

ISSN 2079-4665, E-ISSN 2411-796X

<https://www.mir-nayka.com>

Original article

УДК 330.34:614.2+314

JEL: J11, J14, J21, O1, O18, R23

<https://doi.org/10.18184/2079-4665.2023.14.1.126-145>

The socioeconomic consequences of population ageing: aspects of modern challenges in the Russian Federation

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Abstract

Purpose: the article summarizes the key characteristics of the population ageing phenomenon and identifies the channels through which it has an impact on the demographic crisis parameters as well as the socioeconomic growth of the country.

Methods: the study is based on tracking the consequences associated with the phenomenon of population ageing. Simultaneously, computational and graphical methods, comparative and retrospective analysis of the sex and age pyramids, expert and empirical assessment of the trends in the structure of the population older than 60–65 years, as well as its economic burden per 1,000 able-bodied people, were used.

Results: the main parameters of the socioeconomic impacts of population ageing are determined. Age limits and essential features of this phenomenon are revealed. The forecast trend of socioeconomic parameters of population ageing is supported by the SWOT analysis matrix, and a conceptual model for the implementation of systematic adjustment measures for the ongoing demographic crisis is proposed.

Conclusions and Relevance: the article demonstrates that population ageing is not a fundamental socioeconomic problem that endangers the well-being of the population over working age. However, it has many negative consequences for the socioeconomic growth of the country that are still being researched; the real threats come not from population ageing as such, but from the existing disproportion in the workload of the population over 60–65 years old per 1,000 able-bodied population. Despite the relative parameters of the ageing trend in Russia, in the future, the life expectancy of the population will be 73.58–75.03 years.

Keywords: demographic ageing, age structure, forecast, working age, older working age, retirement age, demographic burden, socioeconomic threats, SWOT analysis

Conflict of Interest. The Authors declare that there is no Conflict of Interest.

For citation: Mabila G., Sukhareva I. A., Linskiy D. V., Trusevich E. V., Shamileva E. E. The socioeconomic consequences of population ageing: aspects of modern challenges in the Russian Federation. *MIR (Modernizatsiya. Innovatsii. Razvitiye) = MIR (Modernization. Innovation. Research)*. 2023; 14(1):126–145. (In Eng.)

EDN: <https://elibrary.ru/ypxqlq>. <https://doi.org/10.18184/2079-4665.2023.14.1.126-145>

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Научная статья

Социально-экономические последствия старения населения: аспекты современных вызовов Российской Федерации

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Аннотация

Цель статьи – обобщение сущностных характеристик феномена старения населения и обоснование каналов его влияния на основные параметры демографического кризиса и социально-экономического развития страны.

Методы. Исследование основано на отслеживании сложившегося состояния старения населения – в расчетно-графическом анализе состава и структуры половозрастной пирамиды страны, в системной оценке эмпирических трендов индекса старения населения и его влияния на динамику ВВП государства. Наряду с традиционными и специфическими методами научного поиска применены методы компаративно-ретроспективного анализа и экспертно-рейтинговой оценки демографической нагрузки населения старше 60–65 лет на 1000 лиц трудоспособного населения.

Результаты работы. Идентифицированы основные параметры социально-экономических последствий депопуляции страны. Выявлены существенные черты феномена старения населения и возрастные границы старости, приведена специфика контингента населения старше трудоспособного возраста. Обоснован прогнозный тренд социально-экономических параметров, результирующих со старением населения. На основе матрицы SWOT-анализа аспектов этого процесса предложена концептуальная модель реализации мер противодействия социально-экономическим вызовам старения населения.

Выводы. В работе выявлено, что феномен старения населения не представляет собой фундаментальной социально-экономической проблемы, угрожающей благополучию населения старше трудоспособного возраста. Однако он имеет ряд негативных последствий для социально-экономического развития страны, которые подлежат дальнейшему исследованию. Реальные угрозы исходят не от феномена старения населения как такового, а от сложившейся диспропорции в нагрузке населения старше 60–65 лет на 1000 лиц трудоспособного населения. Несмотря на относительные параметры тренда старения России, на перспективу ожидаемая продолжительность жизни населения составит 73,58–75,03 лет.

Ключевые слова: демографическое старение, возрастная структура, прогноз, трудоспособный возраст, лица старшего трудоспособного возраста, пенсионный возраст, демографическая нагрузка, социально-экономические угрозы, SWOT-анализ

Конфликт интересов. Авторы заявляют об отсутствии конфликта интересов.

Для цитирования: Мабиала Ж., Сухарева И. А., Линский Д. В., Трусевич Е. В., Шамилева Э. Э. Социально-экономические последствия старения населения: аспекты современных вызовов Российской Федерации // МИР (Модернизация. Инновации. Развитие). 2023. Т. 14. № 1. С. 126–145

EDN: <https://elibrary.ru/yplxqlq>. <https://doi.org/10.18184/2079-4665.2023.14.1.126-145>

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Introduction

The phenomenon of population ageing in all societies of the country determines the trends of the demographic process and the need for the state to develop adequate stratagems – the effective socioeconomic policy of the state. The activities of the appropriate state policy, considering objective

socio-demographic processes, should include the directions of changes in labour legislation, pension reform, migration flows, etc. The demographic ageing has systemic consequences that are social, economic and demographic: a reduction in the number and proportion of the able-bodied and active population; an increase in the financial and demographic burden on the able-bodied population; a reduction

in financial opportunities for social security of the elderly, an increase in their overall demand for social services, etc.

The relevance and significance of population ageing issues evolve over a long-time and are inextricably linked to the history of the country. The trends of the actual demographic situation, which have continued over the past decade, largely determine the state of the economy and the social level of society. Since a person is not only a producer but also a consumer of socioeconomic needs, the capacity of the domestic market and the economic potential of the country and its territorial formations depend precisely on the size of population, and the characteristics of its age composition.

In the first years after the economic collapse of the Soviet Union, Russia had fairly high demographic indicators in terms of population, but not in terms of age parameters. Since the 90s of the twentieth century on the territory of the former Soviet Union, mortality began to exceed the birth rate, and, thus, it has become one of the factor determinants of the state of the demographic crisis, which lays the foundation for the emergence of serious social, economic, socio-psychological, cultural, medical and other consequences.

Quite often, this process is perceived as a threat to social and spatial development, well-being, normal communication between generations, the development of innovations and technologies. It is critical to research the socioeconomic impacts of population ageing as well as the challenges that this phenomenon creates. This issue is of considerable scientific interest in all research circles. At the same time, we can single out the works of S.I. Kuzin [1], V.N. Barsukov et al. [2, 3], V.V. Gorbunova [4], N.V. Goroshko, E.K. Emelyanova [5], S. Serpa and C.M. Ferreira [6], which set out various scientific and practical aspects of the need to reform pension systems; optimization of the load ratio on the able-bodied population; modernization of the sphere of social and medical services.

The purpose of the article is to summarize the essential characteristics of the phenomenon of population ageing and identifies the channels of its impact on the main parameters of the demographic crisis and socioeconomic growth of the country.

The goal is achieved by completing specific tasks such as revealing the economic and social consequences of the ongoing trend of population ageing; demonstrating the country's economic development prospects in light of the demographic crisis; revealing the causes; identifying the challenges and the possible solutions to the current situation.

The demographic ageing in a certain way disrupts the existing structure of interaction between

generations in various spheres, however, it also creates concrete opportunities for socioeconomic progress. The challenges generated by the ageing of the population require a radical restructuring of the entire socioeconomic system, as well as the adaptation of society and the economy to the peculiarities of the "old" population. In this regard, the primary focus of developed social policies is now on mitigating the current and future socioeconomic effects of population ageing.

