

## **Human capital as a management object in the management strategy of the region innovative development**

### **El capital humano como objeto de gestión en la estrategia de gestión del desarrollo innovador de la región**

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*(recibido/received: 28-October-2020; aceptado/accepted: 05-December-2020)*

#### **ABSTRACT**

The relevance of the problem under study is due to the fact that the role of human capital in the development of the content and dynamics of the innovation system of both a country as a whole and its individual regions is currently increasing. The purpose of the article is to develop recommendations for improving the efficiency of the use of human capital in the process of implementing innovative activities. The leading methods of studying the problem of the article include the analysis of theoretical sources, analysis of statistics, comparison. The article examines the essence of innovative development, analyses human capital and innovative development of the Odesa region, identifies problems, and elaborates ways to solve them.

**Keywords:** Innovation; Regional development; Labour market; Strategic management; Human capital.

#### **RESUMEN**

La relevancia del problema en estudio se debe a que en la actualidad está aumentando el papel del capital humano en el desarrollo del contenido y la dinámica del sistema de innovación tanto de un país en su conjunto como de sus regiones individuales. El propósito del artículo es desarrollar recomendaciones para mejorar la eficiencia del uso del capital humano en el proceso de implementación de actividades innovadoras. Los métodos principales para estudiar el problema del artículo incluyen el análisis de fuentes teóricas, análisis de estadísticas, comparación. El artículo examina la esencia del desarrollo innovador, analiza el capital humano y el desarrollo innovador de la región de Odesa, identifica problemas y elabora formas de resolverlos.

**Palabras claves:** Innovación; Desarrollo regional; Mercado laboral; Gestión estratégica; Capital humano.

## 1. INTRODUCTION

For an innovative economy, it is important to understand that the stimulating development and introduction of advanced technologies in the sectors of the regional economy is impossible with an outdated understanding of the role of a human in the functioning of economic systems. The innovative activity of enterprises is impossible without professionals in innovation management, in the field of investment in innovative projects and programs, in the marketing of innovative products, etc. In this regard, in the strategy for managing the innovative development of the region, human capital is an important management object. Despite the fact that the issues of the transition to the innovative development of territories are quite relevant, at present, the transformations in this area have a rather low impact (Markina, 2015).

It is important to ensure the availability of education, health care, cultural, trade and consumer services for the population at a high level. Measures to increase the level of human capital also include: improving the quality of life; increasing the level of environmental development; raising the level of development of education and science; increasing the level of innovative development of the region. First of all, it is necessary to form a training system for the implementation of the innovation process. To do this, it is necessary: to develop a plan and organise work on the preparation of standard curricula for university students, engineering and technical workers of enterprises, employees of administrative bodies for managing innovative projects; to develop presentation materials and organise permanent seminars in the region within the framework of exhibitions, meetings, presentations, and the like; conduct weekly seminars to improve the qualifications of executive engineering and technical personnel, employees of administrative bodies and post-graduate training of graduates of higher educational institutions; organise work on the use of various modifications of the developed standard programs in the educational process of the university for the preparation of specialists of different levels and specialities; organise the publication of methodological materials for advanced training in the field of innovative development and management of innovative projects.

The theoretical significance of the article lies in the study of human capital as a management object in the strategy of managing the innovative development of the region. The practical significance of the work lies in proposing directions for improving the management of human capital as a factor in the innovative development of the region's economy. The theoretical basis of the article is formed by fundamental developments on the topic under study, which were presented in the works of foreign and domestic authors.

Many authors have paid attention to human capital as a management object in the strategy of managing the innovative development of the region. Thus, D. Garasyuk et al. (2015) believe that in recent years, scientists have concluded that an increase in spending on improving human potential contributes to the growth of the competitiveness of the state's economy, increasing innovation potential. Z.V. Yurynets (2016) believes that the development of human capital is necessary for the development of both the state as a whole and each individual enterprise, which cannot be fully implemented by the efforts of individual enterprises. This requires joint work of business and the state, aimed at the development and implementation of specific measures for the development of human capital. According to N.G. Mazy and O.E. Voytik (2015), it is necessary to form a stably developing and effectively functioning R&D sector, to ensure its basic role in the technological transformation of the economy, for which it is supposed to solve urgent problems that give a complete "picture" in the field of education, application directions for the development of human capital for the digital economy and focused on the formation and strengthening of ties between science and business, improving scientific developments, developing the creative abilities of employees and the successful implementation of innovations within the framework of innovative digital solutions.

