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## GEODEMOGRAPHIC FEATURES OF HUMAN POTENTIAL FORMATION IN EU COUNTRIES

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**Relevance of the study.** The issue of the formation of human potential under the influence of current demographic processes in EU countries is considered. It is found that there is a relationship between the formation of human potential, human development and the features of the demographic development of the region. **The subject of the research:** is the study of the demographic features of the formation of human potential at the level of the countries of the region and the identification of typical groups according to these characteristics. **The purpose of the study:** to identify modern trends in the formation of the natural base of human potential in EU countries under conditions of social upheavals and post-industrial trends in development. **Research methodology:** the methods of analysis, synthesis, theoretical generalization, comparative characteristics, statistical (grouping, typology) and geographical – in the grouping of EU countries by life expectancy were used. **The results of the study:** the problems of increasing the life expectancy of the population and population aging, their impact on the formation of human potential in the countries analyzed,

groups of EU countries by life expectancy were identified, differences in the sex structure of the aging population were determined, the projected dynamics of the population, fertility processes and median age were analyzed from the point of view of the aging population of the European region. **Practical significance:** results were obtained that indicate that the trend towards an increase in the average life expectancy of residents of EU countries is long-term and will continue in the future; there is a significant impact of the age structure of the population on the formation of the human potential of the region, as well as a complex interdependence between human development, economic development and the structure of human potential. **Conclusions:** the modern demographic features of the formation of human potential in EU countries and their forecast prospects were clarified. **Prospects for further research:** the challenges for socio-economic development caused by the demographic trends identified in the study require further in-depth research in order to develop ways to overcome them.

**Key words:** demographic processes, life expectancy, population aging, human potential, human development.

## ГЕОДЕМОГРАФІЧНІ ОСОБЛИВОСТІ ФОРМУВАННЯ ЛЮДСЬКОГО ПОТЕНЦІАЛУ У КРАЇНАХ ЄС

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**Актуальність дослідження.** Розглянуто питання щодо формування людського потенціалу під впливом актуальних демографічних процесів у країнах ЄС. З'ясовано, що існує взаємозв'язок між формуванням людського потенціалу, людським розвитком та особливостями демографічного розвитку регіону. **Предмет дослідження** становить вивчення демографічних особливостей формування людського потенціалу на рівні

країн регіону та виокремлення типових груп за цими ознаками. **Мета дослідження** – виокремити сучасні тренди у формуванні природної бази людського потенціалу країн Європи за умов суспільних потрясінь та постіндустріальних тенденцій у розвитку. **Методологія дослідження**: використано методи аналізу, синтезу, теоретичного узагальнення, порівняльну характеристику, статистичні (групування, типологія), географічний – у групуванні країн ЄС за тривалістю життя. **Результати дослідження**: розглянуто проблеми збільшення тривалості життя населення та старіння населення, їх вплив на формування людського потенціалу у країнах, що аналізувалися, виокремлено групи країн ЄС за тривалістю життя населення, визначено відмінності у статевій структурі старіючого населення, проаналізовано прогнозовані перспективи чисельності населення, процесів народжуваності та медіанний вік з точки зору старіння населення ЄС. **Практичне значення**: отримано результати, які засвідчують, що тенденція до збільшення середньої очікуваної тривалості життя жителів країн ЄС має тривалий характер та продовжуватиметься у майбутньому; наявний значний вплив вікової структури населення на формування людського потенціалу регіону, а також складна взаємозалежність між людським розвитком, економічним розвитком та структурою людського потенціалу. **Висновки**: з'ясовано сучасні демографічні особливості формування людського потенціалу країн ЄС та їхні прогностичні перспективи. **Перспективи подальших досліджень**: виклики для соціально-економічного розвитку, що спричинені з'ясованими у дослідженні демографічними тенденціями, потребують подальшого ґрунтовного дослідження у напрямі розробки шляхів їх подолання.

