

SOFIA UNIVERSITY
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**“IMPACT OF THE DEMOGRAPHIC SITUATION IN BULGARIA
AFTER 1990 OVER THE DEVELOPMENT OF THE HUMAN CAPITAL AND
SILVER ECONOMY.”**

DISSERTATION ABSTRACT

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The papers for the defense (thesis, reviews and statements) are available at the “Regional Development” Department, room 281-B of the Faculty of Geology and Geography, Sofia 15 bul. “Tsar Osvoboditel”, North wing, floor 3.

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Title: “Impact of the Demographic Situation in Bulgaria after 1990 over the Development of the Human Capital and Silver Economy.”

I. GENERAL DESCRIPTION OF THE THESIS

1. RELEVANCE OF THE PROBLEM

Demographic processes related to the number, growth and structure of the population have impact on and determine to a great extent the long term social, economic and political development of countries. The demographic factors form complex challenges and opportunities for societies including such related to the economic growth. Nevertheless, the claim that demographic events define everything is an overstatement because it is in contradiction with the fact that demographic trajectories can be changed with economic measures, political and institutional reforms, changes in technologies, in cultural norms and behavior.

The world is going through unprecedented demographic changes in three main directions: population growth, changes in fertility and mortality which lead to modifications in the age structure of the population. The number and growth of population are directly resulting from the dynamics in the indicators for mortality, fertility and international migration. These indicators vary significantly in different countries in the world and explain the key differences in the economic development related to labour, physical and human capital as well as to poverty and inequalities.

The deteriorating demographic situation in Bulgaria over the past 30 years affects all aspects of public and political life on the one hand but on the other hand can be influenced by particular and purposeful measures which can mitigate the negative effects of the demographic processes. In this regard, the impact of demographic situation on human capital and silver economy development is a research of great importance.

The selected research of human capital development over the past 30 years in the conditions of deteriorating demographic situation in Bulgaria is prompted by the fact that contemporary theories for economic growth review human capital as a key factor for economic development because it contributes to economic growth not only by increasing productivity but also by creating environment for innovations. Studies and measurements in the field of human capital are of key importance to the development of Bulgaria in terms of the necessity for innovative development of the economy.

Silver economy development can play a crucial role in addressing the challenges arising from population ageing. Demographic ageing is a process which should be observed and which requires timely measures. Drafting regional development strategies addressed to elderly people is of essential importance in the context of dynamic demographic processes and lasting trend of population ageing worldwide.

The negative demographic trends in Bulgaria have been intensifying over the past 30 years. New problems arising from the dynamic demographic processes require measures different from those taken so far. The two national strategies for demographic development and active ageing outline the main goals of the demographic development but the measures for achieving those goals need to be brought up-to-date taking into consideration the new opportunities provided by the digital technologies. Reducing the negative effects of population ageing is a key challenge not only for Bulgaria but also for all European countries. Therefore I think that the problem related to the impact of demographic processes on the development of human capital and silver economy is relevant.

2. MAIN RESEARCH THESIS

The main research thesis is related to measuring to what extent the demographic situation in Bulgaria affects the development of human capital and silver economy and whether the initiation of certain measures can change the demographic trends.

In compliance with the research thesis of the dissertation, the study of human capital potential in Bulgaria by planning regions through statistical methodology for data analysis can provide reliable information about the state of human capital and its components as well as outline of the intraregional differences. All twenty-five indicators, which are main determinants of the educational, health, labour, social and cultural and intellectual potential, are fully analyzed.

Silver economy development is reviewed and analyzed on national level and specific recommendations for effectively addressing the challenged arising from population ageing are outlined.

3. PURPOSE AND TASKS OF THE THESIS

The aim of this thesis is to outline the main parameters of the demographic situation in Bulgaria between 1990 and 2019 through researching and analyzing the factors and causes that shape the demographic processes and how they affect the development of the human capital and silver economy in the country as well as to prove that the process of influence is two-way.

To achieve this goal the following tasks are set and solved:

1. Clarification of the current demographic situation in the Republic of Bulgaria;
2. Study of the demographic development of the country;
3. Analysis of the impact of the demographic processes on the development of the human capital and silver economy in the Republic of Bulgaria; research of the potential of human capital in Bulgaria at regional level; monitoring of the dynamics of the factors leading to demographic ageing of the population in Bulgaria and the demographic indicators related to ageing in the context of the dynamic demographic situation in the European Union;
4. Analysis of the development of the silver economy in Bulgaria and review of the measures aimed at promoting active life of the elderly; the silver economy as an important European priority – a comparative overview of the development of the silver economy in Germany and Japan;
5. Study of the challenges posed by the ageing population;
6. Outlining specific ideas for overcoming certain demographic problems as well as recommendations for improving the potential of human capital in Bulgaria and for developing the silver economy in the country

4. OBJECT AND SUBJECT OF THE RESEARCH

The object of the research is the demographic situation in Bulgaria in the conditions of deteriorating demographic indicators and its impact on the development of the human capital and silver economy in the country.

The subject of the research is the analysis of the demographic processes between 1990 and 2019 which determine the development of the demographic policy and affect the potential of human capital and the development of the silver economy in the country.

5. RESEARCH METHODS

Basic scientific methods are used - analysis and synthesis, induction and deduction, historical method, hypothesis method together with demographic methods, mathematical-statistical and graph-analytical methods. Works of Bulgarian and foreign authors, experts in the field of demography, human capital and silver economy are used for theoretical and methodological basis of the thesis. Data from the National Statistical Institute, Eurostat

(European Union Statistical Office), the World Health Organization, the World Bank and others is used.

