more effectively, and to more actively demonstrate its position in relations with international financial institutions [134].

As we can see, there are many financial and credit instruments to improve the situation of support and innovative development of small business in Ukraine. Each of them is able to solve almost the most important problem of small business – the problem of finding and obtaining financial resources. The implementation of the proposed tools to stimulate innovation in small business in Ukraine will significantly increase the level of innovation activity of small business structures and stabilize the accelerated process of updating their production.

However, despite the multiplicity of possible financial and credit instruments to ensure the innovative development of small businesses, attracting the required amount of financial and credit resources is largely conditioned by the availability of obtaining them from a specific source. Therefore, it is advisable to carry out the analysis of financial instruments in a comparative aspect, which will also allow to consider the overall

effectiveness of individual financial instruments of innovative development of small business in Ukraine as an integral characteristic that defines the requirements and conditions for obtaining an adequate amount of financial resources. Therefore, taking this approach into account, based on a comprehensive review of the use of financial and credit instruments to stimulate innovative development of small businesses, we will analyze the definition of the most effective algorithm for supporting innovation activities.

The algorithm of financial-credit mechanism for effective support of innovative development of small business is presented in fig. 2.27.

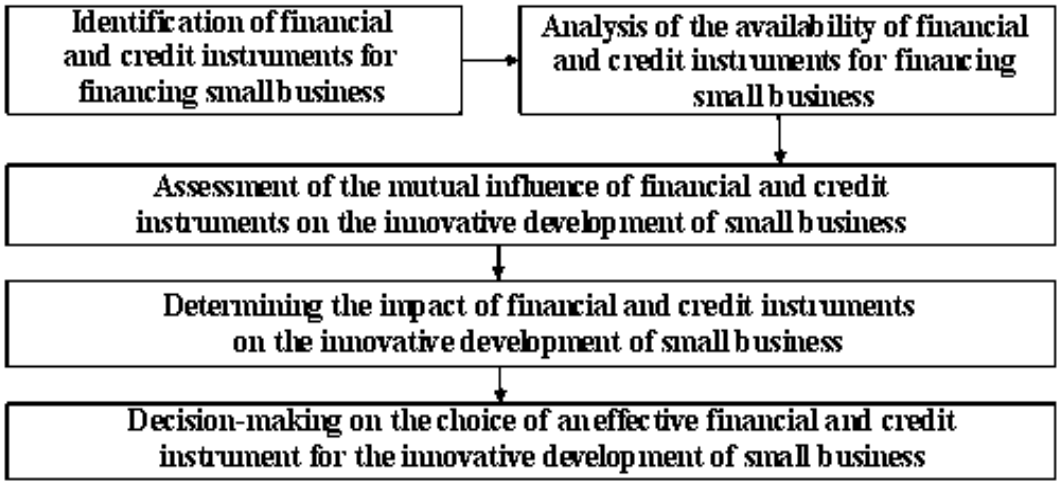

Figure 2.27 – Algorithm of financial-credit mechanism for effective support of innovative development of small business

The analysis of the impacts between different financial instruments to support the innovative development of small business in Ukraine, to a certain extent, determines the coordination of actions of different economic entities in terms of both borrowing and providing the necessary amount of financial and credit resources.

Thus, the disclosure of the mutual effects between different financial instruments not only allows us to analyze relevant financing in more detail the current state of development, but also to explore the problematic aspects, which essentially reveal the conditions for the use of certain financial instruments necessary for innovative development of small business in Ukraine.

2.4 Conclusions of Section 2

Therefore, according to the results of the study in the second section, the following main conclusions are formulated:

1. In accordance with the identified research objectives, the second part of the dissertation analyzed the current state and mechanism of financial support for innovative development of small businesses in Ukraine and China, in particular, comparative analysis of the dynamics of major economic and innovation indicators of countries such as Ukraine and China in accordance with 1992 and 1980 to 2017. Seven major economic indicators were selected for benchmarking Ukraine and China ranked in the world in terms of a number of innovative indicators the main of which is the Global Innovation Index. The comparative analysis of the dynamics of the above indicators was carried out not only in quantitative but also in graphical terms, which greatly simplifies its visual perception and allows not only to follow the trends of the selected indicators, but also to trace the parallels of the development of the economies of the two countries with the further possibility of their forecasting with minimal error thanks to the use of a large array of data. Areas where China's experience can be important for Ukraine's economy and innovative small business development are identified. The study showed that Ukraine's economic and innovation potential is not being fully utilized, probably due to the lack of development of relevant institutions.

2. The dynamics of innovation activity of enterprises of Vinnytsia region from 2007 to 2017 and sources of financing small business innovation activity using economic and statistical methods of both Ukraine and China were also analyzed. The results of the study show that the most active innovations were in the pre-crisis period of 2007 – almost 24 % of the total, and in 2012–2013, before the start of ATO – respectively 18 % and 19.4 %. For 2017 we have innovative activity of enterprises in 15,4 %. Regarding the sources of financing, the main source of financing of innovative activity of the enterprises in Ukraine is the own funds of the enterprises – more than 95 %.

3. In order to identify the main factors and tools for the mechanism of financial support for innovative development of small business in Ukraine and China, a thorough study was conducted, which showed that the main tool for innovative development of China is the creation of state-level scientific technoparks. Further studies have shown that high-tech areas are concentrated mainly in the North and East China, as well as the relatively

developed economies of the southwest coast: Beijing, Tianjin, Jiangsu, Shandong, Guangdong, Shanghai and Fujian. Basically, high-tech areas have the following geographical distribution: 58 zones in the Eastern region, 27 zones in the central region, 29 in the Western region and 15 in the Northeast region of China. Research has been conducted on the intensity of research on state-owned technoparks in China as a% of the country's total budget, and the cost of research work is shown in the form of a 100 million yuan, which results in an increase in spending data year by year, which is a very positive trend for Chinese entrepreneurs.

The contribution of such sources of funding as business angels and venture funds was analyzed as the most important sources of financial support for China's small business innovation, the distribution of Chinese national technology business incubators by Chinese regions and the growth of their total from 2011 to 2016 were determined and the place identified and the role of such a movement to support innovative enterprises in China as hackspace.

4. In Ukraine, not taking into consideration the positive experience of creating powerful IT clusters, as an analogue of techno parks in the field of information technology, this tool is not as widespread today as in China. Among the most used tools of the mechanism of financial support of innovative development of small business are various commercial structures, in particular banks, so the theoretical and game model of optimization of interaction of financial structures and start-ups in small business was developed. On the basis of the algorithm, it was proved that it would be profitable for a financial institution to issue a start-up loan only if the probability of successful completion of a start-up by the average amount of return to a financial institution after successful completion of the start-up is greater than the profit obtained from providing a normal credit transaction based on a time factor. The decision on granting or not giving credit to a small business to finance start-up in the form of a static game-theoretic model is presented in Fig. 2.23. The Nash equilibrium was chosen as a tool of game theory, since it is a method of self-regulation of systems of any complexity, unlike the Paretto optimality used as a tracking apparatus. So, as seen from the theoretical game model, this equilibrium will be present only in one case – when a financial institution agrees to finance the project with the probability of success. According to game theory, this situation is optimal for self-regulation of the interaction of financial structures and start-ups in small business.

SECTION 3 PROSPECTS OF FINANCIAL SECURITY SMALL INNOVATIVE BUSINESS DEVELOPMENT

3.1 Forecasting general trends in the growth of key economic indicators and prospects for small business innovation in Ukraine and China

Based on part 2 of this dissertation, the analysis of the main economic indicators characterizing the development of the economy at the macro level in both Ukraine and China, we forecast their further trends until 2025 on the basis of regression analysis using the corresponding trend line, the equation of which is presented in the diagrams together with the magnitude of the approximation reliability. The trend line most closely approximates the dependence y shown in the diagram if the approximation value (R^2) equals or approaches 1.

As can be seen from Chart 3.1, China's GDP per capita trend is positive with a confidence of almost 96 %.

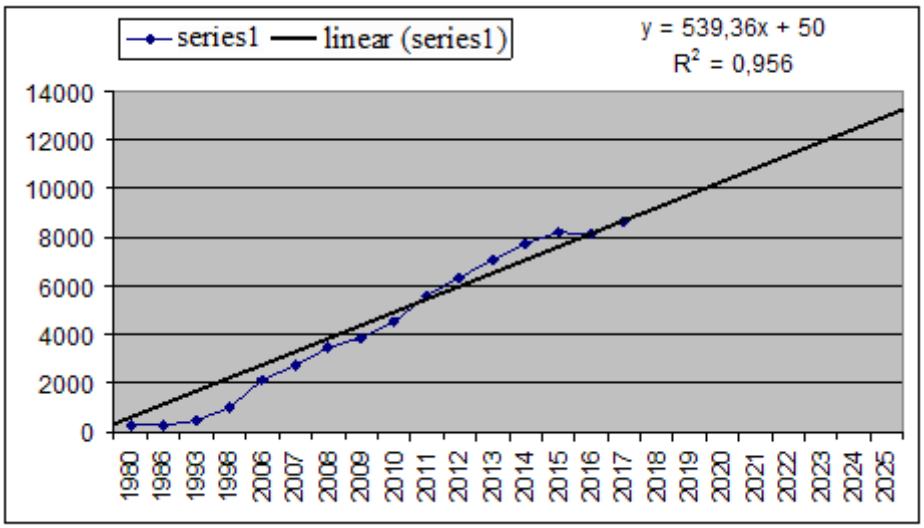

Figure 3.1 – China's GDP per capita forecast to 2025, $

Note: made by the author

As can be seen from Chart 3.2, Ukraine's GDP per capita trend is also positive, but growth rates are much lower than in China. If we compare the projected GDP per capita in Ukraine in 2015, it will be at the level of 2012 to a similar figure in China.

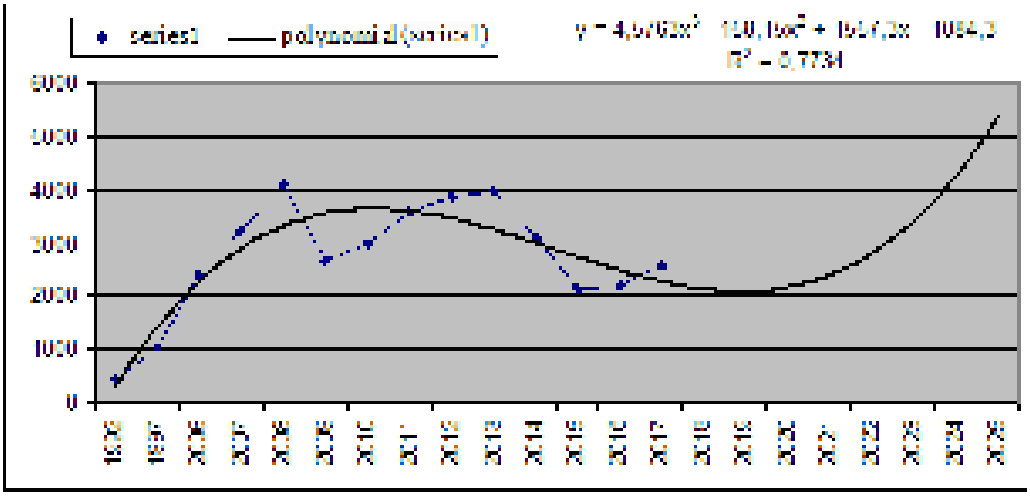

Figure 3.2 – Ukraine's GDP per capita forecast to 2025, $

Note: made by the author

Figure 3.3 predicts Ukraine's unemployment rate by 2025 based on official data, not chart 3.4, we can trace the modeled unemployment rate over the same period in China.

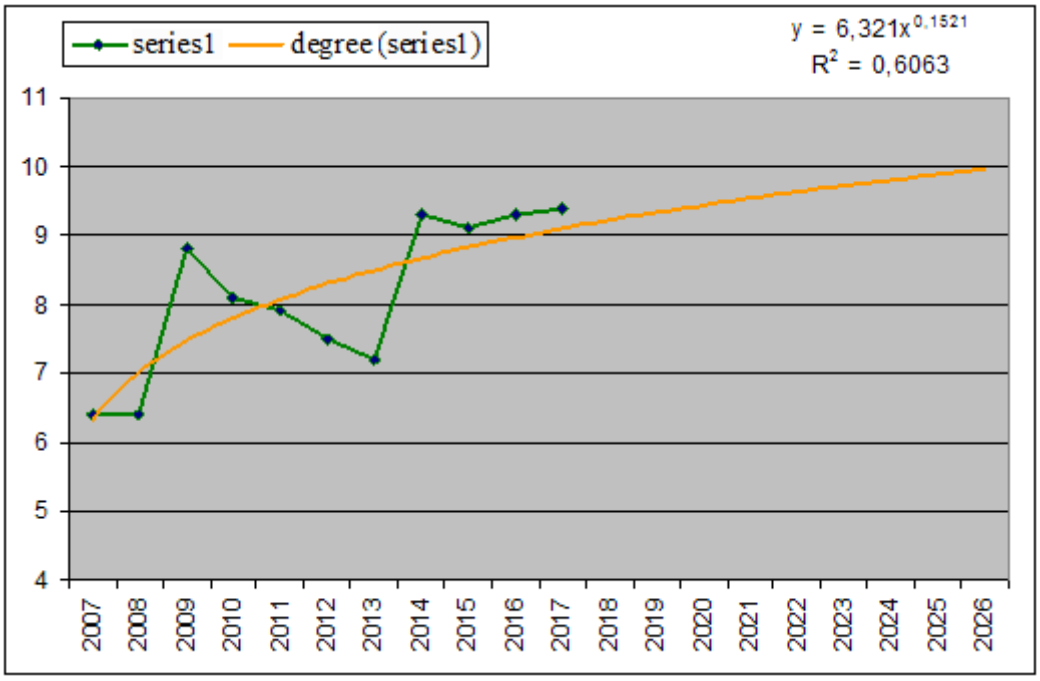

Figure 3.3 – Unemployment forecast in Ukraine by 2025, %

Note: made by the author

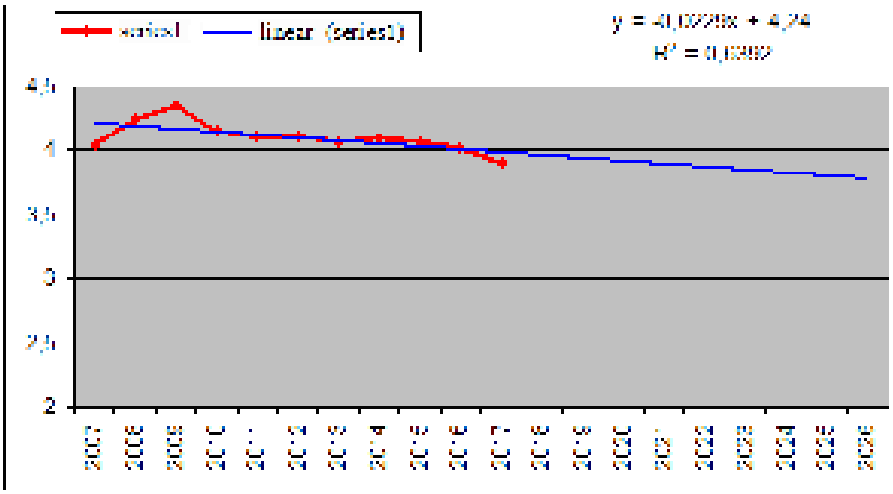

Figure 3.4 – China's unemployment rate by 2025, %

Note: made by the author

If both charts are analyzed, there is a clear positive trend towards a decrease in China's unemployment rate and a gradual 0.6 % increase in unemployment in Ukraine by 2025, which may be explained by the objective natural increase in unemployment.

Predicting the tendency of innovation development of small enterprises in Ukraine, it is appropriate to make a forecast for 5–8 years of such important macroeconomic indicators for the country as exports and imports of goods and services, especially when analyzing China's indicators, since a large share of exports consists of innovative goods, high a percentage of which is produced by small and medium-sized enterprises. If we analyze Ukraine, there is a recent increase in exports in the field of IT technologies, which are usually created on the basis of small innovative enterprises or IT firms (Fig. 3.5).

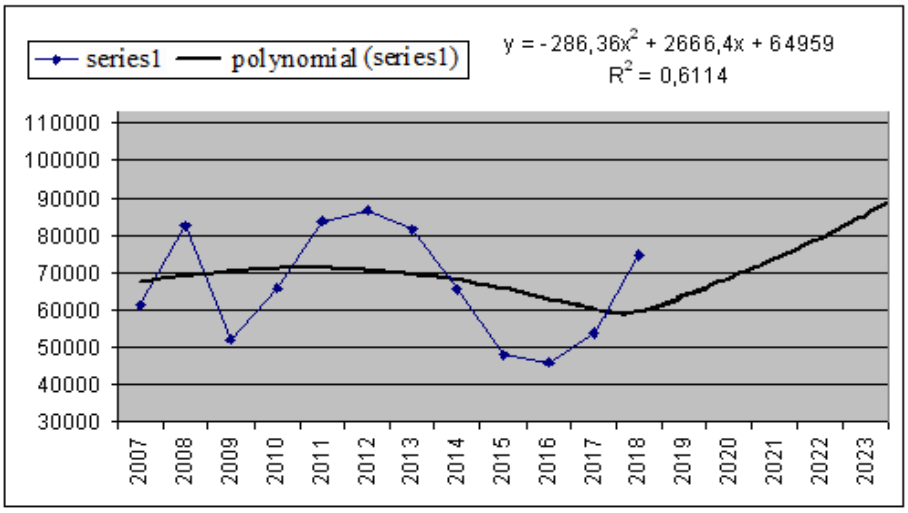

Figure 3.5 – Forecast of the level of increase of exports by Ukraine, including innovative products, million

Note: made by the author

China's export growth projection is shown in Chart 3.6. As can be seen from the graph, the projected value of China's exports in the stable economic situation will be increased in 1.5 times, which is a very positive trend for SMEs engaged in export innovative products.

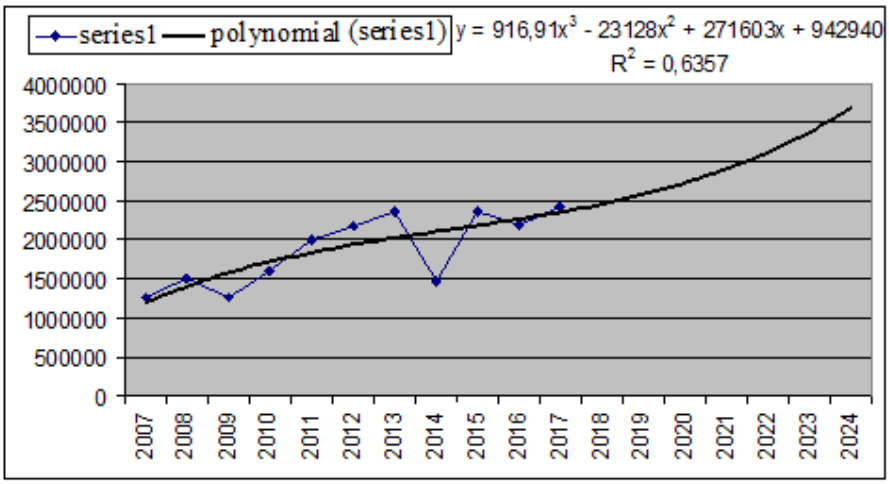

Figure 3.6 – Forecast of the level of export growth by China, including innovative products, mln

Note: by the author

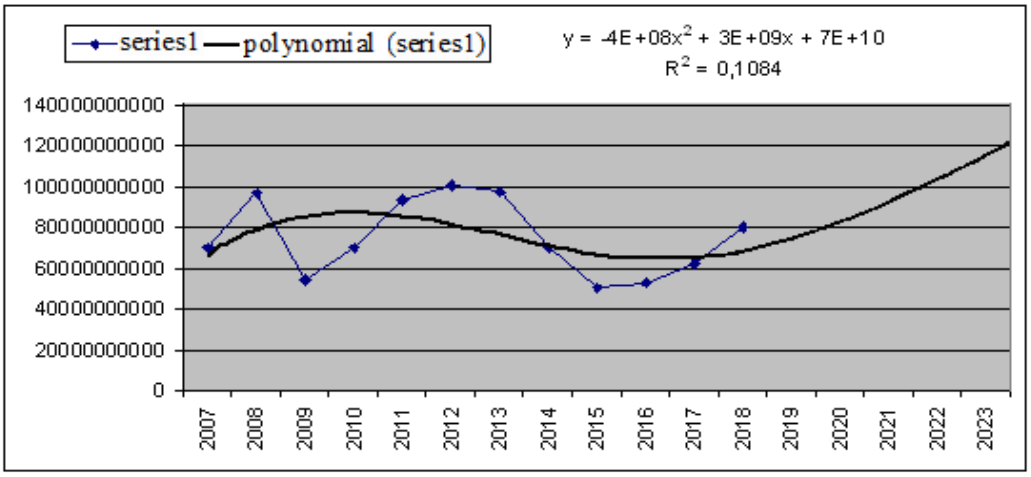

Figure 3.7 – Forecast of volumes of increase of imports by Ukraine, USD

Note: by the author

As can be seen from Fig. 3.7 and 3.8 it is predicted to increase the volume of imports both in China and Ukraine. If we compare the export and import forecasts in Fig. 3.5–3.8, it is possible to observe a tendency of export surplus over imports both in Ukraine and in China, which is definitely a positive factor in the development of the economy of both countries.

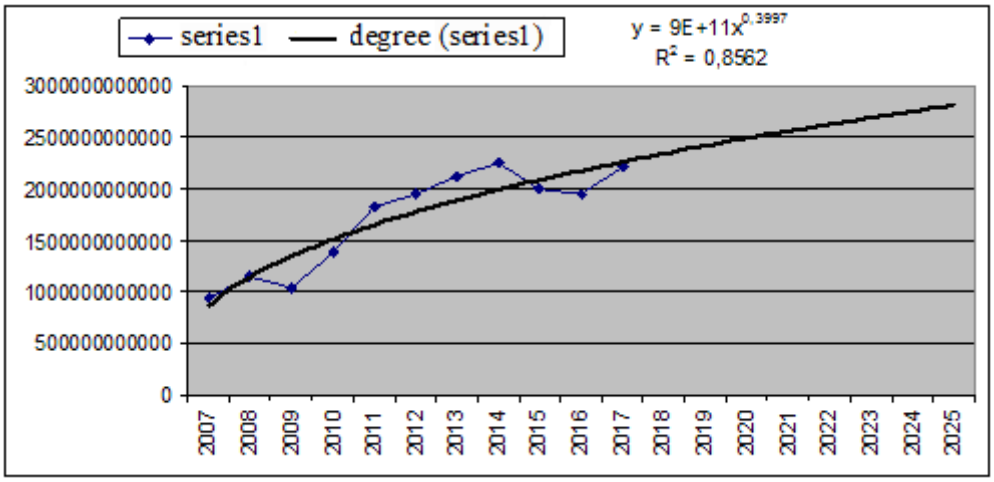

Figure 3.8 – Forecast of Chinese imports, USD

Note: made by the author

Forecasting tendencies of small enterprises innovative activity development in Ukraine, it is necessary to analyze such important state document as «Strategy of innovative development of Ukraine for 2010–2020 in the conditions of globalization challenges» [122].

The strategy consists of analytical and directly strategic parts. The analytical part formulates a systemic socio-economic problem, which is solved by the Strategy. This problem is projected on the current state of innovative development of Ukraine in comparison with the main mega-trends of innovative development of world and European economies, as well as the economies of individual countries. The strategic part outlines key strategic goals, main strategic priorities, defines directions, mechanisms and possible solutions of the problem, contains the formulation of key measures for the practical implementation of the strategy.

The result of the strategy's implementation is the approval of an innovative investment model of its economic and social development in Ukraine, increasing the efficiency of the country's intellectual potential, all its human and natural resources, ensuring the competitiveness of the national economy, achieving stable, sustainable development and improving the well-being of citizens.