**Ключові слова**: демографічні процеси, тривалість життя, старіння населення, людський потенціал, людський розвиток.

**Problem statement.** Modern transformational processes of social development have a direct impact on the socio-economic aspects of the formation and development of human potential. The transition from a post-industrial type of economy to “Industry 4.0” and entry into “Industry 5.0” leads to dynamic changes in the employment structure of the population of the whole world, and highly developed countries of the European Union in particular. These changes not only affect the structure of demand for labor, but also indirectly – on the supply, which directly depends on the size of the economically active population of the region. However, there is also an inverse relationship and influence: dynamic changes in the demographic structure of the population affect the formation of the natural basis of the human potential of this region, and therefore – on the possibilities of economic growth, labor productivity growth, the structure of consumer demand and, ultimately, the structure of the economy as a whole. Thus, the current demographic trends of increasing life expectancy and population aging, which are inherent in many economically developed countries of the world and Europe in particular, pose new challenges both for public policy in these countries and for their economic systems.

According to Q. Meng and W. Yu [1], changes in demographic patterns, aging trends have a complex nature and long-term consequences for

socio-economic systems. Population aging can lead to economic recession and labor shortages, a decline in labor productivity, thereby reducing the potential for economic growth. For example, the reduction in the labor force led to the fact that Japan experienced a “lost decade” in the late 1990s [2]. Population aging will also increase fiscal and social security pressures on governments, and the need for social benefits, such as health care and pensions, is likely to increase. This may lead to an increase in the budget deficit and have an impact on public investment in other sectors [1].

On the other hand, the increase in the share of the population of older age groups leads to a change in consumption patterns: older people are more likely to give preference to such needs as health care, medical care and lifestyle services, compared to younger generations. This is also the reason for the increase in the share of the tertiary sector in the structure of the economy at the current stage of development, which scientists are already inclined to call the “silver economy” [3].

However, the increase in life expectancy in the European Union is largely due to an improvement in the standard and quality of life, so the majority of the population under the age of 75 retains the ability to productive work and health, and has significant human potential, including experience and competence, which in

turn is a positive phenomenon and, with a balanced state policy in this area, can be a factor in economic revitalization. The increase in average life expectancy encourages people to increase investments in education, extend years of education and increase the accumulation of human capital, which in turn contributes to the development of the economy of countries. As confirmed in the study by N. Metzger, W. Shenay [4], a healthy lifestyle, better access to health care services, or improved education help to increase life expectancy, which subsequently increases human development and is reflected in the final calculated human development index.

**Analysis of recent research and publications.** The issues of development and formation of human potential have become one of the most relevant in world scientific thought since the beginning of the 90s of the 20th century, that is, since the publication of A. Sen's research and the first UN Reports on human potential development. According to the theory of human development, its foundations are to live a long, healthy and creative life, to be knowledgeable and to have access to the resources necessary for a decent standard of living [5].

Significant achievements in the field of human potential research in Ukrainian scientific thought were made by E. Libanova [6; 7], O. Makarova and T. Zayats [8], M. Mahsma [8], G. Nazarova [9], L. Semiv [10], L. Cherenko [11] et al., who in particular devoted their research to the conceptual foundations and definition of the essence of human development, human potential and human capital, the problems of poverty and living standards, their relationship with economic and social development at the national and regional levels, etc.

The works of domestic scientists S. Aksyonova and B. Krimer [12], O. Gladun [13], G. Melnychuk [14], I. Kurylo [15], M. Shuba [16] are devoted to demographic aging, its prospects, and the study of challenges to social and economic development associated with aging.

Recent studies by Ribeiro, Tiago & Carvalho, Helena & Gouveia, Elvio & Nascimento, Marcelo & Peralta, Miguel & Marques, Adilson (2024) [17] are devoted to studying the moderat-

ing effect of the HDI on the relationship between frailty and health-related quality of life among European older adults. Also, of interest are the works by Daia, Alexandru & Stancu, Stelian (2020) [18] on the impact of population aging on the sustainability of the EU. Significant proposals for improving demographic policies and their alignment with the social needs of the EU are made by Stupariu, Marius (2023) [19]. Kluge, Fanny & Goldstein, Joshua & Vogt, Tobias (2018) [20] focus on the threats to fiscal budgets associated with the extension of life expectancy and the new benefits from this. Important are the works of A. Balachandran (2020) [21] on comparing the causes and processes of population aging in the EU and Asia, and their differences.