Literature Review

The term "population ageing" refers to the phenomenon that occurs when the age structure of the population shifts significantly in favour of the elderly. This concept is frequently used in scientific studies, as evidenced by the numerous works of domestic and international academics that are committed to this issue. Such a conceptual approach can be found in the works of S. Serpa and K.M. Ferreira [6], Su-I Hou [7] and others, in which the nature and depth of emerging socioeconomic problems are insufficiently represented. As mentioned in the works of S.I. Kuzin [1], Su-I Hou [7], R.I. Kapelyushnikov [8], and others [9, 10, 11], most of the authors focused special attention only on the narrowly pragmatic aspects of this phenomenon (e.g. the raising of the retirement age, the deficit of the Pension Fund, the imbalance of the socio-demographic groups, etc.).

Population ageing is a process that has already affected most countries around the world and will continue at a rapid pace throughout the XXI century. Its diverse socioeconomic consequences will largely indicate the development of national economies not only in the next ten years but also in the long term [1, 11].

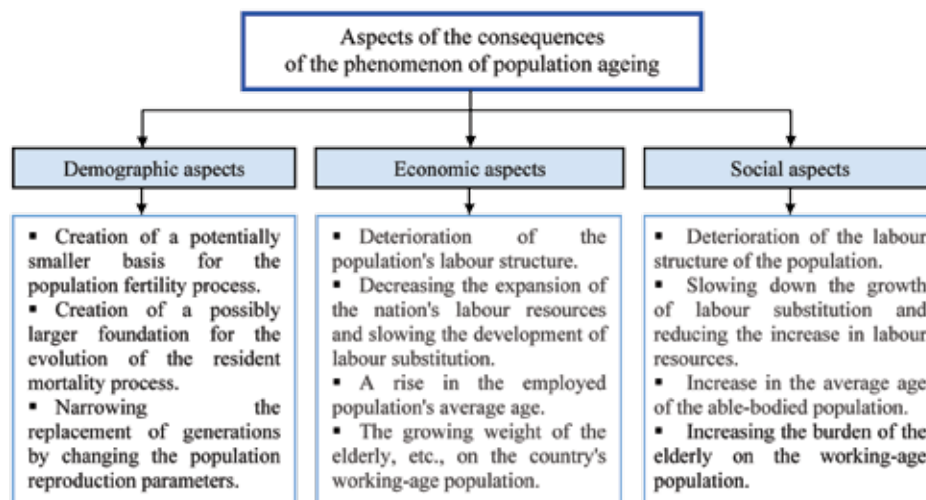
"The ageing of the population is a natural byproduct of cultural and civilizational development. It is generated by the transition from a state of reproduction of the population characterized by a high birth rate and low life expectancy to one characterized by a low birth rate, low mortality, and high life expectancy" [5].

The impact of population ageing should be classified into three categories (Fig. 1): demographic, economic, and social aspects [2].

Several works by both domestic and international scientists have consistently demonstrated that the phenomena of ageing are irreversible in light of the growing demographic problem and the slowing rate of population growth [3, 9].

It is safe to say that its socioeconomic impacts are felt to varying degrees in almost every country on the planet, primarily in Europe and North America.

It should be noted that the concepts of age and age-related changes occupy a special place in numerous



Compiled by the authors based on [2]

Fig. 1. Aspects of the consequences of population ageing

Составлено авторами на основе [2]

Рис. 1. Различные аспекты последствий старения населения

studies on the problems of socioeconomic and demographic development, which is determined both by the general dependence of an individual's complex of acquired, achievable socioeconomic characteristics on age and by the specifics of age as such a social resource that can be called substratum [6].

The acquisition and change of the entire spectrum of properties by an individual and the process of changing his demographic and social conditions are closely related to age, as well as the socioeconomic transformations that accompany individual age-related changes. As for the essence of the category "age", according to C. Serp and K.M. Ferreira, age is not a natural given, even if it serves as a tool for measuring biological development; age becomes a social concept established in the process of comparison with various members of a social group [6].

"Considering time as a reflection of non-random causes of development, many authors define age as a measure of three consecutive continuous states of development that any person experiences before reaching this state" [7].

The scientific community considers the categories of "age" and "advanced age" as historically and socio-culturally constructed phenomena that are factors determining the functions of the socioeconomic and socio-morphological state of the country. Thus, describing the social character of ageing, Su-I Hou point-out that ageing itself is not something that inevitably condemns people to loss of flexibility for thought, forgetfulness or inability to be physically or intellectually active [7].

Proponents of gerontology and geriatrics put forward arguments that the chronological age of 65 does not affect the physical functioning and cognitive abilities of a person, although it has significant consequences for the socioeconomic interaction of people in social and economic spaces [6, 7].

The phenomenon of population ageing is well known to cause changes in the demographic structure of society, the structure of employment and the labour market, consumer demand for goods and services, and an increase in budget expenditures to meet constitutional obligations for pensions, social security, health insurance, and so on. In addition, the ageing process leads to an increase in the factors associated with socioeconomic risks caused by deterioration of health, acquired disability, changes in social status, a decrease in material well-being, and the emergence of new social needs focused on new strategies and stereotypes of the behaviour of elderly people.

According to R. Nagarajan et al., "The age trait is functionally related to the psychosocial properties of the individual, which affect the individual's feelings and beliefs, desires and aspirations, ideas and interests, and through them, all his behaviour, and through behaviour, all his socioeconomic activities" [12].

It should be recognized that the aspects of "age and ageing" emphasizes aspects of the life path, which indicates the connection between the socioeconomic context and the existence of the person himself. At the same time, the increase in the number of elderly people and their share in the number of able-bodied populations, as well as the focus on increasing the

demographic burden in conditions of low economic development make it difficult to keep the working-age population at the proper level, which excites the mood of "fear of old age" [13].

Materials and methods

The current demographic crisis in the country and the projected increase in the elderly and senile population at the beginning of the XXI century require solving several medical, humanitarian, and, above all, socioeconomic problems related to the specific needs of ageing people. Because of systemic trends in population age structure, the phenomenon of population ageing that we have been studying is a source of concern for scientists all over the world [1, 10, 14]. These assumptions are based on the traditional approach to measuring ageing, which, as noted in the works of C.B. Kuzin [1], N.V. Goroshko et al. [5, 15], S. Kudo et al. [16], links the expected phenotypes to a predetermined chronological age.

In this paper, we have carried out a scientific generalization of the socioeconomic essence of population ageing, empirically concretized the impact of this process, identified trends in the socioeconomic growth against the background of general trends in the increase in the population over the working age and forecasted the intensification of these problems against the backdrop of an increasing demographic crisis [6, 7], allowing us to sustain the conclusion of our research based on digital data.

Therefore, to track the current situation in the problems of population ageing, and, consequently, the socioeconomic consequences of this phenomenon, in the computational and graphical analysis of the gender and age pyramid, in the systematic assessment of empirical trends, and forecasting, using an extrapolation Excel model, the dependence of the GDP growth rate on the trend of the population older than working age, traditional and specific research methods are applied: the method of comparative and retrospective analysis, the method of expert analysis and rating assessment of the demographic burden of the population older than working age per 1000 able-bodied persons, and the SWOT analysis of factor determinants of socioeconomic consequences of population ageing and their graphical interpretation.

Results

Two types of population ageing can be distinguished when viewed from the perspective of an increase in the proportion of elderly people in the age structure [9]:

- 1st type of ageing is characterized by a high proportion of elderly people in the total population, an increase in life expectancy, a trend in mortality reduction;

- 2nd type of ageing is characterized by a high rate of increasing the proportion of elderly people due to an increase only in the number of elderly people and a decrease in the birth rate.