According to the analysis and according to the expert estimates obtained in the framework of the implementation of the State Program for Forecasting Scientific and Technological and Innovative Development of

Ukraine [122], from our point of view, the most promising directions for the development of innovative activity in Ukraine in general are:

– research of nanostructures and development of nanotechnologies;

– immuno biotechnology, biosensor and molecular diagnostics;

– plant biotechnology and biophysics;

– biodegradation;

– cryobiology and cry medicine;

– information technologies;

– micro and optoelectronics;

– aerospace technologies.

It should also be noted that Ukraine has a strong potential in such areas as:

– control of processes of structure formation, formation of properties of structural and tool materials, their welding, including with use of highly concentrated sources of energy and electromagnetic influence (electron and ion-beam technologies, laser technologies, etc.);

– development of technologies for the production of functional materials for electronics, laser and diagnostic equipment;

– creation of newest composite materials and study of mechanical properties of complex structures and systems based on them;

– development of technologies for the production of synthetic diamonds and other superhard materials, as well as tools based on them.

Given the prerogatives identified, SMEs should focus on the above outlined most promising areas of enterprise innovation.

To forecast tendencies of innovation development of small enterprises it is necessary to forecast the development of the most promising directions of innovative activity of enterprises within the limits defined in the «Strategy of innovation development of Ukraine for 2010–2020 in the conditions of globalization challenges» [122] and «Strategy of innovative development of Ukraine on the period until 2030» [123]. It is necessary to take into account the most innovative and modern trends of today.

Fig. 3.9 presents the elaborated structural-logical scheme of prediction of the main tasks of perspective directions of development of innovative activity of small enterprises in Ukraine (PDDIA).

In forming the structural and logical scheme of the main tasks of perspective directions of development of innovative activity of small

enterprises in Ukraine and the mechanism of its implementation, the author proceeded from the need to clearly define the goals for which the enterprise needs to fulfill the projected tasks.

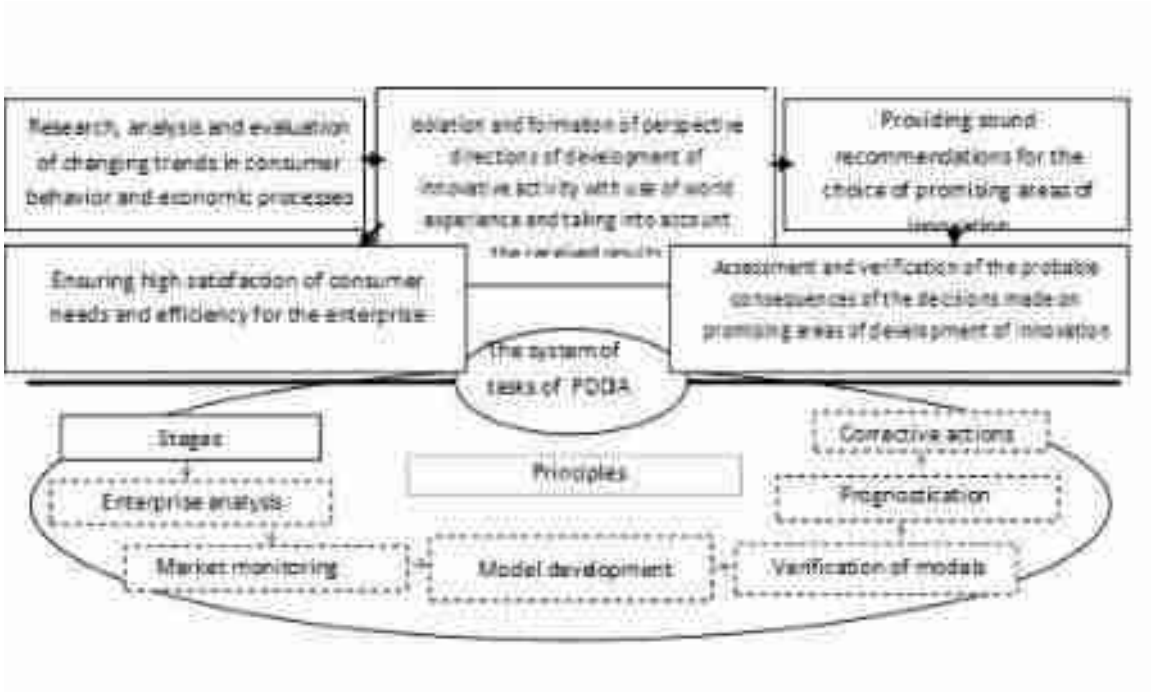

Figure 3.9 – Structural and logical scheme of prediction of the main tasks of perspective directions of development of innovative activity of small enterprises

Note: made by the author based on source [110]

One of such goals of forecasting the main directions and perspective tendencies of small enterprises innovative activity development can be considered the creation of the forecast innovative activity directions development made on the basis of identification of scientifically grounded, optimal in time and space, alternative options of small enterprises innovative activity development, considering as perspectives current trends, and those factors that contribute to accelerating their spread. Also, in our opinion, forecasting small enterprises innovative development directions perspective should be made taking into account certain principles, the main ones of which are presented by the author in Fig. 3.10.

The potential and innovative development tendencies of high-tech and traditional sectors of the economy of Ukraine were also reflected in the report of the National Academy of Sciences «Innovative Ukraine 2020» [126]. According to researchers, the most promising for SMEs in Ukraine is the field of information and communication technologies (ICT).

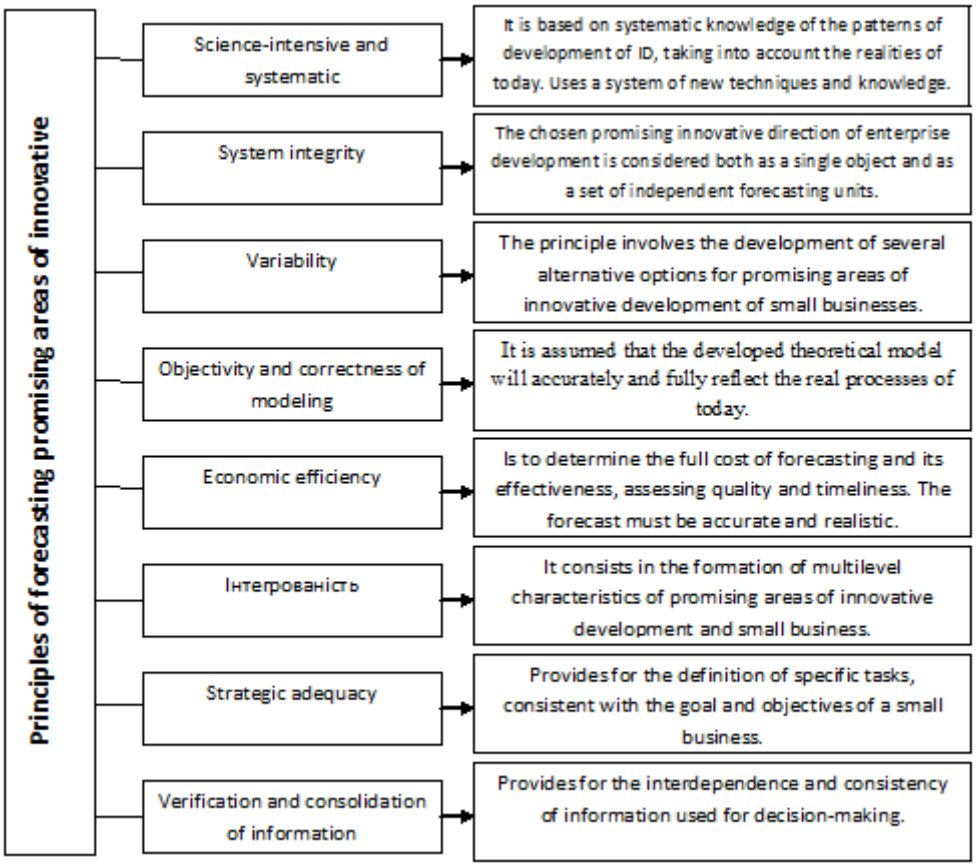

Figure 3.10 – Basic Principles for Forecasting Perspective Areas of Innovative Development of Small Enterprises

Note: made by the author

The ICT sector in Ukraine is a powerful and dynamic sector of the national economy. According to the State Statistics Committee [49], in 2016 the share of ICT in GDP was 1.42 %. The main indicators of development indicate a positive trend in the number of enterprises, the number of employees, the volume of sales of ICT sub-sectors. At the same time, ICT telecommunication sub-sectors have good financial performance (net profit, operating and overall profitability) which shapes their attractive investment prospects for internal and external investments.

According to data, in 2015–2017 [92, 126], the highest level of innovation activity (26.6 %) was observed in enterprises by type of economic activity «Information and Telecommunications», 12.2 % of which had technological innovations. Regarding the directions of innovation activity of Ukrainian enterprises, more than 3/4 of the ICT enterprises with technological innovations have purchased machines,

equipment and software for the production of new or significantly improved products and services.

Ukraine's economy needs highly effective catalysts for economic growth, such as implementing ICT in all sectors of the national economy. While in Ukraine these processes are successfully developing in the fields of e-business, e-commerce, IT (information technologies), some are lagging behind in TKP (telecommunication services), e-government, far behind in cashless payments, provision of public (municipal) services.

E-business combines both organizational and technological innovation and involves it-based and intra-corporate networks usage. The Internet paves the way to expand the client base, the scope of non-cash turnover, modern financial instruments (payment cards, payment system (PS)), new markets related to network systems and telecommunications and provides new opportunities for small innovative enterprises.

Analyzing the main trends of development of SMEs in the ICT sector, it is impossible to ignore the prospects of innovative clusters development in Ukraine [131], which are based on small and medium businesses. For the first time Ukrainian IT companies joined the cluster in 2010 in Lviv and as of January 2018, 16 of the clusters demonstrated the active work in the promotion sphere in Ukraine. The most famous of them are the following [131, 132]:

1. Lviv IT Cluster was founded in 2010 through the merger of SoftServe, N-iX and ELEKS. Today, the organization brings together more than 70 IT companies, employing more than 11,000 professionals. Cluster projects directed on socially important areas: education, law, infrastructure, search investors.

2. The Kharkov IT cluster was founded in 2015 by AltexSoft, Insart, Promodo, SlobodaStudio, Telesens and Videal, and now brings together 34 IT companies. There have been many events, including IT Talk conferences to improve the professional skills of IT companies, seminars on Legal, Finance, Security, Marketing.

3. The Cherkasy IT cluster was created in 2015. The union includes 13 IT companies: Active Bridge, CoreValue, Default Value, eKreative, Everlabs, InterLink, Master of Code Global, QuartSoft, RedHat, SPD-Ukraine, TalentScan, TransferWise and Visual Craft, as well as the GeekHub educational project and the Android community – developers of GDG Cherkasy. Cluster founders are betting on educational projects to get as many young people as possible aware of the IT professions benefits.

4. The Odessa IT cluster was created in 2015. The union brought together 18 IT companies employing more than 3,000 specialists. The cluster implements educational projects: several weeks of not boring programming, creating games for schoolchildren and more.

5. The Kyiv IT cluster was founded in 2016. The union includes 24 IT companies: Alter, AGOV, AOG, B2B Soft, Evergreen, Flexible IT, Grossum, IDAPGroup, Kiselev, Pro Vision Lab and others [132]. Kyiv IT Cluster's mission is to develop Kyiv as a major IT location in Eastern Europe, creating a community where, through synergies, friendships, specialization and launching joint projects, participating companies the quality of products and services and capture a much larger share of the global market are improved. Together with the KSCA, the cluster is engaged in the iCity Kyiv project – building the creative space and central IT events of the Kyiv area on the basis of the Bratislava cinema, launching an incubation and entrepreneurship program [132].

The growing role that electronics plays in innovation in many industries is demonstrated by the experience of China and other countries. In particular, according to a 2017 report, in China, innovative companies dominate high-tech industries such as the media Internet, electronic components and communications equipment, the transition on smarter technologies, Internet of Things (IoT) and Industry 4.0 [96–98, 129].

During 2015–2017 [125] in Ukraine the share of innovative enterprises varied within 20 % of the total number of surveyed enterprises. The most innovative enterprises were small and medium-sized enterprises, whose share in the total number of innovative enterprises was about 90 %, which was due to the survey sample structure rather than the small SMEs' tendency to innovate.

We forecast the share of enterprises engaged in innovation in Vinnytsia region and the most significant items of their costs by 2025 based on the analysis conducted in section 2 of this paper.

As can be seen from Fig. 3.11 the tendency of enterprises innovation activity in Vinnytsia region is projected with a sufficiently high approximation, as both the number of enterprises and the total amount of their costs are gradually increasing.

Fig. 3.12 and 3.13 the cost estimates of innovative enterprises in Vinnytsia region are drawn up according to the optimistic and pessimistic

scenario. As can be seen from the forecast, in the first case, the trend is positive, in the second – negative, with a decrease in costs. It is necessary to stabilize the economy so that the optimistic forecast is realized in the future.

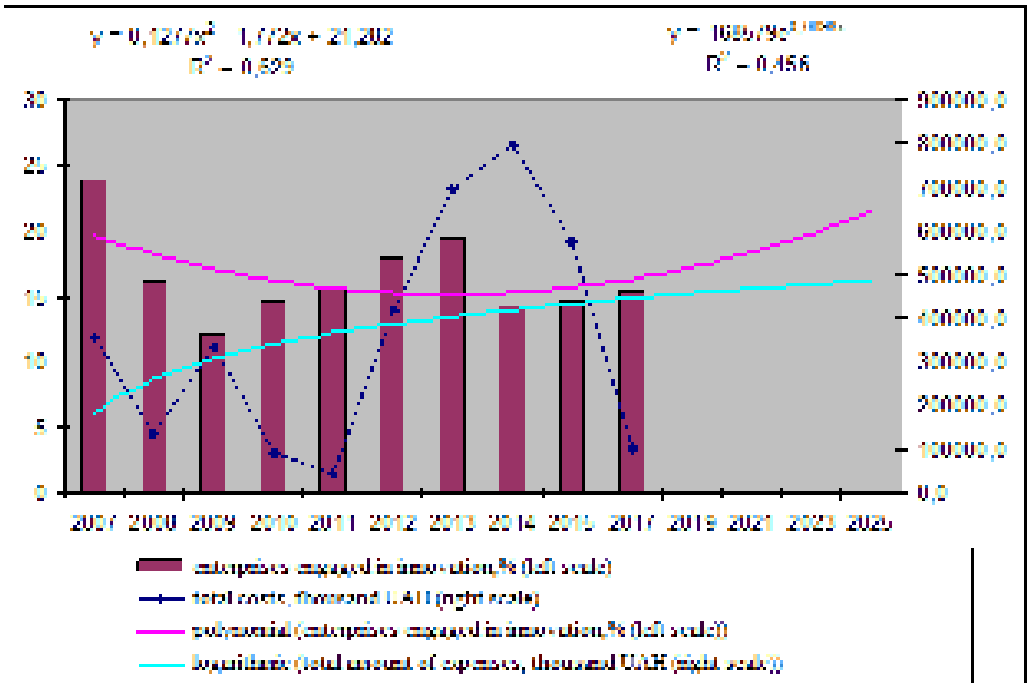

Figure 3.11 – Forecasting innovation activity of enterprises in Vinnytsia region Note: made by the author

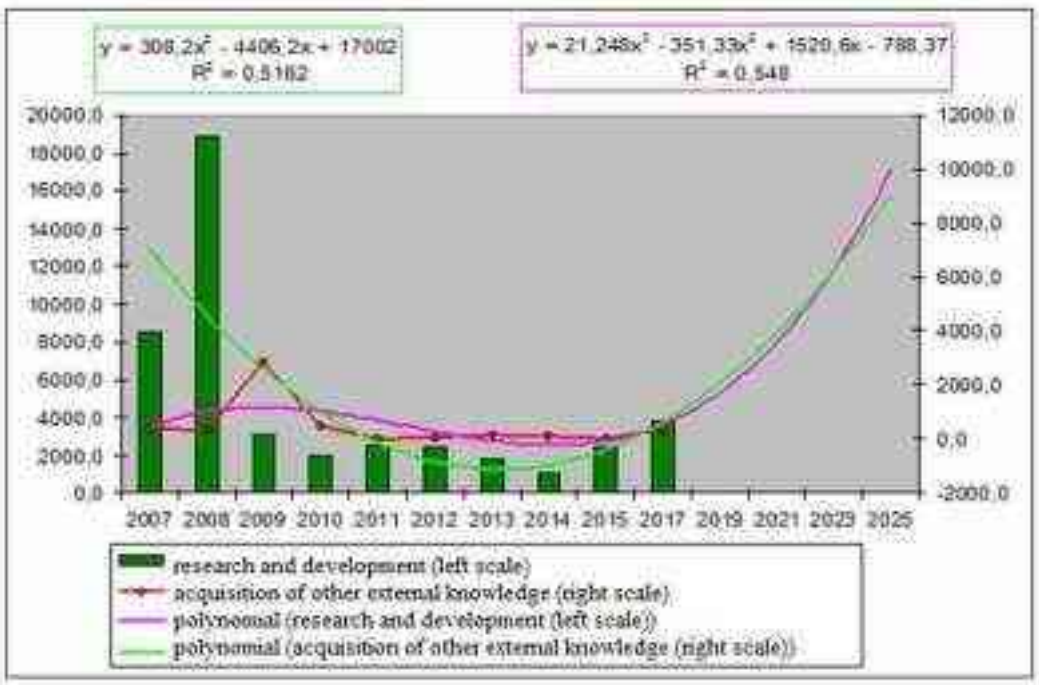

Figure 3.12 – Cost forecast of innovation-active enterprises in Vinnytsia region: optimistic scenario, thousand UAH. Note: made by the author

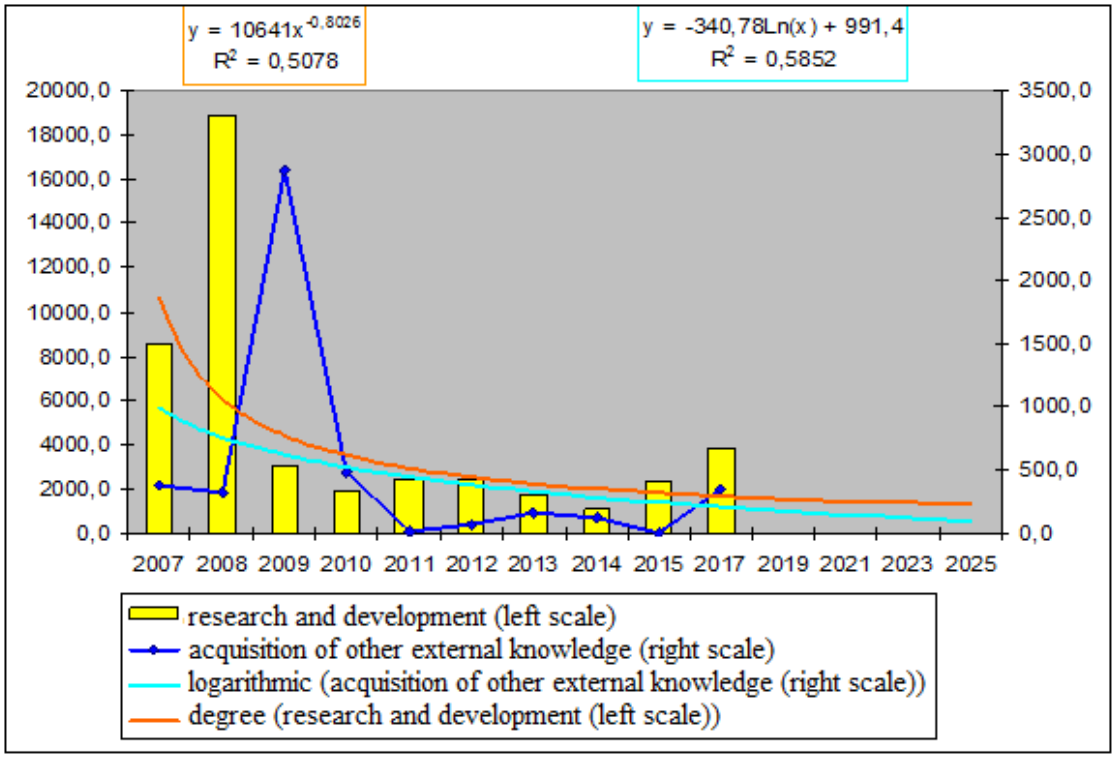

Figure 3.13 – Cost forecast of innovative enterprises
in Vinnytsia region: pessimistic scenario, thousand UAH

Note: by the author

Among the enterprises innovative activity of the most stood out companies of the financial sector. It is obvious that innovation in this sector (both technological and not technological) are of greater importance to successful work than in «traditional» sectors. Unfortunately, in Ukraine there is a gradual degradation of innovative capacity: according to the SSC [96], the number of researchers in Ukraine is rapidly shrinking (with 133 of 744 people in 2010 to 59 392 in 2017), the research intensity of GDP (expenditure on research and development from all sources in percent of GDP) in 2017 amounted to only 0.45 %, the dynamics of the number of enterprises implementing innovations is also negative (in 2017 there was a reduction in the number of industrial enterprises undertaking innovation activities, 9 % compared to 2016 – % to 16.2 % all industrial enterprises), although some examples of innovative business and high technologies, which are successfully developing in the Ukrainian economy still exist.

In the last fifteen years, investments in intangible assets have accounted for about 2–4 % of all capital investments, and the share of high-tech and medium-tech industrial activities in 2017 amounted to 11.3 %.

The main focus of innovative activity and innovation costs for service providers with technological innovation is the acquisition of machinery, equipment and software, and, to some extent, training and education for innovation. In 2017, only 16.9 % of enterprises were engaged in internal research (R&D), and 9.3 % were external. At the same time, expenditures for internal R&D were 2.3 %, and external – 3.1 % of the total expenses of enterprises. At the same time, the shares of small, medium and large enterprises with technological innovations that conducted internal R&D were almost identical, indicating that there is no significant relationship between the size of enterprises and the conduct of their own research and development [92, 125].

Also, according to a source [125] in Ukraine the level of ability to carry out innovative activity decreased, the quality of research institutions decreased, the expenses of companies for the implementation of R&D and the volume of purchases by the state of high-tech goods decreased. In order to at least preserve the innovative potential in Ukraine, it is worthwhile to study the Chinese experience, where, unlike in Ukraine, during the last decade (2008–2018), there has been a steady increase in R&D expenditure relative to GDP [129]. From 1.37 % in 2008 to 2.07 % in 2017, which is 51 %. In the same period, the total number of patented inventions increased from 85,000 in 2008 to 1.67 million. In 2017, a spectacular increase of 1850 %. Currently, China has six out of every 10 patents published worldwide [96, 129].

In Fig. 3.14 R&D expenditures in Ukraine and China are forecasted by 2025 based on the analysis of Section 2. As we can see, China's overall research activity has grown significantly in recent years and will continue to grow at a rather intense pace. Globally, the share of research in the country has increased in 14 areas monitored by Clarivate Analytics Web of Science from 2008 to 2018 [96, 129]. The Ukrainian forecast, as seen from chart 3.13, is also positive – the increase in R&D expenditures is projected, but not as fast as in China.

