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FORMATION OF THE REGION'S INTELLECTUAL CAPITAL

ФОРМУВАННЯ ІНТЕЛЕКТУАЛЬНОГО КАПІТАЛУ РЕГІОНУ

Summary. Formation of the intellectual capital of a region is an important condition for ensuring its sustainable socio-economic development. The article discusses the essence of intellectual capital, its structure, key components and impact on the investment climate of a region. We focus on the relationship between human resources, innovation potential and information technologies, which together form the basis for regional development in a global competitive environment. Particular attention is paid to the analysis of external and internal factors that influence the effective formation and use of intellectual capital. These include the quality of education, the level of qualification of labour resources, the presence of innovative enterprises, the development of research infrastructure and access to information resources. We note that the creation of favourable conditions for intellectual development contributes to the competitiveness of regions at the national and international levels. The article analyses the main approaches to managing the intellectual capital of a region, including the need for intersectoral cooperation, public-private partnerships and intensification of innovation activities. It is determined that investments in education, science and technology are critical for the formation of an effective development model. The practical aspects of integrating intellectual capital into regional development strategies are also considered. The article emphasises that success in this area depends on the coordinated cooperation of all stakeholders: the state, business, scientific institutions and the public. The article offers recommendations for improving the mechanisms for supporting the intellectual potential of regions by stimulating innovation, improving the quality of education and forming a digital infrastructure. The article is of practical value for researchers, managers and government officials involved in regional development. The conclusions and recommendations can be used to develop regional development strategies aimed at ensuring the efficient use of intellectual capital.

Keywords: intellectual capital, region, factors of influence, development, levels, provision, formation.

Formulation of the problem. In today's conditions of the national economy, important tasks of socio-economic development at the regional level are to increase the efficiency of human capital use, create favorable conditions for the generation and distribution of unique intellectual products with a priority focus on their innovative nature.

Intellectual capital is the resource basis for innovation, providing it with the necessary level of research and development. The development of education, research and innovation contributes to the overall economic recovery of the region through a multiplier effect on the development of other sectors.

The first attempts to apply the concept of intellectual capital as a factor in the development of the educational sphere at the regional level are associated with the study of the impact of knowledge and intellectual resources on the economic development of countries, the definition of indicators, indicators that can reflect the strength of this impact.

Analysis of recent achievements and publications. A significant number of scientific works by both domestic and foreign scholars have been devoted to the study of intellectual capital. Ukrainian economists have made a

significant contribution to the study of the essence of intellectual capital and its main structural elements: A. Chukhno, O. Butnik-Siverskyi, Y. Vorobei, I. Davydova, D. Zvirgzde, M. Paladii, I. Pominova, O. Popelo, etc. Ensuring intellectual capital is inextricably linked to the results of scientific research by foreign researchers, namely: L. Edvinson, M. Malone, K.E. Swayby, N. Bontis, N. Dragonetti, K. Eisenhardt, G. Roose, B. Lundvall, S. Borras, T. Stewart, D. Tice, etc. At the same time, the economic literature pays insufficient attention to the analysis of the problems of intellectual capital in the context of socio-economic development of the educational sphere.

Therefore, **the purpose of the article** is to identify patterns and study the factors influencing the formation of intellectual capital of a region in the context of its socio-economic development.

Presentation of the main material. In our opinion, the process of transforming intellectual potential into intellectual capital, as well as the movement of intellectual capital from one hierarchical level of the economy to another, is continuous and cyclical and is associated with the creation and dissemination of innovations (Figure 1).

In its most general form, intellectual capital at the macroeconomic level is the aggregate of the intellectual capital of regions; intellectual capital of regions is the aggregate of the intellectual capital of enterprises; intellectual capital of enterprises is the aggregate of the intellectual capital of individuals. Thus, the quality of the intellectual capital of the country as a whole and of regions in particular depends on the quality of the intellectual capital of each individual.

