

For the purpose of comparison, classification of EU-27 states within 3 groups was also performed with the method of k-means. Obtained composition of groups of states that occurred, was almost identical with results of classification with Ward's method. Hungary and Italy were the only exceptions here as they changed their positions. What is more, the variance analysis conducted during classification showed that all considered variables discriminate concentrations, because for each of the variables, F statistics was significant on the level of relevance of 0.05.

**Conclusions.** On the grounds of performed analyses we can make some fundamental observations:

- analysing the results of performed linear arrangement, we ought to remember that they are based on nine selected variables. And they, in turn, are resultants of somehow subjective choice of the author (starting with the choice of the type of measure, its model, through selection of diagnostic variables, their standardisation) and the access to data. Supposedly, while adding or removing some variable, we might obtain slightly different results. However, it certainly does not diminish the value of this study as the assessment of the level of living of populations in European Union member states;

- the leading group of countries that are the closest to development model and thus the countries that are characterised by the highest level of living of population in the light of adopted qualities include: Cyprus, Denmark, Ireland, Finland and Sweden;

- on the opposite side, we can find the countries of the former Eastern bloc, which are characterised by the lowest level of living of their populations and at the same time, they are distinguished by a low rate of GDP per capita. They include Hungary, Poland, Slovakia, Bulgaria and Romania.

- despite the fact that Poland has been the EU member state since 2004, the level of living of its inhabitants is still significantly different from the level of living of the populations of the so-called "old" Community member states.

- there occurs a clear, positive relationship between the level of economic development of the state (measured in GDP per capita) and the level of living of its inhabitants. The countries that were distinguished by high value of Hellwig's measure, including Denmark, Sweden, Ireland, Finland or Belgium and Holland are also characterised by high level of GDP per capita. On the other hand, low value of GDP per one inhabitant in countries including: Romania, Bulgaria is reflected in low value of synthetic value that describes the level of living of inhabitants of these states.

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### БАГАТОВИМІРНИЙ ПОРІВНЯЛЬНИЙ АНАЛІЗ РІВНІВ ЖИТТЯ НАСЕЛЕННЯ В КРАЇНАХ-ЧЛЕНАХ ЄС

*В статті проведено порівняльний аналіз рівнів життя населення країн-членів ЄС, визначено їх відмінності та виявлено групи країн зі схожими характеристиками умов життя населення.*

*Ключові слова: Європейській Союз; таксономія; синтетична змінна.*

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### МНОГОМЕРНЫЙ СРАВНИТЕЛЬНЫЙ АНАЛИЗ УРОВНЕЙ ЖИЗНИ НАСЕЛЕНИЯ СТРАН-ЧЛЕНОВ ЕС

*В статье осуществлен сравнительный анализ уровней жизни населения стран-членов ЕС, определены их отличительные черты и выявлены группы стран с похожими характеристиками условий жизни населения*

*Ключевые слова: Европейский Союз; таксономия; синтетическая переменная.*

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## STATE INCENTIVE OF COMMERCIALIZATION OF INTELLECTUAL PROPERTY

*The article shows understanding of the essence of commercialization process and finds its characteristic features. It also defines the main directions of the state stimulation of commercialization of intellectual property. The mechanisms of the state regulation which can be expediently applied in the Ukrainian practice are presented in this article.*

*Keywords: commercialization, innovative activity, intellectual property, scientific and technical developments.*

**Problem statement.** In a modern world innovative development of economy as the main macroeconomic task is possible only under the condition of successful realization of a huge number of specific innovative projects. Scientific and technical activity has become a day-to-day activity for

millions of experts involved in it; its results versatility influences the activity of billions of people on the planet, the processes of its development are the subject to the state regulation in the developed countries and those countries which try to intensify their social and economic develop-

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ment, no matter when they had their first traditions in this human activity found [1, page 5].