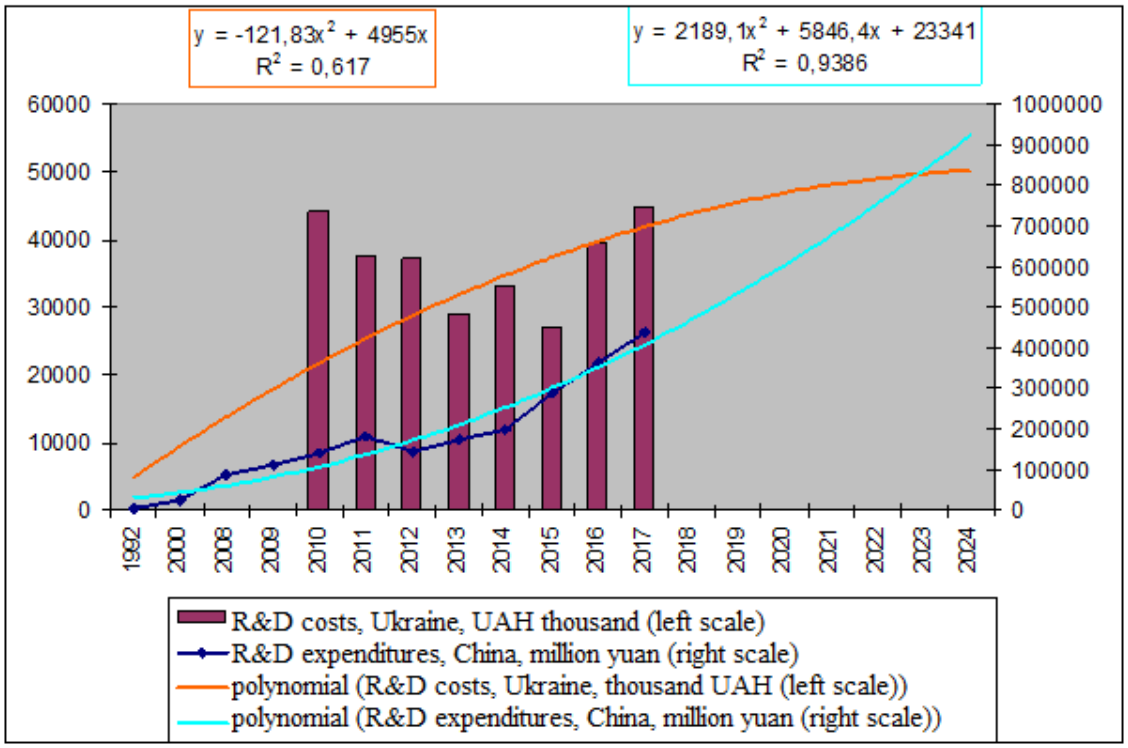

Figure 3.14 – GDR spending forecast

Note: by the author

China's economy and economic structure have changed dramatically over the last 30 years. From 1998 to 2017, nearly 19 million workers were laid off from state-owned enterprises and received employment with SMEs. Since the opening of the market in the 1980s, the number of SMEs in China has grown rapidly. Already in the 1990s, China had more than 1 million private SMEs. After 10 years, the number has grown so high that there are more SMEs in China than in Europe and the United States [130].

According to the Chinese Statistical Yearbook [93] in 2016 SMEs accounted for approximately 97.9 % of all registered enterprises in China. Their combined assets accounted for about 53.4 % of the total Chinese, their revenues accounted for 62 % of the total, and profits amounted to 64.3 % of the total amount of 4.26 billion yuan. They also made almost 58 % of GDP and 68 % of exports.

SMEs play a big role in China's employment issue. The number of employees in small and medium-sized enterprises is about 82 % of total workers in China.

Despite the slowdown in China's economy, SMEs still reported net earnings growth in 2017. Listed SMEs in the National Currency

Transactions and Quotations System (NEEQ) grew by 26,29 % in 2017, and their annual reports reported an increase of over 25 % of annual business income [93, 96]. Total assets also increased by about 23,9 %. SMEs also increased their R&D expenditures by about 8,25 % to a total of RMB 11,58 billion.

Overall, it can be argued that the number of companies in China continues to grow.

Regarding the resourcing of innovative business activity in Ukraine in the context of the above outlined prospective tendencies, the processes of their formation have a number of problems.

First, contrary to the widespread provision for priority support for innovative projects, the practical activity of most common business entities is aimed at serving the needs of exclusively traditional entrepreneurship and, accordingly, does not play a significant role in the resourcing of innovation activities.

Secondly, unlike general entrepreneurial activity, the layer of objects of specific innovative activity does not show high rates of development. Thus, during 2013–2016 there were no significant changes in the number and capitalization of venture funds operating in the territory of Ukraine, the growth of the number of technoparks and innovation centers is also slowing down, unlike in China, where the situation is much better. Chart 3.15 shows the projected increase in the number of venture capital funds in China and the amount of capital attracted by 2025.

Thirdly, in practice, the share of existing objects of general and specific infrastructure of entrepreneurial innovation activity has a limited number of clients, provides low quality services, performs non-specific activities, or does not function at all.

Fourthly, there is an uneven distribution of existing objects of entrepreneurial innovation infrastructure across Ukrainian regions.

Fifth, the problem of creating effective government and market institutions for the financial support of innovative projects remains unresolved. In particular, there are no institutions for public financing of the initial stages of implementation of innovative projects, which, as the world experience shows, is a prerequisite for the development of small high-tech business. For example, the activity of the Ukrainian State Innovation Company is focused on investing in innovative projects of large companies, and the practice of investing in innovative small business development is absent at all.

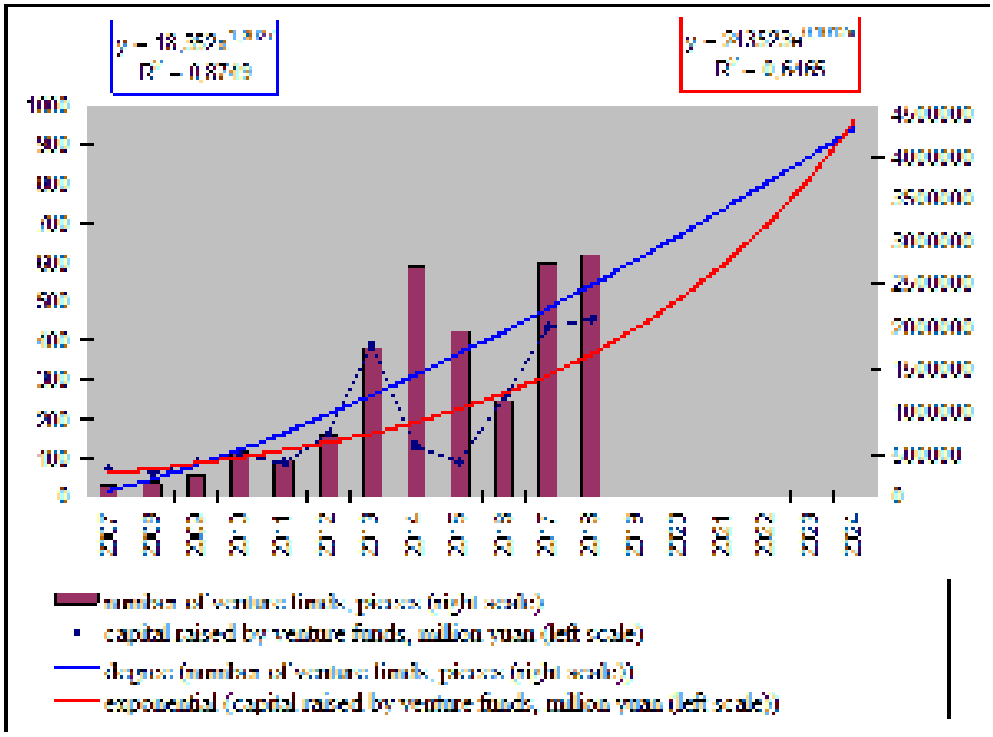

Figure 3.15 – Chinese Venture Funds: Quantity and Capital Raising [93, 94] Note: by the author

If we analyze the prospects for the development of small innovative entrepreneurship in Ukraine for the period up to 2020, in accordance with the logic of the Sustainable Development Strategy «Ukraine–2020» [124] and the Strategy for Innovative Development of Ukraine for the period up to 2030 [123], their main objectives must be fulfilled during the first phase, i.e. until 2020, which will ensure the necessary conditions for high rates of economic development based on the deployment of innovative processes in the country.

In the context of these strategies [133] in our view, development can predict the optimistic, baseline and pessimistic scenarios (Fig. 3.16).

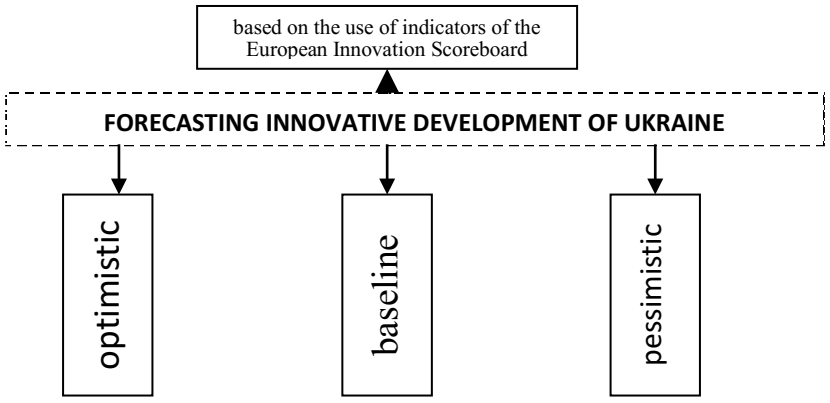

Figure 3.16 – Possible scenarios for innovative development of Ukraine Note: made by the author

There can be separately identified the script innovative bus from the turn of Ukraine on the basis of indicators of the European Innovation on the first scoreboard [122, 124]. We describe the presented in Fig. 3.16 script options in more detail.

I. An optimistic scenario. Under the conditions of realization during the first stage of critical mass components institutional support innovative activity tasks of formation, the following tendencies will be observed and following:

1) launch the mechanisms of self-stratum of small innovative entrepreneurship, the impetus for which should be the following factors: high scientific and technical potential; improving the availability of finance and credit, and information-consultative, organizational and technical services for conducting entrepreneurship innovation; the activity of the newly created generation of qualified specialists in the management of innovative projects; overall increase in business activity in the country, in particular by eliminating excessive regulatory burdens on entrepreneurial activity during the implementation of regulatory policy in the field of small business;

2) self-development of innovation activity infrastructure in the increase volume direction and quality of services improvement due to processes escalation of attraction in circulation of market resources, which is conditioned by the action of the following factors: increasing solvent demand for services of innovative infrastructure, created due to efficient functioning of financial institutions and financial institutions stages of implementation of innovative projects created with state participation; creation of favorable regulatory conditions for the development of market-driven infrastructure for innovation activity; formation of public opinion about the advance of resources in innovative activity expediency.

A characteristic sign of the optimistic scenario implementation is the beginning of the «breakthrough» legalization of existing and development of newly created small high-tech firms focused on the production of information technologies and software, as well as the formation of infrastructure objects oriented to meet the specific requirements of this innovative business area. It is also likely to include the process of «circulation of the minds», i.e. the return from abroad of highly qualified domestic personnel, similar to those observed, in particular, in China.

This development will, over time, create a highly efficient, innovation-oriented economy capable of producing and using radical innovative ideas in promising technological contexts. However, given the characteristic inertia, instability and haphazardness of state policy in the sphere of innovation institutions formation, the low executive discipline of the authorities that took place in the past, as well as the risk of considerable national resources diversion and political attention to the election campaign in 2019, the optimistic scenario raises doubts.

II. The baseline scenario. The baseline scenario is a «leap-like» process of forming institutional support for innovative activity, characterized by local «breakthroughs» in creating favorable conditions for the development of certain institutions, which are largely related to the lobbying processes by coalitions of representatives of these institutions of their own interests. Thus, in particular in the medium term, there are likely to be impulsive «bottom-up» «breakthroughs» in creating the conditions for the development of venture capital, a layer of small innovative entrepreneurship working in the field of information technology, as well as simplifying the procedure of creation of technoparks and the return to their participants the right to tax benefits. These phenomena are certainly positive, however, the inconsistency of appearance and the time gap in the achievement of results due to the lack of effective programmatic management by the state will play a negative role, holding back the overall processes of production innovation in the country.

III. Pessimistic scenario. The pessimistic scenario is a continuation of the trends of slow and contradictory development processes form in the bath «critical mass» of institutions innovation, due to missing a holistic and long-term policy in the field of innovation, low executive discipline of power and limited budget finance in the flow of processes. The need to implement the chosen government of Ukraine key reference point for building an innovative model of economic development and incentive system of state regulation of business eventually lead to the creation of a favorable institution of higher education to build subjects' innovative economy and business activity. However, opportunities to create conditions for a «breakthrough» in the economy to be innovative and to accumulated scientific and technical potential and ensuring high economic growth in the second stage of the strategy will be dropped. In this case likely considered limiting national model selection by national innovation system only seeing

innovation option. Characteristic for this type of scenario is further deployment processes «brain drain» and the sale of unsold innovative ideas abroad, and Lane is overwhelming focus of market innovation and active actors in the modernization and production through implementation perfecting innovations.

IV. Scenario innovative development of Ukraine upon European Innovation Scoreboard indicators [122, 124]. Changes in the values of indicators' complex that define the desired or possible dynamics of the innovative development process, consistent with the main indicators proposed or wanted economic development strategy of Ukraine until 2020, including those that determine the growth rate of GDP. Scenarios Strategy defined necessary level of innovation factor in economic growth, as envisaged in that draft economic development strategy of Ukraine period 2020 as well as opportunities to strengthen this effect by the national innovation system hidden potential maximum use .

The Strategy for Development of the Economy of Ukraine until 2020 justifies two scenarios and two stages of their implementation. In the first stage it is provided to overcome effects of the financial crisis and achieve macroeconomic stabilization and recovery. The second stage – during the formation of the fundamentals of sustainable development, enhance reforms followed with a mounting steadily stable pace of development. According to these steps scenarios for major macro indicators changes of Ukraine's economy are calculated, including real GDP growth, which, according to the Strategy 2020 should be for the inertial scenario of 5.2 %, according to active-ingestions scenario 6.5 %. In fact for 2017 GDP growth is in Ukr and yuan 2.5 % [98].

Expected value indicators of the European Innovation Scoreboard for Ukraine (the EU countries made by 100 %), calculated optimists including this scenario – «Ukraine – the leader in the group of countries «moderate innovators' «(Appendix B, Tab. B.1) show that in the conditions of purposeful innovation policy conform to its business activities should take away with real steps towards the implementation of the necessary structural changes in the economy and technological modernization of production forecast GDP taken in more optimistic scenario may be overdone.

The scenario «Ukraine – the leader in the group of countries» moderate innovators «is on and more probable for the period up to 2020. Its

implementation will allow Ukraine to achieve integrated indicators of innovative development, which at present are typical for Norway, Czech Republic, Italy, Spain and other countries. Due to the increase in the contribution of innovation to economic growth factor is 1.5 times that will take place due to implementation of the Strategy, respectively the GDP growth tempo will increase, figure 3.17.

Forecasted for Ukraine's GDP growth at 5.7 % in annual average and far exceeds the similar index in countries belonging to the nowadays group of «moderate innovators». This is due to the fact that Ukraine has a much lower starting level of GDP per capita at relatively equal positions with the countries of this group in many indicators that designate «the driving force of innovation» – «creating new knowledge» [122, 124].

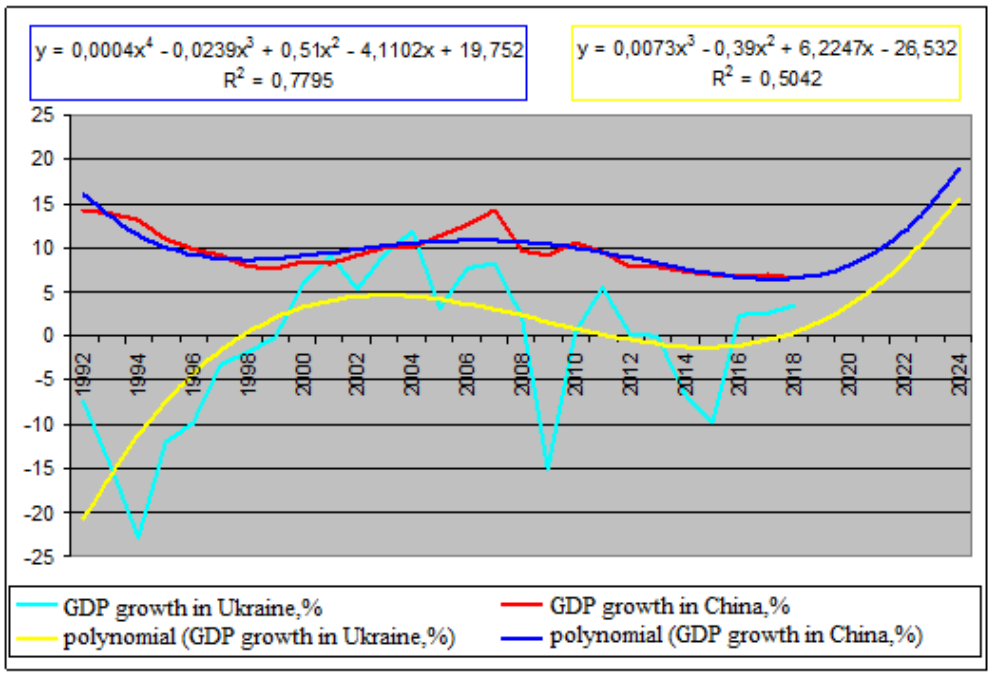

Figure 3.17 – Ukraine and China GDP growth forecast, %

Note: made by the author

Given the inertial innovation policy, Ukraine's position vis-à-vis other European countries should not be expected to improve. It will be rather visa versa, Ukraine will lose even the relatively small advantage, that are still remain. As a result, the country may be the end of the list of countries CC and are evaluated with EIS tools.

For comparison, let's look at the main trends of SME development in China. G and the bottom of the article EURObiz, today in China there are three major trends of SMEs development [127]:

1. China's industrial sector is trying to lift the value chain and strengthen production. They are still looking for new opportunities for automation and improving their supply chains for them to be more effective. Especially industrial robotics, machine tools, transport equipment, as well as agricultural machinery give a great chance for successful investment in it.

2. The second trend is growing domestic consumption. With middle class increasing in China by its demand for European products is growing. Chinese consumers are particularly interested in luxury products. At this time the dimensional companies operating in China should actively use different sales channels, especially e-commerce.

3. The third trend is the increase in Chinese outward investment. Year after year, more Chinese investors are trying to invest in other countries and companies that finance the economy and continue to make contacts, although they may be most beneficial for their own business in China.

Thus, in the conducted general trends forecasting major growth economy indicators in Ukraine and China, describes the main scenarios of innovative development of Ukraine and highlighted major trends development of SMEs in China.

3.2 Ways of ensuring effective financial institutional environment and state support of small innovative active enterprises

In most developed countries, such as China, they create the most favorable conditions for their manufacturer in the form of simple and acceptable taxation, low rents, various types of economic incentives; [96, 135].

In recent years (2015–2018), the state has made certain steps aimed at stimulating the development of domestic production by attracting investment to the real sector of the economy through industrial parks [164]. But the degree of interest of the state is not very clear and the pace of creation of necessary conditions for this is too slow. As Prime Minister of Ukraine V. Groysman put it: «I would like all Ukraine to be an industrial park very much, but we need to move step by step» [165].

In the process of shaping the modern environment of innovative knowledge and technology, it is important to take advantage of world-class experience. For example, 36 technological platforms were created in the EU to accelerate economic development in order to accelerate strategic objectives in key industries on an innovative basis and the principles of mutually beneficial partnerships [164]. Platform participants were key industry and business entities, research institutes and universities, chambers of commerce, regional development agencies and technology transfer centers, which facilitated the timely exchange of information on enhancing innovation activity and improving the investment climate. In the United Kingdom, for example, the share of public spending on the construction, creation and development of technological zones is around 60 %, in Germany, France and the Netherlands about 75 % and in Belgium almost 100 %. A prime example of state incentives within the ITP is Turkey. Today in Turkey there are 56 technological areas mortars from orbit, and 13 more will soon begin to work [164, 165].

Regarding the main problems of state support for small innovation-active enterprises and ways of providing financial support to the institutional environment, it should be noted, firstly, that SMEs are not a uniform and the same environment and have at least three focus groups. Secondly, the answer to the question of the need for state support for small innovative active enterprises leads to fundamentally different conclusions and fundamentally different sets of state instruments:

- if the support for the growth of individual companies – then the toolbox is one;
- if support for job creation in SMEs with expected job cuts in large and medium-sized companies there is a different set of tools;
- If state support for maintaining the total number of micro-business entities and creating positive annual dynamics of the «created / liquidated» indicator – then the toolbox will be different. Third, it should be noted that any support from the state, or from any donor, should not distort market competition. Providing low-cost resource information for individual subjects, consulting, training or other assistance to small businesses should not lead to the fact that similar entities that provide the same services on the market conditions can not continue to compete and will be forced to withdraw from market. However, many of these companies, in turn, also

are the subjects of a logo business. With this support, the opposite is achieved.

Fourthly, it should be noted that the support for SMEs in Ukraine in order to have an effective impact on the SME sector should obviously have a scale comparable to the size of the SME sector itself and its role in Ukrainian economy. Today, there are about 15,000 medium-sized business entities in Ukraine, about 330,000 small businesses are legal entities and about 1,400,000 individual entrepreneurs [91]. However, the financing of public SME development programs is often only a few tens of millions of UAH.

The experience of the EU and other countries in the world is different: the SME support policy in the EU Horizon 2020 – has a funding amount of 80 billion euros for 7 years (2014–2020), which determines the estimated size of the program at 500 euros per year for the 1st the subject of SMEs in the EU. The allocation of tens of millions of hryvnas per year to SME support programs in Ukraine does not have any impact on the state of the SME sector and is determined by the high risk of corruption [91].

Therefore, in the current situation of significant expected job cuts in the global economy over the next twenty to thirty years in large corporations, it is the small business that will become the tool that will provide jobs for the working population. However, this challenge can only be resolved by implementing several significant changes in public policy:

1) In order for small businesses to be able to engage in small business with a secondary education (in the format, for example, of a self-employed person), state regulations must be understandable to such a person and must be enforceable without deliberate mistakes on the part of this subject. At present, state regulations in Ukraine do not comply with these principles. Virtually any government regulation today is one that cannot be enforced by a small business entity without error, and accordingly, any small business entity is at constant risk of penalties. Therefore, public policy should incorporate the principle and appropriate tools that make it difficult to regulate small businesses.

2) in order for a small business to be able to absorb the necessary number of people to be blown away by the spread of artificial intelligence – it is desirable that the business climate in the country is favorable for independent economic activity. Otherwise, people will expect from the state appropriate and long on long term care, and forecast of the total

number of people who will lose workplaces till 2050, in turn suggesting that not only waiting, but actively demand.

For comparison, let us consider the existing problems of SME financing in the Chinese economy, where much attention is paid to the development of such enterprises.

According to the Chinese Enterprise Survey System [135], more than 40 % of them had problems with under funding, although SMEs are important to the Chinese economy and now make up about 97 % of all businesses. About 66 % of recent SMEs have had problems accessing bank finance. In 2015, only 23.2 % of bank loans were made to SMEs. Access to short-term capital repayment loans is even more difficult – only 4.7 % of these loans were granted to small and medium-sized enterprises [135]. Loans from government institutions are mainly allocated to state-owned enterprises and large companies.

According to the HKUSTIEMS survey in 2016 [136], the lack of bank financing for small and medium-sized enterprises may be explained by the fact that the banking system provides credit facilities only to public enterprises and not to the private sector. It can be assumed that the main reason for the lack of financing for small and medium-sized enterprises is the insolvency of the credit market due to information asymmetry, which is that lenders often do not have complete information about the borrowers. And because they are not fully aware of the businesses and their offerings, this may lead to a lack of credit availability and incorrect credit appraisal in accordance with credit standards.

Another major reason for the lack of sufficient financing for small and medium-sized enterprises is the specificity of China's financial system. The high share of state-owned commercial banks, government control over interest rates, the underdevelopment of the capital market and the limitation of cross-border capital transactions lead to a lack of financing for SMEs. As public financial institutions are designed to promote national economic development, only a small portion of the loans can be directed to SMEs [136]. But ideological and political sensitivity plays a large role. The use of party-state resources to support non-state enterprises, from the standpoint of China's ideology, can be seen in a negative context as financing «capitalist» enterprises. Because it is difficult to obtain financial support from banking sources, most SMEs finance their activities through non-

banking sources. In the mid-1990s and 2000s, 2/3 of all SMEs relied mainly on informal finance.