We must agree that the ageing of population is a natural process that is most pronounced in developed countries. It is determined by groups of factors [6, 9]:

- reduction and/or slowing of the birth rate; mortality among children and middle-aged people; external migration to the country; internal migration;
- military conflicts; and other processes leading to the irretrievable loss of the young and middle-aged population.

The accelerated population ageing against the background of low fertility and depopulation is one of those phenomena that will have a long-term impact on all aspects of society. Population ageing as a demographic problem exists in many countries of the world, except in Africa, where the youngest and fastest-growing population lives, and the age group (14–19) has increased by 25.6% over the past decade. Mainly in Europe, most countries are demographically elderly, with a proportion of the population over 65 years of age – 12.0%. The demographically oldest states are Norway (21.1%), Germany (20.6%), and Greece (19.7%) [2, 16, 17, 18]. Only four European countries have a smaller proportion of people older than 65 years than Russia (25.2%): France (12.7%), Moldova (10.0%), Macedonia (11.8%), and Ireland (11.9%), but these countries are on the threshold of old age" [3, 9].

The highest death rate per 1,000 people is observed in Bulgaria (18 people) and the lowest value in Turkey (5.5 people), although as a result, an increase in the natural population is observed in most European countries.

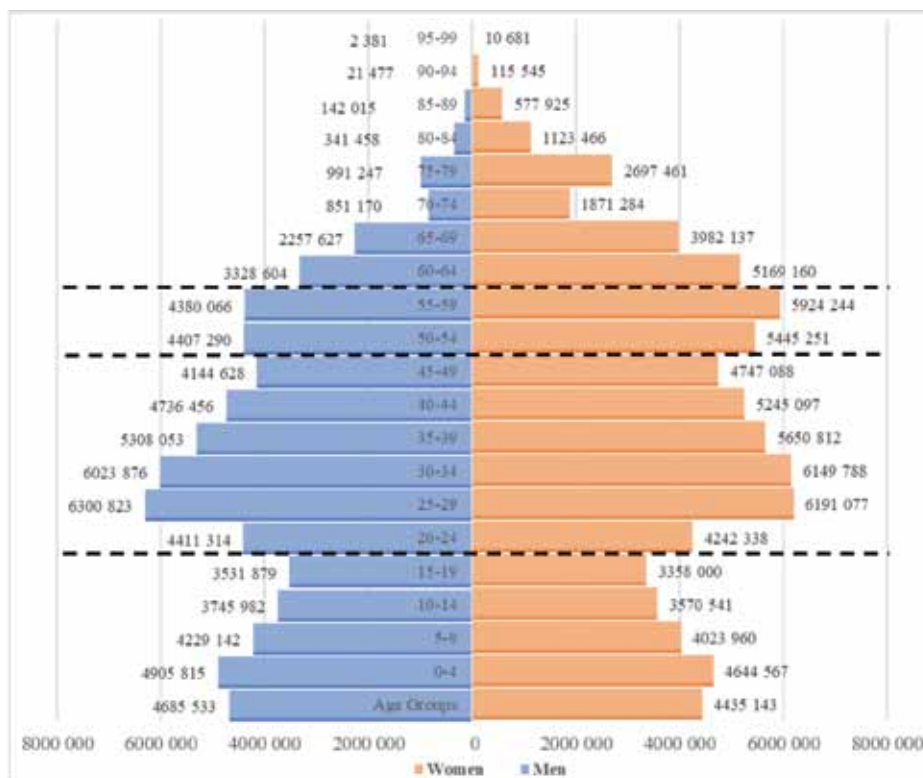
"From a demographic point of view, in European countries, the ageing process is more typical for women: in 2016, the number of women over 65 years of age was twice the number of men and accounted for 65% of the total population of the country over 65 years of age" [1, 13].

According to international criteria, the population is considered old if the proportion of people aged 65 years and older exceeds 7% of the population. In addition to the global trend of aging and an increase in the proportion of elderly people, Russia is characterized by a long-term behavior of wave-like deformation of the age composition and significant gender disparities in old age, as evidenced by the Russian population's age-sex pyramid, which was built at the beginning of 2021 according to Rosstat (Fig. 2) [2, 15].

According to the current legislation of Russia, the population is considered to be older than able-bodied, at the age of 60 and older (for women), and 65 years and older for men. In addition, if we are

interested in the trends in the population of Russia over the working age, then over the 5 last years there

has been a significant slowdown in the growth of this indicator (Table 1).



Compiled by the authors based on [2, 15]

Fig. 2. Sex and age pyramid of the Russian population, 2021

Составлено авторами на основе [2, 15]

Рис. 2. Половозрастная пирамида населения России, 2021 г.

Table 1 shows that the population over the working age was 35.986 million people in 2017, 36.685 million in 2018, 37.362 million in 2019, 37.989 million in 2020, and 36.629 million in 2021, which is respectively 24.5%, 35%, 25.5%, 25.9%, and 24.8% of the Russian population, which amounted to 147.922 million people in 2021, including 68739.35 men (or 46.47%) and 79182.65 women (53.53%). At the same time, the population of working age was 11081.4 men and 25821.4 women, or 16.3% and 33.0% of the male and female populations, respectively.

The upper portion of the Russian sex and age pyramid plainly shows a considerable surplus of women of older ages. The percentage of the population that was of working age at the start of 2020 was 15.5%, up 0.5% from the previous year. It represented 11.1% of the male population and 19.2% of the female population. The population of Russia over the working age has decreased as a result of the country's rising

retirement age. It fell by 3.6% in 2019, totalling 36.6 million persons (women 56 years and older, men 66 years and older) at the start of 2020, as opposed to 38.0 million people (women 55 years and older, men 66 years and older). The decrease in the working-age population ranged from 25.9% to 25.0% [12, 17, 19].

The Russian population has a relative upward trend, which is reflected in the data of the two last years (Table 2).

The analysis of the data in Table 2 shows that Russian population increased by 1.17 million people from 2020 to 2021, primarily due to the increases in the population in the Volga Federal District (296,508.12 people), the Central Federal District (216,505.12 people), the Siberian Federal District (184,468.12 people), and the Southern Federal District (117,535.13 people), which represent respectively 25.3%, 18.5%, 15.7%, and 10.0% of the total population of the country.

Table 1

The Russian population older than the able-bodied population, 2017–2021

Таблица 1

Численность населения старше трудоспособного населения в России, 2017–2021 гг.

Years	The total population of Russia, in millions of people	The population over working age, in millions of people			By percent of the total Russian population
		Urban population	Rural population	Total	
2017	146.880	26.527	9.459	35.986	24,5
2018	146.781	27.037	9.648	36.685	25,0
2019	146.781	27.535	9.827	37.362	25,5
2020	146.749	27.984	10.005	37.989	25,9
2021	147.922	26.999	9.630	36.629	24,8

Compiled by the authors based on statistical data: *The Russian population by gender and age as of January 1, 2021 (statistical bulletin)*. Rosstat. Moscow, 2021. URL: https://rosstat.gov.ru/storage/mediabank/Bul_chislen_nasel-pv_01-01-2021.pdf

Составлено авторами на основе статистических данных: *Численность населения Российской Федерации по полу и возрасту на 1 января 2021 года (Статистический бюллетень)*. Росстат. Москва, 2021. URL: https://rosstat.gov.ru/storage/mediabank/Bul_chislen_nasel-pv_01-01-2021.pdf

Table 2

The state of the Russia's urban and rural population by regions, 2020–2021, millions of people

Таблица 2

Численность городского и сельского населения по регионам России, 2020–2021 гг., млн человек