Intellectual capital at the individual level, which is most often called human capital, is formed throughout life: in the process of sensory and rational cognition of subjects, education, study and perception of culture, accumulation of knowledge, training and mastering educational programmers, gaining professional experience, advanced training, etc. A person endowed with certain knowledge and skills to reach the working age (in some cases earlier) and find employment becomes part of the intellectual capital of an enterprise.

Organizational level intellectual capital, in addition to human capital itself, includes its derivatives – intellectual property and various kinds of formalised knowledge that can be traded and exist independently. In addition, intellectual capital includes a company's business relationships, databases, brand, etc.

One of the characteristics of the intellectual capital of a regional or national economy is the created conditions for intellectual activity, which is referred to as the «intellectual climate of the region». Such conditions include the level of funding for education, research and development, information and communication technologies, digital economy, as well as the state of educational and innovation infrastructure, material and technical support for research and educational activities.

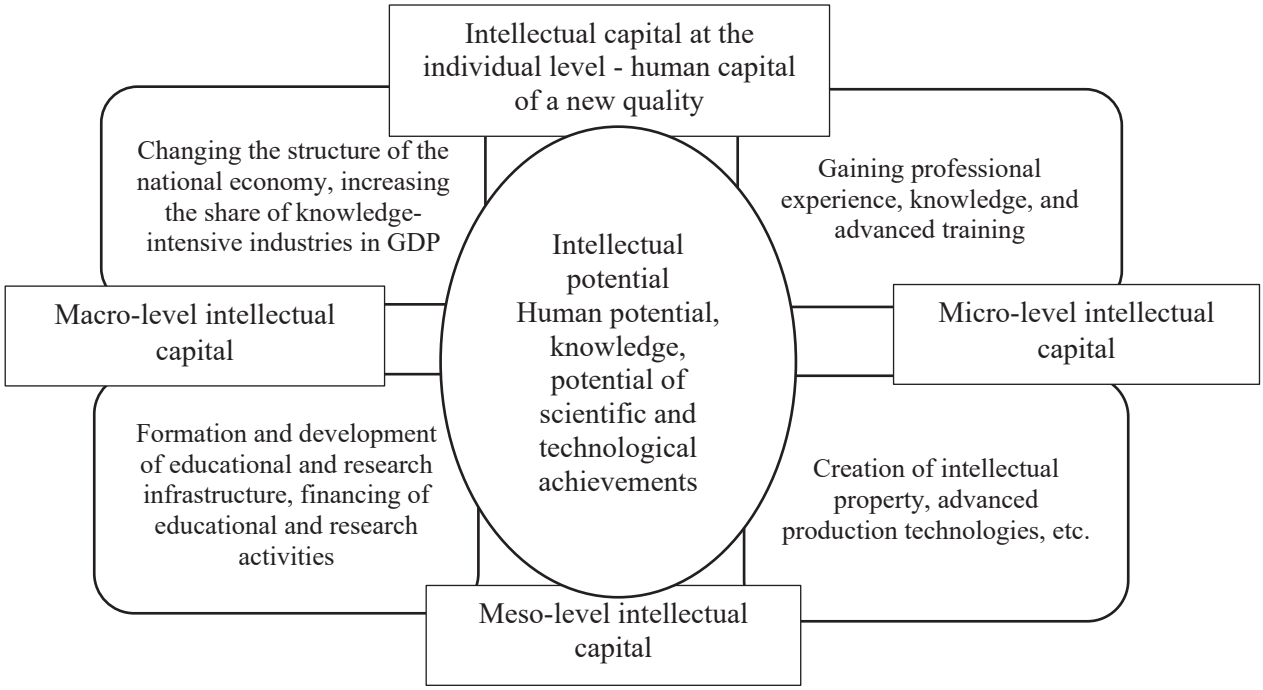

Figure 1. Intellectual capital transformation cycle

It should be noted that the state's attention to creating a favorable intellectual climate is constantly growing. Thus, among the strategic goals of the state are the following: socio-economic development of the educational sphere; accelerated introduction of digital technologies in the economy and social sphere; outstripping the increase in domestic spending on research and development from all sources compared to the country's GDP growth; creation of advanced infrastructure for research and development and innovation activities [1].