In China, informal finance is not necessarily illegal. This is a «quasi-regulated» sector. Informal financing is provided by financial institutions not controlled by the Central Banking Regulatory Commission (CBRC). These financial institutions are registered as local branches of other bureaucracies. The main difference between banks and non-bank financial institutions (NBFIs) is that NBFIs are not allowed to accept deposits. According to the CBRC, only banking institutions with financial licenses allow to mobilize deposits from government deposits, and financial institutions cannot borrow interest rates more than four times the base lending rate set by the PBOC [96, 135].

Thus, despite the fact that SMEs are an important development factor for the Chinese economy and now they account for about 97 % of all businesses, they have an urgent problem with access to banking finances, since the banking system provides credit facilities only to public enterprises and not to the private sector. Especially difficult is the situation with short-term loans and borrowings, which is related to the asymmetry of information about the borrower and the tight state control of the banking system.

As for Ukraine, the problems of state control of the banking system are not in the first place; the more widespread problem is that it is the most common source of financing for SMEs in China – wide and easy access to informal finance. Ukraine has significant experience of cooperation with China, in particular the development projects of Ukrainian-Chinese industrial parks (ITPs) have been repeatedly proposed [164]. But unfortunately, the proposals of Ukraine do not attract Chinese investors yet. Ukrainian business is ready to create ITP, but the state is not ready yet [165].

In China, foreign investment should be at least 25 % in the authorized capital of joint venture companies. ITP members have tax exemptions: the first 2 years are completely exempt from income tax, the next 3 years are exempted by 50 %. And the income tax in China is 33 %. The rent in the technopark is 1/3 of the operating in the city. For example, the costs of maintaining a technopark are covered by: the city – by 75–80 %; province – by 10–15 %; the government – by 5 %; at the expense of rent – by 3–5 % (goes to the premium) [164].

Considering the example of tax breaks in other developed countries, the reduction of income tax rates for innovative enterprises, organizations performing innovative research and development activities and ITP participants is widespread in the European Union [166]. In particular, in Greece, ITP participants and design and development firms implementing projects outside the country have complete exemption from income tax. The privilege has no time limits and is subject to the following three conditions:

1) the proportion of Greek workers should exceed 4/5 of the total number of employees and 3/5 of each category of staff;

2) the existence of a special guarantee by one of the specially designated banks of Greece;

3) the annual volume of imports exceeds $ 50 thousand USA [167].

In France, this incentive for innovative businesses is a logical extension of the «tax holidays»: for the next two years, the tax is paid at half the rate.

A reduced rate of up to 25 % is applied in Luxembourg to tax the profits of new businesses and new businesses for eight years, with the rate being determined by the volume of investment in fixed assets [166].

Also, the complete exemption from taxation of research profits enterprises and participants of ITP without limitation of the validity of this privilege applies in Turkey, but it is a prerequisite that research should be the exclusive activity of such subjects of innovation process [166,167].

Successful innovation requires a sound financial base, which in a market environment should be formed not only through direct financing methods but also through the use of indirect leverage, such as taxes. In Ukraine, tax incentives for innovation throughout the years of independence were not effective enough and therefore did not produce the expected results [166].

The imperfection and contradiction of national legislation is one of the negative factors influencing the innovation activity [168]. There are many legal acts in Ukraine that make up the institutional base for the development of innovative activity, but they do not fully fulfill their main purpose – to stimulate and support the development of innovative activity. The imperfection of the legal framework is exacerbated by the practice of «suspension» of certain articles of the laws in force concerning scientific, scientific and technical, and innovative activity, legislative or by-law acts. Thus, the Law of Ukraine «On Innovative Activity» provided for the

stimulation of innovative activity through the establishment of tax benefits. However, its relevant articles were suspended for the first time in 2003 and then in 2004 [168].

Although the current tax theory has formed a generally negative attitude to tax benefits, which is one of the tax regulation instruments types, experience of developing tax systems of European states shows: against the general decrease background in the number of tax benefits, tax incentives for investment and innovation, along with social benefits not only retain their position, but also become one of the most important and common tax regulation tools. Unlike economically developed countries, tax incentives for innovative activity are practically not used in Ukraine, with the exception of special tax regimes under the ITP [169].

For the effective and rapid application of the ITP tool in the development of innovative activities, the state needs to exempt at a legislative level the ITP from the land tax, the infrastructure charge and from the mandatory sale of foreign currency funds received from the sale of products. Finally, the government should actively encourage the development of ITPs with capital investment, as is the case in developed countries. Such signals are expected by businessmen, industrialists, scientists, inventors and «troublemakers» – R&D managers [164, 165].

Economic development, comfortable and safe life in the country depends directly on the introduction of innovative technologies in the country economy, the opportunity to realize at home for many talented and active professionals. The progressive world today successfully combines scientific potential with industrial capabilities.

Experts emphasize [164] that the new approaches of the state to the management of innovative activity should provide for changing requirements to the restrictions formation, which should not artificially impede the scientists' initiative, inventors and entrepreneurs in the right to commercialize and bring to market new competitive products.

To create an institutional environment that integrates components of the national innovation system, experts advise to create effective network-based production systems of innovative orientation. And for the effective implementation of the innovation cycle from idea generation to economic impact, it is important to set up innovation cluster activities. They form the basis for intensifying the processes of idea generation, information sharing

and expanding the use of best practices that reduce transaction costs and reduce time spent on decision making.

The practice of creating cluster networks in China demonstrates better financial support for innovation activities, the formation of modern infrastructure in this field, and an increase in the level of investment attractiveness [96, 164]. Therefore, in order to attract investment to Ukraine, experts urge as soon as possible to demonopolize the economy, to form, as in China, the appropriate infrastructure – techno-industrial parks, business incubators, to establish transparent effective links between specialists and cash flows for the implementation of innovative decisions.

It is also important to step up work to bring together the disparate efforts of individual potential participants in the innovation process at the regional level. This involves defining the priorities for the development of the region, structuring the business environment through the formation of technological platforms and the development of network innovation structures, in particular, clusters within which significant improvement of the science and production interaction can be achieved.

If we analyze the legal field of Ukraine as a whole, according to the Law of Ukraine «On Development and State Support of Small and Medium-Sized Entrepreneurship in Ukraine» of 22.03.2012 [141], financial support of small and medium-sized businesses (SMEs) from the state is provided by local and the state budgets for partial compensation of interest rates, leasing and factoring payments, providing guarantees and sureties for loans, granting loans for starting a business, providing loans for the introduction of new technologies, etc. Financial support is provided through the Ukrainian Entrepreneurship Support Fund (UFPP) and regional funds, but the size and number of supported enterprises provided financial assistance cannot have an impact on SME access to credit [155, 156].

Several financial institutions are actively involved in providing financial assistance and lending to innovative enterprises in Ukraine, including the World Bank, such as the European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC). In addition, they are actively involved in providing loans to existing enterprises of Ukraine Northern Environmental Finance Corporation (NEFCO), which is active in the implementation of energy and environmental projects.

International Finance Corporation (IFC) also provides loans to Ukrainian enterprises. Yes, an important aspect in this regard is the crediting of exporting enterprises through the Global Trade Finance Program. In total, within the framework of the program, IFC provided Ukrainian banks with guarantees of trade financing of about $ 160 million. At that, banks participating in this program are such institutions as Ukreximbank, OTR Bank and Raiffeisen Bank Aval [151, 155].

Ukrainian SMEs – SMEs can obtain financing in the form of loans for one to three years at 8–12 % per annum. As a rule, in trade financing, the bank pays attention to the structure of the agreement, the pledge on which the purchased goods are most often.

The determining factor for risk assessment is the borrower's external economic experience and the reliability of its counterparties. The size of the limit is set by the credit committee of the bank and can vary within about 30 % of the amount of the client's annual revenue.

In 2014, IFC granted Credit Europe Bank a $ 15 million loan to increase access to finance for Ukrainian companies implementing energy efficiency improvement projects. This loan product (to support bank lending in energy conservation) is also aimed at improving access to finance for small and medium-sized enterprises in Ukraine [155].

The Eco-Efficiency Program is targeted at the municipal sector and projects related to district heating or wastewater treatment. At industrial enterprises, these may be projects related to the modernization of pre-sewage treatment plants. In this case, the loan amount can range from 100 thousand to 400 thousand euros. The maximum loan repayment period is no more than 8 years [155].

In Ukraine, the program is supported by KfW (German credit organization and new recovery German state bank – KfW). The program helps the district of production, improve the quality and range of production, increased productivity and job creation. It aims at lending to business entities, legal entities and individual entrepreneurs and implemented to targeting lending of logo and medium-sized enterprises (SMEs). In this case, the loans are given to enterprises of manufacturing industry, agriculture, services and trade. Restrictions on the proceeds of the sale of the enterprises are not provided, but also need to provide positive credit history. Credit may be awarded in the amount of $ 25 thousand till $ 500 thousand. Foreign or non-national currency in the form of a non-

revolving credit line for up to 5 years. The amount of own contribution to the project initiator should be not less than 20 % of the project cost, and the main condition for acceptance as collateral property is its liquidity. When requesting a loan review for this program and my presence is a mandatory business plan or feasibility study, which will be funded financially. Participating banks The KfW program of Ukrainian banks is «Ukreximbank», which opened a special credit line for the purpose of hoping to finance Ukrainian enterprises. A special feature of this program is that it is forbidden to finance projects with high environmental risk and production related to environmental non-safety.

In 2016, the Public Joint Stock Company (PJSC) «Kredobank» continued lending to Ukrainian small and medium-sized enterprises. Thus, in January-September, «Kredobank» extended loans totaling over UAH 281 million for this segment, which is almost in line with the same period of 2015. To date, «Kredobank» remains one of the few Ukrainian banks to continue lending to small and medium-sized businesses. In 2016, the most popular were loans to replenish working capital – overdrafts and credit lines, which make up the vast majority of loans. «Kredobank» was able to continue lending to small and medium-sized enterprises thanks to a prudent credit policy, individual approach to each client, speed of decision making and loyal conditions – in particular, loans for working capital replenishment can be obtained at a rate of 17.5 % per annum,»- says the director Department of Small and Medium Business Clients of PJSC «Kredobank» Irina Gruy. The strong resource support of the strategic investor – the largest bank of Poland, «PKO Bank Polski SA», contributes to maintaining the activity of the bank in lending. Working with small and medium-sized businesses is one of «Kredobank's» strategic priorities. Today the bank offers a full range of credit products for small and medium-sized enterprises. For the period from 2013 to 2016, the total amount of loans granted by the bank in this segment exceeded UAH 1 billion [157].

The use of international currency loans by Ukraine small and medium-sized enterprises is one of the most attractive instruments of the financial market of Ukraine, which helps to overcome the financing gap, the overall improvement of the economic entities financial condition and increase the level of economic security of the state as a whole. The role of international financial institutions, foundations and banks in Ukraine is increasing today. Due to the infusion of financial resources of such structures as the EBRD,

IFC, NEFCO, KfW, support is provided to various industries and sectors of the economy of Ukraine and small and medium-sized enterprises in particular.

Since the beginning of 2018, the credit portfolio of micro, small and medium-sized business of «Oschadbank» JSC has grown by more than UAH 1 billion, which now amounts to over UAH 3.6 billion. [137]. «Oschadbank»emphasizes that an increase in SME lending has been achieved thanks to the launch of the «Build Your Own program» at the end of 2017 [137]. And these are the expected indicators. They confirm the timeliness and efficiency of «Oschadbank» active work with the SME segment, since the growth of the SME loan portfolio of SME clients was half the year before the program was launched.

In addition to providing energy-efficient ACMB loans and a standard line of credit, the Bank also offers a special micro-credit program that allows legal entities and individual entrepreneurs to obtain financing with a more loyal approach to business valuation and collateral requirements. This is a simple loan of up to UAH 5 million with quick decision and a simplified package of documents. The program has already been launched in 12 regions: Vinnytsia, Dnipropetrovsk, Zhytomyr, Zaporizhia, Kiev, Lviv, Odesa, Poltava, Sumy, Kharkiv, Chernihiv and Chernivtsi. It is planned to be implemented throughout Ukraine by the end of the year. In addition, the conditions for obtaining overdraft were adapted specifically for the clients of the micro and small business segment. As a result, the number of such overdraft customer requests in 2018 has tripled compared to the same period of 2017. By the end of this year, Oschadbank plans to reach over 50 % of active clients of this segment in overdraft shelves [137].

Cooperation with agribusinesses is a priority for Oschadbank. The financial institution offers both farms and large agribusinesses a complete line of credit products with attractive conditions. These are loans for working capital replenishment, for the purchase of transport, equipment, for their repair and reconstruction. Programs with the German-Ukrainian Fund and the European Investment Bank for EUR 220 million are also in operation. These programs, in particular, help to reduce the cost of loans to agricultural companies from 16.9 % to 12 %. A business support program, jointly with the EBRD, also provides trade finance support.

Creating an enabling environment for business and SME development is one of the medium-term reform areas identified in the Ukraine 2020 Sustainable Development Strategy [140]. The main plan of measures for

implementation of which is presented in Appendix C, tab. C. State financial support to SMEs is provided through state and local budgets.

The main normative legal document in this area is the Law of Ukraine «On Development and State Support of Small and Medium-Sized Entrepreneurship» dated 22.03.2012 № 4618-VI. [141]. Part 1 of Art. 15 of this Law stipulates that state support for small and medium-sized enterprises includes financial, information, advisory support, including support in the field of innovation, science, industrial production, support for small and medium-sized enterprises engaged in export activities, support in the field of training, retraining and advanced training of management and business personnel.

Also, from 02.08.2017 entered into force of the Law on State Aid to Business Entities No. 1555-VII of July 1, 2014 [142], which establishes the legal bases for conducting monitoring of state aid to economic entities, exercising control over admissibility such competition aid, aimed at ensuring the protection and development of competition, enhancing the transparency of the functioning of the State aid system.

It is interesting to monitor The State Aid Portal [143], developed by the Antimonopoly Committee of Ukraine with the support of the EU International Technical Assistance project to collect information on current and new state aid containing a state aid register, decision register, register affairs, etc.

To support small and medium business at the state groove in either, it is based in following: [138]

1. provision of financial products and assistance programs to SMEs by state-owned banks (JSC «Oschadbank», JSC «Ukreximbank», JSB «Ukrgasbank»);

2. involvement of the unemployed in the organization of entrepreneurial activity, which is one of the active forms of support for the unemployed, provided by the State Employment Service in the absence of suitable work in the labor market;

3. support for agriculture by the Ministry of Agrarian Policy (for example, the budget program of the CPCWK 2801580 «Financial support to agricultural producers» – 945 million UAH) [139].

Economic Development, pursuant to paragraph 1 of the Regulation «On the Ministry with TVO Economic Development and Trade of Ukraine», approved by the Cabinet of 20.08, 2014. Number 459 is the main body in the central organs of the executive power.

According to paragraph 1 of the Regulation on the Ministry of Economic Development and Trade of Ukraine, approved by the Cabinet of Ministers of Ukraine of August 20, 2014 No. 459, the Ministry of Economic Development is the main body in the system of central bodies of executive power, which ensures the formation and implementation of business policy. However, analyzing the passports of the Ministry's budget programs for 2018, no programs were identified that seek to provide state aid / support to the development of the SME itself, but only a budget program concerning, for example, the development of competition for SMEs (CCPPC 1201440 of the program «Promotion of Mutual Trade by Removing Technical Barriers to Trade between Ukraine and the European Union» – UAH 1.0 million in 2018) [139].

It should also be noted that, in accordance with the current legislation, financial state support for small business entities at the state level is implemented within the national budget program «Microcredit of small business entities», the main manager and responsible executor of which is the State Regulatory Service of Ukraine (respectively to the resolution of the Cabinet of Ministers of Ukraine «On approval of the Procedure of using the funds provided in the state budget for micro-crediting of small business entities» of 27.07.2011. Number 794 [144]).

However, having analyzed Appendix 3 to the Law on the State Budget of Ukraine for 2018, in the distribution of expenditures it can be seen that this budget program is absent, which logically leads to the conclusion that such state financial support is not provided in practice to SMEs or is insufficient in its volume. However, Appendix 9 to the same Law provides a list of credits (loans) that the state is involved in the special fund of the State Budget of Ukraine for 2018, among which there are investment projects related to SMEs, Table. 3.1 [138, 139].

As mentioned above, today the state budget of Ukraine for support and development of SMEs allocated insufficient financial district is resources. However, there is also a positive experience of supporting SMEs at the regional level – at the expense of the regional budget, rayon budgets and budgets from this self-government, in accordance with the business development programs. Thus, in Appendix 3 and weave 3 to the appropriate budget allocation on expenditure line contains code TPKVKMB 7610 «Support for small and medium enterprising».

Table 3.1 – Investment projects supported by SMEs

Name of the lender and the investment project implemented at the expense of the credit (loan)	The name of the currency in which the loan is borrowed	Total loan amount (loans) (thousand units)	Expenditures programmatic classification code and crediting of the state budget	Name according to the program classification of expenditures and crediting of the state budget	Volume of borrowing (loan) in 2018 (thousand UAH)
Lender – European Investment Bank:					
Basic Credit for Small and Medium-Sized Enterprises and Mid-cap Companies Project	*Euro*	*400 000*	3511620	Financing of development projects at the expense of funds raised by the state	658 000.0
Lender – Credit institution to rebuild:					
Small and Medium Enterprises Support Project	*Euro*	*10 000*	3511620	Financing of development projects at the expense of funds raised by the state	72 000.0

Note: Processed by the author based on the source [139].

An example of state support for SME development at the expense of the local budget is Kyiv, in particular the Regulation on financial and credit support for SMEs in Kyiv (Decision of the Kyiv City Council dated 21.09.2017 No. 46/3053) implemented by the Kyiv City by the state administration and the German-Ukrainian Fund [145, 146].

The program of financial and credit support of SMEs in Kyiv is aimed at preventing specialization of SMEs mainly in trade and intermediary activities. Funding will be given to the city for industry, educational infrastructure, using modern innovative education tools, such as cloud technologies and providing services in housing and utilities, using innovative electronic documents and accounting tools and various start-ups in these fields. Kyiv city government allocated UAH 10 million for financial and credit support in 2018. These funds will offset 50 % of the nominal interest rate set by the loan agreement for Kyiv entrepreneurs. Thus, for the final borrower, the interest rate will be the lowest in Ukraine – about 7.5 %.

Borrowers may be economic entities resident in Ukraine, registered in the city of Kyiv, whose production facilities are located in the territory of the city of Kyiv, and which are subject to the definition of small or

medium-sized enterprises in accordance with the provisions of the Economic Code of Ukraine. The amount of the national currency loan may not exceed an amount equivalent to EUR 250.000. The maximum period of financial support may not exceed 2 years.

However, support for SMEs is coordinated regional funds and we support businesses established within Ukrainian business support fund- a structure that for public funds implemented with and the Government, measures and programs aimed at providing SMEs the opportunity to receive education, consulting, warranty, and in particular, preferential credit and cash back.

Financing of innovative start-up projects on a turn-key basis, with preferential lending – 28.4 %, occupies a leading position in the structure of financing of program activities of regions of Ukraine and the city of Kyiv. 3.2 % of the total approved volume was earmarked for educational and methodological work with the use of e-democracy tools, 12.4 % for the creation of new innovative objects of infrastructure using clean technologies, support of innovative entrepreneurship and replenishment of authorized and circulating funds of already existing objects – 6.6 %, compensation of interest on bank loans – 0.8 %, other measures – 48.6 % [147].

At the same time, European practices for stimulating technological growth focus on the implementation of the European Technology Platforms (ETP) tool, which envisages equal cooperation between the state, large, medium and small businesses (SMEs) as one of the most important missions, driven by capacity-building initiatives. Europe through innovation [148], as the broad participation of SMEs in social production contributes to the creation of a healthy competitive environment and the motivation for wider innovation and diversification Uzziah achievements of NTP. That is why ETPs have been at the forefront of implementation of all European Framework Programs for Research and Innovation [146]. Their role in Horizon 2020 [41] has been strengthened, and is seen as a key platform for dialogue between the state and the private sector, as it focuses on financing innovative businesses, especially SMEs. ETPs combine technology know-how, manufacturers, regulators and financial institutions, non-governmental organizations, social platforms and consumers, community groups, etc. to develop strategic behaviors to implement leading technologies to meet broader needs and promote socially

acceptable solution. The ETP has also been given a significant place in the external consultations and public participation necessary to implement Horizon 2020 [41].

Particular emphasis on SME participation in the ETP is because in the EU small and medium-sized enterprises (SMEs) form the backbone of the economy: according to the European Commission, in 2015, 22.3 million small enterprises (SMEs) or 99.8 operated in the EU non-financial sector. % of the total employing 66.9 % of all employed and receiving 57.8 % of all EU added value [149]. Therefore, many programs (which mostly have a platform architecture) are being developed in the EU to support and develop SMEs, in particular as a basis for innovation and technological development. For example, the COSME (Competitiveness of Small and Medium-sized Enterprises) program [150] established in EU Regulation 1287/2013 for 2014–2020 provides for funding of € 2.3 billion. COSME measures are aimed at optimizing synergy with other programs as «Horizon 2020», Partnership Instrument and European Structural and Investment Fund programs. COSME aims to strengthen the competitiveness and sustainability of EU entrepreneurship and to foster a culture of entrepreneurial activity and facilitate the creation and development of SMEs through:

a) improving access to finance for SMEs in the form of stockholding and debt guarantees;

b) improving access to markets, particularly within the EU and at global level;

c) improve the framework conditions for competitiveness and sustainable EU enterprises' development, particularly SMEs, including in the tourism sector;

d) to promote entrepreneurship and a formation of enterprise culture activity.

Improving access to finance for SMEs is planned to be implemented within COSME by € 167.3 million through the implementation of a € 116.2 million loan guarantee scheme, a fund-raising tool for business growth of € 49.6 million [146]. The program also contains 6 sub-programs for expanding access to markets, one aimed at facilitating SMEs' access to public procurement by co-financing the activities of intermediaries for SME participation in public procurement (especially abroad). Fifteen sub-programs are aimed at improving competitiveness by improving the

regulatory environment and facilitating the introduction of high technology, including digital and four sub-programs, which shape the culture of doing business [146].

However, the main government initiatives to promote entrepreneurship and SMEs are particularly focused on deregulation. For example, the Ministry of Economic Development and Trade of Ukraine supports the UNLIMIT UKRAINE project, initiated by the European Business Association for support in the form of educational events and consultations, meetings with mentors, information support and business contacts, free media advertising on the Internet [151].

SMEs are better supported at the regional level. For example, table. 3.2 presents statistics of the main indicators of the target program for promoting small and medium-sized enterprises of Kyiv City Council for 2015–2018 [145].

For this purpose considerable funds are envisaged, the financing structure of which, however, is not sufficiently diversified, as it would be desirable to separately allocate in the item «funds of financial institutions» such sources of financing as specialized venture funds and business angels, both domestic and international.

Table 3.2 – Indicators Kiev city council – Specific Program conjugation and small and medium business development promotion for 2015–2018 years

	Total	2015	2016	2017	2018
Total, UAH million	7.6	1.0	1.5	2.0	3.0
In % to the total					
local budget	0.1	0.0	0.0	0.1	0.1
other sources, including:	99.9	100.0	99.9	99.9	99.9
- funds of financial and credit institutions	99.1	96.0	99.4	99.5	99.7
- own funds of business entities	0.2	0.3	0.3	0.2	0.2
- funds of the Fund of Compulsory State Social Insurance of Ukraine in case of unemployment	0.5	3.4	–	–	–
- funds of international organizations	0.1	0.2	0.2	0.1	0.1

Note. Processed by the author based on the source [145]

At the same time, the state spends considerable funds on the implementation of state target programs (STP), which in 2016 provided 29 with the planned volume of financing of 79.9 billion UAH with shares in the general state budget – 55.8 %, local – 4.2 %, from other sources – 39.9 %.