	2020			2021		
	Total population	Urban population	Rural population	Total population	Urban population	Rural population
Russian Federation	146.749	109.79	36.96	147.922	109.25	38.67
Central Federal District	39.25	32.34	6.91	39.47	32.53	6.94
Far Eastern Federal District	8.24	6.03	2.21	8.34	6.07	2.27
North Caucasus Federal District	10.15	5.12	5.03	10.19	5.14	5.05
North-Western Federal District	14.05	11.94	2.11	14.16	12.03	2.13
Siberian Federal District	17.04	12.68	4.36	17.22	12.79	4.43
Southern Federal District	16.58	10.46	6.13	16.70	10.52	6.19
Ural Federal District	12.44	10.19	2.25	12.55	10.25	2.29
Volga Federal District	28.99	21.00	7.99	29.29	21.18	8.11

Compiled by the authors

Составлено авторами

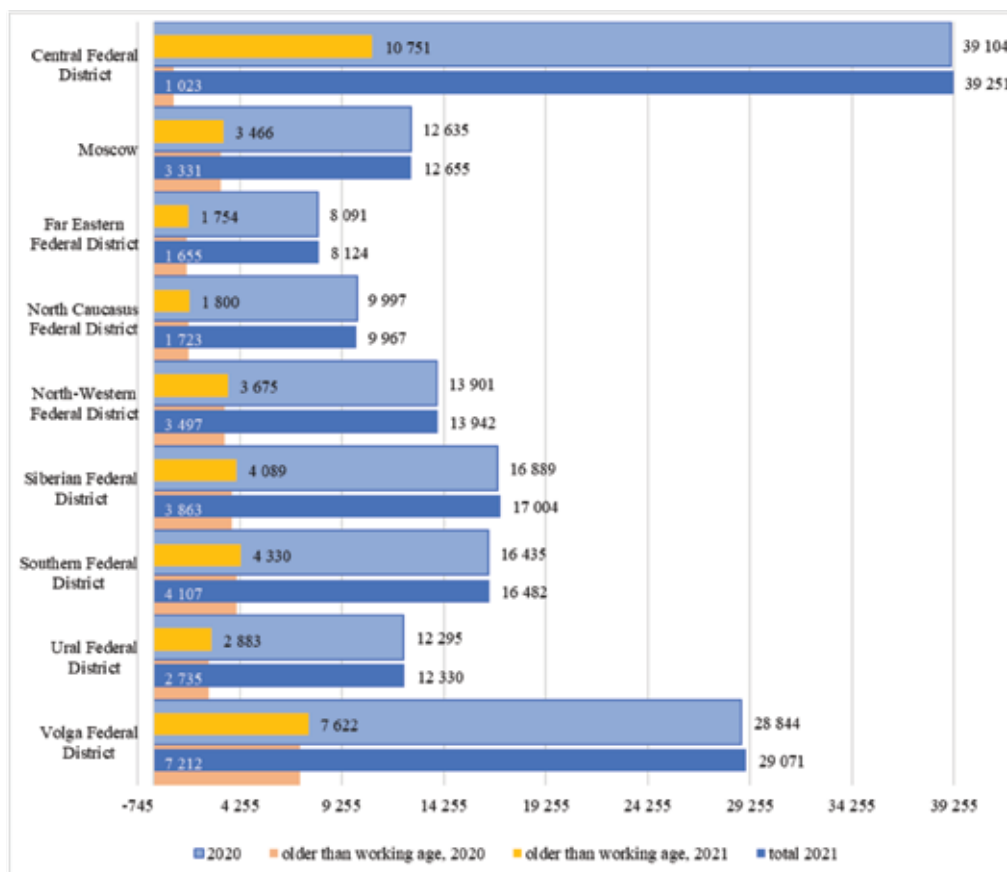
The number of the population over the working age, depending on its structure (Fig. 2) varies by regions of the country. Over the past three years, the following composition has been noted (Fig. 3).

The Central Federal District has the highest indicators in terms of the composition and structure of the total population, where 39.104 million people (or 26.6%) live in 2020 and 39.251 million people (or 26.5%) in 2021. The Volga Federal District has the second position, where 28.844 million people (or 19.7%) live in 2020 and 29.071 million people (or 19.7%) in 2021. The Siberian Federal District and the Southern Federal District have respectively 17.004 million people (or 11.5%) and 16.482 million people (or 11.1%). The Far Eastern Federal District

has the smallest proportion of the population. Its territory is home to the least number of people: 8.091 million (or 5.5%) in 2020 and 8.125 million (or 5.5%) in 2021.

During the studied period, there was a relative trend in the population. If at the beginning of 2019 the number of women aged 16–59 years and men aged 16–64 years was 81.4 million, or 55.4% of the population, then the working-age population increased by 1.6% in 2019, and in 2020 it was 82.7 million, or 56.3% of the total population of Russia.

At the beginning of 2021, the general trend of the population over the working age predetermined the number of able-bodied people (women aged 16–59



Compiled by the authors.

Fig. 3. The state of the population and people older than working age in the federal districts of Russia in 2020–2021

Составлено авторами.

Рис. 3. Соотношение численности населения и лиц старше трудоспособного возраста по федеральным округам России в 2020–2021 гг.

years and men aged 16–64 years), which amounted to 81.8811 million people (or 62.94% of the total population), including 42.7066 million men and 39.1745 million women. At the beginning of 2019, women aged 16–59 and men aged 16–64 made up 81.4 million people or 55.4% of the total Russian population.

The data in Table 3 reveal the fact that the population in the age groups (65–69) and (70 and older) has annual growth trends. The population in the group (65–69) reached 8,469 million people in 2021, compared with 8,179 million in 2020 and 8,339 million in 2019. As for the population aged 70 and over, it amounted to 14.686 million people in 2021, 14.361 million people in 2020, and 13.797 million people in 2019. The data presented in this way systematically reflect the dynamics of the population growth rate over the working age as one of the determinants of the trend of the GDP growth rate of the country (Fig. 4).

The data in Table 3 showed that over the years, the growth rate of the population over working age exceeded the growth rate of the able-bodied with a growth rate equal to 0.689, although over the past 5 years there has been a relative improvement in the state of GDP.

However, the well-founded polynomial equation of the 2nd degree of dependence of the GDP growth rate on the growth rate of the population older than the able-bodied population shows that over the past 5–7 years, with the growth of the population older than the working age by 1 unit, the country's GDP decreased by 48.24 units with an approximation coefficient equal to 0.0688 ($y = -48.237x^2 + 101.66x - 51.923$; $R^2 = 0.0688$).