In the study of the intellectual climate of a region, an important place is occupied by the study of the regional innovation system actors whose activities are focused on the creation, exchange, transformation and implementation of new knowledge in the form of technological and other innovative products. These entities include research organizations, universities, business incubators, technology parks, expert and consulting bureaus, patent offices, start-up financial support institutions, etc.

In addition, an important place is given to the formation of innovation clusters, the integration of universities and research organizations and their cooperation with organizations operating in the real sector of the economy.

The intellectual climate of the region is shaped mainly by the part of the population involved in research and development activities (researchers with academic degrees; personnel engaged in research and development). The direct embodiment of the region's intellectual climate is research and development, scientific publications, patents and other intellectual property results that serve as the resource basis for innovation.

Intellectual capital at the macroeconomic level is essentially the same as intellectual capital at the mesoeconomic level, as it is divided only on a territorial basis. The difference is in the management entities, competences, and tasks for managing intellectual capital.

Taking measures at the national level to develop intellectual capital by increasing funding for the research and education sector, developing state programmers in the field of science and innovation contributes to the creation of a favorable intellectual climate and the development of intellectual potential, which, in turn, affects the state of intellectual capital and facilitates its transition to a qualitatively new level, and also affects the intellectual capital of other levels of the economy.

The above transformation of intellectual capital from one hierarchical level to another, accompanied by its qualitative changes, is continuous. In this regard, the definition of the boundaries of intellectual capital of an individual, enterprise, region, country is in a certain sense conditional, but allows for a more detailed consideration of the features of intellectual capital at different levels, and determination of the most appropriate management approaches.

Each level of socio-economic development of the educational sphere as a guarantee of intellectual capital has its own peculiarities. The tasks of the individual level include the following:

– accumulation of knowledge as a result of passive interaction with the world around us and active, purposeful study of a particular subject area in order to develop intellectual abilities;

– obtaining education of various levels through the development of state educational programmers to improve literacy and demand in the labor market;

– accumulation of work experience, improvement of knowledge and skills, professional development for career growth and job retention;

Upskilling (or retraining) to further use the acquired knowledge and skills in the workplace, and to increase social mobility.

It is important to note that the efforts made by an individual to develop intellectual capital are focused mainly on the development of personal abilities, skills, and professionalism, and their application in the work of research teams or as part of the intellectual capital of regional enterprises contributes to the creation of intellectual products and innovations.

At the same time, the quality of the intellectual capital of the population as a whole and of individuals in particular determines the state of the intellectual capital of the organizational, regional and national levels. That is why among the strategic goals of the state in the context of socio-economic development of the educational sphere, along with the need for breakthrough scientific and technological development, an important place is given to creating comfortable conditions for self-realization and unleashing the talent of each person. In addition, the strategic objectives of the state include the following: creating conditions for the early development of children under the age of three; forming an effective system for identifying, supporting and developing abilities and talents in children and youth; forming a system for continuous updating of professional knowledge and skills by working citizens [1].

Considering the organizational level, it should be noted that the tasks of enterprises that are part of the regional innovation system and other enterprises differ significantly. However, it is possible to identify common tasks related to the formation of intellectual capital that are inherent in most enterprises:

Building a strong human resource potential to achieve the strategic goals of the enterprise;

– continuous updating of employees' professional knowledge and skills to perform work of greater complexity and volume, and to produce goods, works and services of appropriate quality;

– encouraging innovation and creativity in work (for intellectual organizations);

– implementing advanced management, organizational and technological solutions to increase labor productivity and upgrade fixed assets;

– establishing stable relations with counterparties, promoting a positive reputation, and creating a brand.

The tasks of shaping the intellectual climate of the region include the following:

– creating conditions for a favorable intellectual climate;

– development of educational and scientific infrastructure, increase in funding for educational and research activities;

– stimulating and supporting research initiatives;

– development of regional programmers aimed at developing science, education, information and communication technologies;

– promoting the integration of universities, research organizations and organizations of the real sector of the economy [1];

– monitoring the state of the educational system, research and development, information and communication technologies.