Actual for innovative entrepreneurship financing indicators amounted to UAH 25.1 billion, 73.7 % of which was financed from the state budget, 5.2 % – local, 21.1 % – from other sources. At the same time, no reports on implementation were submitted for 4 STP, 6 cereals were not financed at all [152]. This indicates that STP have not become an effective tool for solving the most important problems of innovative development, and they serve as a declaration of intent. Priority principles are not adhered to, resources are dispersed, programs do not contain methods of assessing the effectiveness of their implementation, there is no opportunity for public control, unsatisfactory reporting of state customers, and no transparent reflection in the state budget of expenditures for financing state targeted programs.

In the context of the unstable economic and political situation in Ukraine, the state is trying to adequately fund scientific and technical activities: in 2014–2015, it amounted to UAH 3.9–4.0 billion. The public sector accounted for 36.1–32.0 % of the funding of scientific and technical works, and entrepreneurial, respectively, 58.4–62.7 % [153, p. 83]. Some of them go to the financing of the State Target Scientific and Technical Programs (SCSTP). And to a lesser extent, they also have certain disadvantages of STP, such as bureaucratic procedures. In 2014–2015, considerable funds were allocated for financing innovative activity in industry (UAH 7.7 and 13.8 billion), which are financed mainly from the own sources of enterprises (respectively, 85.0 and 97.2 %) [153, p. 151].

We also consider it necessary to analyze the main factors of regional SMEs in Vinnytsia region, as one of the leading regions in terms of economic development in recent years.

Given the lack of demand and the correspondingly low sales and profit margins, Vinnytsa SMEs have limited ability to make investments at their own expense. As of 2017, 79.2 % of SMEs in the region were profitable. At the same time, this figure is 5.8 pp. higher than in the whole country, and 1.6 pp higher. – higher than in 2016. Although the share of for-profit enterprises is quite large, the total profit they generate is insufficient to cover investment costs [155].

Limited access to external funding is also a significant barrier to the development of SMEs in the region. Vinnytsia region is one of the regions with a high level of banking infrastructure. As of July 1, 2018, there were

340 structural subdivisions of banks (or 2 units per 10 thousand population) operating in the region.

At the same time, according to the results of the NBU survey, SME demand for loans grew steadily throughout 2016, and this trend persisted in 2018 (Fig. 3.18).

This was more about obtaining short-term hryvnya loans. However, since the first quarter of 2018, there has been an increase in demand for long-term loans and in the second quarter of the same year – for foreign currency loans. However, despite the growing demand for credit, their availability continues to be low due to high credit rates.

Figure 3.18 – Dynamics of SME demand for bank loans and the level of banks' approval of loan applications in Vinnytsia region, quarterly

Note. Processed by the author on the source [154]

In addition, in 2017, the rate of approval of credit applications increased only in the third and fourth quarters (by 18.5 % and 7.3 % respectively), and in 2018 it increased only in the second quarter (19.9 %) after falling in the first (–11.1 %). Also, in Vinnytsia region there are limited opportunities to attract financing for the development of SMEs from the proceeds from abroad. First, in 2017, foreign direct investment continued to decline. In 2017, FDI amounted to $ 187.8 million. USA, which is 15.8 % less than in 2016. Secondly, the region accounts for only 2 % (UAH 1.9 billion) of the total volume of transfers of individuals from abroad. Per capita per capita, this amount is only UAH 1.7 thousand, which

is almost 2 times lower than the corresponding figure for Ukraine as a whole (UAH 3.2 thousand). Regarding the implementation of the SME development policy at the regional level [154], during 2016–2018 several regional development programs were in operation in the Vinnytsia region, including the «Strategy for balanced regional development of Vinnytsia region for the period up to 2020», which includes the operational objective «Creating favorable conditions for the dynamic development of small and medium-sized businesses, simplification of administrative procedures», and the« Regional Program for the Development of Small and Medium-Sized Enterprises for 2017». Vinnytsia Oblast is also one of the five pilot regions of the USAID Leadership in Economic Governance Program, which developed the Vinnytsia Oblast Small and Medium Business Development Strategy for 2020.

Specific measures that are consistent with the principles of the Small Business Act for Europe and implemented in the region (including with the assistance of regional (city) authorities in 2015–2020 are presented in Appendix D Table D.1. Appendix E the diagrams illustrate the comparison of key indicators of SME development in Vinnytsia region with those of other regions in 2016, which shows that Vinnytsia region is one of the leaders in the share of profitable SMEs – about 80 %, including innovative, related mainly with IT technology, and over 85 % of the total is busy SMEs account for about 72 % of all products sold in Vinnytsia region, including a significant percentage of innovative products.

Therefore, from all of the above it can be concluded that in order to ensure sustainable economic development, the Ukrainian state should, under the example of developed countries, create the proper conditions for accelerating innovative development, introduction of technological innovations in enterprises, enhancing the innovation activity of small and medium-sized enterprises, namely:

- is faster to improve the legislative framework regulation of investments and term activities in the sphere of innovations, improve the level of protection of property rights and to actively fight against corruption in economic actively with those;

- In order to increase the efficiency of innovative activity, it is necessary to attract considerable financial resources and intellectual resources. As the financial determinant is a major factor in revitalizing innovation, given that in the current difficult economic situation it is

difficult for the Ukrainian government to find additional financial resources, its focus should be on a thorough audit of public expenditures so that public finances has become a priority for the innovation industry.

It is still the main source of financing innovation are still the own funds of enterprises and organizations, rather than loans, grants and venture financing, etc., as in developed countries, which was analyzed in more detail in section 2.2 of this work;

- to provide budget support, primarily to those enterprises engaged in promising research in the field of innovation in Ukraine, as well as to modernize, based on the use of modern science and technology, traditional and high-tech economic sectors for Ukraine, such as space, nuclear energy, agricultural sector and others, which were defined in paragraph 3.1 of this work.

- as necessary, despite the current difficult economic and policy including well the situation in Ukraine, significant cash expenditures, which the government had to go to increase funding for the Ukrainian armed forces, to find opportunities for incentives in the tax area, which will allow businesses accumulate in to provide financial resources for innovation activities. It should be noted here that in this direction, following the example of China, certain steps in Ukraine are beginning to take place. Thus, at a government meeting on October 19, 2016, a resolution was adopted, according to which scientific institutions are exempted from paying part of their profits to the general fund of the State Budget based on the results of their financial and economic activities. The net profit (income) received as a result of financial and economic activities will remain at the disposal of scientific institutions and scientific and technological complexes, which have 50 % of the net profit from their activities to be used to finance innovations.

3.3 Development of a model of financial support for small business innovation

The mechanism of financial support of economic activity has a complex structure, which includes organizational (organization, development and implementation of innovations), economic (regulation, management, planning and implementation of innovations) and financial components that are interdependent and together allow to achieve the

desired effect. Such interdependence implies the presence of close interaction between economic entities, state authorities and local self-government bodies, whose financial, material, mineral, intellectual and informational resources are at their disposal to ensure efficient economic activity, which is impossible in the current environment without innovations.

Analyzing the existing ways of financing small business innovation, which, in our opinion, are the most common today, we will outline the most important factors that are simultaneously sources of financial support for small business innovation, in the form of a model of financial support for small business innovation (financial support for innovatively active enterprises (FSIAE) graphically in Fig. 3.19. We will describe in Fig. 3.19 factors that are at the same time sources of financial support for the innovation activity of a small business.

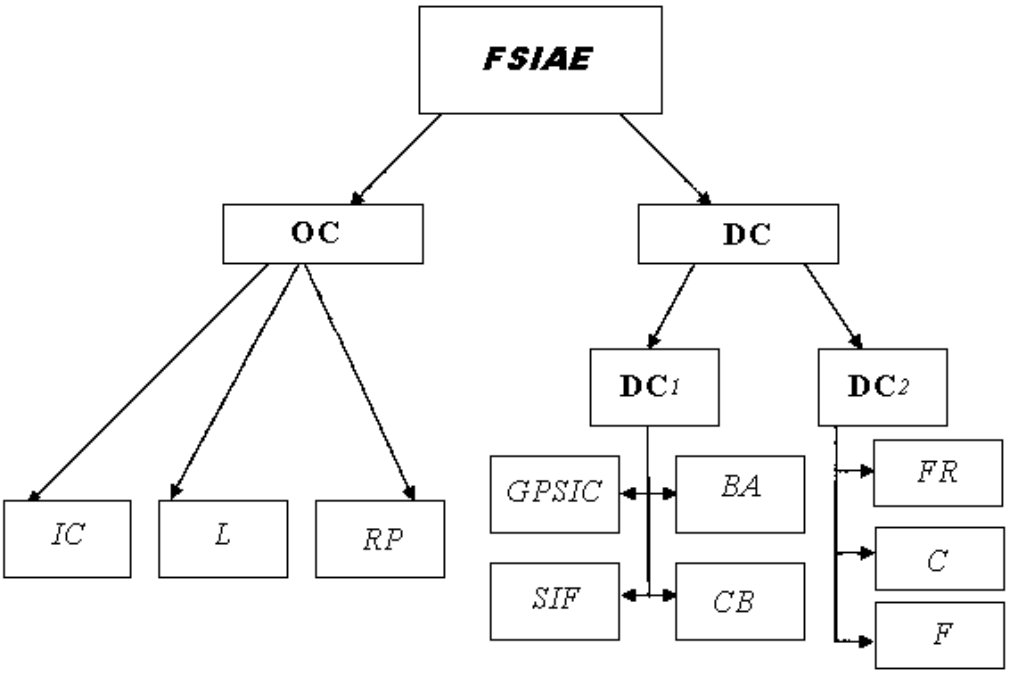

Figure 3.19 – Summarized financial security model
of innovation and disasters enterprises

Note: copyright development

Crowdfunding (C). For the development of projects, there are crowdfunding platforms, where anyone can invest any amount in development. The mechanism is simple – you publish on the site the main provisions and objectives of the start-up and declare the required amount

for the project [10, 158]. This is the same mechanism «from peace to thread», which creates great things and helps to raise money at the start. The most popular crowdfunding platforms in Europe are the following [89, 102]:

- Crowdfunding International , Netherlands: In more than 160 countries, more than 35.000 people today have the opportunity to receive grants for their business projects;

- Ulule, France, since its founding in 2010 Ulule helped raise funds for more than 4.900 creative, innovative or public pr o Active;

- Weakest, Switzerland: Switzerland's largest platform for the creative industry. In addition, Weakest also supports nonprofits by funding their projects and helping to develop their communities. Over the past two years, Weakest has helped launch 550 projects totaling 4 million Swiss francs;

- Biggggidea, Ukraine: aims to develop a strong and open society, to implement the desired systemic changes. The Biggggidea platform raises funds for projects in education, healthcare, literature, music, journalism and research;

– Na-Starte.com, Ukraine, the main objective is to develop platform cult was their initiatives and innovations in Ukraine. The largest project amount in Ukraine was raised at the platform – 3.7 m and UAH lion.

Fundraising (FR), as a term, is not yet widespread in Ukraine. In most cases, this concept is associated with philanthropy and social projects, but it is important to understand that in addition to raising resources for commercial projects, finding a financial patron or donor is also fundraising [102].

Franchise (*F*), which in this model will be expressed as two main options. When using the first option (F1), the technology and company name are transferred to a third stakeholder on a one-time basis. In the second option (F2), the technology and the name of the company are transferred to a third interested party on the terms of receiving a reward in the form of a certain percentage of future income or profit from the sale of the transferred innovative product or technology.

Partnership with Business Angels (*BA*). Today the world are approx b ko 500 000 would also demolish angels [10, 159]. A business angel is a private investor who invests his own funds in unusual and promising projects at the stage of creating a company in exchange for a share in its capital. Angels tend to invest their own money, unlike venture

capitalists, who manage a pool of other people's money in a professional fund [10, 102]. The business angel's funds fill the gap in start-up funding between friends and family [106], which provide basic funding, and formal venture capital, which is often not interested in small investments. So, for example, the US investment business angels is a common second round of financing for start-up high rate development and have almost the same size as venture capital, however, it is distributed 60 times more ($ 20.1 billion against $ 23.26 billion, in 61.900 companies against 1.012 companies) [89, 102].

For a business angel, there is no «certain» amount of investment, it can range from several thousand to several million US dollars. The Harvard report by W. R. Kerr, J. Lerner, and A. Shoar shows that start-ups with angel funding «fail» less often than companies with other sources of initial funding. Among the start-ups raised by angels are billions of airlines, biotechnology, financial, computer, energy companies, etc. Many of them are well known: Xerox, Amazon.com, Ryanair, Apple, Xynergy, Compaq, America Online, Google, E-bay, Innovative Robotics and many others [89, 161].

Supporting a variety of innovation funds (*SIFs*), both domestic and foreign, including non-government grants, venture capital funds and business incubators.

Bank loans (CB) are a necessary element of the process of functioning of a market economy, as well as almost the only quick source of solving the problem of financial support for innovation of small enterprises. The main problem that prevents the widespread use of this most accessible financial source in Ukraine is the high interest rates on loans.

Equity initial capital (*IC*) – is the financial basis for the creation and development of an enterprise of any form of ownership and legal form.

Implementation licenses innovative product (*L*), including exclusive, single, n is exceptional and, where appropriate, an open license.

Reinvestment of the share of profit (RP) received from the sale of the product. It should be noted that for newly created enterprises, this factor at the beginning of their life cycle will be zero, and in the further profitable operation of the enterprise, it will become positive;

Let's display the simplified model of financial support of innovative activity of the small enterprise mathematically in the form of function:

$$\text{FSIAE} = f(\text{OC};\text{DC}), \tag{3.1}$$

where OC is equity; DC – raised capital.

As in (3.1) using an integrated component of capital raised, then, the percentage given in equation variables can at railway time observed what impact will change each of the factors included in the DC, on the indicator of financial independence of the enterprise, and hence on its financial condition. This is important because the stability of the financial condition of pi railway enterprises' is one of the most important indicators, which solved the lending business and public agencies [10, 11].

In this model, we refer to borrowed capital only those financial resources that must be repaid with interest, without them (only the body of the loan or loan) or as a percentage of profit, and do not include crowdfunding and fundraising, as the former operates on the basis free of charge, and fundraising is proposed to be used only to attract a financial patron or donor, who also operate on a gratuitous basis.

Since the indicator «borrowed capital» is a multifactorial model of financial support for innovation of a small enterprise, it can be represented as the following:

$$DC = f(DC_1; DC_2), \tag{3.2}$$

where DC_1 – objective borrowed capital, which is provided on the terms of return after a certain period, with interest (or no interest) for its use; DC_2 – debt capital that is provided to support the project without its return in the future.

Let us show in formulas (3.3) and (3.4) the components of both options of possible external capital:

$$DC_1 = f(GPSIC; SIF; BA; CB), \tag{3.3}$$

where *GPSIC* – government programs to support innovation; *SIF* – partnership with various innovation funds; *BA* – partnership with business angels; *CB* – bank credit.

$$DC_2 = f(FR; C; F), \tag{3.4}$$

where *FR* is fundraising; C – crowdfunding; *F* – franchising.

Let's show both franchising options in the form of general formulas:

$$F = \sum_{i=1}^{n} \alpha_i F_i, \tag{3.5}$$

$$\alpha_i = 0,1, \tag{3.6}$$

$$F \in F_{1,}F_2, \tag{3.7}$$

where F – total financial resources derived from franchising; n – the number of firms that acquired the franchise; α – choice of franchising option; $F_{and\_}$ financial resources derived from each franchise option.

We combine formulas (3.5), (3.6) and (3.7) into a single generalized model of obtaining financial resources for all possible options for franchising:

$$F = \sum_{i=1}^{n} F_1^i + \sum_{j=1}^{m} F_2^j, \tag{3.8}$$

where $\sum_{i=1}^{n} F_1^i$ – inancial resources obtained from the first franchise option from all n-number of companies; $\sum_{i=1}^{n} F_2^j$ – financial resources derived from the second franchise option from the entire m-number of j-firms.

Also we will express in the form of functional dependence the indicator of own capital for providing innovative activity of small enterprise:

$$OC = f(\text{IC;L;RP}) \tag{3.9}$$

where IC is the initial capital; L – providing licenses to interested parties; RP – reinvestment of part of the profit.

Given expressions (3.2)–(3.9), dependence (3.1) takes the following final form:

$$\text{FSIAE} = f(\text{IC;L;RP;GPSIC;SIF;BA;CB;FR;C;F}). \tag{3.10}$$

Since the factors included in equation (3.10) are equivalent in their ability to be involved and in this model the multiplicative and synergistic effects are not taken into account, and the time factor in the form of a discount factor is ignored, then the model will be considered static rather than dynamic.

Since the modeling of the process of financial support of innovative activity of enterprises is most often carried out by means of deterministic, statistical, expert and combined methods, the basis of mathematical expression is shown

in Fig. 3.19 models we use the classical set of factors and their functional dependence, which is represented in general in formula (3.11) [18]:

$$X = \{x_1, x_2, ..., x_n\} \rightarrow f \in Ff = \{f_1, f_2, ..., f_n\}, \quad (3.11)$$

where X – is the set of factors influencing the financial security process; Ff – is the set of financial support for innovation.

Taking into account formula (3.11) and the model presented in Fig. 3.19 we will present it in the form of a multifactor model of optimization of financial support for innovatively active enterprises (FS_{IAE}) in the classical hierarchical structure of the purpose tree (Fig. 3.20). Mathematically presented in Fig. 3.20 model can be expressed by one-stop dependencies:

$$\mathrm{FS_{IAE}} = \mathrm{f}(\alpha, \beta, \gamma) \rightarrow \mathrm{argmax}, \quad (3.12)$$

where α is equity; β is the objective borrowed capital that is provided on a fixed-term basis, with interest (or interest) on its use; γ is a subjectively raised capital that is provided to support a project without returning it in the future.

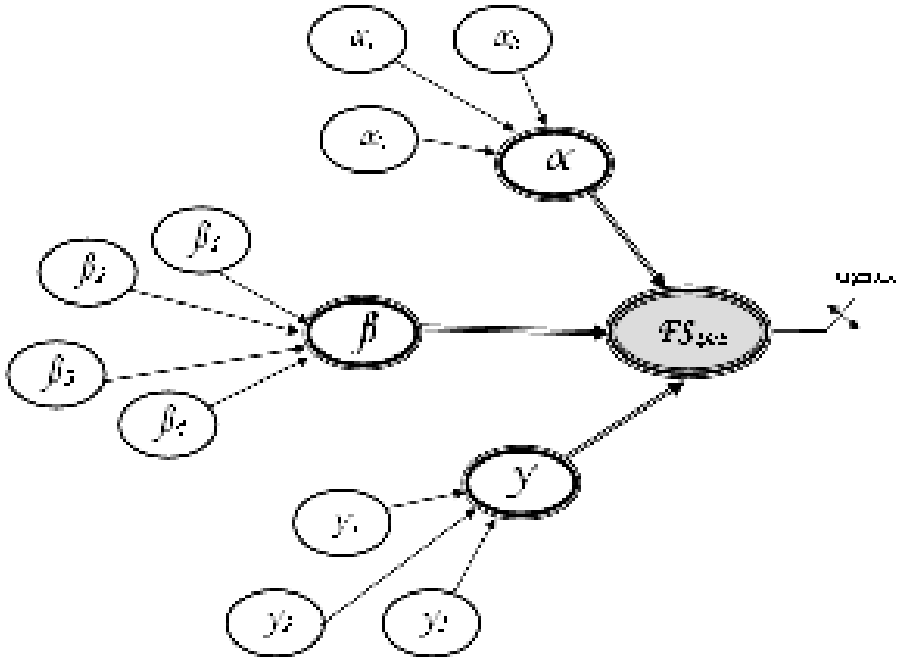

Figure 3.20. A multifactorial model of optimizing the financial support of small business innovation

Equity, in turn, is expressed by functional dependency (3.13) (the first group of factors):

$$\alpha = f(\alpha_1, \alpha_2, \alpha_3), \tag{3.13}$$

where α_1 is the initial capital; α_2 – providing licenses to interested parties, α_3 – reinvestment of part of the profit.

Objective borrowed capital, which is provided on a fixed-term repayment basis, with a percentage (or percent) of its use, is a function dependent on the four main factors of the second group:

$$\beta = f(\beta_1, \beta_2, \beta_3, \beta_4), \tag{3.14}$$

where β_1 is government innovation support programs; β_2 – partnership with various innovation funds; β_3 – partnership with business angels; β_4 – bank credit.

Finally, the subjectively involved capital provided to support the project without returning it in the future is expressed by the following dependence (third group of factors):

$$\gamma = f(\gamma_1, \gamma_2, \gamma_3), \tag{3.15}$$

where γ_1 is fundraising; γ_2 – crowdfunding; γ_3 – franchising.

To simplify the practical application, taking into account the above, let us consider as an example the linear dependence option for the developed multifactor model, where the above factors are represented as variables (x) and the financial support model for small business innovation as an integral parameter (Fs):

$$F_s = x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10}. \tag{3.16}$$

The proposed linear model has a smaller range of applications but is simpler in calculations.

Thus, the developed model of financial support of innovative activity of small enterprises is formed taking into account ten factors which are included in the relation (3.16). Since the model developed is a multivariate group dependence, we interpret formula (3.16) taking into account the hierarchy and the three groups of factors presented in Figs. 3.20:

$$F_s = x_1^1 + x_2^1 + x_3^1 + x_1^2 + x_2^2 + x_3^2 + x_4^2 + x_1^3 + x_2^3 + x_3^3. \tag{3.17}$$

In general, the developed model is mobile, and its information is consolidated starting from the lower levels, which allows it to be quickly adapted in the changing conditions of the modern market and information environment, adding both vertical and horizontal new significant factors. To simplify the practical application, given that the developed model does not take into account the multiplicative and synergistic effects, as well as ignore the time factor, we consider the model static rather than dynamic, and consider the linear dependence for the developed multifactor model. Given that the factors included in equation (3.17) are diverse in their prevalence, accessibility and efficiency, we introduce the weighting factor k and present the formula (3.18) as the following linear dependence:

$$\begin{aligned} F_s = {} & x_1^1 \cdot k_1^1 + x_2^1 \cdot k_2^1 + x_3^1 \cdot k_3^1 + x_1^2 \cdot k_1^2 + x_2^2 \cdot k_2^2 + \\ & + x_3^2 \cdot k_3^2 + x_4^2 \cdot k_4^2 + x_1^3 \cdot k_1^3 + x_2^3 \cdot k_2^3 + x_3^3 \cdot k_3^3. \end{aligned} \tag{3.18}$$

For the determination of a specific quantitative weight k, the method of active examination was used [162]. The procedure for determining the weight coefficient k is the formation of a final evaluation with a strictly increasing continuous function satisfying the condition of unanimity [109]. It is assumed that the experts report their true opinions, and if each of the experts is a little mistaken (unconsciously and depending on their qualifications), the average score is:

$$q = x = \frac{1}{n} \sum_{i=1}^{n} x_i , \tag{3.19}$$

is fairly objective and accurately evaluates the object, since in the equivalent direct mechanism, the reporting of reliable information is a Nash equilibrium for experts, and the final estimate is the same as in the original mechanism [109, 162]. To simplify the mechanism of evaluation of experts and aggregation of their results by the formula (3.19), we use the following method of selection of experts, developed by the authors. Let E_i be a tuple of the characteristics of an i-expert:

$$E_i = \langle V_i, B_i, P_i \rangle , \tag{3.20}$$

where V_i is the experience of the expert (number of years worked in the required off-site); B_i is the probability of a correct conclusion; P_i is a field of expertise.

Then the requirements for the selection of experts will be as follows:

$$\bigcup_{i=1}^{n} P_i = P_{tot.}, \tag{3.21}$$

$$\forall i : P_i \le P_{tot.}, \tag{3.22}$$

where $P_{tot.}$ – the general field of expertise (the whole set of expert questions).

$$\forall i: B_{\text{i}} \le B_c, \tag{3.23}$$

where B_c is the critical value of probability.

$$\forall i: V_{\text{i}} \le V_c, \tag{3.24}$$

where V_c is the critical value of the experience.

When processing the calculation of consistency, if necessary, when the opinions of experts are not consistent, the results of those experts for whom the following requirement is fulfilled are rejected:

$$V_j = \min_i \{V_i\}_{i=1}^{n} . \tag{3.25}$$

If two experts have the same V_i value, then an expert with a larger V_i value remains. If these values are the same, then an expert with a larger P_i value remains. Using the above expert selection method and active examination method, an expert survey was conducted to determine *q (π (s)),* the results of which are presented in Table 3.3.