In particular, the absolute and relative numbers promising from the standpoint of the reproduction of the labor potential of the population of its age contingent in Russia should significantly decrease

Table 3

Таблица 3

The empirical trend of population ageing index and GDP growth

Эмпирический тренд индекса старения населения и роста ВВП

Population's age groups	Population by year, 1,000 people										
	1926	1959	1989	2002	2005	2010	2015	2019	2020	2021	
The entire population	92,681	117,534	147,022	145,167	143,801	142,857	146,267	146,781	146,749	147,922	
including age, years:											
65–69	1,721	2,664	4,510	6,345	7,567	4,002	6,428	8,179	8,339	8,469	
70 and older	2,212	4,303	9,646	12,469	12,242	14,210	13,377	13,797	14,361	14,686	
of the total population, aged:											
younger than working age	36,854	35,094	35,995	26,327	24,349	23,126	25,689	27,430	27,442	27,387	
the growth rate of people younger than working age	x	0.952	1.026	0.731	0.925	0.950	1.111	1.068	1.000	0.998	
in working age	47,830	68,609	83,746	88,942	90,099	87,983	85,415	81,362	82,678	81,881	
the growth rate of the population in working age	x	1.434	1.221	1.062	1.013	0.977	0.971	0.953	1.016	0.990	
older than working age	7,945	13,827	27,196	29,778	29,353	31,714	35,163	37,989	36,629	36,903	
the growth rate of people older than working age	x	1.740	1.967	1.095	0.986	1.080	1.109	1.080	0.964	1.007	
GDP, billion rubles, comparable prices	x	x	x	10,830.5	21,609.8	46,308.5	83,087.4	109,608.3	107,315.3	130,795.3	
GDP growth rate	x	x	x	1	1.995	2.143	1.794	1.319	0.979	1.219	

Compiled by the authors based on [15, 18]. Составлено авторами на основе [15, 18]

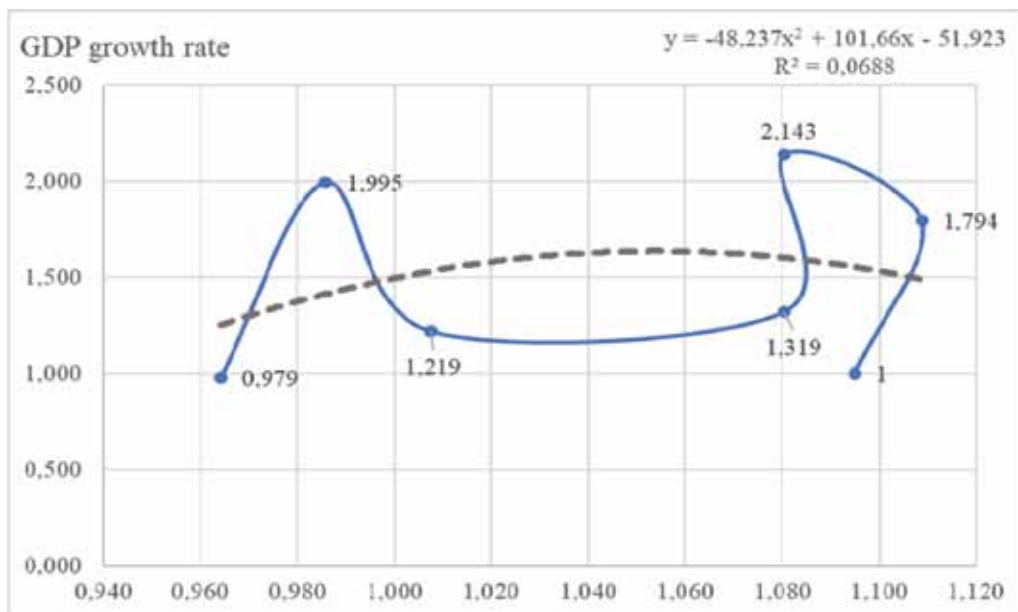
over the next 15–20 years. It can be argued that a decline in the population of working age will increase the social and financial burden on the latter, especially when considering the rate of increase in the elderly and the coefficients of the probability of the formation of people over 65 years old (Table 4).

A petal diagram of the interpretation of the forecast trend of the population over the working age is shown in Fig. 5.

The current growth of the elderly and the decrease in the number of able-bodied people have led to an increase in the social and financial burden on the latter. In recent years, the burden on the able-bodied has been slowly but steadily decreasing, mainly due to people over 65 years of age. So, if in 2010 there were 28 people over 65 years old per 100 people of working age (and 73 people in the age group (0–18)), then in 2019, these figures were 21 people and 71 people, and in 2020 – 23 and 75 people. In 2021, these figures would have been 22 people and 74, respectively.

The increase in the burden on the able-bodied population can have various socioeconomic aspects: financial (increase in fiscal payments); physical (increase in working age or day); moral (overwork due to lack of rest as a result of permanent work), etc. Many facts are already in effect: the retirement age has been increased, the length of the working day is usually abnormal, and taxes are rising. The consequences of such an overload are the rapid development of a person's working potential and the deterioration of health, and disability. The growth rate of the number of disabled people in the country remains high, and the average age of people with cardiovascular diseases is approaching 40 years old (the average age of Russian was 40.48 years old at the end of 2021, of which men were 37.73 years, and women – 42.86 years old) [7, 19].

Thus, it becomes important to establish the demographic burden



Compiled by the authors based on table 3

Fig. 4. The reliance of the GDP rate on the growth rate of the population over the working age during the 5 last years

Составлено авторами на основе табл. 3

Рис. 4. Зависимость темпа ВВП от темпа роста численности населения старше трудоспособного возраста за последние 5 лет

Table 4

Empirical probability of the formation of the population over the working age

Таблица 4

Эмпирическая вероятность формирования численности населения старше трудоспособного возраста

Age groups, years	2019	2020	2021	2022	2023
60–64	0.678	0.689	0.701	0.712	0.723
65–69	0.585	0.629	0.673	0.716	0.759
70 and older	0.0907	0.0895	0.0883	0.0870	0.0859

Compiled by the authors based on [17]

Составлено авторами на основе [17]

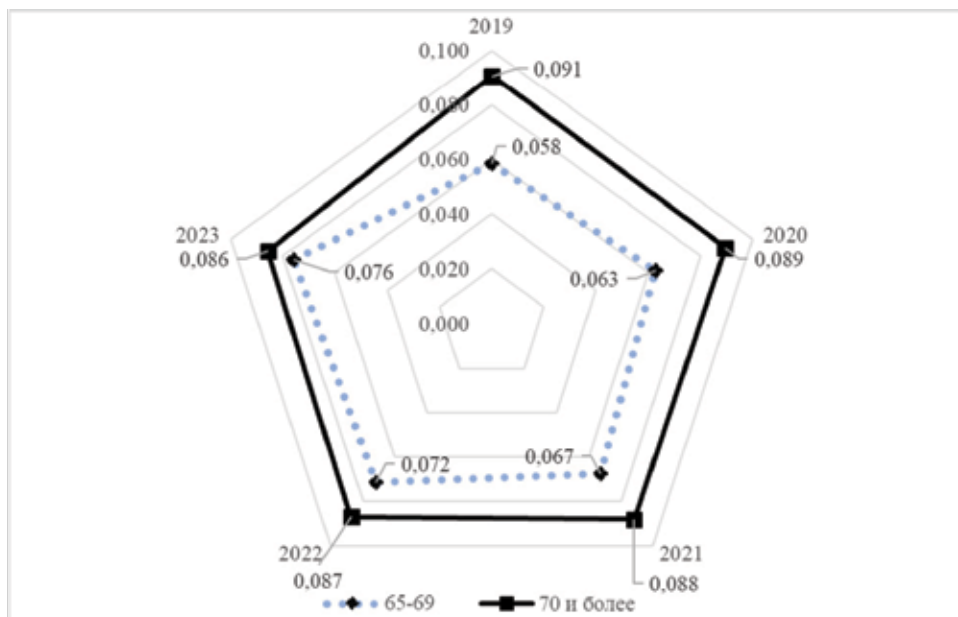
of the population older than the working age per 1,000 persons of the working-age population. Russia, geographically, has a large differentiation of the demographic burden on the able-bodied population: in Russia in 2021, there were 749 people over the working age per 1,000 persons of the working-age population, and 785 people over the age of 65 (2020) and 788 people (2019). As of 2021, there were 1,137 urban and 455 rural people per 1,000 persons of the working-age population, compared to 1,324 urban and 453 rural populations in 2020, and 1,239 urban populations and 458 rural populations in 2019 [20, 21].

An interesting point is the revealed uniformity of the workload of the population older than the

working age per 1,000 persons in the able-bodied population (Fig. 6).