T. Torgalo (2016) believes that the use of new forms and methods of the educational process, including the use of digital technologies, is of great importance in innovative education; introduction of training programs

corresponding to the economy of innovation orientation; vocational guidance of graduates of educational institutions; the introduction of international exchange in innovative programs with successful foreign universities; organisation of scientific and practical conferences on topics related to innovative development; organisation of internships in higher educational institutions and advanced high-tech companies for teachers, graduate students, students. O.G. Shepelenko (2015) believes that the key role in improving the quality of human capital for the purpose of realising the innovative potential of individual territories is inseparably linked to the necessity to improve its professional training. Now educational institutions have almost the same programs, regardless of the part of the country in which they are located, although it is advisable that they reflect the specifics of the respective region where an educational institution is located. In this regard, in order for educational institutions to become more focused on the needs of economic sectors, appropriate high-tech companies should be involved in the formation of their development strategies. However, in the literature, there are no relevant studies of the problems and prospects of increasing human capital for development of innovative activities in specific regions, which will be discussed later in this article.

## **2. LITERATURE REVIEW**

The modern world of universal competition and global challenges, lack of natural, financial and human resources encourages all actors in different markets to look for new development opportunities, use their own advantages and opportunities to obtain better access to resources. Currently, innovative activity has become one of the most important elements of the socio-economic development of the country and its regions. The innovative nature of production is one of the most significant factors that determine the success of an individual enterprise, region, country in a market environment, financial stability and competitiveness. Innovative development can be defined as a strategic process characterised by efficient use of resources, improvement of tools and methods of activity, an active role of an individual in transformations and the social nature of changes.

H. Angang et al. (2018) believe that a country or region in the middle-income stage is driven by technological elements, which are usually associated with the introduction of large-scale technologies, and in the high-income stage, it is driven by innovation. Y. Zhang and P. Hu (2018) believe that innovation can effectively stimulate healthy economic development. As the main factor influencing regional innovation, the regional innovation environment can, to a certain extent, influence the development and use of regional innovation, which creates benefits for the overall innovation development and even economic development of the region. I.B. Yulenkova (2019) believes that, depending on the level of innovation processes, the directions and rates of development of regions are determined in the context of qualitative transformations and an increase in the main economic indicators. According to L.M. Vasilyeva (2016), an obligatory component of the management of innovative development of economic entities is a strategic approach. It allows for strategic analysis and assessment of the risks of readiness or lag in human capital development.

The management object in the strategy of managing the innovative development of the region is human capital. Currently, the role of human capital is growing rapidly. This is explained by the fact that the development of the economy depends to a greater extent on the level of technological production and the introduction of innovations, as well as on the relevant knowledge, skills and abilities of a person, i.e., on the human potential that predetermines the national wealth of the country.

There are many opinions regarding the definition of the concept of “human capital” today. Thus, M. Kuliah et al. (2020) believes that human capital is defined as the person himself who personally lent the company the individual’s capabilities, knowledge and personal experience. L.A. Ostankova and R.N. Masalab (2016) believe that human capital means a generalisation of human characteristics, including its ability to learn, mental, physical, intellectual ability, ability to work, physical and psychological health. O.V. Levkivsky (2017) believes that investments in human capital are divided into three main groups: education, health care,

mobility (migration). According to P.P. Mykytyuk (2015), the development of human capital is closely related to the acquisition of new knowledge, the study of new methods of work, technology, languages, the restructuring of the way of life, etc.

Many authors have expressed an opinion about the impact of human capital development on innovative development, economic development, and the standard of living of the population. So, D.P. Melnichuk (2015) believes that the development of human capital, as an innovative factor in the development of the economy, can give real results if it is effectively used. A generalising indicator of the effective use of human capital is a decrease in the labour intensity of products and, accordingly, an increase in labour productivity. S. El-Saharty et al. (2020) believe that human capital is one of the most important resources affecting both the level and quality of life of the population. C. Diebolt et al. (2020) believe that human capital is seen as a key factor in current and future economic growth. More broadly, society is moving towards a knowledge economy driven by human capital, technological progress, and digitalisation.