Commercialization of intellectual property is a key factor of economic growth and development in a mid-term and a long-term prospect. Well balanced, available and reliable system of the state incentive of commercialization of intellectual property plays an important role in this process. In the times of modern economic competition those countries win, which provide favorable conditions for the development of intellectual property, that is help in every possible way the scientists and inventors to commercialize the ideas and projects. Getting new knowledge and mastering new technologies as well as their effective use in social and economic development by a decisive measure defines the role and the place of a country in the world commonwealth, the level of national security and people's standards of living. In the industrially developed countries 80-90% of GDP gain comes to that new knowledge, realized in equipment and technologies. Despite the availability of considerable scientific developments and high education level of the research institutes staff, the scientific and technical sphere in Ukraine is not in its best situation. The sphere of scientific and technical activity in our country is one of the most complicated, in terms of providing legal regulation. Unfortunately, the state still has not taken any necessary steps to transform the scientific and technical activity into a fully-fledged branch of national economy.

In European countries such mechanisms that stimulate the transfer of technologies operate. There are different examples of programs which direct considerable financial resources at incentive of commercialization of intellectual property. These are the programs that work both nationwide and all over Europe (structural funds). For instance, the programs for joint financing of contract scientific researches, subsidizing of services in commercialization of technologies, granting the start capital for so-called "start-up" companies etc. Foundation of the "start-up" companies focused on commercializing of knowledge and skills of research, is one of the main instruments of commercialization in Europe, therefore, this economic sector is focused on application of different incentives (tax, financial, economic).

National industry is in a great need of production updating (first of all, updating of technologies), the scientific and technical sphere possesses considerable capital funds and intellectual resources for resolving this problem, but there is no system of commercialization of scientific development and technologies in Ukraine. Still no accurate mechanisms for attraction and use of the results of scientific and technical activity, that is intellectual property, are developed to apply them into economic turnover. After all, it is the state who has to pay special attention to scientific and technical activity and create the regulatory and legal framework, that will be capable to provide commercialization of the objects of intellectual property.

#### **Analysis of the last researches and publications.**

Providing the innovative processes to a great extent depends on creation of the mechanism of management of practical implementation of difficult innovative projects. It should be mentioned that national and foreign economists and researchers of innovative processes pay considerable attention to the research of forming factors of scientific and technical potential. Thus, the essential contribution to the development of theoretical and practical aspects of economy and management of scientific and technical potential was made by scientists-economists D. M. Chervaniov, V. D. Bazylevych, O. I. Zhylinska, V. M. Geyets, L. K. Bezchasny, Y. M. Bazhal, G. I. Kalytych, A. Malytsky, V. P. Solovyov, S. Y. Glazyev, N. P. Goncharova, D. I. Kukurin. Among foreign researchers such names should be

noted as J. Schumpeter, B. Santo, B. Twiss, R. Hoffmayer, B. Lundwall, S. Friman, G. Mensha, J. Kazmietsky, Y. N. Grik, I. A. Monastyrny. Scientists are unanimous in their conclusions that transformation of scientific and technical potential into the main driving force of economic growth of the state is possible only on the basis of formation of the effective organizational economic mechanism of scientific and technical development commercialization. Theoretical and methodological principles of resolution of this issue in Ukraine are one of the priority tasks of economy as well as scientific and technical potential management.

**Aim of research.** To reveal the essence of commercialization of intellectual property process and its characteristics. To define the main directions of the state incentive of commercialization of intellectual property.

**Main results of research.** Commercialization of the objects of intellectual property is a long and complicated process which is possible only on condition of close interaction of the state, science, industry and market, with informational support of all the stages of innovative cycle, taking into account the economic and social factors of emergence and use of intellectual property, as well as modern trends in business and economy, conducting effective market researches.

Commercialization of technologies is the most important element of innovative process as it is the process of transformation of the results of scientific and technical activity into goods and their further effective commercial realization [2]. As J. Kazmietsky says, "commercialization is the process by means of which the research and development results (RAD) are in due time transformed into the products and services in the market" [3]. According to Y. N. Grik and I. A. Monastyrny, commercialization of innovative idea is getting the profit from its sale and use in one's own production [4]. For instance, "Encyclopedian economic and law dictionary" gives several definitions of commercialization.

1. As a concept of the first steps of transition of CIS countries to the market relations. "Commercialization is the first step on the way to privatization when the enterprises are responsible for the results of their financial activity, and the state doesn't date their expenses any more".

2. "This is wide use of commercial beginnings in economy, expansion of number of commercial organizations." Without having explained specifically what commercialization is, this definition, explains it once again with commercialization itself.