Over the two past decades, this parameter has amounted to 328 people, of which 319 people in urban areas and 358 people in rural areas. A similar situation was observed in individual federal districts and regions of Russia, e.g. 777 people (103.7%) in the Volga Federal District, 757 people (101.1%) in the Siberian Federal District, and 750 people (101.13%) in the Ural Federal District [22].

The Empirical indicators and demographic forecasts indicate that in rural areas, we should expect a slight decrease in the level of ageing, while in urban areas – it will increase. Since the economic and demographic

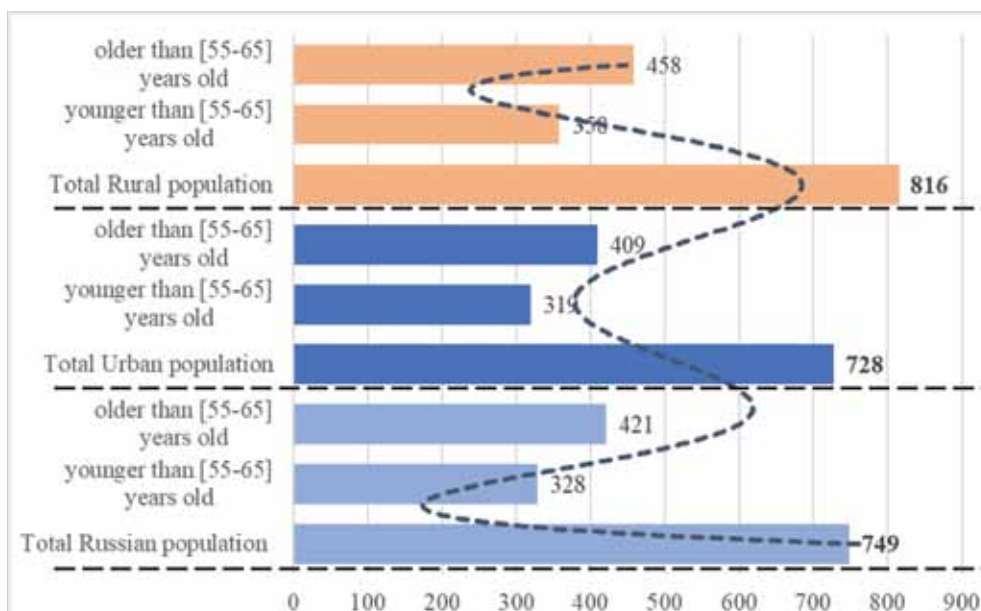


Compiled by the authors based on table 4

Fig. 5. The schedule of interpretation of the forecast of the population over the working age

Составлено авторами на основе табл. 4

Рис. 5. График интерпретации прогноза численности населения старше трудоспособного возраста



Compiled by the authors based on [20, 21]

Fig. 6. Demographic burden per 1,000 persons of the working-age population in Russia

Составлено авторами на основе [20, 21]

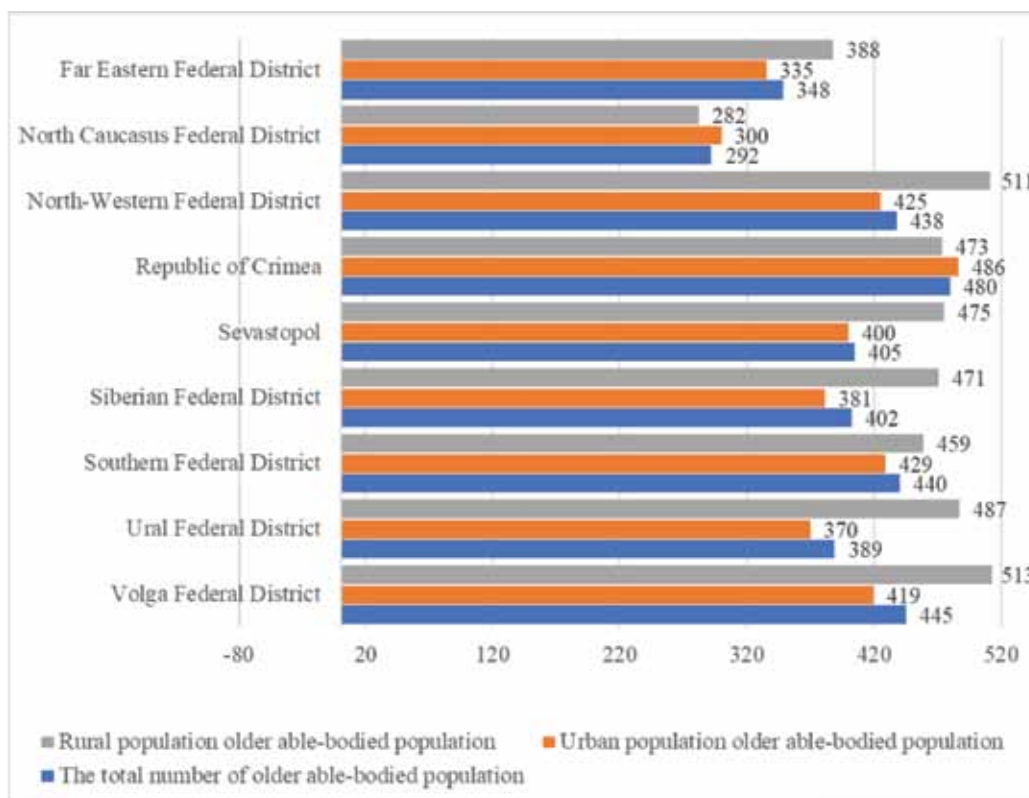
Рис. 6. Демографическая нагрузка на 1000 человек населения трудоспособного возраста в России

pressures in cities will noticeably increase, household pressures on urban women also increase, which will exacerbate the problem of the development of social forms of care for the elderly [10].

A schematic representation of the current demographic burden on the working-age population in the subjects of the Russian Federation in 2021, extrapolated by the average data for the two last decades is shown in Fig. 7.

The regional aspect, the highest levels of demographic burden on people older than working age are currently observed in the Southern Federal District, where there is a load of 762 per 1,000 persons of the working-age population (including 440 people over working age) [3, 23]. In Crimea, there are 815 people, including 480 people over working age, per 1,000 persons in the able-bodied population.

The primary focus of social policies is to reduce the



Compiled by the authors

Fig. 7. The current demographic burden of people older than working age per 1,000 persons in the working-age population on average for 2021

Составлено авторами

Рис. 7. Сложившаяся демографическая нагрузка населения старше трудоспособного возраста на 1000 человек трудоспособного населения, в среднем за 2021 г.

current and future socioeconomic consequences of population ageing [24].

The age structure of the socioeconomic system, which was formed in the conditions of a younger population, is "ageing".

The peculiarity of Russia is that most of its citizens come to the threshold of old age with a completely worn-out body, acquiring a "bouquet" of various health disorders until old age. Almost one-third of those who died between 2019 and 2021 were under

the age of 65. The number of deaths exceeded 2.4 million people, while the natural losses, excluding migration, amounted to 991,000 people. In 2021, the mortality rate was 15.6 per 1,000 persons, and the decrease was 6.4% [22, 25].

The idea of how there is now a chance for those who were born in Russia to live to the threshold of being over 70 years old and how that has changed over the past six years is given by various indicators published on statistics by the heads of the regional state administration services (Table 5).