**Purpose of the study.** Despite the sufficient study of the conceptual aspects of human potential development, studies of the dynamics of human potential formation are procedural in nature and constantly relevant, taking into account changes in the dynamics of demographic processes and social shifts. This research is devoted in particular to the study of modern aspects and features of human potential formation in the countries of the European Union and aims to identify modern trends in the formation of the natural base of human potential of these countries under conditions of social upheavals and post-industrial trends in development.

**Main material.** The formation of the natural base of human potential is determined by the trends of demographic development of the population in the study region. If, according to the component structure of human development, the key indicators are life expectancy, expected and average duration of education and gross national income per capita as an indicator of well-being, then we understand that the natural base of human potential formation is directly characterized by the first component.

Analyzing the situation in all 27 EU countries, we see that the EU is experiencing a serious demographic crisis of population aging. General trends indicate an increase in the share of the elderly population (the share of the pop-

ulation aged 65 and over increased from 16% in 2003 to 21.2% in 2023), while the category of children is not growing (the share of children under 15 decreased from 16.4% in 2003 to 14.9% in 2023) [22]. And this indicates an increase in the dependency ratio of the population in the future. In addition, the birth rate is very close to the mortality rate or lower.

If we consider the shape of the sex-age pyramids of the population of the EU countries, their shape will be a narrowed one, which indicates a narrowed type of population reproduction.

The general pyramid for the EU as a whole has the shape of a narrowed pyramid, which is characteristic for highly developed countries with a high level of education, easy access to birth control and proper medical care, as well as due to the complex of historical, economic and social prerequisites that have shaped the current geodemographic situation in the region.

All EU countries can be divided into four groups, depending on the demographic situation [23]:

1) The first group consists of countries with the least favorable demographic structure. Negative demographic trends here have been going on for several decades. The demographic situation can be called critical. This includes Bulgaria and Germany.

2) The second group of countries has the same negative trends, but not as serious. Negative demographic trends here, as in the first group, are characterized by a long duration. This group includes most EU countries: Austria, Croatia, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia and Spain.

3) The third group consists of countries with a relatively good demographic situation, or countries that are just starting to suffer from negative demographic trends with the potential to take measures to correct the situation. This group includes 7 countries: Belgium, Denmark, Finland, France, Malta, the Netherlands, Sweden.

4) The fourth group is small and includes EU countries that demonstrate positive demographic trends – a higher percentage of the young population and a high birth rate. These are Cyprus, Ireland and Luxembourg.

It is worth noting that there are groups of countries that demonstrate similar demographic development indicators largely due to their geographical proximity. These include: Mediterranean countries with a pronounced emigration element: Greece, Italy, Portugal; Northern European countries: Belgium, Denmark, Finland, the Netherlands, Sweden.

Geographical proximity also means similar cultural and sociological characteristics that affect demographic development.

An indisputable demographic trend that affects the formation of the natural basis of human potential should be recognized as an increase in the life expectancy of the population in the European region.

An analysis of life expectancy indicators for the period 2014–2023 indicates their increase for the EU-27 from 80.8 years in 2014 to 81.5 years in 2023 (Table 1).

A significant increase in life expectancy in the studied region has occurred since the 1960s. During this time, life expectancy increased by an average of two years per decade, but in 2020 this indicator fell in 22 out of 27 countries. The largest decline occurred in Poland (-1.4 years), Bulgaria, Spain, Italy (-0.9 years) and Romania (-0.9 years). This phenomenon occurred against the background of a decrease in fertility during the COVID-19 pandemic in 2020. As can be seen from the study by S. Aksyonova and B. Krimer [12], for most European countries, the first (2020) year of the pandemic was characterized by a decrease in childbearing activity, but the second (2021) year was marked by an increase in fertility, and in some countries even exceeded the level in the pre-pandemic period.

It was also found that the average lifespan of the population decreased among the male population. In Poland the indicator decreased by 1.3 years, Bulgaria – 1.1 years, in Romania by 0.9 years, and in Spain and Italy by 0.8 and 0.7 years respectively (Table 1).