3. "Activity subordination to the aim for gaining the profit" [5]. But activity subordination to the aim for gaining the profit is the whole business activity, which is far broader than just commercialization. The economic encyclopedia gives the following definition of commercialization: it is "1. Wide use of commercial principles in economy, expansion of number of commercial structures. 2. Activity subordination to the aim for getting the profit in the system of market relations [6]. According to Kendrick White, Director of Marchmont Capital Partners, commercialization is adaptation of fundamental science to business [7].

In our opinion, these definitions are insufficient. In particular, the definition by J. Kazmietsky points at possibility of division of innovative process into own innovations development and their transformation into market products, while the process of commercialization has to connect these stages indissolubly. Besides, it isn't specified, what terms of commercialization should be considered as "due" terms. In the definition of Y. N. Grik and E. A. Monastyrny some ambiguity is brought by the concept "innovative idea", since any stage of innovative process, in my opinion, represents a certain innovative idea, not necessarily the one that gives the chance for commercialization. At the same time, in the given definition one important detail is

emphasized: commercialization of innovations provides getting the profit from introduction or sale. Due to existence of specified inaccuracies I will give my own definition of the concept "commercialization". Thus, commercialization is a system of actions aimed at transformation of RAD results, which save their market relevance and demand, into products and services in the market which are aimed at reforming of economic activity of enterprises and their achievement of strategic development objectives by means of implementation the necessary structural transformations adapted for changes of environment functioning factors in order to get the maximum profit from their sale, licensing or independent use. Thus, the process of commercialization allows searching, evaluation (expertise) and selection of innovations for financing, legal claiming for rights on future intellectual property, introduction of innovation in production, as well as its further modification and support of intellectual product.

At the present stage of development, realization of innovations is a key task not only for the scientific and technical sphere of the country, but for the increase of domestic economic competitiveness within the national innovative system in overall. Final result of innovative activity is creation of innovation, but the process of commercialization not only has

to be continuous, like innovative search itself, but it has to begin even before the end of research and development.

There is a great variety of mechanisms by means of which in the developed countries of the world the state takes part in creation of favorable innovative climate and promotes commercialization of the research activity results. In general, the applied tools can be divided into three big groups. Firstly, it is a direct financial involvement of the state in the form of financing of certain projects (for example, participation in venture financing) or organizations (for example, small innovative firms). Secondly, it is support of connections between the public and private sector in the scientific innovative sphere (joint state-private partnership). Thirdly, it is financing of creation of elements of production and technological infrastructure (science and technology parks, incubators, offices to promote the technologies etc.). Let's have a look at those mechanisms of state regulation which can be expediently applicable to Ukrainian practice and take a foreign experience as an example.

New tendencies are observed in the world that clearly appeared in the 1990-s in the market of intellectual property objects, where among its main players (multinational corporations) bigger and bigger role is being played by the research universities [8, page 176].

**Table 1. Stakes held by institutional sector R & D scope of the U.S. A. in activity consumption quantity,% \***

Sector and the nature of work	1999			2004			2009		
	Fundamental research	Applied research	Development	Fundamental research	Applied research	Development	Fundamental research	Applied research	Development
University & Colleges	54,0	11,1	0,9	57,0	13,0	1,2	53,4	16,7	0,8
Federal Government	8,6	10,6	6,0	8,4	10,8	7,2	7,2	11,2	6,9
Federally Funded Research & Development Centers	9,6	3,2	2,1	8,9	4,5	2,6	7,7	6,5	1,9
Industry	17,1	70,4	89,9	14,0	65,7	87,5	19,5	57,6	89,5
Non-Profit Organizations	10,8	4,7	1,0	11,8	6,1	1,5	12,2	8,0	1,0

\*Compiled by the author based on [9].