Table 3.3 – Expert assessment of the weight of factors for Ukraine

Expert	**Indicators**										**Total weight, %**
	x_1^1	x_2^1	x_3^1	x_1^2	x_2^2	x_3^2	x_4^2	x_1^3	x_2^3	x_3^3	
1	58	5	8	1	2.5	1.5	9	5	3	7.0	100.0
2	58	6	7	1.1	2.5	1	8	5	3.5	7.9	100.0
3	57	4	9	1	3	2	9	5	3	7.0	100.0
4	56	5	8	1	2.5	1.8	11	4	3.5	7.2	100.0
5	58	5	7	1.1	3.5	1.3	11	4	3	6.1	100.0
6	57	5	8	1	2.5	1.3	9	5	3	8.2	100.0
7	60	4	7	0.8	3.5	1.3	8	4.2	3.5	7.7	100.0
8	59	6	8	1	3	1.5	9	4	2.5	6.0	100.0

Continuation of the table 3.3

Expert	Indicators										Total weight. %
	x_1^1	x_2^1	x_3^1	x_1^2	x_2^2	x_3^2	x_4^2	x_1^3	x_2^3	x_3^3	
9	58	6	9	1	2.5	1.3	8	5	3	6.2	100.0
10	57	5	9	1	3.5	1.8	9	4	2.5	7.2	100.0
11	59	4	8	1.1	3.5	1.5	8	5	3	6.9	100.0
12	58	5	9	1	3	1.3	9	4	3	6.9	100.0
13	57	4	8	1	3.5	1.5	9	5	3.5	7.5	100.0
14	58	5	8	1	2.5	1.3	10	4.3	3	6.9	100.0
15	58	5	8	0.8	3	1.8	8	5	3	7.4	100.0
16	57	4	9	1	3	1.5	10	5	2.5	7.0	100.0
17	60	5	8	1	3	1.8	9	4	2.7	5.5	100.0
18	56	5	9	1.1	3	1.5	10	5	3	6.4	100.0
19	58	6	7	1	3.5	1.5	9	4	3	7.0	100.0
20	60	5	7	1	3	1.5	8	4	3	7.5	100.0
21	59	6	7	1	3	1.5	8	4	3	7.5	100.0
average value	**58.000**	**5.000**	**8.000**	**1.000**	**3.000**	**1.500**	**9.000**	**4.500**	**3.000**	**7.000**	***100.0***

Note: Prepared by the author based on a study using Excel.

To verify the correctness of expert data, the calculation of the coefficient of concordance (Table 3.4) was performed according to formulas (3.26) and (3.27).

Table 3.4 – Ranking of peer review results

factor	*rank*												
	1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***
x_1^1	1	1	1	1	1	1	1	1	1	1	1	1	1
x_2^1	5	5	4	5	5	5	5	4	5	4	4	4	5
x_3^1	3	4	2	3	3	4	3	3	3	2	2	2	3
x_1^2	9	9	8	10	10	9	9	9	10	9	9	8	9
x_2^2	7	8	6	8	7	7	7	6	8	6	6	6	7
x_3^2	8	10	7	9	9	8	8	8	9	8	8	7	8
x_4^2	2	2	2	2	2	2	2	2	3	2	2	2	2
x_1^3	5	6	5	6	6	5	6	5	6	5	5	5	6
x_2^3	6	7	6	7	8	6	7	7	7	7	7	6	7
x_3^3	4	3	3	4	4	3	4	4	4	3	3	3	4

Continuation of the table 3.4

Factor	*Rank*								**Total rank**	Δ	Δ^2
	14	***15***	***16***	***17***	***18***	***19***	***20***	***21***			
x_1^1	1	1	1	1	1	1	1	1	21	–94.5	8930.25
x_2^1	5	4	5	5	5	5	5	5	99	–16.5	272.25
x_3^1	3	2	3	3	3	3	4	4	62	–53.5	2862.25
x_1^2	10	7	10	10	8	10	9	9	191	75.5	5700.25
x_2^2	8	5	8	7	6	7	7	7	144	28.5	812.25
x_3^2	9	6	9	9	7	9	8	8	172	56.5	3192.25
x_4^2	2	2	2	2	2	2	2	2	43	–72.5	5256.25
x_1^3	6	4	6	6	5	6	6	6	116	0.5	0.25
x_2^3	7	5	7	8	6	8	7	7	143	27.5	756.25
x_3^3	4	3	4	4	4	4	3	3	75	–40.5	1640.25
										$\sum \Delta^2$ =29422.5	

Note: Prepared by the author based on a study using Excel.

Average rank:

$$\overline{\sum p} = n \times (m+1)/2, \tag{3.26}$$

where n is the number of experts; m is the number of possible estimation options.

$$\overline{\sum p} = 21 \times (10+1)/2 = 115.5 \,.$$

Concordance ratio:

$$w = \frac{12\sum \Delta^2}{n^2(m^3 - m)}, \tag{3.27}$$

where Δ is the deviation from the average sum of ranks.

$$w^{UA} = \frac{12 \times 29422.5}{21^2 \times (10^3 - 10)} = \frac{353070}{441 \times (1000 - 10)} = \frac{353070}{436590} = 0.8.$$

The results obtained suggest that the consistency of the experts' opinions is satisfactory, since the obtained indicator is more than 0.35 [163], and therefore the results of the expert study are correct.

Since peer reviews have been conducted for mutually influential factors, it is necessary to check the accuracy of expert calculations for the maximum permissible total error for each level of interrelated factors. Using the obtained values of the coefficients of q, we will check their calculated values against the limits of the recommended statistical error for economic indicators, which is ± 20 % [163]. According to formulas (3.28) – (3.30) [163] and the initial data of Table 3.3 calculate the real error on the coefficient, and the results of calculations for all second-order factors in table 3.5.

$$\sigma = \sqrt{\sigma^2}\,, \tag{3.28}$$

$$\sigma^2 = \frac{\sum_{i=1}^{N}(X_i - \overline{X})^2}{N}, \tag{3.29}$$

$$\overline{X} = \frac{\sum_{i=1}^{N} X_i}{N}, \tag{3.30}$$

where $\overline{X}$ – the average value of the indicator; X_i – the value of the indicator; N – is the number of indicators.

$$\sum_{i=1}^{N} X_n = 58+58+57+56+58+57+60+59+58+57+59+58+57+$$
$$+58+58+57+60+56+58+60+59 = 1218$$

$$\overline{X} = \frac{1218}{21} = 58 \qquad (X_1 - \overline{X})^2 = (58-58)^2 = 0$$

$$\sigma^2 = \frac{(58-58)^2+(58-58)^2+(57-58)^2+(56-58)^2+(58-58)^2+(57-58)^2}{21} +$$
$$+\frac{(60-58)^2+(59-58)^2+(58-58)^2+(57-58)^2+(59-58)^2+(58-58)^2}{21} +$$
$$+\frac{(57-58)^2+(58-58)^2+(58-58)^2+(57-58)^2+(60-58)^2+(56-58)^2}{21} +$$
$$+\frac{(58-58)^2+(60-58)^2+(59-58)^2}{21} = 1.333;$$

$$\sigma = \sqrt{1.333} = 1.155;$$

$$\sigma\% = \frac{2.256 \times 100\ \%}{58} \approx 1.99\ \%.$$

Table 3.5 – Calculation of error for factors

formula	x_1^1	x_2^1	x_3^1	x_1^2	x_2^2
$(X_n - \overline{X})^2$	1218	105	168	21	63
$\overline{X}$	58.000	5.000	8.000	1.000	3.000
$(X_n - \overline{X})^2$	0.000	0.000	0.000	0.000	0.250
	0.000	1.000	1.000	0.010	0.250
	1.000	1.000	1.000	0.000	0.000
	4.000	0.000	0.000	0.000	0.250
	0.000	0.000	1.000	0.010	0.250
	1.000	0.000	0.000	0.000	0.250
	4.000	1.000	1.000	0.040	0.250
	1.000	1.000	0.000	0.000	0.000
	0.000	1.000	1.000	0.000	0.250
	1.000	0.000	1.000	0.000	0.250
	1.000	1.000	0.000	0.010	0.250
	0.000	0.000	1.000	0.000	0.000
	1.000	1.000	0.000	0.000	0.250
	0.000	0.000	0.000	0.000	0.250
	0.000	0.000	0.000	0.040	0.000
	1.000	1.000	1.000	0.000	0.000
	4.000	0.000	0.000	0.000	0.000
	4.000	0.000	1.000	0.010	0.000
	0.000	1.000	1.000	0.000	0.250
	4.000	0.000	1.000	0.000	0.000
	1.000	1.000	1.000	0.000	0.000
σ^2	1.333	0.476	0.571	0.006	0.143
σ	1.155	0.690	0.756	0.076	0.378
σ %	1.99	13.80	9.45	7.56	12.60

Note: Prepared by the author based on calculations using Excel.

Continuation of the table. 3.5

formula	x_3^2	x_4^2	x_1^3	x_2^3	x_3^3
$(X_n - \overline{X})^2$	31.5	189	94.5	63	147
$\overline{X}$	1.500	9.000	4.500	3.000	7.000
$(X_n - \overline{X})^2$	0.000	0.000	0.250	0.000	0.000
	0.250	1.000	0.250	0.250	0.810
	0.250	0.000	0.250	0.000	0.000
	0.090	4.000	0.250	0.250	0.040
	0.040	4.000	0.250	0.000	0.810
	0.040	0.000	0.250	0.000	1.440
	0.040	1.000	0.090	0.250	0.490
	0.000	0.000	0.250	0.250	1.000
	0.040	1.000	0.250	0.000	0.640
	0.090	0.000	0.250	0.250	0.040
	0.000	1.000	0.250	0.000	0.010
	0.040	0.000	0.250	0.040	0.010
	0.000	0.000	0.250	0.250	0.250
	0.040	1.000	0.040	0.000	0.010
	0.090	1.000	0.250	0.000	0.160
	0.000	1.000	0.250	0.250	0.000
	0.090	0.000	0.250	0.090	2.250
	0.000	1.000	0.250	0.000	0.360
	0.000	0.000	0.250	0.000	0.000
	0.000	1.000	0.250	0.000	0.250
	0.000	1.000	0.250	0.000	0.250
σ^2	0.052	0.857	0.232	0.090	0.420
σ	0.229	0.926	0.482	0.299	0.648
σ %	15.26	10.29	10.71	9.97	9.26

Note: Prepared by the author based on calculations using Excel

When exaggerated errors of the recommended limits, the experts' answers were corrected and the coefficients of consistency and error were recalculated until the error, which did not go beyond the recommended ones, was obtained. According to the results of the calculations presented in table. 3.6 the error does not go beyond the recommended limits, and therefore the results of the study can be considered reliable and correct.

Similar studies were conducted for China, the results of which are presented in Table 3.6 and 3.7.

Table 3.6 – Expertise of the weighting of factors for China

Experts	factors										Total weight, %
	x_1^1	x_2^1	x_3^1	x_1^2	x_2^2	x_3^2	x_4^2	x_1^3	x_2^3	x_3^3	
agreed value of the indicator k_j^i	5.00	9.00	5.00	23.00	19.00	18.00	4.00	6.00	5.00	6.00	*100.0*

Note: Prepared by the author based on a study using Excel.

Table 3.7 – Results of error calculation for China

factors	x_1^1	x_2^1	x_3^1	x_1^2	x_2^2	x_3^2	x_4^2	x_1^3	x_2^3	x_3^3
$\overline{X}$	5.000	9.000	5.000	23.000	19.000	18.000	4.000	6.000	5.000	6.000
σ^2	0.076	0.444	0.104	0.648	0.764	0.353	0.157	0.181	0.172	0.397
σ %	5.5	7.4	6.45	3.5	4.6	3.3	9.9	7.1	8.3	10.5

Note: Prepared by the author based on a study using Excel.

Calculation of the coefficient of concordance (China):

$$w^{CH} = \frac{12 \times 37096.5}{23^2 \times (10^3 - 10)} = \frac{445158}{523710} = 0.85 .$$

Substituting the obtained equations of all factors, both first and second order (for franchising) and calculated by experts values of k in the formula (3.18), we get the current model for financial support of small business innovation activity (3.31):

$$F_s = x_1^1 \cdot 0.58 + x_2^1 \cdot 0.05 + x_3^1 \cdot 0.08 + x_1^2 \cdot 0.01 + x_2^2 \cdot 0.03 + x_3^2 \cdot 0.015 + \\ + x_4^2 \cdot 0.09 + x_1^3 \cdot 0.045 + x_2^3 \cdot 0.03 + 0.07(x_3^{3.1} \cdot 0.6 + x_3^{3.2} \cdot 0.4) . \quad (3.31)$$

It should be noted that the values of the second order and for the franchise factor (formula (3.8)) calculated by the experts have the following corresponding average values: 0.6 and 0.4 for Ukraine; 0.2 and 0.8 for China. For China's realities, this model has the following form:

$$F_s^{CH} = x_1^1 \cdot 0.05 + x_2^1 \cdot 0.09 + x_3^1 \cdot 0.05 + v_1^2 \cdot 0.23 + x_2^2 \cdot 0.19 + x_3^2 \cdot 0.18 + \\ + x_4^2 \cdot 0.04 + x_1^3 \cdot 0.06 + x_2^3 \cdot 0.05 + 0.06(x_3^{3.1} \cdot 0.8 + x_3^{3.2} \cdot 0.2). \quad (3.32)$$

Considering the experience of China and the projected optimal value of all factors, we will show in formula (3.33) an effective model for optimizing the financial support of small business innovation in Ukraine:

$$F_s^{ef} = x_1^1 \cdot 0.05 + x_2^1 \cdot 0.09 + x_3^1 \cdot 0.06 + x_1^2 \cdot 0.2 + x_2^2 \cdot 0.16 + v_3^2 \cdot 0.18 + \\ + x_4^2 \cdot 0.05 + x_1^3 \cdot 0.07 + x_2^3 \cdot 0.06 + 0.08 \cdot (x_3^{3.1} \cdot 0.7 + x_3^{3.2} \cdot 0.3) \quad (3.33)$$

The interpretation of the results of the developed model for the macro level of the state, when the variables (x) are expressed as a percentage of the total investment in small business, will be as follows:

1) if condition (3.34) is fulfilled, the level of financial support for small innovative businesses is maximally effective, which has a positive effect on the main economic indicators of both individual enterprises and the country as a whole. The closer one gets to the result, the more effective the financial support for innovative businesses is

$$\begin{cases} F_s \to 1, \\ F_s > 0.5; \end{cases} \quad (3.34)$$

2) if condition (3.35) is fulfilled, the level of financial support for small innovative businesses is insufficient and inefficient in view of the available sources of financial support. The closer to 0 the result goes, the lower the efficiency of financing

$$\begin{cases} F_s \to 0, \\ F_s \le 0.5. \end{cases} \quad (3.35)$$

With respect to the commercial effect at the micro level, that is, at the level of a small business, using this model, having received the required amount of financing of all its planned projects as 1 or 100 %, the entrepreneur is more likely to provide them with financial resources and the necessary funds under different conditions.

If necessary, it is possible to calculate the commercial effect in monetary terms at the macro level – as predicted by experts the percentage increase in GDP growth (2.5 %–3 %) in terms of national currency, and at the micro level for a specific enterprise in the form of profit from the financed innovation projects.

3.4 Conclusions to Section 3

Therefore, according to the results of the study in the third section, the following main conclusions are formulated:

1. In the third section of this paper, forecasting of perspective directions and tendencies of development of innovative activity of small enterprises in Ukraine and China was made. The purpose of this forecasting is to build a forecast of the development of the most promising areas of innovation activity of enterprises within the defined «Strategy of innovative development of Ukraine for 2010–2020 in the conditions of globalization challenges» and «Strategy of innovative development of Ukraine for the period up to 2030», while taking into account the most innovative and modern trends of today. Based on part 2 of this dissertation, the analysis of the main economic indicators characterizing macroeconomic development in both Ukraine and China predicted their further trends until 2025 on the basis of regression analysis using the appropriate trend line and allowable magnitude of data approximation. The trend line most closely approximates the dependence y shown in the diagram if the approximation value (R^2) equals or approaches 1.

2. The structural and logical scheme of forecasting the main tasks of perspective directions of development of innovative activity of small business in Ukraine has been developed, the essence of which is to distinguish six main stages, the realization of which is the basic algorithm for forecasting tasks of perspective directions of innovative development of any small enterprise. In the presented scheme, all the developed stages are necessarily based on the author's basic principles of forecasting perspective directions of innovative development of small business. Based on the analysis, given these principles, the most promising areas of innovation development in Ukraine were identified, with representatives of Chinese innovation businesses also interested.

3. According to the assigned tasks and on the basis of the forecasting, as well as taking into account the results of individual global indices and analyzing the prospects of innovative development of small business in Ukraine, probable scenarios of innovative development of the country were projected under optimistic, basic, pessimistic scenarios and separately of innovative development of Ukraine based on the use of indicators of the European Innovation Scoreboard, which enables continuous monitoring of presented indicators of benefits to take action at both micro and macro levels in order to realize the optimistic scenario of innovative development of Ukraine.

The third section of the paper also suggested ways to improve the financial support of the institutional environment and state support for small innovative enterprises.

4. For the first time, a multifactor model of financial support for innovative development of small business has been developed, which, unlike the existing ones, takes into account the main factors having a clear financial dimension, which will allow small businesses to attract additional financial resources for the implementation of their innovative projects, especially at the initial stage of their operation. The developed model is described by a number of formulas presented in section 3.3 of the dissertation research. To simplify the practical application, given that the developed model does not take into account the multiplicative and synergistic effects, as well as ignore the time factor, we consider the model static rather than dynamic and use the linear dependence option. Considering that the factors that are functionally interdependent are different in weight, the model introduced a weighting factor *k*, to determine the value of which the method of active examination was used, and to check the correctness of expert data, the coefficient of concordance was calculated and calculated statistical error. Substituting the obtained equations of all factors, both first and second order and the experts calculated by the experts *k*, we obtained a realistic and actual model for financial support of innovative small business development for Ukraine today. For China's realities, the model developed has been interpreted into an appropriate equation, taking into account the country's particularities. Taking into account the experience of China and the projected optimal value of all factors, an effective model for optimizing the financial support for the innovative development of small enterprises was developed for Ukraine.

Using this model, under the optimistic scenario of innovative development of Ukraine, will allow to efficiently search for the necessary funds to finance the innovation activities of small businesses from different traditional as well as the latest financial sources, which will help to obtain significant economic impact both on micro and on macro level. With respect to the commercial effect at the micro level, that is, at the level of a small business, using this model, having received the required amount of financing of all its planned projects as 1 or 100 %, the entrepreneur is more likely to provide them with financial resources and the necessary funds under different conditions. If necessary, it is possible to calculate the commercial effect in monetary terms at the macro level – as predicted by experts the percentage increase in GDP growth (2.5 %–3 %) in terms of national currency, and at the micro level for a specific enterprise in the form of profit from the financed innovation projects.

GENERAL CONCLUSIONS

The financial security mechanism is an effective tool that helps stimulate economic and innovation development, improve the investment climate in the economy, increase the efficiency of financial and economic activity of certain economic entities, and increase the level of competitiveness of individual enterprises, regions and the country as a whole. The peculiarity of the mechanism of financial support for innovative development lies in its focus on the activation of innovative entrepreneurship, in particular, small businesses.

In order to ensure sustainable innovation development, the Ukrainian state needs to, under the example of developed countries, create the proper conditions for accelerating innovative developments, introducing technological innovations at enterprises, enhancing the innovation activity of small and medium-sized enterprises.

Therefore, according to the results of the research conducted in this dissertation, the following main conclusions are formulated:

1. On the basis of generalization of domestic and foreign literary sources theoretical approaches have been developed in understanding the essence of the mechanism of financial support of innovative development, as a complex of certain forms, methods and methods of attraction of various sources of financing of innovations, including public financing; banking and commercial lending; venture investment, external investment and self-financing, with a view to stimulating the development of innovative entrepreneurship, in particular small businesses, improving the investment climate in the economy, improving the efficiency of financial and economic activity of economic entities. This structure of this mechanism allows to mobilize all available sources of financial resources and to direct them to create conditions for effective innovation activity and increase of the level of competitiveness of enterprises. Thus, the financial security mechanism is an effective tool through which to stimulate economic development, improve the investment climate in the economy, improve the efficiency of financial and economic activity of certain economic entities, achieve the level of competitiveness of individual enterprises, regions and the country as a whole. The peculiarity of the mechanism of financial support for innovative development lies in its focus

on the activation of innovative entrepreneurship, in particular, small businesses.

2. Based on the analysis, it was found that small innovative enterprises play an important role in the development of the national economy of both Ukraine and China. The evolution of small business listing criteria in Ukraine during its independent existence was analyzed and comparative analysis of current small business listing criteria in Ukraine and China was conducted. It is proved that in the current conditions of development of science and technology, the role of introduction into the production process of innovation is increasing, therefore, the state innovation policy of Ukraine should be formed on the basis of a careful analysis of the current state of international tendencies of innovative development, which show that the most effective institutions of the innovation system, which are capable very quickly to respond to the needs of the innovation economy are small businesses. According to the developed theoretical and analytical scientific materials it is revealed that for today small innovative entrepreneurship in China operates in accordance with the Law «On stimulating the development of small and medium entrepreneurship», adopted in 2002, which provides equal opportunities for small enterprises for lending, investing , improving production, implementing innovative technologies in China's economy. In China, state-owned small business start-up funds are active, as small businesses produce the largest number of innovative products and technical inventions, and the government helps protect their interests and provides small businesses with tax breaks and additional funding.

3. Improved classification of modern approaches to assessing the effectiveness of innovative small business development, which, in contrast to the existing ones, takes into account not only common but also specific features of interpreting efficiency in modern conditions of formation of innovative economy in Ukraine and its definition based on these features, which will allow consciously choose the best methods for measuring the efficiency of an enterprise's innovation activity in the context of individual innovation projects depending on its strategic goal and choice you are the most profitable of the projects, and you are also interested in a wider range of potential investors, including foreign ones. The end result is the dependence of the definition of the term «efficiency» on the strategic goal of innovation enterprise development and, on the basis of this, the

classification of the concept «efficiency» is developed, which allows to choose the optimal methods of measuring the efficiency of both individual innovation projects and innovative activity of the enterprise as a whole.

4. During the evolution of the study of this problem, scientists have identified various approaches to the formation of a set of key indicators of the effectiveness of activation of innovative development of small business. Also indicators of efficiency of activation of innovative development are distinguished by a variety of the received effects from innovative activity of the enterprise. The main ones are economic, social and environmental effects. In the process of research, the commercial effect was also highlighted as a key indicator of the efficiency of activation of innovative development of small business, which is a kind of economic effect in the context of innovation activity of a small enterprise. Thus, based on the conducted research and critical analysis of methods of evaluating the effectiveness of innovations in the enterprise, the complex of key indicators of efficiency of activation of innovative development of small business was improved, which differs from the existing opportunities to identify the main technological, social, foreign economic and economic-organizational factors, as well as strategic orientation of managing innovation processes at both macro and macro levels.

5. In accordance with the identified research objectives, the second part of the dissertation analyzed the current state and mechanism of financial support for innovative development of small businesses in Ukraine and China, in particular, comparative analysis of the dynamics of major economic and innovation indicators of countries such as Ukraine and China in accordance with 1992 and 1980 to 2017. For comparative analysis, seven main economic indicators were selected and the rating of Ukraine and China in the world was determined by a number of innovation indicators, the main of which is the Global Innovation Index. The comparative analysis of the dynamics of the above indicators was conducted not only in quantitative but also in graphical terms, which greatly simplifies its visual perception and allows not only to follow the trends of selected indicators, but also to trace parallels between the economies of the two countries. Which further makes it possible to predict them with minimal error due to the use of a large array of data. Areas where China's experience can be important for Ukraine's economy and innovative small business development are identified. The study showed that Ukraine's economic and

innovation potential is not being fully utilized, probably due to the lack of development of relevant institutions.