The tasks of forming intellectual capital at the national level are more global, determining the vector of intellectual capital development at all other levels of the economy. The tasks at this level, in addition to the list of regional tasks, include the following

Creating institutional conditions conducive to the formation of an effective educational and scientific sphere;

– development of national programmers, concepts, and strategies for the development of the research and education sector;

– improvement of legislation in the field of intellectual property;

– ensuring the competitiveness of Ukrainian education at the global level;

– formation of advanced infrastructure of scientific research and development, creation of world-class scientific centers [1];

– changing the structure of the national economy towards increasing the share of knowledge-intensive industries in GDP and reducing the share of raw material sectors of the economy;

– promoting the acceleration of the country's technological development, the introduction of digital technologies in the economy, and the transition to an innovation-based economy.

According to [3–5], the role of the private sector in the national innovation system is to develop technologies based on its own research and to market innovations. The role of the state is to promote the production of fundamental knowledge, create infrastructure and favorable conditions for innovation.

In our view, the issues of socio-economic development of the educational sector are mainly the responsibility of public authorities and are related to the search for ways to accelerate economic development in the face of limited resources, while enterprises are the leaders of economic innovation. The innovative development of a country directly depends on the state of the intellectual potential of the population, but the state has only indirect methods of influencing the intellectual potential.

An important role in shaping the region's intellectual potential is played by the educational system, which lays the foundation for further productive intellectual activity. The presence of prestigious higher education institutions in the region facilitates the inflow of talent, which may later form a significant part of the region's intellectual capital. The level and quality of education affect the ability of the population to perform intellectual work of high complexity, while the presence of knowledge-intensive industries and a developed intellectual labor market in the region determine the demand for intellectual professions in the region.

The creation of intellectual products in the region is directly related to the activities of research organizations. However, it is important to note that the positive impact on the formation of the region's intellectual capital is not so much the production of new knowledge as its productive use.

Indirect factors in the formation of the region's intellectual capital include the quality of medical services, availability of cultural institutions, accessibility of sports facilities that determine the standard of living of the region's population, as well as historically formed features of the national mentality (for example, a tendency to innovation and transformation or to borrowing and transfer).

Based on the above, it can be concluded that the intellectual capital of a region is a factor in the formation of regional innovations, and at the same time, innovations are one of the embodiments of the intellectual capital of a region. In turn, the intellectual capital of a region is a factor of economic development of the region along with other factors that directly or indirectly influence

through innovations created on the basis of the intellectual capital of the region. By a factor we mean «a driving force, a resource of any process, a phenomenon, a defining character or certain features of this process» [3].

It should be noted that the presence of a developed intellectual capital of the region is a necessary but not sufficient condition for the implementation of innovation activities, which mainly depends on the material and technical base, level of financing, regulatory framework, developed infrastructure of innovation activities, just as the intellectual capital of the region and innovations created on its basis are a necessary but not sufficient condition for sustainable economic development of the region.

Let us consider in more detail the scientific approaches to the study of factors of socio-economic development of the region's educational sphere. The first group of factors includes the following: availability of natural resources, favorable transport and geographical location, which reduces costs and simplifies the transfer of innovations. The second group of factors includes: agglomeration effect, which provides economies of scale; developed infrastructure; human capital; institutions that contribute to the improvement of the business climate, growth of social mobility, and the spread of innovations.

M. Porter identified labor, natural resources, communications, science and education as the main factors of territory development [2].

The author separately identified a group of indirect factors, which include political, legislative, social, and geographical factors [3].

Based on the existing research experience, the author identifies the main factors of ensuring the intellectual capital of the region, innovations, as well as factors of socio-economic development, their correlation and interconnection (Figure 2).