Thus, as can be seen from table 1, in 2009 Universities and colleges completed (by value) 53.4% of all work in the segment of fundamental research (basic research), but only 16.7% in the segment of applied research (applied research) and very small fraction – 0.8% – in the segment D (development). It should be borne in mind that the overall structure of American research and development, general expressed in value terms which in 2009 amounted to approximately \$ 400.5 billion, fundamental research covering 19.0% applied – 17.8%, and the development – 63.2%. The structure of the corporate sector is almost the opposite: American industry was performed 89.5% of all works in the segment D, 57.6% of works in the segment of applied research, and only 19.5% of jobs in the segment of basic science. Federal R & D sector is characterized, at first glance, more or less contiguous values of three key parameters (basic science – 14.9% Applied research – 17.7% development – 8.8%). However, it should be borne in mind that the sector performed much especially sensitive and labor-intensive applied research and development that require significant resource investments, which makes them not always attractive activity for corporate industry and universities.

According to the expert evaluation, cumulative effect from the use of inventions made in university sector of science of American economy, makes 21 billion USD, which covers the cost of works on pre-commercial stage – carry-

ing out the research and development work (4 billion USD) and output of new production on the licenses of universities (17 billion USD). In the mid 90-s in the USA the practice of evaluation of a certain university's contribution to a scientific, technical and economic development of the country became widespread: for example, the companies found by the alumni and professors of the Massachusetts Technological Institute (MTI) form the twenty-fourth "economy" in the world, taking into account their sizes. Tendency of the last years – changes in the board of founders of the companies: if 50 years ago over 60% of companies' founders were experts with engineering education, in the recent years their number decreased to 40%, and the number of experts in management and business has grown up to 43%, in this case high-tech companies are found not only in the territory of the USA [9, page 48]. About 200 American universities belong to Association of technological management which tracks the main tendencies of patent and licensing activity; according to its data, ten leading research universities of the USA (California University, Stanford, Colombian, Michigan, Wisconsin Madison University, Chicago University, Florida University, MTI, Washington University and University of Washington D.C.), total income of universities from the sale of licenses for the year an average of 230 million dollars. while expenses – 34 463 million. So, during one year these universities got net profit

of 195,177 million dollars and more than a half of this money belonged to the first three universities, namely, Californian University got 45,232 million dollars of profit from license operations, Stanford got 41,446 million dollars, Colombian University got 37,724 million dollars, which respectively makes no less than  $\frac{1}{4}$  of all the profits gained by these universities [9, page 49]. In 1998 additional profit from license activity of all the American universities made 725 million dollars, American economy gained 33,5 billion dollars profit and created 280 thousand workplaces from implementation of 7 469 new university licenses [10, p. 49].

Among the programs for innovative business support, which have more than a 20-year old history in the USA, there is one called SBIR (Small Business Innovation Research Program) launched after the acceptance of the Act of development of small innovative business (Small Business Innovation Research Act) in 1982. In 1992 the program was amended and prolonged till the year 2000. It is being realized now too. Within the framework of this Act another program called "Small Business Technologies Transfers" (STTR) was established. The SBIR program is urged to provide small business with the start capital and maintain participation in RAD, financed by the government. Besides that, within the recent years a great value is given to development of commercial additions of working results, that have been created due to SBIR financial support. In this program the state acts as kind of venture capitalist, investing in high-risk projects. Those state agencies whose budget expenditures on RAD exceed 100 million dollars per year have to bring financial contribution to the program. At the moment 11 federal agencies take part in the program. In 1992 agencies had to transfer 1.25% of their budget on RAD in support of small business within the framework of SBIR, in 1993-94-s this number made 1.5%, later in 1995-1996 – 2%; and in 2012 the percent of compulsory assignments reached 3.5%. Thus, each agency has its own scientific priorities and in accordance with them money is allocated within SBIR program. The program consists of three stages. On the first stage that lasts no more than half a year, small firms-applicants have to show the capability of the innovation offered to meet previously declared requirements of federal agency. Financing at this stage doesn't exceed 100 thousand US dollars. At the second stage that lasts 2-3 years a small enterprise has to create a product prototype. Financing allocated for these purposes equals 750 thousand US dollars. Third stage is a product commercialization. At this stage the state doesn't provide financing any more. As the program developed, its monitoring became stricter as well. Since 1996 all small firms that got support within SBIR framework have to report about their achievements (received both by means of this program, and at the expense of other sources), – such as the amount of sums for commercialization of scientific results, the profit from new production sales. Since 1997 one more criterion that allows evaluation of previous results even at the stage of project implementation has been introduced: firms which received financing at the second stage of the program, had to make the annual report on the other, except for SBIR, sources of financing and their profit from new product sales [11, p. 103].