However, data for 2023 indicate a resumption of the trend of increasing population life expectancy in all EU-27 countries, except Cyprus, which showed a decrease in life expectancy by

0.7 years. Compared to 2020, all countries in this group saw an increase in life expectancy for both men and women.

In general, the leaders in life expectancy among the countries of the European Union today remain: Spain (84.0 years), Italy (83.8 years), Malta (83.6 years), Luxembourg (83.4 years), Sweden (83.4 years) and France (83.1 years). It should be noted that these countries have maintained their leading positions in terms of life expectancy for the past ten years (Table 1).

Among the countries with the lowest life expectancy, it is worth mentioning: Bulgaria (75.8 years) and Latvia (75.9 years). Compared to 2014, life expectancy in both of these coun-

tries has increased slightly (by approximately 1.4 years), but in the group of countries studied they remain outsiders.

A separate group consists of countries in which life expectancy has practically not changed over the past decade. Among them: Austria, Greece, the Netherlands, Germany, France. In these countries, the increase in population longevity was insignificant – up to 0.3 years over the studied period.

The largest increase in average life expectancy is noted in Lithuania (by 2.6 years). In the vast majority of countries, the increase in average life expectancy over the past ten years was from 1.0 to 1.4 years. However, along with this, a group of countries is distinguished where