Table 5

Extrapolation forecast of the development trend of life expectancy of the Russian population

Таблица 5

Экстраполяционный прогнозный тренд продолжительности жизни населения России

Years	Low variant, years old (1)	Medium option, years old (2)	High variant, years old (3)	Increase in life expectancy, years old		
				1	2	3
2020	73.40	73.87	74.34			
2021	73.58	74.29	75.03	0.18	0.42	0.69
2022	73.75	74.69	75.68	0.17	0.40	0.65
2023	73.91	75.08	76.28	0.16	0.39	0.60
2024	74.07	75.45	76.84	0.16	0.37	0.56
2025	74.21	75.82	77.38	0.14	0.37	0.54
2026	74.35	76.18	77.89	0.14	0.36	0.51
2027	74.49	76.53	78.38	0.14	0.35	0.49
2028	74.61	76.87	78.85	0.12	0.34	0.47
2029	74.73	77.21	79.30	0.12	0.34	0.45
2030	74.84	77.54	79.74	0.11	0.33	0.44
2031	74.96	77.87	80.15	0.12	0.33	0.41
2032	75.07	78.19	80.55	0.11	0.32	0.40
2033	75.18	78.50	80.93	0.11	0.31	0.38
2034	75.29	78.80	81.30	0.11	0.30	0.37

Compiled by the authors based on [23]

Составлено авторами на основе [23]

The extrapolated forecast data presented in Table 5 shows that in 2021 the life expectancy of the Russian population reached 73.58–75.03 years old, and has a positive annual trend in the future. By 2035, life expectancy will be 75.40–81.66 years, with equal conditions for ensuring the population's life and the possibility of improving the parameters of socioeconomic protection for the working-age population. However, some evidence suggests otherwise.

The issues are getting worse; during the past ten years, there has been a roughly 30% increase in the prevalence of diseases among those older than the working age. As a result, if the prevalence of diseases was 1798,307 people in the working-age population in 2010–2020 and 1828,915 people in 2022, that equates to 12.3 deaths of individuals over the age of 70 per 1,000 people in the Russian population.

In general, for people of retirement age, the levels of general and primary morbidity and primary disability, respectively, are 2.3, 1.5 and 8 times higher than for people of the working age, which is determined by age-related changes in the body.

In Russia, the mortality rate of the population over 70 years of age is significantly higher than in some developed countries (on average by 1.7 times), and

several times higher than that in the former Soviet States. In comparison with industrially developed countries, the maximum excess is typical for the population in the age group (60–74).

In Russia, from infectious and parasitic diseases, the mortality of men is 22250 people; for women – 10668 people; from neoplasms – 159646 men and 139053 women; from diseases of the circulatory system – 394559 men and 446648 women [22].

A negative economic consequence of the ageing of the population may be the decline of the services market. For the Russian economy, this type of business began to gain a certain pace of development at the beginning of the XXI century. However, today, at the peak of the increase in the population ageing, and the low level of social protection, we cannot talk about "European old age" for Russian citizens. Pensioners can hardly go anywhere, even within Russia, to go to the theatre, cinema, and especially an entertainment center [23, 24].

The increasing deepening of demographic ageing primarily increases the need to increase pension funds, as well as, due to the formation of additional demand for medical services from the elderly population, with the need for investments in the development of special medical technologies aimed at the population

older than the working age, increased resources for the maintenance of the elderly people in residential institutions [24].

It should also be noted that one economic challenge brought about by population aging is the aging of the workforce as a result of insufficient educational and professional flexibility, as well as the weak development of institutions and traditions of self-education and continuous education throughout life, which threatens to slow down the renewal of knowledge and ideas, impeding scientific and technological progress.

From all the above, the question arises – what are the social and economic challenges caused by the ageing of the Russian population? It has been empirically proven that the progressive ageing of the population always entails many social and economic problems and contradictions. Its immediate result is an increasing discrepancy between the "ageing" age structure of the existing socioeconomic system, which has developed under the conditions of the "younger" population. Therefore, the ageing of the population is the most serious challenge to the financial and economic system, primarily in the sphere of public finance and the labour market. The special character of this problem is explained by the spatial and temporal globality of the demographic ageing [25].

The most significant implication of the phenomenon of population ageing and its steady natural decline is that these demographic trends will determine the further reduction of the population's base of reproduction and labour potential.

The financial and economic consequences of the demographic ageing, in particular its impact on the social protection system, are most clearly demonstrated by indicators characterized by the ratio of the over-able-bodied (over 65 years) and the working-age population (15–64 years). However, if we take the age range of working age, and, consider the prevailing Russian legal and economic realities, the age range of labour activity narrows to 20–59 years. Because of this, the situation looks even more dramatic: the load indicator (older than 60 / 20–59), which is approximately 36%, will increase to 65% in the future by the end of 2030, and the coefficient of potential support (20–59 / older than 60) will decrease from 2.8 to 1.5 [8, 26].

The ageing of the labour force almost certainly reinforces the trend of feminization of the labour market. The cumulative effect of gender inequality throughout life makes older women particularly vulnerable to age discrimination, although it manifests itself in general among all older people. Despite the legal prohibitions on discrimination and harassment based on age or gender, social attitudes and behavioural stereotypes are changing too slowly [21, 27].

The predicted trends in the socioeconomic sphere, which will directly or indirectly affect public health, are, first of all [28]:

- the progressive population ageing; and, as a result, a potential decrease in workforce quality and competitiveness due to the accumulation of chronic diseases and the conditions characteristic of the population older than working age;
- the growth of the population of retirement age with lower incomes (poverty acts as a determinant of the deterioration of health and access to medical care);
- a rise in the ratio of people in retirement to those in the labour force, and, as a result, a rise in budgetary spending on the healthcare.

We used a SWOT analysis to conduct a thorough analysis of the issue of the aging population and its socioeconomic repercussions. The proposed SWOT analysis (Table 6) focuses on the opportunities and threats that may emerge in Russia as a result of the demographic process of ageing, allowing for the identification of potential solutions to mitigate the negative effects of this phenomenon and its impact on socioeconomic processes [1, 14, 28]. We were able to identify the advantages and disadvantages, as well as the threats and opportunities of population ageing in Russia.

The primary issues caused by population ageing, which have an impact on the nation's socioeconomic condition, the development of the health system, and the operation of the health sector, can be attributed [14, 28]:

- a significant proportion of the population who completes the period of work with an unsatisfactory state of health;
- the growing needs of the population of older age groups with disabilities in medical and social care;
- increasing demand for long-term care services from the elderly who have difficulties in normal life and depend on outside care;
- deepening of health problems and the need for long-term care in the future due to insufficient prevention, among younger patients;
- unconditional growth of budget expenditures, in the form of targeted allocations and subsidies for pension service costs;
- increases in corporate charges and transaction costs, as well as an increase in economic risk, etc.

Thus, despite the contradictory positions on this issue, against the background of the revealed essence of the socioeconomic impact of the population ageing, it is necessary to propose some promising solutions to this problem, formulated in a conceptual model by J.W. Rowe and R.L. Kahn [14], which reveals the direct impact of the population ageing on the health

Table 6

Matrix of the factor determinants of SWOT analysis of the socioeconomic aspects of population ageing

Таблица 6

Матрица факторных детерминант SWOT-анализа социально-экономических аспектов старения населения

Strengths	Weaknesses
<ul style="list-style-type: none"> • Application of the potential for stabilization and growth of fertility – to provide for a short-term increase in the coefficient for the future by 10.8% and a reduction in the level of natural loss by 1.30 • Using a strategy to stimulate fertility in families • Formation of conditions for reducing the workload of the population over the working age per 1,000 persons of the working age 	<ul style="list-style-type: none"> • The predominance of the number of dead over those born (depopulation) • The disproportion of the working-age population by gender, the number of women exceeds the number of men by 25% • Ageing of the population and an increase in the average age of the population, which is 40.48 years old • The population is ageing at a relatively rapid rate of 24.9%
Opportunities	Threats
<ul style="list-style-type: none"> • Reducing the mortality rate, increasing the birth rate through the implementation of state-targeted health programs and improving the demographic situation • Increasing the number of jobs through the development of promising areas of economic activity: traditional sectors of the economy • Positive attitude and loyalty of employees older than 60–65 years of age 	<ul style="list-style-type: none"> • Modernization of the production base and optimization of the number of employees at the enterprises of cities, and the deterioration of market conditions, which contributes to the further release of some employees • Continued outflow of personnel, primarily young people under the age of 30 with higher professional education, and highly qualified workers to large cities

Compiled by the authors based on [1, 14, 28]

Составлено авторами на основе [1, 14, 28]

and activity of people older than the working age, economic growth, stability of the fiscal system and the state budget, general social welfare, etc.