According to O.Yu. Samborskaya (2019), such components of human capital as education and science primarily contribute to the growth and development of the modern economy, the entire society and improve the quality of life of the population. S.D. Purnomo et al. (2019) believe that economic growth, in particular, is determined by the quality of human resources and labour supply. This finding implies the importance of improving the quality of human resources, including education and health, and the need to improve policies on internal migration. According to O. Gizelo (2015), depending on the composition, structure of human capital and the level of development, human capital is a fundamental factor that accelerates or slows down innovative transformations both at the state and regional levels.

### 3. MATERIALS AND METHODS

The main method used in the analysis of human capital and innovative development of the region is the analysis of statistical indicators. The Main Department of Statistics in the Odesa region (2020) is responsible for collecting and publishing in open sources statistical data on human capital and innovative development of the region. To analyse indicators characterising human capital and innovative development of the region, the author selected the following indicators:

- dynamics of the resident population of the Odesa region;
- the dynamics of the distribution of the resident population of the Odesa region by individual age groups;
- dynamics of the average life expectancy at birth of the population;
- dynamics of the average number of full-time employees at the enterprises of the Odesa region;
- dynamics of total resources on average per month per household in Odesa, Mykolaiv and Kherson regions;
- the dynamics of the available income per person in the Odesa, Mykolaiv and Kherson regions;
- dynamics of the number of colleges and universities in the Odesa region;
- dynamics of the number of graduated post-degree students, doctoral students, graduates of universities, academies and institutes in the Odesa region;
- dynamics of the number of employees involved in the implementation of research and development in the Odesa region;
- dynamics of the number of employees involved in the implementation of research and development in the Odesa region;
- dynamics of the share of innovatively active enterprises in the total number of enterprises in the Odesa region.

At the same time, to analyse individual indicators, it is necessary to study data for several years, and compare individual indicators with those of neighbouring regions. It is important to characterise the Odesa region

and its investment policy. Odesa region is located in the extreme southwest of Ukraine. Its main feature is its economic and geographical location – coastal and border position. Wide access to the Azov-Black Sea basin and to large river arteries determines its great advantages and transport opportunities. The average compactness of the population is 74 people per 1 km<sup>2</sup>, which is slightly lower than the national figure. The most densely populated are the suburban areas and the Transnistrian part of the region, the least populated are the central and northern parts. The main directions of the regional policy of the Odesa Regional State Administration are the creation of a powerful material and technical, technological, informational, intellectual basis for the sustainable and dynamic development of the region's economy, the provision of innovative loans for enterprises that implement investment projects in priority sectors of the economy, as well as the creation of a network of business centres.

The problem was studied in three stages:

- at the first stage, a theoretical analysis of existing methodological approaches to the analysis of human capital and innovative development of the region was conducted, statistical indicators were selected for analysis;
- at the second stage, the selected indicators in dynamics, comparison with other regions were studied;
- at the third stage, generalising conclusions were made regarding the management of human capital and innovative development in the Odesa region, proposals were developed to change the situation for the better.

#### 4. RESULTS AND DISCUSSION

Analyse human capital and investment development of the Odesa region. Dynamics of the resident population of the Odesa region in 2017-2019 presented in Figure 1.

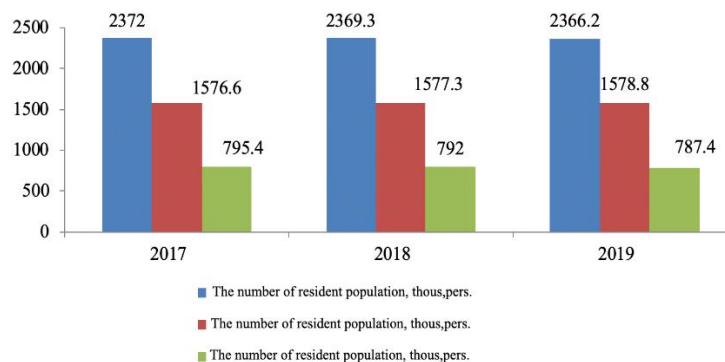


Figure 1. Dynamics of the resident population of the Odesa region in 2017-2019, thous. pers.  
Source: Main Department of Statistics in Odesa region (2020).