Practice showed that the companies need 5-9 years on average to develop the project from the concept till it becomes a commercial product. In four years after the financing stops, at the second stage of the program about 12% of the supported firms are able to commercialize the results of RAD work. The SBIR program efficiency evaluation is quite inconsistent. Thus, it should be noted that no systematic evaluation of the results was carried out and all the conclusions are based on the analysis of data on rather casual

circle of the companies-recipients of financial support. Therefore, the results of comparative research of 513 companies which got the SBIR grants were published and those of 185 companies, whose applications were declined and those of 79 companies, which meet the requirements of the program, but didn't submit their applications. Calculations showed that the more grants the company gets within the framework of this program, the less it spends by its own on RAD. So, the classical effect of replacement of private expenses by the state ones takes its place [11, p. 121]. The aim of the program was absolutely opposite – to support the small companies, so that they increased their own expenses on RAD.

At the same time data on 50 most commercially successful companies, supported within the program, testify that the state investments are completely paid off. Thus, total sales volume of these companies made 9.1 billion US dollars that is 30 times more than the amount of financing, allocated at that time within SBIR program. Private investments attracted by these companies at the third stage made 963 million US dollars that exceeded the program cost by three times. The amount of workplaces grew due to the activity development of these companies from 1254 up to 10287.

At present time the discussion around the program has risen on whether it is possible to evaluate the program results by the number of "brought-up" leading companies and volume of the initial expenses compensated by them later. The point of view that such evaluation is disoriented gets more and more popularity, since the assignment of such programs is to support not those projects and firms that would get financing from private sources as a result of commercial attractiveness of their projects, but those firms which couldn't present any interest for the private sector at the stage of their program appeal, due to a high risk put into their offered projects. Then the indicators of "success" will be much lower, but it will testify in favour of the fact that the most risky projects has been chosen for financing. Otherwise the financial burden is transferred from private into the state sector that, in fact, means inefficient use of public resources. The same argument is set upon the ANVAR program, one of the most known initiatives of the small business support realized in France.

ANVAR (ANVAR – Agence Nationale de Valorisation de la Recherche) – is a National agency on increasing the innovative attractiveness of scientific researches. It is a governmental agency with industrially commercial status which was found in 1979 for providing assistance for innovative activity in the industry of France, mainly in the sector of small and medium business. This status means that ANVAR acts as independent concern, but its mission is defined by the government and the government provides the main assets to the program funds. ANVAR acts under the auspices of several ministries which are responsible for industrial issues, scientific researches and those concerning the sector of small and medium-sized enterprises. The ANVAR's annual budget makes about 215 million euros. Within ANVAR framework several initiatives are developed. Thus, ANVAR gives financial support to the innovative enterprises and research laboratories, in two main ways. One way of support is the interest-free loan for the period of up to 5-6 years which is the subject to return in case of successful project implementation and which covers up to 50% of general expenses, connected with the innovative project implementation or the project on technology transfer. The second way is giving the grants for the sum of up to 38 000 euros. Financing can be used for preparation and finishing of innovative programs, founding the innovative companies, increasing the technological level of small and medium-sized enterprises (by involving the researchers, re-

ceiving and using the scientific and technical information etc.), as well as incentive for wider participation of small and medium-sized enterprises in the European projects of technological cooperation within the EUREKA organization or within other regional or international initiatives. ANVAR has 24 regional offices and the project selection for financing is made by their employees, taking into account economic, technical and financial indicators of the applications. According to the ANVAR agency data, within 10 years it gives support to, on average, 20 000 companies and laboratories, and also gives financing to 34 000 technology-based innovative projects of total cost of 3 130 000 000 euros. Thus, in accordance with the conducted in 2012 evaluation of ANVAR activity by foreign experts, from 40% to 50% of loans granted come back on average. It causes disturbance and compels to discuss the vectors of improvement of agency's activity now. In particular, the question about the effectiveness of requirement to return the money for only those organizations, whose projects were commercially successful is disputable, as well as whether it stimulates the dependant mood among the small enterprises, which can be engaged in "decumulation" of finances under such circumstances.