Population ageing also leads to new challenges regarding the functioning and development of housing and transport infrastructure. In most cases, the equipment of the housing stock at the regional level does not meet the needs of the elderly. In cities, problems are aggravated, firstly, by the equipment of houses and adjacent territories, and secondly, by the qualitative characteristics of the dwellings themselves (whether they have at least basic amenities that would provide comfortable living, carry and out current and major repairs, if necessary, etc.) [29].

Fig. 8 depicts the relationship between the ageing process and various aspects of the socioeconomic life, with three levels (micro, meso, and macro) of population ageing phenomenon highlighted [3, 30].

At each of these levels, the consequences of the ageing phenomenon have a direct factual impact on certain areas of the socioeconomic life of the country [2, 30]:

- at the micro level, the consequences of population ageing raise life expectancy; they coincide with an increase in the local population, increasing the burden on the able-bodied population as well as the population's health and social protection authorities;
- at the meso-level, the consequences of population ageing create conditions for changing consumer behaviour and the mode of the accumulation

formation, lowering aggregate demand and slowing economic growth, among other things;

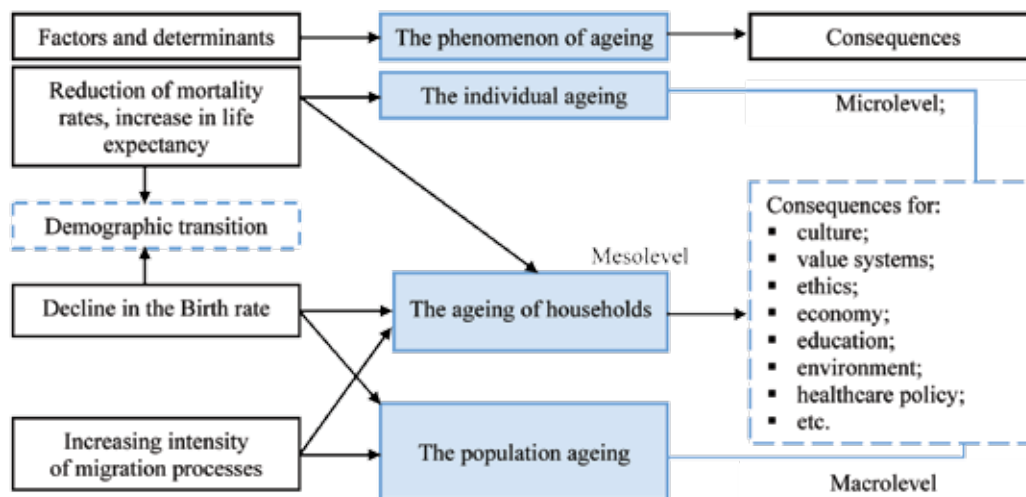
- at the macro level, the consequences of population ageing create conditions for an increase in the burden on pension funds and act as a catalyst for changing the state's policy toward citizens who are no longer of the working age.

An increase in budget spending to fund social programs and constitutional obligations in the areas of pension insurance and medical and social services for elderly citizens; changes in labour market structure and unemployment; an increase in the proportion of older citizens, including those aged after retirement; and changes in the labour market structure and participation rates are just a few of the negative effects of population ageing that slow down the nation's economic growth.

Conclusions and Relevance

Russia belongs to the countries with a relatively high level of population ageing: in terms of the proportion of the population of the age group (65–69 years) and (over 70 years), it closes the group of 7 countries with an empirically high percentage of pensioners to the population: Poland (36.6%), Spain (36.2%), and Bulgaria (35.0%). The United States (32.4%), Estonia (31.2%), Ukraine (29.4%), and Russia (29.3%) are the top four countries.

The ageing of the Russian population is characterized by such features as the subjection to the influence of "demographic waves", and a tangible sexual and



Compiled by the authors based on [3, 30]

Fig. 8. The population ageing: factors and consequences

Составлено авторами на основе [3, 30]

Рис. 8. Старение населения: факторы и последствия

territorial differentiation of the level of ageing of the population.

Russia is experiencing noticeable difficulties in the sphere of socioeconomic protection of the population over the working age and in the future will feel very acutely such social and economic consequences of this process, namely:

- the strengthening of the demographic and economic (respectively, and tax) burdens on the able-bodied contingent;
- the systemic crisis and shortage of labour (primarily qualified);
- the general ageing of the labour force and labour potential;
- reduction of the possibilities of the labour-resource provision of long-term care for persons over 65 years of age;
- growth of consumer demand for medical services;
- the growing need to disband the existing socioeconomic system by the new challenges of digitalization of the social protection system, pension fund, health care system, etc.

The negative manifestations of these processes may be the human capital outflow, the influx of migrants, the decline of traditional industries, increased dependence on imported goods, and the death of such business lines as tourism and recreation, hotel and restaurant business. In this regard, the state should not only adopt the experience of other countries in the world, but also speed up the processes

of making appropriate decisions, regulations, and development programs at the legislative level. Other disadvantages of policy formation in the interests of the population over the working age in Russia remain activities in the fields of ageing research and social protection of 65-year-olds, the formation of adequate financing measures, and the implementation of targeted programs to support working people over 55–65 years old, considering the expectations of the socioeconomic conjuncture.

In summarizing the findings of the work done, it should be emphasised that Russia continues to experience broad patterns of population ageing. The negative trend can be mitigated by the implementation of state programs to help the population over the working age, as well as programs to stimulate population growth, which in the long term will have a positive impact and stop the ageing process of the nation, and, consequently, will have a positive impact on the level of the able-bodied population.

In addition, it must be said that the Russian economy is facing a serious problem of reducing the working-age population. This is complicated by the birth rate below the reproductive level of simple reproduction and population ageing, which can slow down the economic development of the country and jeopardize its security.

Nevertheless, dangers are accompanied by opportunities, and with the active implementation of the various programs of the socioeconomic policy, significant results can be achieved and positions at the mega-level can be strengthened. This is

impossible without an effective demographic policy and the involvement of additional workers who were previously less involved in paid work, which requires the development of the appropriate infrastructure. In this regard, the main directions of modernization should be to improve the quality of labour resources and increase their quantity, as well as to develop the digital economy and remove barriers preventing people with special needs from entering the labour market.

Modern demographic trends determine the need to increase the effectiveness of the state's social policy in the interests of the elderly, to attract significant financial, material, and labour resources to improve the level and quality of their lives through decent socioeconomic provision, to create conditions for effective professional and labour activity, social activity, and personal self-realization, and to improve medical care, the supply of medicines, and social assistance.

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The article was submitted 28.10.2022; approved after reviewing 13.02.2023; accepted for publication 09.03.2023

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Статья поступила в редакцию 28.10.2022; одобрена после рецензирования 13.02.2023; принята к публикации 09.03.2023

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