Over the past two years in the Odesa region, the total resident population has decreased by 5.8 thousand people, the urban population has increased by 2.2 thousand people, the rural population has decreased by 8 thousand people, which is a negative fact and does not contribute to the development of human capital in the region. Distribution of the resident population of the Odesa region by individual age groups of the region in 2017-2019 presented in Table 1.

In the Odesa region, the share of citizens of working age has been steadily decreasing over the past 2 years, the population is younger than the working age and the population is older than the working age. That is, during the analysed period, there is a process of demographic aging of the population in the region. Average life expectancy at birth of the population of the Odesa region in 2017-2019 is presented in Figure 2.

Table 1. Distribution of the resident population of the Odesa region by individual age groups in 2017-2019, thousand people.

Indicators	As of January 1, 2018	As of January 1, 2019	As of January 1, 2020	Abs.chan. 2020 to 2018
0-15 years old	423.7	426.2	425.3	1.6
0-17 years old	464	467.8	468.8	4.8
16-59 years old	1439	1427.4	1418.2	-20.8
15-64 years old	1604	1595.6	1588	-16
18 and more years old	1908	1901.5	1897.4	-10.6
60 and more years old	509.3	515.7	522.7	13.4
65 and more years old	365.3	369.7	376.1	10.8

Source: Main Department of Statistics in Odesa region (2020).

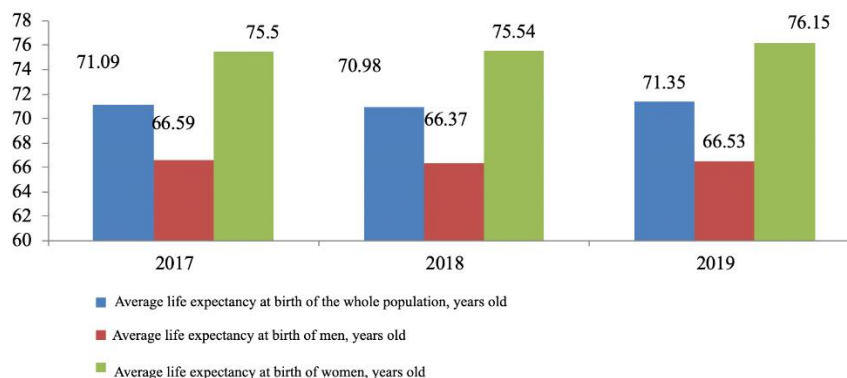


Figure 2. Dynamics of average life expectancy at birth of the population of the Odesa region in 2017-2019, years.

Source: Main Department of Statistics in Odesa region (2020).

Average life expectancy at birth of the entire population of the Odesa region in 2017-2019 increased by 0.26 years, average life expectancy at birth for men decreased by 0.06 years, life expectancy at birth for women increased by 0.65 years. Dynamics of the average number of full-time employees in the Odesa region in 2017-2019 are presented in Figure 3.

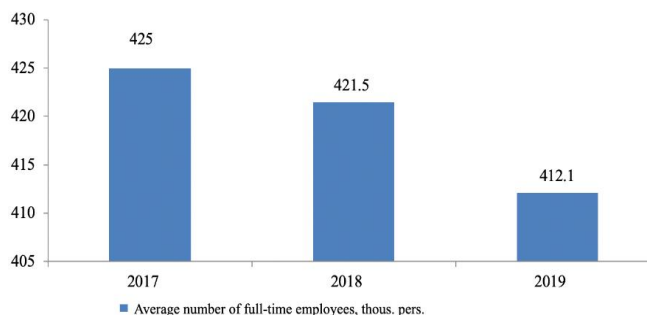


Figure 3. Dynamics of the average number of full-time employees in the Odesa region in 2017-2019, thous. pers.

Source: Main Department of Statistics in Odesa region (2020).