In Canada the program of assistance to industrial researches (Industrial Research Assistance Program – IRAP) was initiated by the government [13] within which the strategy concerning incentive of the Canadian small innovative enterprises is realized. The program provides 150 million US dollars a year and each project lasts 5 years on average. The program also provides strategic access of small enterprises to information, resources and financing, so that they could commercialize the results of their developments. In 2011-2012 the support was given to more than 5500 projects, connected with industrial development, and in overall the program helps 12,000 Canadian small firms to increase their innovative potential. Innovative risks for small enterprises decrease because the program network has more than 260 industrial and technology advisers, 140 partner organizations at a regional level, known as "members of the network" and more than 1,000 of participants inside the Canadian Technology Network. Small companies which took part in IRAP, have by 20% higher level of survival in comparison with those small enterprises which weren't given any support from the government.

In Sweden support of small technology-based companies is carried out through the Swedish Industrial Development Fund (IDF) [14]. The fund carries out crediting and directs investments in the small firms whose production belongs to priority branches of technologic development (information and communication technologies, natural sciences, industrial technologies), and has the number of employees up to 250 people and turnover up to 400 million SEK. (59 million US dollars). For getting the loan, the small firm needs to show that the project has good commercial prospect and high level of management. The overall cost of the project must be no less than 4 million SEK (590 thousand dollars). The IDF credit can cover up to 50% of overall cost of the project. The interest rate of the credit is evaluated on a market basis. IDF offers different schemes, including converting of the credit into the share of the company on condition of successful development of business. IDF can carry out the investment at different stages of project development (seed stage, initial, and at the stage of expansion of the company). For getting the seed capital, the company has to prove that the project contains unique idea which has obvious potential of commercialization. Very important aspect is demonstration of potential of a new business in terms of market expansion. Intellectual property rights on basic technologies have to belong to the company.

By doing this, IDF doesn't provide grants (free financing). First of all IDF is interested in technology-based companies that came out of universities. The sum of initial investment request has to range from 250 thousand SEK (37 thousand dollars) up to 2 million SEK (293 thousand dollars). By today IDF has made investments into more than 300 companies; the Fund possesses shares for the sum of about €390 million and investments for the sum of €210 million.

In People's Republic of China till 1998 the service of technology transfer existed only in two universities (Tsinghua University and Beijing University). Today each big research university has its service of technology transfer. These structural divisions are financed by the government of China at the expense of general expenditures share, allocated to university. However, nowadays this organizational model is being changed. The majority of services on technology transfers act as associable private companies which belong to universities [15].

Besides, during the last years the tendency for creation of interstate networks of innovative activity is being observed. The most successful is activity of the European association of business-angels, whose structure includes over 200 organizations, including 150 business and innovative centers located in 27 countries. The innovative infrastructure functions in Russia too, where 70 technology parks already function and about 50 thousand small technology-based firms function in the sphere of science and technology; the system of venture investment is being created. In the Russian Federation the bill "On Commercialization of Technologies" is developed. Its main objective is stimulation of commercial use of technologies created in the state scientific organizations. Law scope is the results of scientific researches received at the expenses of (or due to using) budgetary funds, start-ups and mechanisms of joint state-private partnership in the scientific and technical sphere.

Assignment of the bill:

- to introduce the rules of law that are defined by commercialization tasks as one of the elements of the state scientific organizations activity and higher education institutions;
- to develop rules and participation ways of research and development organizations (RDO) in founding of small innovative enterprises;
- to allow to use the profit from commercialization of technologies for development of scientific researches in RDO;
- to develop the commercialization infrastructure in RDO and in higher education institutions, as well as in the ministries and agencies [16, p. 21].

In Ukraine the current system of innovative business operating is organizationally imperfect, complicated, confused, opaque and has all the characteristics of being under development. In the scientific sphere an integral research process is still artificially divided into 3 categories (sectors): fundamental, departmental and high school science. It generated overlapping and weakening of scientific researches. Shortage of financing both state and private is the main problem of commercialization of inventions which are potentially competitive. Unique results of national developments and researches go abroad, since the policy of our state is far from the desirable one in terms of giving support to the inventors and implementation of their achievements nowadays. In 2013 the budget allocated only 321452,2 thousand UAH on research, scientific and technical development, conducting of work on the state target programs and state order, implementation of international scientific and technical programs and projects by higher education institutions and scientific institutions, financial support of scientific infrastructure and scientific objects, that make national heritage as well as medical care of Cri-

mean astrophysical observatory employees, that is by 242927 thousand UAH less than in the previous year [17].