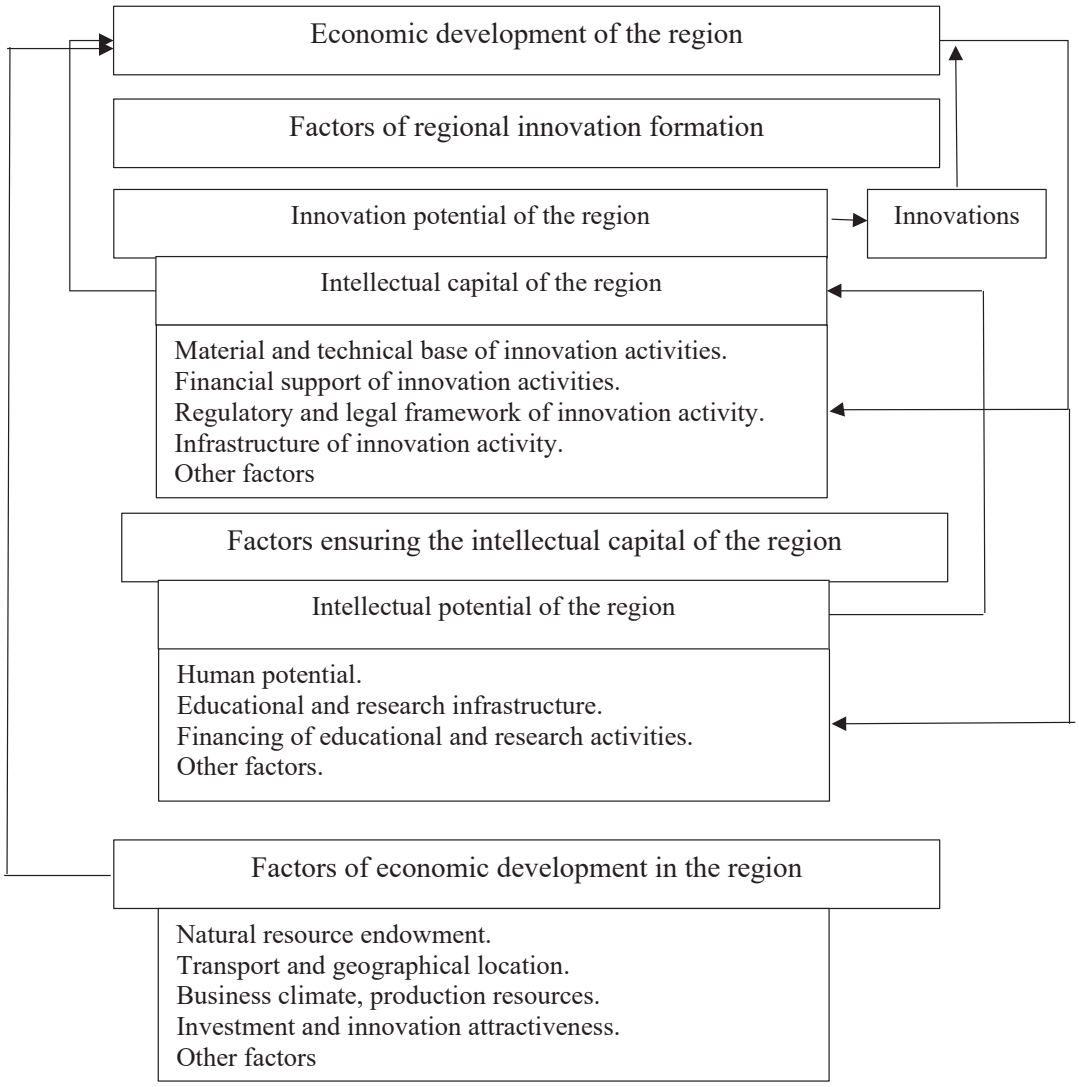

Figure 2. Factors of regional intellectual capital, regional innovations, regional economic development and their correlation

We can see that the economic development of a region depends on many controllable (partially controllable) factors, including the region's intellectual capital and innovations, and uncontrollable factors (natural resource endowment, transport and geographical location). Since the intellectual capital of a region can be implemented in various sectors of the economy (industry, agriculture, construction, healthcare, education, etc.) that are not directly related to the creation and dissemination of innovations, it can both directly influence the level of economic development of the region and indirectly through innovations created on its basis.