Based on the data shown in Figure 3, it can be concluded that the annual decrease in the average number of full-time employees in the Odesa region in 2017-2019. The overall decrease in the indicator for 2 years was



12.9 thousand people. An analyse the total resources on average per month per household in Odesa, Mykolaiv and Kherson regions in 2015-2019 are presented in Figure 4.

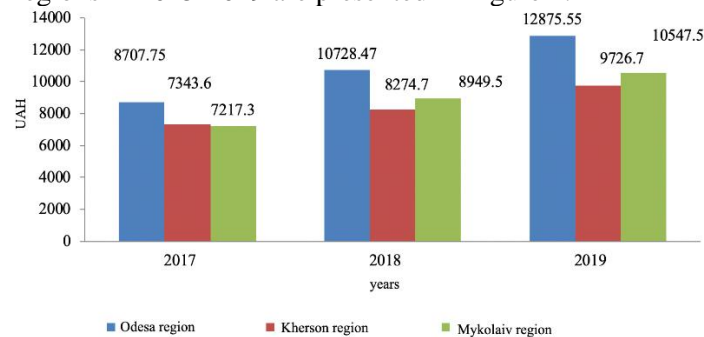


Figure 4. Dynamics of total resources on average per month per household in Odesa, Mykolaiv and Kherson regions in 2015-2019, UAH.

Source: Main Department of Statistics in Odesa region (2020); Main Department of Statistics in the Mykolaiv region (2020); Main Department of Statistics in Kherson region (2020).

In all the considered regions of the Black Sea region, the total resources increased annually on average per month per household. The highest value of the indicator was recorded in the Odesa region. The growth of total resources on average per month per household for 2 years amounted to UAH 4167.8 in the Odesa region, UAH 2383.1 in the Kherson region, and UAH 3330.2 in the Mykolaiv region. Next, the dynamics of available income per person in Odesa, Mykolaiv and Kherson regions in 2015-2019 is considered in Figure 5.

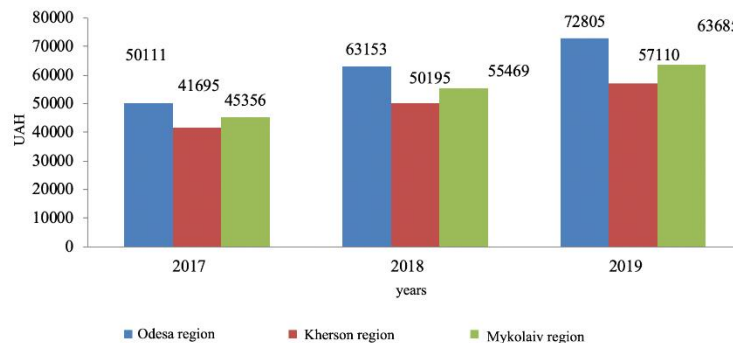


Figure 5. Dynamics of available income per person in Odesa, Mykolaiv and Kherson regions in 2015-2019, UAH.

Source: Main Department of Statistics in Odesa region (2020); Main Department of Statistics in the Mykolaiv region (2020); Main Department of Statistics in Kherson region (2020).

Available income per person in Odesa, Mykolaiv and Kherson regions in 2015-2019 increased annually. The highest value of the indicator was the same as for the previous indicator in the Odesa region. The growth of available income per person for 2 years amounted to UAH 22694 in the Odesa region, UAH 15415 in the Kherson region, and UAH 18329 in the Mykolaiv region. Dynamics of the number of colleges and universities in the Odesa region in 2015-2019 presented in Figure 6.

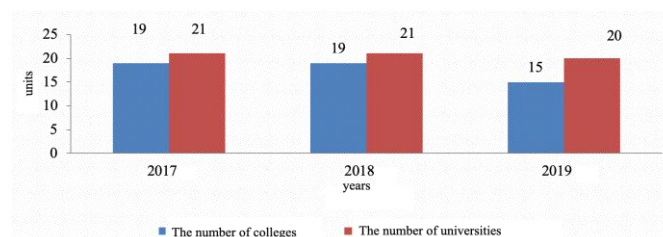


Figure 6. Dynamics of the number of colleges and universities in the Odesa region in 2017-2019, units.

Source: Main Department of Statistics in Odesa region (2020).