The issue state regulation by means of commercialization of intellectual property in Ukraine at the moment relates to the following: whether Ukraine exists as the country with its own full-fledged immaterial assets of the objects of intellectual property, which make a high value added and its share in the national gross product (as it successfully performed in the developed countries), which considerably increase its capitalization or its separate parts become the object of external management of those countries where the market economy is already functioning (as it happens in the poorest countries of Africa and Latin America). To avoid the last option, it is necessary to create from scratch the immaterial economy with the developed legal system and intellectual property, which would be connected with manufacturing the products of scientific and technical progress.

Therefore, the main ways of incentive of commercialization of intellectual property are:

- providing the priority of the state support of science and development of high technologies, making the expenses on scientific research and development reach the level of 1,8% of GDP (in 2013 in Ukraine they allocated 0,43% of GDP for scientific research and development, while in the countries of European union this figure made 3%) [18].
- improvement of founding and use of branch innovative funds in terms of carrying out and commercialization of innovations;
- formation of regulatory base of functioning of the system of innovative venture project financing;
- development of small innovative business by creating the favorable conditions for its establishment and functioning;
- providing financial support for patent and inventive activity, assistance in protection of intellectual property and support of the rights on it both in Ukraine and abroad;
- improvement of the system of incentive of the processes of creation and use of innovative products;
- involvement of the objects of intellectual property into economic turn, carrying out their inventory and providing their reliable protection from unauthorized use;
- acceleration of infrastructure development that provides commercialization of the results of innovative activity;
- development of information infrastructure, providing assistance to the research organizations in their access to information networks and databases.

For innovative business incentive it is necessary to introduce the new principles of organization the scientific activity. Such principles are:

- legal support of two forms of ownership on the scientific results: state and private. Results of the research have to be protected by patents or licenses with which would allow to enter the market of scientific production;
- functional union of scientific organizations and higher education institutions that will promote consolidation of scientific efforts as well as material and information base in the research structures;
- transformation of scientific schools headed by leading scientists into the main organizational form of science development. The principle of scientist's professionalism should prevail, as he is the generator of scientific ideas and deeply knows the theory and methods of research and also has a rich experience of management. It is the research supervisor only, but not the official-administrator, who should make the distribution of available resources, which will significantly reduce the official structure in the scientific sphere. New management organization of scientific activity has to provide: overlapping elimination in the state management of science by establishing a common all-Ukrainian body which has to direct scientific researches, developments and introduction of innovations, and innova-

tive business in overall; formation of directions of scientific researches as the state programs, proceeding from requirements of national economy and considering the opportunities of national education and scientific institutions; formation of orders for preparation of scientific staff through postgraduate study and doctoral studies; formation of scientific coordination councils in the regions on the basis of leading scientific establishments of higher education institutions; formation of the relevant volume of financial resources necessary to perform the state programs of innovative development; carrying out the inventory of scientific and innovative potential of the country; formation of the new administrative organization unit – scientific and educational unions; establishing the centers for collective use of the scarce equipment and material base for experimental works; monitoring legislation implementation concerning the innovative business and preparation of necessary amendments to the current legislation. It is necessary to introduce the establishment of profile research structures, flexible systems of interaction of educational and research structures of several higher education institutions etc.

The abovementioned actions have to serve for the improvement of Ukrainian science, increase its productivity, and make the practical introduction of the received results more widespread.