Table 1

## Average life expectancy in the EU-27 countries

| Countries      | Years |      |       |      |      |       |      |      |       |      |      |       |
|----------------|-------|------|-------|------|------|-------|------|------|-------|------|------|-------|
|                | 2014  |      |       | 2017 |      |       | 2020 |      |       | 2023 |      |       |
|                | All   | Men  | Women | All  | Men  | Women | All  | Men  | Women | All  | Men  | Women |
| Austria        | 81.6  | 79.1 | 84.0  | 81.7 | 79.4 | 84.0  | 81.3 | 78.9 | 83.6  | 81.6 | 79.2 | 84.0  |
| Belgium        | 81.4  | 78.8 | 83.9  | 81.6 | 79.2 | 83.9  | 80.8 | 78.5 | 83.0  | 82.5 | 80.3 | 84.6  |
| Bulgaria       | 74.5  | 71.1 | 78.2  | 74.8 | 71.4 | 78.4  | 73.6 | 70.0 | 77.5  | 75.8 | 72.0 | 79.6  |
| Croatia        | 77.9  | 74.7 | 81.0  | 78.0 | 74.9 | 81.0  | 77.6 | 74.5 | 80.7  | 78.6 | 75.4 | 81.8  |
| Cyprus         | 82.3  | 80.3 | 84.3  | 82.2 | 80.2 | 84.2  | 82.4 | 80.4 | 80.0  | 81.6 | 80.4 | 80.8  |
| Czech Republic | 78.9  | 75.8 | 82.0  | 79.1 | 76.1 | 82.0  | 78.2 | 75.2 | 81.3  | 80.0 | 77.0 | 82.9  |
| Denmark        | 80.7  | 78.7 | 82.8  | 81.1 | 79.2 | 83.1  | 81.6 | 79.7 | 83.6  | 81.9 | 80.0 | 83.8  |
| Estonia        | 77.4  | 72.4 | 81.9  | 78.4 | 73.8 | 82.5  | 78.9 | 78.7 | 83.0  | 78.1 | 74.1 | 83.1  |
| Finland        | 81.3  | 78.4 | 84.1  | 81.7 | 78.9 | 84.5  | 82.0 | 79.2 | 84.8  | 81.7 | 79.1 | 84.4  |
| France         | 82.9  | 79.5 | 86.1  | 82.7 | 79.6 | 85.7  | 82.3 | 79.2 | 83.5  | 83.1 | 80.1 | 83.9  |
| Germany        | 81.2  | 78.7 | 83.6  | 81.1 | 78.7 | 83.4  | 81.1 | 78.7 | 80.6  | 81.2 | 79.0 | 82.4  |
| Greece         | 81.5  | 78.8 | 84.1  | 81.4 | 78.8 | 83.9  | 81.4 | 78.8 | 83.9  | 81.6 | 79.0 | 84.2  |
| Hungary        | 76.0  | 72.3 | 79.4  | 76.0 | 72.5 | 79.3  | 75.7 | 72.3 | 79.0  | 76.9 | 73.6 | 80.1  |
| Ireland        | 81.4  | 79.3 | 83.5  | 82.2 | 80.4 | 84.0  | 82.6 | 80.8 | 84.4  | 82.6 | 80.8 | 84.4  |
| Italy          | 83.2  | 80.7 | 85.6  | 83.1 | 80.8 | 85.2  | 82.3 | 80.0 | 84.5  | 83.8 | 81.7 | 85.8  |
| Latvia         | 74.5  | 69.1 | 79.4  | 74.9 | 69.8 | 79.7  | 75.1 | 70.6 | 80.4  | 75.9 | 70.8 | 80.7  |
| Lithuania      | 74.7  | 69.2 | 80.1  | 75.8 | 70.7 | 80.5  | 75.5 | 70.1 | 80.1  | 77.3 | 72.5 | 81.7  |
| Luxembourg     | 82.3  | 79.4 | 85.2  | 82.1 | 79.9 | 84.4  | 82.2 | 79.9 | 84.5  | 83.4 | 81.7 | 85.1  |
| Malta          | 82.1  | 79.9 | 84.3  | 82.4 | 80.2 | 84.6  | 82.3 | 80.3 | 84.5  | 83.6 | 81.8 | 85.1  |
| Netherlands    | 81.8  | 80.0 | 83.5  | 81.8 | 80.2 | 83.4  | 81.4 | 79.7 | 83.1  | 82.0 | 80.5 | 83.4  |
| Poland         | 77.8  | 73.7 | 81.7  | 77.8 | 73.9 | 81.8  | 76.4 | 72.4 | 80.6  | 78.6 | 74.8 | 82.4  |
| Portugal       | 81.3  | 78.0 | 84.4  | 81.6 | 78.4 | 84.6  | 81.1 | 78.0 | 84.1  | 82.4 | 79.5 | 85.2  |
| Romania        | 75.0  | 71.3 | 78.7  | 75.2 | 71.6 | 79.0  | 74.2 | 70.4 | 78.3  | 76.6 | 72.9 | 80.5  |
| Slovakia       | 77.0  | 73.3 | 80.5  | 77.3 | 73.8 | 80.7  | 77.0 | 73.5 | 80.4  | 78.1 | 74.7 | 81.5  |
| Slovenia       | 81.2  | 78.2 | 84.1  | 81.2 | 78.2 | 84.0  | 80.6 | 77.8 | 83.4  | 82.0 | 79.1 | 85.0  |
| Spain          | 83.3  | 80.4 | 86.2  | 83.4 | 80.6 | 86.1  | 82.4 | 79.6 | 85.2  | 84.0 | 81.2 | 86.7  |
| Sweden         | 82.3  | 80.4 | 84.2  | 82.5 | 80.8 | 84.1  | 82.4 | 80.6 | 84.2  | 83.4 | 81.7 | 85.0  |
| EU-27          | 80.8  | 77.9 | 83.7  | 80.9 | 78.1 | 83.6  | 80.4 | 77.5 | 83.2  | 81.5 | 78.9 | 84.2  |

Note: Compiled based on Eurostat data [24].

the increase in this indicator was from 0.1 to 0.9 years. Among them: Estonia, Ireland, Spain, Italy, Netherlands, Poland, Portugal, Slovenia, Hungary, Finland, France, Croatia.

Analysis of demographic indicators provides basis for distinguishing 4 groups of countries in the EU structure, which are clearly distinguished by life expectancy parameters:

1) countries with the lowest life expectancy – Bulgaria, Latvia, Lithuania, Romania, Hungary;

2) countries with low life expectancy, which, however, have a tendency to increase – Slovakia, Croatia, Czech Republic, Poland;

3) countries with high life expectancy – Austria, Belgium, Finland, Portugal, Germany, Netherlands, Cyprus, Ireland, Denmark, Greece;

4) countries with the highest life expectancy – Sweden, France, Malta, Luxembourg, Italy, Spain.