In 2017-2019 there is an annual decrease in the number of colleges and universities in the Odesa region: the number of colleges in 2 years decreased by 4, the number of universities decreased by 2, which is a negative fact and negatively affects the development of human capital. Next, it is necessary to consider the dynamics of the number of graduated post-degree students, doctoral students, graduates of universities, academies and institutes in Figure 7.

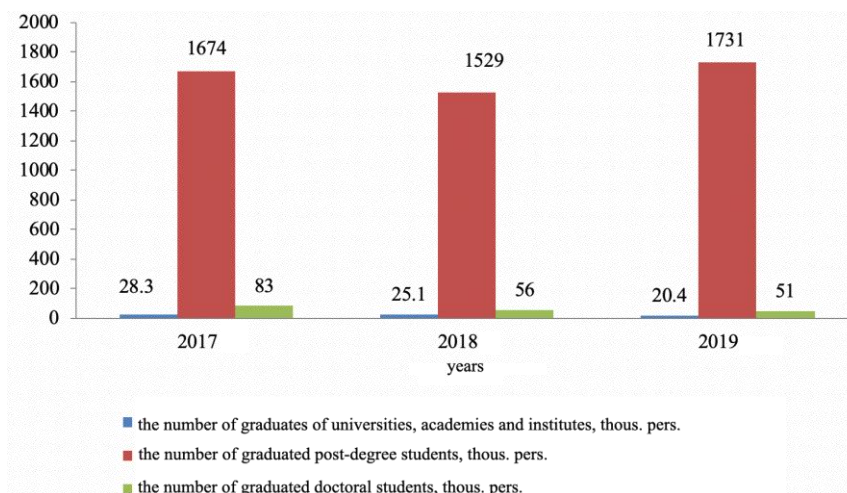


Figure 7. Dynamics of the number of graduated post-degree students, doctoral students, graduates of universities, academies and institutes in the Odesa region in 2017-2019.

Source: Main Department of Statistics in Odesa region (2020).

In 2017-2019 there is an annual decrease in the number of graduated doctoral students, graduates of universities, academies and institutes in the Odesa region: the number of graduated doctoral students in 2 years decreased by 32 people, the number of graduates of universities, academies and institutes in the Odesa region decreased by 7.9 thousand people. The number of graduated post-degree students increased by 57 people. Consider the dynamics of the number of employees involved in research and development in 2017-2019 in the Odesa region in Figure 8.

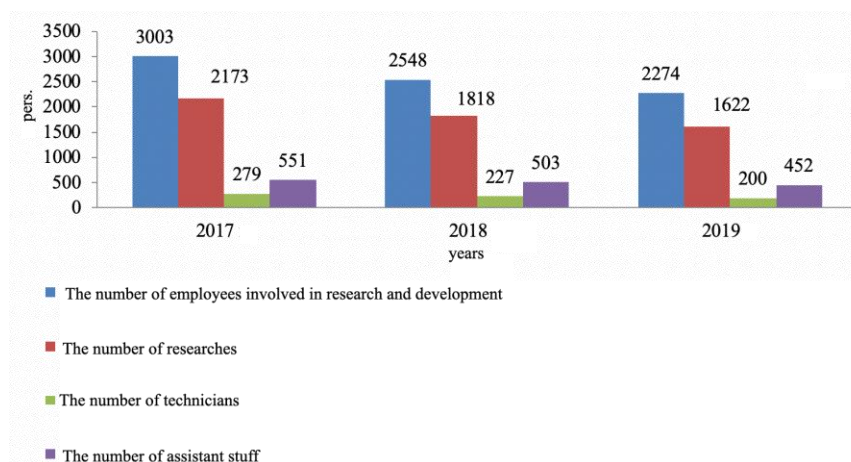


Figure 8. Dynamics of the number of employees involved in research and development in the Odesa region in 2017-2019, people.

Source: Main Department of Statistics in Odesa region (2020).



In 2017-2019 in the Odesa region there was an annual decrease in the number of employees involved in the scientific research and development. The total decrease in 2 years was 729 people, while the number of researchers decreased by 551 people, the number of technicians by 79 people, the number of support personnel decreased by 99 people. In conclusion, the innovative activity of industrial enterprises in the Odesa region for 2000-2019 is studied. The data are presented in Figure 9.