6. The dynamics of innovation activity of enterprises of Vinnitsa region in the period from 2007 to 2017 and sources of financing small business innovation activity using economic and statistical methods of both Ukraine and China were also analyzed. The results of the study show that the most active innovations were in the pre-crisis period of 2007 – almost 24 % of the total, and in 2012–2013, before the start of ATO – respectively 18 % and 19.4 %. For 2017 we have innovative activity of enterprises in 15.4 %. Regarding the sources of financing, the main source of financing of innovative activity of the enterprises in Ukraine is the own funds of the enterprises – more than 95 %.

7. In order to identify the main factors and tools for the mechanism of financial support for innovative development of small businesses in Ukraine and China, a thorough study was conducted, which showed that the main tool for innovative development of China is the creation of state-level scientific technoparks. Further studies have shown that high-tech areas are concentrated mainly in the North and East China, as well as the relatively developed economies of the southwest coast: Beijing, Tianjin, Jiangsu, Shandong, Guangdong, Shanghai and Fujian. Basically, high-tech areas have the following geographical distribution: 58 zones in the Eastern region, 27 zones in the central region, 29 in the Western region and 15 in the Northeast region of China. Research has been conducted on the intensity of research on state-owned technoparks in China as a% of the country's total budget, and the cost of research work is shown in the form of a chart on a scale of 100 mlg. yuan, which results in an increase in spending data year by year, which is a very positive trend for Chinese entrepreneurs. The contribution of such sources of funding as business angels and venture funds was analyzed as the most important sources of financial support for China's small business innovation, the distribution of Chinese national technology business incubators by Chinese regions and the growth of their total from 2011 to 2016 were determined and the place identified and the role of such a movement to support innovative enterprises in China as hapspace.

8. In Ukraine, not looking at the positive experience of creating powerful IT clusters, as an analogue of techno parks in the field of information technology, this tool is not as widespread today, as in China.

Among the most used tools in the context of financial support for innovative development of small business, various commercial structures, in particular banks, are distinguished, so a theoretical and game model of optimizing the interaction of financial structures and start-ups in small business has been developed. On the basis of the algorithm, it was proved that it would be profitable for a financial institution to issue a start-up loan only if the probability of successful completion of a start-up by the average amount of return to a financial institution after successful completion of the start-up is greater than the profit obtained from providing a regular credit transaction based on a time factor. The decision on granting or not giving credit to a small business to finance start-up in the form of a static game-theoretic model is presented in Fig. 2.23. The Nash equilibrium was chosen as a tool of game theory, since it is a method of self-regulation of systems of any complexity, unlike the Paretto optimality used as a tracking apparatus. So, as seen from the theoretical game model, this equilibrium will be present only in one case – when a financial institution agrees to finance the project with the probability of success. According to game theory, this situation is optimal for self-regulation of the interaction of financial structures and start-ups in small business.

9. In the third section of this paper, forecasting of perspective directions and tendencies of development of innovative activity of small enterprises in Ukraine and China was made. The purpose of this forecasting is to build a forecast of the development of the most promising areas of innovation activity of enterprises within the defined «Strategy of innovative development of Ukraine for 2010–2020 in the conditions of globalization challenges» and «Strategy of innovative development of Ukraine for the period up to 2030», while taking into account the most innovative and modern trends of today. Based on part 2 of this dissertation, the analysis of the main economic indicators characterizing macroeconomic development in both Ukraine and China predicted their further trends until 2025 on the basis of regression analysis using the appropriate trend line and allowable magnitude of data approximation. . The trend line most closely approximates the dependence y shown in the diagram if the approximation value (R^2) equals or approaches 1.

10. A structural and logical scheme of forecasting the main tasks of perspective directions of development of innovative activity of small business in Ukraine has been developed, the essence of which is to

distinguish six basic stages, the realization of which is the basic algorithm for forecasting tasks of perspective directions of innovative development of any small enterprise. In the presented scheme, all the developed stages are necessarily based on the author's basic principles of forecasting perspective directions of innovative development of small business. Based on the analysis, given these principles, the most promising areas of innovation development in Ukraine were identified, with representatives of Chinese innovation businesses also interested.

11. According to the set tasks and on the basis of the conducted forecasting, and also taking into account results of separate world global indices and having analyzed prospects of innovative development of small business in Ukraine, probable scenarios of innovative development of the state on the optimistic, basic, pessimistic scenarios and, separately, on the scenario of innovative development Ukraine on the basis of the use of indicators of the European Innovation Scoreboard, which allows for constant monitoring of the presented indicators to adjust actions at both micro and macro levels in order to implement an optimistic scenario of innovative development of Ukraine.

12. For the first time, a multifactor model of financial support for innovative development of small business has been developed, which, unlike the existing ones, takes into account the main factors having a clear financial dimension, which will allow small businesses to attract additional financial resources for the implementation of their innovative projects, especially at the initial stage of their operation. The developed model is described by a number of formulas presented in section 3.3 of the dissertation research. To simplify the practical application, given that the developed model does not take into account the multiplicative and synergistic effects, as well as ignore the time factor, we consider the model static rather than dynamic and use the linear dependence option. Considering that the factors that are functionally interdependent are different in weight, the model introduced a weighting factor *k*, to determine the value of which the method of active examination was used, and to check the correctness of expert data, the coefficient of concordance was calculated and calculated statistical error. Substituting the obtained equations of all factors, both first and second order and the experts calculated by the experts *k*, we obtained a realistic and actual model for financial support of innovative small business development for Ukraine

today. For China's realities, the model developed has been interpreted into an appropriate equation, taking into account the country's particularities. Taking into account the experience of China and the projected optimal value of all factors, an effective model for optimizing the financial support for the innovative development of small enterprises was developed for Ukraine.

Using this model, under the optimistic scenario of innovative development of Ukraine, will allow to efficiently search for the necessary funds to finance the innovation activities of small businesses from different traditional as well as the latest financial sources, which will help to obtain significant economic impact both on micro and on macro level. With respect to the commercial effect at the micro level, that is, at the level of a small business, using this model, having received the required amount of financing of all its planned projects as 1 or 100 %, the entrepreneur is more likely to provide them with financial resources and the necessary funds under different conditions. If necessary, it is possible to calculate the commercial effect in monetary terms at the macro level – as predicted by experts the percentage increase in GDP growth (2.5 %–3 %) in terms of national currency, and at the micro level for a specific enterprise in the form of profit from the financed innovation projects.

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Appendix A

Table A.1 – Comparative table on selected indicators of Ukraine and China for small business development and innovation

indicator	*Ukraine*	*China*
Legal acts	1. Law on State Aid to Business Entities 2. Law on Development and State Support of Small and Medium-Sized Entrepreneurship in Ukraine 3. Law on Scientific and Scientific and Technical Activities 4. The Law of Ukraine «On Priority Areas of Science and Technology Development» 5. The Law of Ukraine «On special regime of innovative activity of technological parks». 6. The Law on Innovation Activity 7. CMU Resolution «On Approving the Procedure of Using the Funds Provided in the State Budget for Microcredit of Small Business Entities» 8. Strategy of innovative development of Ukraine for 2010-2020 in the conditions of globalization challenges » 9. Ukraine's Innovative Development Strategy for the Period up to 2030 »	1. The Law of the People's Republic of China «On stimulating the development of small and medium-sized enterprises» 2. Resolution of the State Council «Point of view» on support for small business and innovation 3. Resolution of the National Assembly of People's Representatives «Rules of the Special Economic Zone». 4. Programming document of the second stage of the PRC reforms «Decisions on deepening scientific and technological progress», adopted by the CPC Central Committee and the State Council 5. Programming document adopted by the National Council of the People's Republic of China «National Program of Scientific and Technical Development for the Medium and Long Term (2006-2020)" 6. Programming document adopted by the State Council of the People's Republic of China «Mass Entrepreneurship, Comprehensive Innovation»
State Programms	1. State aid portal 2. TPKVKMB 7610 «Promoting the development of small and medium-sized enterprises».	1. State Small and Medium Business Development Fund 2. State Program for Innovative Development Strategy of PRC 2020-2050 3. State Program «Made in China – 2025» 4. State program of support for SMEs «Internet Plus» 5. National key technology development program 6. State Program «863» 7. State Program «973» 8. State programs «Spark», «Torch» 9. National Key Technologies R&D Program – NKTRDP
Public administration bodies	1. The Verkhovna Rada of Ukraine 2. The Cabinet of Ministers of Ukraine 3. Ministry of Economy of Ukraine 4. Antimonopoly Committee of Ukraine 5. State self-government bodies	1. CCP CCP 2. The State Council of China 3. SSMEO State Information Service 4. Central Banking Regulatory Commission 5. KPMG Innovation Startup Center
Sources of financial resources	- own sources; - loans from banking institutions; - venture funds; - European Small Business Support Programs (SOSME, Horizon 2020, EBRD, IFC, NEFCO, Global Trade Finance Program); - non-state domestic small business support programs (UFPP, «Eco-efficiency»)	- government interest-free loans; - state support programs for small businesses; - venture funds; - state technoparks; - business angels; - Highspecies; - Since 2015, even more tax exemptions for small businesses

Appendix B

Table B.1 – Estimated values of the European Innovation Scoreboard for Ukraine

Indicators	**2020**
Input indicators are the driving force behind innovation	
Persons with higher education in the field of technical and natural sciences among the population aged 20-29 (number per 1000 inhabitants of the relevant age)	90–95 %
Persons with higher education, among the population aged 25-64 (number per 100 inhabitants of the relevant age)	95–100 %
Broadband use rate by population (number of broadband lines per 100 inhabitants)	65–70
Persons participating in training programs for the population aged 25-64 (number per 100 inhabitants of the relevant age)	40–45
Level of education of youth (the share of persons aged 20-24 who have at least full secondary specialized education, among the population of the relevant age)	90–95 %
Input Indicators – Creating new knowledge	
Non-profit sector expenditures on R&D (% of GDP)	60–70 %
Commercial sector expenditure on R&D (% of GDP)	50–60 %
R&D expenditures in high-tech and medium-high-tech industries (% of R&D expenditures in industry	95–100 %
Enterprises receiving funding for innovative activities from non-profit sources (% of total both innovative and non-innovative enterprises)	60–65 %
Input indicators are innovations and entrepreneurs	
Small and medium-sized companies that innovate for their own needs (% of total MSCs)	70–80 %
Small and Medium-Sized Enterprises Participating in Joint Innovation Projects in Industry (% of total MSCs)	60–70 %
Costs of innovation (% of total turnover)	40–50 %
Venture Capital Assigned for Early Stage Financing (% of GDP)	30–40 %
Information and Communication Technology Expenditure (% of GDP)	95–100 %
Small and medium-sized companies using organizational innovations (% of total MSCs)	60–70 %
«Output» indicators – application	
Persons employed in high-tech service sector segments (% of total workforce)	80 –85 %
Exports of high-tech products (% of total exports)	40–45 %
Sales of new products on the market (% of total turnover)	60–70 %
Sales of new but not new industrial products on the market (% of total turnover)	60–70 %
Persons employed in the high-tech and medium-high-tech industries sectors of the industry (% of total workforce)	80–90 %
Output indicators are intellectual property	
EU patents per 1 million people	15–20 %
US patents per 1 million population	15–20 %
Patents of «triad groups» per 1 million population	15–20 %
New EU trademarks per 1 million people	15–20 %
New EU industrial designs for 1 million people	15–20 %

Appendix C

Table C.1 – Plan of measures for implementation of the Strategy for development of small and medium-sized enterprises in Ukraine for the period up to 2020

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
Creating a favorable environment for the development of small and medium-sized enterprises				
1. Increasing the level of information support, including the improvement of the national statistics system	1) creation of a web-portal to meet the needs of small and medium-sized enterprises in accessing quality information submitted in a consumer-oriented format on the state of conducting business activities at all stages of management: starting a business; obtaining the necessary administrative services; attraction of financing; support programs for small and medium-sized entrepreneurs;	IV quarter 2018	Ministry of Economic Development other central and local executive authorities	creation and functioning of the official web portal of the Ministry of Economic Development
	availability of business support infrastructure; conducting export activities, etc.			
	2) on the basis of the available calculation data and the publication of additional statistical indicators necessary to evaluate the implementation of the Small Business Act for Europe, taking into account the recommendations of the Organization for Economic Co-operation and Development	every year	Gosstat Ministry of Economic Development	publication of additional statistics, including: export volume (by small and medium enterprises); turnover factor of small and medium-sized enterprises; share of small and medium-sized enterprises created one year ago (in 2019); share of small and medium-sized enterprises created two years ago (in 2019); share of small and medium-sized enterprises created three years ago (in 2019); share of small and medium-sized enterprises created four years ago (in 2020); the share of small and medium-sized enterprises created five years ago (in 2021);

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
				share of small and medium-sized enterprises, established more than five years ago but not more than 10 years old ago (in 2025); share of jobs created by small and medium-sized enterprises created three years ago (in 2019); share of fast – growing small and medium – sized enterprises (estimated by increase number of employees) (in 2020); number of subjects SMEs that have received orders via computer networks for the sale of goods or services (excluding e-mail orders); the number of small and medium-sized entities making purchases through computer networks of goods or services (excluding e-mail orders);
				share of volume of internal expenses for carrying out research and development, percent of gross domestic product; the share of exports carried out by small and medium-sized enterprises; average export value per small and medium-sized enterprise (dollars)

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	3) preparation and publication of a review (report) on the state of development of small and medium-sized enterprises in Ukraine, which will contain, in particular, the following data: statistical and analytical data on small and medium-sized enterprises of the National Bank and the State Statistics Committee; public policy results for the past year (period); information on SME development and support programs, including international technical assistance projects, etc.	every year	Ministry of Economic Development Gosstat DFS National Bank (by agreement)	publication of an annual survey on the state of development of small and medium-sized enterprises on the official website of the Ministry of Economic Development
	4) taking measures and facilitating the preparation of the evaluation of the implementation of the Small Business Act for Europe concerning Ukraine, which is being prepared by the Organization for Economic Cooperation and Development	every year	Ministry of Economic Development other central executive bodies	ensuring that the decision to carry out the assessment is made public
2. Ensuring the implementation of the «think small first» principle	1) providing methodological assistance to regulators in preparing their decision to conduct regulatory impact analysis and small business test	constantly	DRS	holding at least 20 training events for regulators annually
	2) conducting a study of the effectiveness of regulatory impact analysis and small business test, in particular as regards the collection of data and data required by economic entities to calculate	IV quarter 2018	Ministry of Economic Development	conducting research and preparing appropriate proposals
	3) facilitating the application by the developers of draft regulatory acts on-line service to prepare a decision to analyze the regulatory impact of the regulatory act and test small business	constantly	DRS other central and local executive authorities	introduction of a web resource to analyze the impact of the draft regulatory act and take appropriate measures to promote the web resource
	4) carry out a systematic review of regulatory acts in key areas of the economy (agriculture, security and selected food quality indicators; construction;	constantly	central executive authorities	adoption of acts of the Cabinet of Ministers of Ukraine compliance with legal requirements;

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	energy; transport and infrastructure; information technology and telecommunications)			
3. Simplifying the process of closing a business	ensuring that the terms of the statutory withdrawal from the entity are applied in the event of termination	—«—	Ministry of Finance DFS Ministry of Justice	compliance with legal requirements; reducing complaints
4. Improvement of the licensing and permitting system	development and submission to the Cabinet of Ministers of Ukraine of the draft Law of Ukraine «On strengthening the protection of economic entities against unlawful acts or omissions of permitting bodies»	III quarter 2018	Ministry of Economic Development	approval of the bill by the Cabinet of Ministers of Ukraine and submission to the Verkhovna Rada of Ukraine
5. Increasing access of small and medium-sized enterprises to public procurement	1) introduction in the card of registration of the participant in the electronic system of purchases of a separate field according to the category of business entity depending on the number of employees and income from any activity for the year	IV quarter 2018	Ministry of Economic Development	enabling the electronic system to choose the category of entity
	2) development and submission to the Cabinet of Ministers of Ukraine of the draft Law of Ukraine «On Amendments to the Law of Ukraine» On Public Procurement «on Regulation of Sub-Procurement» in order to increase the number of competitive purchases in which small and medium-sized entities may participate entrepreneurship	IV quarter 2018	Ministry of Economic Development	approval of the bill by the Cabinet of Ministers of Ukraine and submission to the Verkhovna Rada of Ukraine
	3) raising awareness of small and medium-sized enterprises about participation in public procurement as suppliers, in particular through training, trainings aimed at developing the necessary competences and skills	constantly	Ministry of Economic Development state-owned enterprise «Prozorro» (with consent)	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings
6. Ensuring the development of effective public-private dialogue	1) development and submission to the Cabinet of Ministers of Ukraine of the draft resolution of the Cabinet of Ministers of Ukraine on amendments to the Regulation on the Council of	III quarter 2018	Ministry of Economic Development	adoption by the Cabinet of Ministers of Ukraine of the resolution

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	Entrepreneurs under the Cabinet of Ministers of Ukraine, approved by the Cabinet of Ministers of Ukraine of February 13, 2008 No. 54, in order to increase the efficiency of the Council of Entrepreneurs interaction with regional and local associations of small and medium-sized enterprises			
	2) support in the Verkhovna Rada of Ukraine of the draft Law of Ukraine «On the Establishment of Business-Ombudsman» (registration number 4591)	before the Lawaprov ement	Мінекономрозв итку	прийняття Закону України
Improving access to finance for small and medium-sized enterprises				
7. Expansion of lending to small and medium-sized enterprises by commercial banks	1) develop proposals for the effective implementation of credit guarantee schemes provided by financial institutions to small and medium-sized enterprises, including portfolio credit guarantee schemes, taking into account best international practice	IV quarter 2018 p.	Ministry of Economic Development Ministry of Finance National Bank (with consent)	submission of proposals to the Cabinet of Ministers of Ukraine
	2) promoting the implementation of a credit guarantee system for small and medium-sized enterprises by financial institutions by implementing a pilot project on the implementation of a partial guarantee scheme for bank loans based on the German-Ukrainian Fund	—«—	National Bank (by agreement) Ministry of Finance Ministry of Economic Development	introduction of loan guarantee schemes provided by financial institutions to small and medium-sized enterprises
8. Enhanced use of promissory notes	1) raising awareness of small and medium-sized enterprises about the use of simple / transfer bills	constantly	NCSSM (with consent) Ministry of Finance National Bank (with consent)	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings
	2) drafting and submitting to the Cabinet of Ministers of Ukraine a draft Law of Ukraine «On Amendments to the Law of Ukraine» On the Circulation of Bills in Ukraine «in order to bring it into line with the Geneva Conventions	IV quarter 2018	—«—	approval of the bill by the Cabinet of Ministers of Ukraine and submission to the Verkhovna Rada of Ukraine

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
9. Activation of lending to non-banking financial institutions	support in the Verkhovna Rada of Ukraine of the draft Law of Ukraine «On Credit Unions» (registration number 6405)	Before the Law approvement	National Financial Services Commission (with consent) Ministry of Finance National Bank (with consent)	Approval of the Law of Ukraine
10. Reducing the financing gap through the use of factoring services	drafting and submitting to the Cabinet of Ministers of Ukraine a draft law of Ukraine «On Amendments to the Civil Code of Ukraine on Financial Services»	II quarter 2019	National Financial Services Commission (by agreement)	approval of the bill by the Cabinet of Ministers of Ukraine and submission to the Verkhovna Rada of Ukraine
Simplification of tax administration for small and medium enterprises				
11. Ensure an effective value-added tax refund process	1) monitoring the work of the VAT refund registry	III quarter 2018	Ministry of Finance DFS	publicizing the results of monitoring and proposals for improving the administration of value added tax
	2) raising awareness of small and medium-sized enterprises about the use of the VAT refund register	constantly	—«—	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings
12. Settlement of the issue of overdue payments	1) extension of the Contract Management module in Prozorro's electronic procurement system with a feature that will allow the Treasury to record the amounts and terms of payments within the framework of the signed contract	IV quarter 2018	Ministry of Economic Development Treasury state-owned enterprise «Prozorro» (with consent)	supplementing the Contract Management module with relevant functions
	2) development and submission to the Cabinet of Ministers of Ukraine of the draft Law of Ukraine «On Amendments to Certain Laws of Ukraine on Counteraction to Delayed Settlements between economic operators «, subject to the provisions of Directive 2011/7 / EC of the European Parliament and of the Council of 16 February	—«—	Ministry of Finance Ministry of Economic Development Ministry of Justice	approval of the bill by the Cabinet of Ministers of Ukraine and submission to the Verkhovna Rada of Ukraine

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	2011 on counteracting late payment in commercial transactions			
13. Increasing labor market flexibility	preparation and submission to the Cabinet of Ministers of Ukraine of proposals on development of draft normative legal acts concerning: remote employment; activities of business entities that provide employment mediation services and those who hire employees to continue their work with other employers	IV quarter 2018	Ministry of Social Policy Ministry of Finance Ministry of Economic Development	submission of proposals to the Cabinet of Ministers of Ukraine
Promoting entrepreneurial culture and developing entrepreneurial skills				
14. Ensuring the development and promotion of an entrepreneurial culture	promoting entrepreneurship with the involvement of SMEs, in particular by demonstrating successful business projects	constantly	Ministry of Economic Development other central and local executive authorities	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings
15. Participation in Global Entrepreneurship Monitoring	facilitating Ukraine's participation in Global Entrepreneurship Monitor	II quarter 2019	Ministry of Economic Development other central and local executive authorities	ensuring Ukraine's participation in the Global Monitoring of Entrepreneurship, including through international technical assistance
16. Holding on a regular basis the European Week of Small and Medium-Sized Entrepreneurship in Ukraine	holding the European Small and Medium Enterprises Week in Ukraine	yearly	Ministry of Economic Development other central executive bodies oblast and Kyiv city state administrations	holding the European Small and Medium Enterprises Week in Ukraine
17. Encourage lifelong learning	1) development of proposals for intensification of cooperation between the subjects of small and medium-sized enterprises and vocational-technical and higher educational establishments in order to adapt the curricula to the needs of the labor market, including through conducting vocational guidance	IV quarter 2018	MES Ministry of Economic Development Minregion Ministry of Social Policy Antitrust Committee other central and local executive authorities	submission of proposals to the Cabinet of Ministers of Ukraine; meeting labor market needs

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
			Confederation of Employers of Ukraine (with consent)	
	2) improving the methodological bases for drawing up a mid-term forecast of labor market needs in specialists and staff, taking into account the best European practices	—«—	Ministry of Economic Development Ministry of Social Policy MES Confederation of Employers of Ukraine (with consent)	publication of the order of the Ministry of Economic Development
18. Enhancing the training of SMEs in the skills of export activities	facilitating the participation of small and medium-sized enterprises in Ukraine by ensuring their participation in the EU Erasmus for Young Entrepreneurs Program	constantly	Ministry of Economic Development MES Government Office for Export Promotion (with consent) Chamber of Commerce (by agreement)	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings
19. Support for entrepreneurship for certain categories of population (internally displaced persons, retired or retired, youth, older generation)	promotion of entrepreneurship among certain categories of population (internally displaced persons, retired or retired, youth, older generation)	—«—	Ministry of Social Policy MTOT Ministry of Economic Development other central executive bodies oblast and Kyiv city state administration	—«—
20. Increasing the level of financial literacy	development and implementation of training courses and trainings, information materials for improving the financial literacy of small and medium-sized enterprises through the infrastructure for supporting small and medium-sized enterprises, including to facilitate their access to finance, assist in starting and managing a business, plans and more	IV quarter 2018	Ministry of Economic Development MES Ministry of Social Policy Ministry of Finance National Bank (with consent) Independent Banking Association of Ukraine (with consent)	conducting training courses and trainings on a regular basis, disseminating information materials within the framework of the pilot project on the functioning of the network of business support centers, including at the expense of international technical assistance
21. Promoting the development of social	conducting research on the state of development of social	I quarter 2019	Ministry of Economic	conducting research and submitting a