The latter group includes countries in which life expectancy has traditionally remained the highest over the past two decades.

This classification is partly correlated with the level of well-being of the population of these countries: all countries with the highest life expectancy indicators belong to the group of countries with a very high level of human development (the HDI in 2022 in Italy was 0.906, and in Ireland 0.950; GNI per capita in these countries exceeded 40.000 US dollars) [5].

This indicates a connection between the well-being of the population and the ability of residents to live a long and healthy life, to live to the age of 80 or more, which in turn is a consequence of improving medicine, the functioning of health care systems, living and working conditions.

Similar results were obtained by O. Nikolaeva [25], who studied the expected duration of healthy life and conducted a cluster analysis of European countries according to a number of indicators of economic and social life of the population, environmental factors, and obtained 5 clusters that grouped countries by the level of average life expectancy. According to this study, the highest indicators of healthy life expectancy were characterized by Belgium, Germany, Luxembourg, France, Switzerland, Great Britain, Denmark, Ireland, Iceland, Spain, Italy, the Netherlands,

Norway, Sweden – that is, countries with high economic development, good environmental standards, significant spending on health care, high-quality nutrition of the population, etc.

In all EU countries, differences in the life expectancy of men and women are observed. On average, women in the studied countries live 5.3 years longer than men. Together with the overall indicator of life expectancy, its values for the male and female population of the EU-27 increased. Thus, the average life expectancy of men increased from 77.9 years in 2014 to 78.9 in 2023, i.e. by 1 year. At the same time, the average life expectancy of women increased by 0.5 year.

The largest difference between the life expectancy of men and women is currently observed in Latvia (9.9 years), Lithuania (9.2 years), Estonia (9.0 years), Bulgaria (7.6 years), Poland (7.6 years), Romania (7.6 years), Hungary (6.5 years), which significantly exceeds the average value for the EU-27 (5.3 years).

The smallest difference between the average life expectancy of men and women is observed in Cyprus (women live on average 0.4 years longer). In Denmark, the Netherlands, Germany, and France, women live on average 3–3.5 years longer than men.

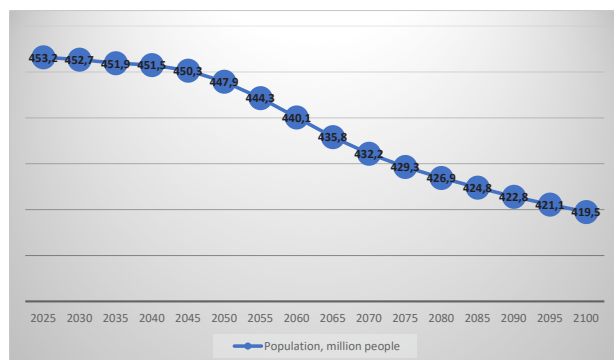
In all other EU countries, the disparity in life expectancy between both sexes approaches the EU-27 average.

The analysis of the demographic forecast proposed by Eurostat [26] regarding the population of the EU-27 countries by 2100 is shown in Fig. 1.

According to Fig. 1, we can conclude about the general population reduction in the EU-27 countries by 2100. The largest volumes of population reduction are predicted from the middle of the 21st century. Then the population will decrease by 3–4 million people every five years and will reach 419.5 million people in 2100. The general population reduction from 2025 to 2100 is predicted by 33.7 million people.

Total Fertility Rates by 2100 will remain low, although they will increase on average in the EU to 1.65 births per woman of fertile age. However, for normal reproduction of generations, this indicator should be at the level of 2.2 births. The highest fertility rates will be in France (1.79),

Romania (1.77), and the lowest in Spain (1.53), Italy (1.55), Cyprus and Malta (both 1.59).