Conclusions. The intellectual capital of a region is formed under the influence of human potential, the created scientific and educational infrastructure, the level of financing of research and development activities, and other factors. In turn, the intellectual capital of a region, along with other factors of innovative development, influences the formation of regional innovations.

One of the most common approaches to the decomposition of the intellectual capital of a region is a three-component structure, which includes human, relative and structural capital. It has been found that the main focus of scientists in the study of the structure of intellectual capital is on human resources and the results of intellectual activity

The application of the concept of intellectual capital at the regional level is possible on the basis of adaptation of its provisions to the goals and objectives of regional and national socio-economic policy, the key of which is breakthrough scientific, technological and socio-economic development.

Understanding and accounting for the processes of formation, accumulation and use of the region's intellectual capital plays an important role in the development and improvement of regional socio-economic policy.

Management of the region's intellectual capital involves creating favorable conditions on the part of regional authorities that will facilitate the effective transformation of the region's existing intellectual potential into specific scientific results and innovations that are in demand by the market and can contribute to the region's economic development. Therefore, it is necessary to develop approaches to managing the intellectual capital of a region that are consistent with the development strategy of a particular region. An important place in this issue is occupied by the methodological support for the assessment of the region's intellectual capital, which may be a promising area of research.

References:

1. Bazylevych V.D. (2014) Intelektualna vlasnist [Intellectual property]. Kyiv: Znannia.
2. Bazylevych V.D. (2017) Liudynotsentrychnist paradyhmalnykh zrushn v ekonomichnii teorii XXI st. [Person-centered paradigm shifts in the economic theory of the XXI century]. Paradyhmalni zrushennia v ekonomichnii teorii XXI st. Kyiv: KNU im. T. Shevchenka, pp. 15–20.
3. Virchenko V.V. (2012) Evoliutsiia pidkhodiv do vyznachennia sutnosti ta strukturuvannia intelektualnoho kapitalu [Evolution of approaches to definition and structurization of intellectual capital]. *Visnyk KNU imeni Tarasa Shevchenka. Seriya "Ekonomika",* no. 136, pp. 25–30.
4. Vorobei Yu.M. (2016) Sutnist, struktura ta funktsii intelektualnoho kapitalu kompanii [The sense, structure and functions of the company's intellectual capital]. *Young Scientist*, no. 4(31), pp. 39–43.
5. Davydova I.A., Brezhnieva-Ermolenko O.V. (2009) Do pytannia pro henezys teorii intelektualnoho kapitalu [To the question of genesis of the intellectual capital theory]. *Visnyk of V.N. Karazin Kharkiv National University. Seriya "Ekonomika",* no. 869, pp. 10–13.
6. Klymovych N.I. (2014) Evoliutsiia pohliadiv na poniattia «intelektualnyi kapital» [Evolution of Views on the "Intellectual Capital" Notion]. *Business inform* (electronic journal), no. 2, pp. 215–219.
7. Kozynets H. (2013) Struktura intelektualnoho kapitalu [The structure of intellectual capital]. *Naukovi pratsi Kirovohradskoho natsionalnoho tekhnichnoho universytetu. Ekonomichni nauky*, no. 23, pp. 272–278.
8. Mykhailyshyna D. (2018) Dolia vypusknyka. Yaki faktory vplyvaiut na rezultaty ZNO [The fate of the graduate. Which factors influence results]. VoxUkraine (electronic journal). Available at: https://voxukraine.org/longreads/zno/index.html
9. Paladii M. (2010) Transformatsiia intelektualnoho kapitalu v materialni ta dukhovni blaha – osnova innovatsiinoho rozvytku natsionalnoi ekonomiky [Transformation of intellectual capital into material and spiritual goods – the basis of innovative development of national economy]. *Intellectual property*, no. 11, pp. 11–15.