**Conclusions and prospects of further research on the problem.** In the last decades while there was an establishing process of Ukraine as a country, some new tendencies appeared in the world; new relations between scientists and society were made. Earlier science was giving the answers to the question of how it is possible to resolve this or that problem, today society demands that science predict the problems to arise soon and find the solutions. Today in Ukraine there are no necessary conditions for commercialization of intellectual property, the mechanism of the state support of promotion national objects of intellectual property to foreign markets is almost absent, protection of the rights on these objects abroad is not legally regulated. Those inventions made within RAD framework are generally used only by one organization, as a rule, by the one to develop them. Technical universities lack the structures to provide commercialization of inventions. The reason is poor organization of scientific and technical sphere, its inability to function in market conditions, limitation of financing, low level of economic knowledge of the innovators. Commercialization of intellectual property is an important stage in the process of innovative activity. Due to commercialization, the results of research turn into goods and find their realization in the sphere of industry. This article covers the concept of process of commercialization of intellectual property, emphasizes the stages of commercialization and its characteristic features. It gives the definitions of this term by different authors; the author's own definition is offered as well. Both foreign and Ukraine market realization peculiarities of the results of scientific development are defined. Certain legislations in the sphere of industrial property and innovative activity are considered and some shortcomings that cause ambiguity and inconsistency of its separate provisions are found. On this basis certain conditions of establishing organizational economic mechanism of commercialization of scientific and technical development in Ukraine are detected.

Our government needs a systemical approach to resolving this problem and concentrate its attention on organization and financial issues of activity of scientific and technology complex of Ukraine, that are driving factor in the innovative development of the state economy. Thus, it is reasonable to direct further researches on resolution of the problem of improvement of organization of use and

commercialization of scientific achievements, increasing the efficiency of scientific and technical activity because they remain those of the most essential for economic and social development of the country.

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### ДЕРЖАВНЕ СТИМУЛЮВАННЯ КОМЕРЦІАЛІЗАЦІЇ ІНТЕЛЕКТУАЛЬНОЇ ВЛАСНОСТІ

*У статті викладено розуміння суті процесу комерціалізації та виявлено її характерні риси. Визначено основні напрямки державного стимулювання комерціалізації інтелектуальної власності. Наведено механізми державного регулювання, застосування яких може бути доцільним в українській практиці.*

*Ключові слова: комерціалізація, інноваційна діяльність, інтелектуальна власність, науково-технічні розробки.*

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### ГОСУДАРСТВЕННОЕ СТИМУЛИРОВАНИЕ КОММЕРЦИАЛИЗАЦИИ ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ

*В статье изложено понимание сути процесса коммерциализации и выявлены ее характерные черты. Определены основные направления государственного стимулирования коммерциализации интеллектуальной собственности. Приведены механизмы государственного регулирования, применение которых может быть целесообразным в украинской практике.*

*Ключевые слова: коммерциализация, инновационная деятельность, интеллектуальная собственность, научно-технические разработки.*

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### STATISTICAL ESTIMATION OF THE GREEN GROWTH IN UKRAINE

*A set of indicators proposed by the OECD that assesses economic opportunities arising from the green growth as well as helps policy-making concerning environmental issues, in particular indicators on technology and innovation, production and consumption of environmental goods and services, environmentally related prices and transfers as well as associated to green growth financial flows, have been studied in detail in this article. The results of the comparison analysis of the application of the abovementioned indicators by the Czech Republic, Denmark, Germany, the Netherlands and Korea are presented in the article. Based on the performed analysis possible application of the proposed by OECD set of indicators to the Ukraine's national context has been explored. Proposed set of green growth indicators can be applied in Ukraine, however further development is required to enhance the statistical data accounting and availability. Among the main challenges to the implementation of such system in Ukraine is the lack of data as well as medium compliance of the Ukraine's Environmental Accounts with the European regulation, which complicates the development of national policy towards green economy and the international comparison.*

*Keywords: green growth; green economy; indicator; economic opportunity; policy response.*

**Introduction.** An extensive use of the environmental resources over the last few decades, the intention of the governments to reach the target of economic growth by no means has led to partial loss of biodiversity, climate change and deterioration of life conditions in certain areas. Years of academic research and political discussions resulted in the international agreement for an alternative path of development that is sustainable development. Establishing a clear system of environmental accounting has become a key for a transparent policy-making system. According to the final report of United Nations Economic

Commission for Europe Ukraine's Environmental Accounts are partially compliant with the European regulations [1]. Therefore there is a need to reform the environmental accounts in order to provide a proper evaluation of the natural asset base and changes in it.

It is established that sustainable development cannot be achieved under the current pattern of consumption; therefore an alternative way of organising the economic activity, in particular green economy, has been proposed. Green economy aims for improved human well-being and social equity, while significantly reducing environmental