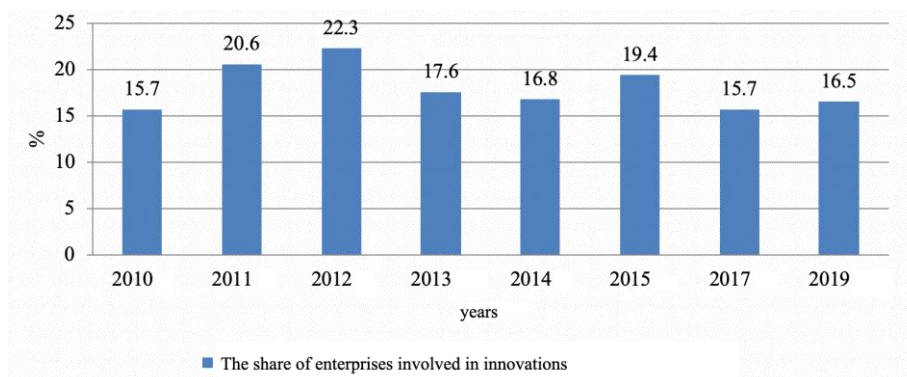


Figure 9. Dynamics of the share of innovatively active enterprises in the total number of enterprises of the Odesa region in 2017-2019, %.

Source: Main Department of Statistics in Odesa region (2020).

Starting from 2010 to 2019, in the Odesa region the innovative activity of enterprises either increased (in 2011, 2012, 2015, 2019), then decreased (in 2013, 2014, 2017). The 2019 value lags behind the 2011-2015 data and exceeds only the values of 2010 and 2017. In the most developed countries (Belgium, Germany, Ireland) the share of innovatively active enterprises in the total number of enterprises exceeds 50%, that is, the Odesa region is significantly behind in this indicator.

In general, it can be concluded that the Odesa region has some success in the development of human capital and innovation, but there are also problems with these issues. In the Odesa region, certain measures are being taken to develop human capital as a management object in the strategy for managing the innovative development of the region. The Odesa Regional State Administration has developed a Regional Development Strategy for the Odesa Region for 2021-2027. The goal of this initiative is to create better conditions for growth and increase investment in the region's economy, improve the level and quality of life of the population, and improve innovation. This document includes four components – business, science, government and the public. The principle of innovative development of the regional economy based on smart specialisation is taken as a basis. The Strategy focuses on the key priorities that make the Odesa region unique.

After analysing the development of human capital as a management object in the strategy for managing innovative development of the Odesa region, a number of conclusions can be drawn:

- For 2017-2019 in the Odesa region the total number of resident population decreased by 5.8 thousand people.
- In the region, the share of working-age citizens has been steadily decreasing over the past 2 years.
- Life expectancy at birth for males has decreased by 0.06 years over the past 2 years.
- The average number of full-time employees in the Odesa region decreases annually.
- In 2017-2019 there is an annual decrease in the number of colleges and universities in the Odesa region.
- In 2017-2019 there is an annual decrease in the number of graduated doctoral students, graduates of universities, academies and institutes in the Odesa region.

- In 2017-2019 in the Odesa region there was an annual decrease in the number of employees involved in the implementation of scientific research and development.
- In comparison with developed countries, the Odesa region has a low innovative activity of enterprises.

Positive trends in recent years include:

- Average life expectancy at birth of the entire population of the Odesa region in 2017-2019 increased by 0.26 years.
- The growth of total resources on average per month per household for 2 years amounted to UAH 4167.8 in the Odesa region.
- The growth of available income per person for 2 years amounted to UAH 22694 in the Odesa region.
- Odesa region is ahead of Kherson and Mykolaiv regions in terms of population income.
- The number of graduated post-degree students increased by 57 people.
- In 2019, the share of innovatively active enterprises increased in the total number of enterprises in the Odesa region.