**Fig. 1. Population dynamics in EU countries according to Eurostat forecasts until 2100**

*Note: Compiled based on Eurostat data [24].*

According to Eurostat forecasts, the average life expectancy of the European Union population will increase significantly by 2100. The trend towards a difference in life expectancy between men and women will continue. The male population of all EU countries will cross the lower limit of life expectancy of 87 years by that time. And the highest average duration – over 90 years – will be observed in Norway, Iceland and Spain. As for the female population, life expectancy here will be longer than that of men in all countries of the region. Its lower limit will be 91.5 years (Bulgaria). The highest indicators – over 93 years – will be in Ireland, Portugal, Italy, Norway, Slovenia [23].

In all countries, an increase in the median age of the population is predicted. If in 2023 this indicator was 44.3 years on average for the EU, then in 2050 it will be 48.0 years, and in 2100 it will be 50.2 years. This emphasizes the trend of demographic aging of the population. We observe some changes in the median age in individual countries. If in 2023 the lowest median age was recorded in Cyprus (38.3 years), then in 2050 it is predicted that this indicator will be the lowest in Luxembourg (45.6 years), and in 2100 – in Sweden, the Czech Republic and Slovakia (48.4 years each). In contrast, the highest median age in 2023 was recorded in Italy (48.0 years), in 2050 – these will be Greece, Italy, Lithuania and Portugal (over 51.6 years), and in 2100 – Italy, Croatia, Spain, Finland, Malta (over 53 years).

By the middle of the 21st century trends towards an increase in average life expectancy will be barely noticeable. And already in the second half of the current century, the growth in life expectancy will be more rapid [23].

Analysis of short-term (until 2050) and long-term (until 2100) demographic forecasts for the EU countries gives grounds to argue that with an increase in average life expectancy, a low birth rate in the region, signs of a demographic crisis will continue to intensify, which will manifest itself in further “aging” of the population, an increase in the demographic burden on the working-age population, etc.

On the one hand, such structural changes have a negative economic consequence – an increase in the demographic burden on people of working age, the outspread of “dependency”, etc. [26].

However, as noted by M. Vinogradova and D. Vinogradova [27], there is a gradual increase in the human potential of the population over 65 years of age. Thus, by comparing the indicators of prospective and traditional demographic burden for the population of European countries during 1991–2024, they determined that the demographic burden of the population, taking into account the achieved life expectancy, is currently lower than the general indicator of the demographic burden calculated on the basis of the traditional one. That is, the share of people aged 65 and over who are included in the labor force and can and actively use their human potential in certain types of employment is increasing. With an increase in the overall average life expectancy, demographers point to the emergence of a new phenomenon – “young old age”, when people up to 75 years of age maintain increased working capacity and good health. This phenomenon has appeared in the last 10 years and is a consequence of leading a healthy lifestyle, facilitating working conditions, a high level of health care and medical care. At the same time, this forces governments to reconsider the basic principles of demographic policy, the retirement age limit. Proposals are increasingly being made to preserve jobs for people who have reached retirement age, and programs are being opened

for people of “silver” age, aimed at educating the population of older age categories, providing them with new qualifications, and opening up employment opportunities.

**Conclusions and prospects for further research.** Social transformations of recent decades, associated with post-industrial development, the development of “Industry 4.0” and the transition to “Industry 5.0”, affect all spheres of human life, influencing the direct formation of human potential itself. The spread of the knowledge economy, the rapid introduction of technologies and the diffusion of innovations have become the basis for the formation of new social trends and processes. Changes affect the spheres of realization of human potential: increasing changes in the structure of employment and the formation of demand and supply for human labor create the need to change the structure of human capital. The demand for manual and mechanized human labor, which

cannot be algorithmized, is growing; everything that can be described by a certain algorithm is gradually being replaced (where possible) by new technologies based on artificial intelligence. Geodemographic processes that affect the formation of human potential also change the possibilities of the economy and human development, creating prerequisites and limitations, challenges and new opportunities. All this contributes to the release of a significant part of human potential and the problem of population employment, causing new challenges to education and state programs for forecasting and implementing human potential under modern conditions. An attempt to understand the challenges to the future of human potential, carried out in this study, also raised new questions about the limits of the influence of geodemographic processes on the formation and development of human potential, which are important problems for further understanding and scientific research in this direction.

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