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
entrepreneurship	entrepreneurship in Ukraine and preparing proposals for the development of draft legal acts on the support of social entrepreneurship, taking into account the best international experience		Development Ministry of Social Policy Ministry of Finance other central and local executive authorities	proposal
22. Promoting the social responsibility of small and medium-sized enterprises	1) preparation and submission of proposals to the Cabinet of Ministers of Ukraine for the development of draft regulatory acts on the implementation of state policy in the field of promoting the social responsibility of business in Ukraine	—«—	Ministry of Economic Ministry of Economic Development Ministry of Social Policy other central executive bodies	submission of proposals The Cabinet of Ministers of Ukraine
	2) promoting the social responsibility of business entities, including through the dissemination of relevant business practices and implemented corporate social responsibility projects at national, regional and local level	constantly	Ministry of Economic Development Ministry of Social Policy Minregion Ministry of Natural Resources oblast and Kyiv city state administrations	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings
Enhancing the competitiveness and innovation potential of small and medium-sized enterprises				
23. Strengthening the institutional capacity of business associations	conducting a survey of the status of the business associations' infrastructure in order to identify existing shortcomings in their activities and their ability to provide quality services to small and medium-sized enterprises, including ensuring effective representation of their interests in the framework of public-private dialogue	I quarter 2019	Ministry of Economic Development	conducting research and preparing appropriate proposals
24. Ensuring consideration of regional characteristics of small and medium-sized enterprises	1) facilitating the development of regional and local strategies, programs and projects for the development of small and medium-sized enterprises and their alignment with the strategic directions specified in the Strategy of development of small and medium-sized enterprises in Ukraine for the period up to 2020 approved by the decree of the Cabinet of Ministers of	constantly	Ministry of Economic Development Minregion oblast and Kyiv city state administrations	preparation and giving of recommendations to oblast, Kyiv city state administrations and local self-government bodies

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	Ukraine of May 24, 2017 No. 504			
	2) preparation and submission to the Cabinet of Ministers of Ukraine of the draft Law of Ukraine «On obligatory deduction of a certain percentage from the budget of development of the region (city, district) for financial and credit support of small and medium-sized enterprises»	I quarter 2019	Ministry of Finance Antitrust Committee other central and local executive authorities	approval of the bill by the Cabinet of Ministers of Ukraine and submission to the Verkhovna Rada of Ukraine
25. Modernization of the existing support infrastructure for small and medium-sized enterprises	1) preparation of methodological recommendations on the establishment of business support centers and implementation of a pilot project on the functioning of a network of business support centers at regional and local level	IV quarter 2018	Ministry of Economic Development Minregion Antitrust Committee	recommendations have been prepared; the creation of regionalnetworks of business support centers within the existing SME support infrastructure
	2) ensuring, when developing and approving action plans for 2018-2020 for the implementation of regional development strategies by 2020, the consideration of measures aimed at establishing business support centers as part of the regional development infrastructure, and the preparation of relevant regional development projects that can be implemented at the expense of the State Regional Development Fund	—«—	oblast and Kyiv city state administrations with the involvement of local governments Minregion Ministry of Economic Development Antitrust Committee	developed and submitted to the Ministry of Regional Development projects for the establishment of business support centers
	3) carrying out, among rural population, small and medium producers of agricultural products, outreach work to promote the development of agricultural cooperation	constantly	Ministry of Agrarian Policy local executive authorities	information events, including seminars, roundtable meetings, including through international technical assistance
	4) Promoting the accessibility of services to SMEs in rural areas, including advisory services	constantly	Ministry of Agrarian Policy local authorities	conducting information events, in particular the dissemination of information materials; conducting seminars, consultations, round table meetings

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
26. Intensification of the process of transfer of scientific achievements to the field of entrepreneurship	1) ensuring the development of academic entrepreneurship in order to facilitate the effective transfer of academic achievements and higher education to the field of entrepreneurship	—«—	MES Ministry of Economic Development Antitrust Committee	conducting information events, in particular the dissemination of information materials; conducting seminars, consultations, round table meetings; creation of business incubators and business accelerators on the basis of higher education institutions and scientific institutions
	2) facilitating the establishment of a network of private sector consultants (mentors), public authorities and civil society institutions on the basis of higher education institutions in order to inform on the best national and international practices of transferring scientific achievements and higher education to theentrepreneurship field	—«—	Ministry of Agrarian Policy local authorities	creation and operation of the network
27. Activation of technology transfer	1) conducting research on the activities of technology transfer offices regarding the prospects of applying the results of their activity by small and medium-sized enterprises	III quarter 2018	MES	publicizing the results of the study
	2) facilitating interaction between scientific institutions, research institutes and small and medium-sized enterprises	constantly	MES Ministry of Economic Development Antitrust Committee other central and local executive authorities	conducting information events, in particular the dissemination of information materials; conducting seminars, consultations, round table meetings
28. Promoting the greening of small and medium-sized enterprises	1) raising awareness among SMEs about the benefits of greening entrepreneurship	—«—	Ministry of Natural Resources other central and	—«—

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
			local executive authorities	
	2) preparation of drafts of the relevant legal acts on the introduction of European norms and requirements for limit levels of air emissions and discharges into water or soil, pumping underground, transfer of various types of pollutants in accordance with the Protocol on emission registers and transfer of pollutants and protection of environmental rights of territories communities and every citizen on the premises of the enterprises in accordance with the Aarhus Convention	IV quarter 2018	Ministry of Natural Resources Antitrust Committee other central and local executive authorities	the adoption of relevant legal acts
	3) facilitating the introduction of models of sustainable consumption and production by «small-scale» businesses, including «green practices», including the implementation of environmental management systems, environmental certification and eco-labeling in accordance with the requirements of international standards of the ISO series	constantly	Ministry of Natural Resources Ministry of Economic Development other central and local executive authorities	implementation of environmental management systems, environmental certification and eco-labeling in accordance with the requirements of international standards of the ISO series
29. Harnessing the capabilities of the European Union's Horizon 2020 Framework Program for Research and Innovation	1) raising awareness of SMEs about the opportunities of the European Union's Horizon 2020 Research and Innovation Program	—«—	MES Ministry of Economic Development other central and local executive authorities	conducting information events, in particular the dissemination of information, analytical materials; holding forums, seminars, round table meetings, etc .;
	2) ensuring the development and training of the national focal points of the EU Horizon 2020 Framework Program for Research and Innovation on the possibility of using the program by Ukrainian participants	—«—	—«—	holding consultations
30. Harnessing the capabilities of the EU's COSME (2014-2020) Competitiveness Program	1) Promoting the participation of small and medium-sized enterprises in the EU COSME (2014-2020) Competitiveness Program, including the	every quarter	Ministry of Economic Development MES other central and	conducting information events, in particular the dissemination of information

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	European Enterprise Network (EEN)		local executive authorities	materials, holding seminars, round table meetings, etc .; holding consultations
	2) creation and maintenance of a separate web resource of the EU COSME (2014-2020) Competitiveness Program	II quarter 2018	Ministry of Economic Development	creation and operation of a web resource
Organizational support and mechanism for implementation of the Strategy				
31. Increasing the institutional capacity of the state in the formulation and implementation of state policy in the field of business development	1) strengthening the institutional capacity of the Ministry of Economic Development for the implementation of the state policy in the field of development of small and medium-sized enterprises through the formation of a consultative-advisory body at the Ministry of Economic Development – Office for the development of small and medium-sized enterprises	—«—	—«—	issuing of the order of the Ministry of Economic Development on creation of the Office of development of small and medium business
	2) preparation of proposals for the establishment of an institution for the development of small and medium-sized enterprises based on the results of the activity of the Small and Medium Business Development Office	II quarter 2019	Ministry of Economic Development Ministry of Finance	submitting proposals to the Cabinet of Ministers of Ukraine
32. Ensure effective coordination of the implementation of the Action Plan	1) coordinating the implementation of tasks aimed at the implementation of the Strategy for the development of small and medium-sized enterprises in Ukraine for the period up to 2020, approved by the Decree of the Cabinet of Ministers of Ukraine of May 24, 2017 No. 504	constantly	Ministry of Economic Development other central executive bodies	setting up an interagency working group with the participation of responsible executors, holding coordination meetings twice a year
	2) determination of responsible employees of central executive authorities for the implementation of state policy on development and support of small and medium-sized enterprises	II quarter 2018	—«—	publication of the order
	3) ensuring public access to information on the implementation of the action plan for the implementation of the Strategy for development	constantly	Ministry of Economic Development	publication of the half – yearly report on official website of the Ministry of

The name of the task	Name of the event	Deadline	Responsible for implementation	Performance indicators
	of small and medium-sized enterprises in Ukraine for the period up to 2020, approved by the Decree of the Cabinet of Ministers of Ukraine of May 24, 2017 No. 504			Economic Development
33. Promoting effective public-private dialogue on business development	organizing and holding meetings with economic entities with the participation of the Council of Entrepreneurs under the Cabinet of Ministers of Ukraine to discuss urgent problems and find ways to solve them	quarterly starting fromQ2 2018	Ministry of Economic Development oblast and Kyiv City State Administration	submitting proposals to the Cabinet of Ministers of Ukraine as a result of discussions on urgent problems and finding ways to solve them
34. Promoting the involvement of international aid for entrepreneurship development, including in the framework of the implementation of the action plan for the implementation of the Small and Medium Business Development Strategy in Ukraine until 2020	organizing and conducting working meetings with representatives of international financial organizations and international technical assistance donors to discuss the current status of implementation of this Action Plan for the implementation of the Strategy and future cooperation	constantly (once every six months)	Ministry of Economic Development other interested central executive bodies	formation of the Ministry of Economic Development of the working group, holding coordination meetings twice a year
35. Ensuring transparency, openness and impartiality in monitoring and evaluating the effectiveness of the Small and Medium Business Development Strategy in Ukraine until 2020	conducting an independent evaluation with the involvement of international and national experts on the implementation of the tasks envisaged by the Strategy and submitting proposals to the Cabinet of Ministers of Ukraine on further steps for the development of small and medium-sized enterprises in Ukraine	IV quarter 2020	Ministry of Economic Development	publication of the results of the independent evaluation together with recommendations and proposals on the official web site of the Ministry of Economic Development and submitting relevant proposals to the Cabinet of Ministers of Ukraine

Appendix G

Table G.1 – Specific measures consistent with the principles of the Small Business Act for Europe and implemented in the region (including with the assistance of regional (local) authorities in 2015–2020)

Policy areas and their compliance with the principles of the Small Business Act for Europe	Main activities	Execution status
Strategy Papers (Business Environment)	Strategy of balanced regional development of Vinnytsia region for the period till 2020	• Approved by the decision of Vinnytsia Regional Council of June 24, 2015 № 893 • Operational objective 2.1. Creating favorable conditions for dynamic development of small and medium-sized businesses, simplification of administrative procedures
	Plan of implementation of the Strategy of balanced regional development of Vinnitsa region for 2016-2017	• Approved by the decision of Vinnytsia Regional Council No. 52 from 11.02.2016 • Priority 3. Attraction of investments and development of international relations – aimed at achievement of Operational objective 2.1. Strategies.
	Small and Medium Business Development Program for 2017	• Approved by the decision of Vinnytsia Regional Council of December 20, 2016 № 225
	Vinnytsia Economic and Social Development Program for 2017	• Approved by the decision of Vinnitsa Regional Council № 202 of 20.12.2016 • Goal3. Increasing competitiveness of the region's economy
	Strategy of development of small and medium business in Vinnytsia region till 2020	• Project developed under USAID's Leadership in Economic Governance Program
Technical Assistance Projects (Entrepreneurial Environment; Advanced Training)	Desarrollo local basado en la comunidad (UE y PNUD)	• 2014-2017, the third phase of the program continues • There are 8 partner regions in the region • One of the projects – «Strengthening of membership organizations of small and medium enterprises» (27.08.2015-30.09.2018)
	Developing a Local Government Strengthening Course in Ukraine, PULSE (USAID)	• December 14, 2015 – December 13, 2020 • The project is implemented by the All-Ukrainian Association of Local Self-Government Bodies «Association of Ukrainian Cities» • The Project introduces three components: the formation of the legal

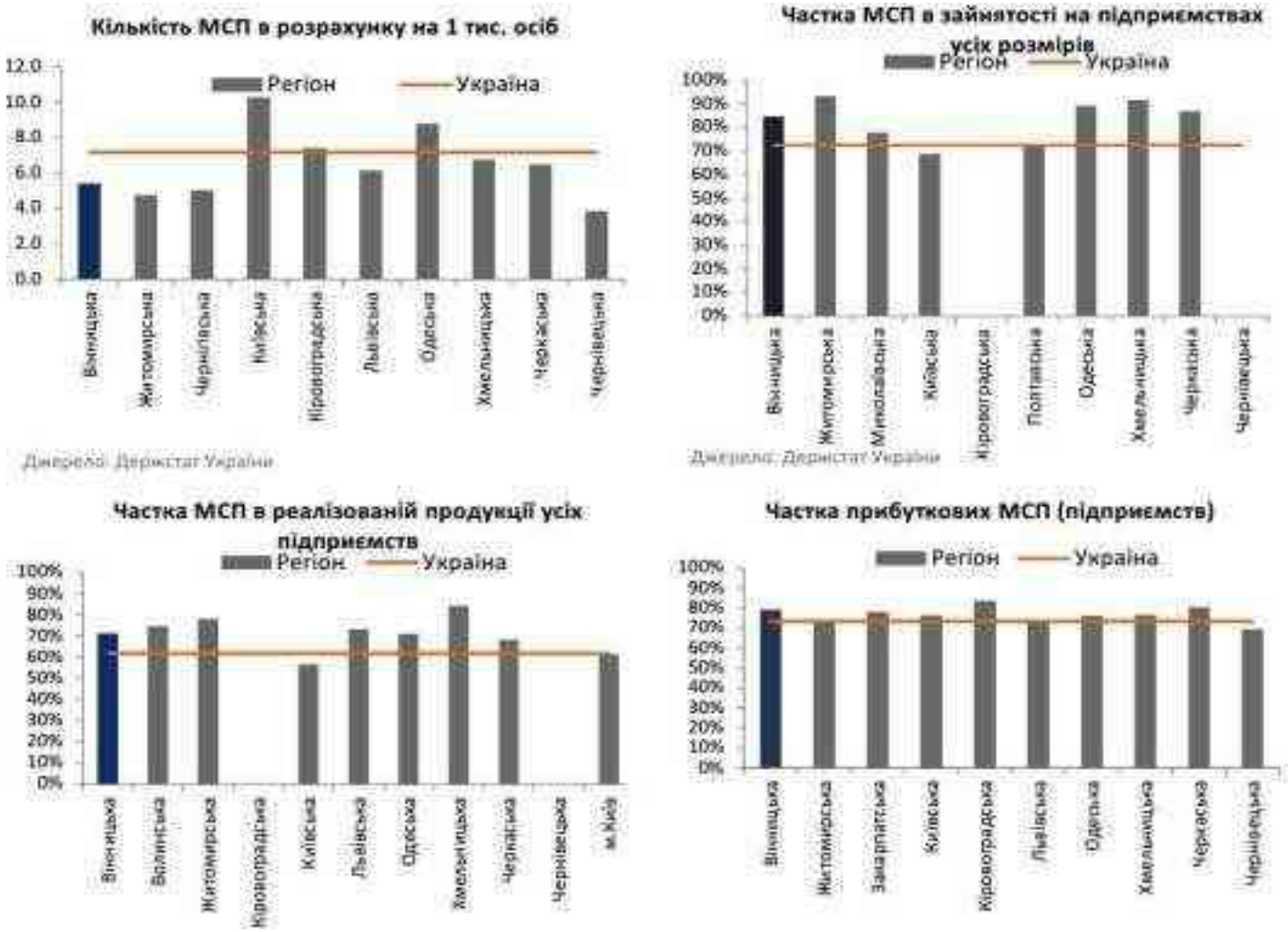
		framework for decentralization reform, the increase of local self-government resources, and the strengthening of the capacity of reform participants.
	E-Governance for Accountability and Community Engagement, EGAP (Swiss Confederation Government through the Swiss Agency for Development and Cooperation)	• May 1, 2015 – March 31, 2019 • Implemented by Eastern Europe Foundation and InnovaBridge Foundation • Vinnytsia region is one of the 4 target areas of the program • The program aims to promote the quality of governance, the interaction of government and citizens, and the introduction of social innovation through the latest information and communication technologies.
	Leadership in Economic Governance (USAID)	• December 2014 – December 2017 • Vinnytsia region is one of the 5 pilot regions of the LEV program • A roadmap for SME development in Khmelnytskyi was developed and formally adopted in 2016. Developer – Khmelnytsky District NGO «LAW», which won the USAID LEV Road Map Competition • In May 2017, the Winner of the Roadmap Competition was the Vinnytsia Regional Non-Governmental Organization «Stina Entrepreneurs Union», which develops the Aquaculture Entrepreneurship Roadmap
	Project «Increasing Ukraine's Investment Attractiveness and Regional Competitiveness» (Ministry of Development of the Republic of Poland)	• On June 30, 2016, the grand opening of the project in Kyiv • Vinnytsia region is selected from one of 7 pilot regions
	U-Lead component 2 – Establishment of administrative centers and awareness raising for local governments (EU)	• In the first quarter of 2017, Kalinovskaya and Severinovskaya ATGs signed a memorandum of cooperation with SKL International, which implements the Initial Phase of U-Lead component 2. • These LTOs will receive the financial support for the creation of the CNAP
	Partnership for Urban Development, PROMIS (Ministry of International Affairs of Canada)	• Implemented from April 2015 to December 2020 by the Federation of Canadian Municipalities (FCM) • The project is aimed at developing the municipal sector in Ukraine, including: in improving the business environment for the development of small and

		medium-sized enterprises • Four cities are partners of the Project (Vinnytsia, Zhmerynka, Ladyzhyn, Khmilnyk) • Within the framework of PROMIS the project of the Program for Enhancing the Competitiveness of SMEs in Vinnitsa by 2020 was prepared.
	Center for Adaptation of Migrants and Entrepreneurs from ATO and Crimea in Vinnytsia Oblast (EU)	• March 26, 2015 – July 25, 2016 • Completed December 25, 2016 • 26 million displaced entrepreneurs, who participated in the business plans competition, received compensation in the amount of UAH 5.5 million. 134 jobs have been created.
	International Investment Forum «Vinnytsia – Business in the Center of Ukraine»	• IV Forum was held on September 2, 2016 in Vinnitsa, organizers – Vinnitsa Regional State Administration and Vinnitsa Regional Council • The V Forum will be held on September 8, 2017 in Vinnitsa
	Fair of loans for small and medium enterprises	• Carried out on November 11, 2016 by the Regional Development Agency of Vinnytsia Oblast in cooperation with the Department of International Cooperation and Regional Development of WATER • Conducted under the Small and Medium Business Development Program • Almost 100 participants (SME and banking sector representatives)
	XIII Regional Competition «Business elite of Podillya»	• On November 6, 2016, the awarding ceremony of the winners of the 13th Regional Competition «Business elite of Podillya» took place • Organized by the Vinnytsia Regional Non-Governmental Organization «Regional Center for Entrepreneurship Support» with the support of the Vinnytsia Regional State Administration • Awarded 124 winners in seven nominations
	All-Ukrainian Rural Tourism Forum	• Held on April 21-22, 2017 in Vinnitsa with the support of the Embassy of Finland in Ukraine
	Public discussion «Regional strategy for SME development in Vinnytsia region: from intentions to concrete actions»	• Held on July 11, 2017 in Vinnytsia • Discussion of the draft SME Development Strategy of Vinnytsia Oblast for the period up to 2020

Administrative Service Centers (Business Environment)	Expanding the network of Administrative Services Centers	• As of July 1, 2017, there were 35 CNAPs operating in the region • In 2015, 1039.3 thousand administrative services were provided, and in 2016 – 1069.2 thousand. • In 2016, Vinnitsa Oblast accounted for 12.3 % of all administrative services provided in Ukraine • In the first half of 2017, CNAPs were opened at Yakushinetska and Voronovichi OTGs. Until the end of 2017, the UDF component of the Severinovskaya and Kalinovskaya ATGs should be operational
	Regional Program of Informatization «Electronic Vinnytsia Region» for 2016-2018	• Approved by the decision of Vinnytsia Regional Council № 44 from 11.02.2016 • Among the main tasks of the Program are in particular the introduction of e-governance and e-democracy technologies in local executive bodies and local self-government, formation of a system of regional electronic information resources, etc.
SME Support Infrastructure (Enterprise Environment)	Agency for Regional Development	• The idea of creating the Agency was approved by the decision of the Vinnytsia Regional Council of March 30, 2016. • Officially registered on June 23, 2016 • Founders: Vinnytsia Regional Council, Vinnytsia Regional State Administration, Association of Local Self-Government Bodies, Vinnytsia National Technical University, Vinnytsia National Medical University M. I. Pirogov • The Agency is the operator of a competition for the partial reimbursement of interest rates on loans to SMEs • The Agency provides advice to entrepreneurs participating in the project «Center for Adaptation of Migrants and Entrepreneurs from the ATO and Crimea Zone in Vinnytsia Region»
	Vinnytsia Refrigeration Equipment Cluster Industrial Park	• Listed on Industrial Parks on May 31, 2017 • As of September 1, 2017, the selection of the management company is ongoing
	Vinnytsia Center for Support of Innovation and Entrepreneurship iHUB	• Opened on 24 November 2015 • Created with the support of the Norwegian Ministry of Foreign Affairs and in a public-private partnership with

		the Vinnytsia City Council. • Vinnytsia iHUB is a site for 45 workplaces
Business Ombudsman of Vinnytsia region	Business Ombudsman of Vinnytsia region	• On June 3, 2016, a Memorandum of Understanding on the Establishment of a Business Ombudsman Institution in Vinnytsia Region was signed • In 2016, it provided 123 consultations. A total of 10 applications were considered, 8 of which were positive and 2 in the work (as of July 2017) • Within the LEV Program, a project is underway to expand the regional network of business institutions
	Four-way territorial agreement for 2016-2020	• Signed on September 30, 2016 • Signatories: Vinnytsia Oblast State Administration, Vinnytsia Oblast Council, Joint Representative Body of Trade Union Organizations of Vinnytsia Region and Vinnytsia Oblast Employers Association support for MS
	Investment portal of Vinnytsia region (www.vininvest.gov.ua)	• In 2016, the Portal was updated by the Department of International Cooperation and Regional Development of Vinnitsa Regional State Administration • Contains information on investment projects, launch sites (vacant land and idle production facilities), as well as a section on information support for entrepreneurship
Measures to facilitate SME access to resources (Financing; Upgrading; SME support tools)	Financial	• On December 20, 2016, a competition for investment projects for partial interest rate reimbursement under the SME Development Program for 2017 was announced. Until September 1, 2017 the third stage of the competition continues. As part of the competition, a training seminar on writing business plans was held. • In January-July 2017, 29 demobilized ATO participants received a lump sum payment for unemployment benefits for setting up their own businesses.
	Personnel	• Program of employment of the population of Vinnytsia region for the period up to 2017, approved by the decision of Vinnytsia regional council of June 20, 2012 № 534 • September 22-24, 2016 held a 3-day training on starting your own business «Starting your own business: theoretical foundations and practical aspects»

Appendix D



Figyre D.1 – Comparison of main indicators of SME development in Vinnitsa region with indicators of other regions for 2016

Зянко, В. В.

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У монографії досліджуються теоретичні, методологічні та практичні засади фінансового забезпечення інноваційного розвитку малого бізнесу. Розкрито сутність механізму фінансової підтримки інноваційного розвитку малого бізнесу та особливості його функціонування в Україні. Проаналізовано макроекономічні тенденції розвитку інновацій малого бізнесу в Китаї та Україні та їх залежність від фінансової підтримки. На основі досвіду підтримки малого бізнесу КНР визначені перспективні та специфічні шляхи вдосконалення вітчизняної фінансової підтримки інноваційного розвитку малого бізнесу. Розроблено для науковців, фахівців з інновацій та підприємництва, політиків, підприємців.

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