Thus, some of the indicators of human capital development and innovation activity have been improving in recent years. Positive trends can be explained by the measures taken by state and regional authorities to ensure the development of human resources and innovation. But in comparison with developed countries in the region, the innovative activity of enterprises is low. Various authors express several points of view regarding the innovative development of territories through the use of human capital. E.A. Kuznetsova et al. (2019) believe that the development of human capital requires both government intervention and the participation of private sectors, since human potential, both in organisations and in the country as a whole, is the main advantage in the global economic market. K.O. Pristavka and Z.N. Kozlovskaya (2019) believe that knowledge is becoming the main source of economic growth and the most important production resource. Thus, a prerequisite for the formation of a knowledge economy is to ensure a high quality of vocational education, and first of all – higher.

According to T.N. Zagurskaya (2020), in order to ensure the innovative development of territories through effective management of human capital, social infrastructure and engineering development of territories based on public-private partnerships should be developed, a motivational mechanism for the process of investing employers in human capital should be created, as well as increased interest in their participation in professional training and retraining of specialists; to apply small innovative technologies aimed at creating local production facilities that can compete in the local market with imported products; to develop online businesses. According to the author, for the innovative development of territories through the use of human capital in the Odesa region, it is necessary to increase the innovative potential of the regions based on the technological improvement of industries, increasing the volume of investment in priority innovative areas through tax incentives and other mechanisms; to develop a training concept for an innovative economy; to create a system of continuous training and advanced training of personnel, integrated into the system of production of innovative products; to monitor the personnel potential of the innovation sphere.

Thus, the Odesa region has resources and opportunities for innovative development of the territory through the use of human capital in the near future. This requires the active participation of all government bodies, business representatives, the population in the development and implementation of effective mechanisms for the effective use of all available resources. Currently, some of the measures for the innovative development of the territory through the use of human capital can be considered effective, but these measures are not enough, since the innovation level of the Odesa region, like the entire country, is still significantly behind the level of developed countries.

Taking into account the identified problems of human capital development and the development of innovative activities in the Odesa region, recommendations were developed. The author's position on human capital as a management object in the strategy of managing the innovative development of the region is as follows. It is necessary at the regional level to create a market for innovative products, which will ensure an adequate level of intellectual property protection; to purposefully train personnel, managers of innovation activities; to treat science as a primary condition for purposeful and consistent work on the formation of a national innovation system; authorities to actively cooperate both among themselves and with the entrepreneurial, scientific and business – educational sectors of the economy; to build a system of administrative and tax incentives in order to stimulate the innovative activity of economic entities; to develop innovative infrastructure and public-private partnerships in the field of venture financing of innovations; to raise the standard of living of the population (quality of healthcare, comfort of living, etc.).

Summarising the above, it should be noted that further research is needed on human capital as a management object in the strategy for managing the innovative development of the region. Currently, individual scientists are exploring the essence and characteristics of human capital and innovative development, however, the influence of human capital on the innovative development of individual regions remains poorly understood. The most promising direction for further research on the topic of the article is to study the experience of improving the quality of human capital in developed countries in order to improve innovation, which will make it possible to decide which mechanisms need to be applied in a particular region.

## 5. CONCLUSIONS

Summarising the results obtained, certain conclusions can be drawn. Currently, innovative activity has become one of the most important elements of the socio-economic development of the country and its regions. An important management object in the strategy of managing the innovative development of the region is human capital. Human capital is a fundamental factor that accelerates or slows down innovation transformation. The development of human capital as a management object in the strategy of managing the innovative development of the region is closely related to the acquisition of new knowledge, the study of new methods of work, technology.

Analysis of the development of human capital and innovative development of the Odesa region revealed both positive and negative trends. The positive side for 2017-2019 includes the following: an increase in average life expectancy at birth, an increase in total resources on average per month per household, an increase in available income per person, the Odesa region is ahead of the Kherson and Mykolaiv regions in terms of population income, an increase in the number of graduated students, growth the share of innovatively active enterprises in the total number of enterprises in the Odesa region. The problematic moments are the following: the total number of resident population has decreased, the share of working-age citizens has decreased, the average life expectancy at birth of men has decreased, the average number of full-time employees has decreased, there has been an annual decrease in the number of graduated doctoral students, graduates of universities, academies and institutes, there has been an annual decrease in the number workers involved in research and development, compared with developed countries in the Odesa region, the low innovative activity of enterprises.

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