Література:

1. Базилевич В.Д. Інтелектуальна власність : підручник ; 2-е вид. Київ : Знання, 2014. 431 с.
2. Базилевич В.Д. Людиноцентричність парадигмальних зрушень в економічній теорії XXI ст. Парадигмальні зрушення в економічній теорії XXI ст.: матеріали III міжнар. наук.-практ. конф., 2-3 листопада 2017 р. Київ : Київський університет, 2017. С. 15–20.
3. Вірченко В.В. Еволюція підходів до визначення сутності та структурування інтелектуального капіталу. *Вісник Київського національного університету імені Тараса Шевченка. Серія «Економіка»*. 2012. № 136. С. 25–30.
4. Воробей Ю.М. Сутність, структура та функції інтелектуального капіталу компанії. *Молодий вчений*. 2016. № 4(31). С. 39–43.
5. Давидова І.А., Брежнєва-Ермоленко О.В. До питання про генезис теорії інтелектуального капіталу. *Вісник Харківського національного університету імені В.Н. Каразіна. Серія «Економіка»*. 2009. № 869. С. 10–13.
6. Климович Н.І. Еволюція поглядів на поняття «інтелектуальний капітал». *Бізнес Інформ*. 2014. № 2. С. 215–219.
7. Козинець Г. Структура інтелектуального капіталу. *Наукові праці Кіровоградського національного технічного університету. Серія «Економічні науки».* 2013. Вип. 23. С. 272–278.

8. Михайлишина Д. Доля випускника. Які фактори впливають на результати ЗНО. VoxUkraine. 2018. URL: https://voxukraine.org/longreads/zno/index.html

9. Паладій М. Трансформація інтелектуального капіталу в матеріальні та духовні блага – основа інноваційного розвитку національної економіки. *Інтелектуальна власність*. 2010. № 11. С. 11–15.

Анотація. Формування інтелектуального капіталу регіону є важливою умовою забезпечення його стійкого соціально-економічного розвитку. У статті розглянуто сутність інтелектуального капіталу, його структуру, ключові компоненти та вплив на інвестиційний клімат регіону. Ми акцентуємо увагу на взаємозв'язку між людськими ресурсами, інноваційним потенціалом та інформаційними технологіями, які разом утворюють основу для розвитку регіонів в умовах глобальної конкуренції. Особлива увага приділена аналізу зовнішніх та внутрішніх факторів, що впливають на ефективне формування та використання інтелектуального капіталу. До них належать якість освіти, рівень кваліфікації трудових ресурсів, наявність інноваційних підприємств, розвиток науково-дослідної інфраструктури та доступ до інформаційних ресурсів. Ми зазначаємо, що створення сприятливих умов для інтелектуального розвитку сприяє підвищенню конкурентоспроможності регіонів на національному та міжнародному рівнях. У статті проаналізовано основні підходи до управління інтелектуальним капіталом регіону, включаючи необхідність міжсекторальної взаємодії, державно-приватного партнерства та активізації інноваційної діяльності. Визначено, що інвестиції в освіту, науку та технології є критично важливими для формування ефективної моделі розвитку. Також розглянуто практичні аспекти інтеграції інтелектуального капіталу в стратегії регіонального розвитку. В статті наголошується, що успіх у цій сфері залежить від злагодженої співпраці всіх зацікавлених сторін: держави, бізнесу, наукових установ і громадськості. Запропоновано рекомендації щодо вдосконалення механізмів підтримки інтелектуального потенціалу регіонів через стимулювання інновацій, підвищення якості освіти та формування цифрової інфраструктури. Стаття має практичну цінність для дослідників, управлінців та представників органів влади, які займаються питаннями розвитку регіонів. Висновки та рекомендації можуть бути використані при розробці стратегій регіонального розвитку, спрямованих на забезпечення ефективного використання інтелектуального капіталу.

Ключові слова: інтелектуальний капітал, регіон, фактори впливу, розвиток, рівні, забезпечення, формування.