6. PLACE OF THE RESEARCH

The study of the demographic situation was conducted on the territory of the Republic of Bulgaria between 1990 and 2019. The potential of human capital was studied at national and regional level between 2000 and 2019. The recommendations regarding the silver economy are based on analysis of its condition at national level.

7. LIMITATIONS OF THE RESEARCH

Indicators that have mainly quantitatively measurable geographical and regional significance for the demographic situation in the country are studied in the present thesis. A limited number of quality indicators are used. The demographic situation is studied between 1990 and 2019 which on the one hand is a long period, but on the other hand is too limited to outline trends and patterns in the demographic development. Therefore, the analysis inevitably goes beyond the specified period. The potential of human capital has been studied for a long period of time from 2000 until 2019. In this regard, the period is divided into three subperiods. The statistics for the period 2000-2006 have been recalculated to coincide with the current zoning of the country after 2007.

8. CONTENTS OF THE THESIS

This thesis consists of introduction, three chapters, conclusion, a list of references and appendices. The structure is classical. The first chapter outlines the theoretical formulations of human capital, population ageing and silver economy. The historical development of the concept of human capital, the conditions for its formation and the methods for its measurement are considered in detail. A review of the scientific literature examining the relationship between human capital and economic growth has been made. The first chapter also covers the theoretical aspects of population ageing and the silver economy. A thorough review of the models of the silver economy in Germany and Japan has been made.

The second chapter covers research and analysis of the demographic situation throughout the country with a focus on internal and external migration, birth rate and fertility, induced abortion, marriage, cohabitation and divorce, mortality and aging. Specific problems related to demographic processes are outlined.

The third chapter focuses on the research of the potential of human capital by measuring the potential of its components - educational, health, labor, social and cultural and intellectual potential. The research is carried out by using statistical method with quantitative and qualitative indicators at national and regional level (by planning regions). An analysis of the impact of the demographic situation on the development of human capital is made and specific measures for the development of the intellectual and innovative potential of human capital are proposed. The prospects for the development of the silver economy in Bulgaria in the context of modern demographic trends are also outlined.

9. PRACTICAL USE OF THE RESEARCH

The research of the potential of human capital, proposed herein, aims to promote regional development in the country through the achieved results because human capital is influenced by the demographic situation and is key to economic growth. The research provides evidence for regional disparities which tend to deepen rather than decrease. The

thesis seeks empirical results to support the analysis and justification of policies and measures aimed at improving the educational, health, labour, social and cultural and intellectual potential at regional level in Bulgaria.

10. APPROBATION OF THE RESEARCH

The issues reviewed in the thesis were discussed in the Regional Development Department at workshops and scientific conferences with representatives of state institutions, local authorities, industry organizations and experts in the field of public policy and administrative reform.

11. PUBLICATIONS RELATED TO THE THESIS

Data, conclusions and results from the research are published in scientific journals and are presented at national and international scientific forums in the form of scientific reports which are also published.

II. CONTENTS OF THESIS

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III. MAIN CONTENT OF THE DISSERTATION

Introduction

The introduction substantiates the relevance of the problem and the topic of the thesis. The purpose and tasks of the thesis are defined as well as the object and the subject of the research. The main trends in the demographic development at global level are outlined. The world is going through unprecedented demographic changes which are taking place in three main directions: population growth, changes in fertility and mortality, leading to changes in the age structure of the population. The number and growth of the population are a direct result of the dynamics in the indicators for mortality, fertility and international migration. These indicators vary considerably from country to country and explain the key differences in the economic development in terms of labour, physical and human capital, economic well-being and growth, as well as poverty and inequality. The dominant demographic trend in the 21st century is population ageing, which reflects increasing life expectancy, declining fertility and the progressive growth of the ageing population. At the same time, there is a process of ageing of the elderly population.

The demographic processes in Bulgaria over the past 30 years (after 1990) have been taking place in the conditions of a new socio-political model and socio-economic changes in the country. At the same time, the demographic development of Bulgaria is not isolated from the global trends in demographic changes. It is the result of processes that began in the early twentieth century. 1989 was an inflection point in the country's demographic development - for the first time the population began to decline, the birth rate dropped significantly and the death rate increased along with changes in the age structure of the population. Negative trends in the country's demographic development have deepened since 1989 and ultimately led to a crisis. The choice to study the development of human capital in the last 30 years in the deteriorating demographic situation in Bulgaria is dictated by the fact that in modern theories for economic growth human capital is considered one of the key factors for economic development because it contributes to economic growth not only by increasing labour productivity but also by creating conditions for innovations. The development of silver economy is crucial for addressing the challenges posed by the ageing population. Demographic ageing is a process that should be monitored and requires timely action.

Chapter 1: THEORETICAL FORMULATIONS OF HUMAN CAPITAL AND SILVER ECONOMY

1.1. Historical development of the concept of human capital. Methods for human capital measurement. Indicators

1.1.1. Historical development of the concept of human capital

The contemporary human capital theory was developed in the first half of the 20th century but the roots of the concept of human capital can be traced back to the 17th century when William Petty made approximate assessment of human capital in England. In 1853 the English statistician William Farr elaborated scientifically founded methodology for assessment of the current value of future labour income. A number of other economists contribute to the human capital literature, showing in different ways that people are an investment with rate of return. Among them are Adam Smith, Jean Baptiste Say, John Stuart Mill, William Rosher and Henry Sidjuick.

The American economist Theodor Shultz was the first to use the term “human capital” (1961) in the contemporary economic literature. According to his definition human capital is composed of “knowledge, skills and abilities of the people employed in an organisation”. The short initial definition which Schultz gives is limited because it doesn’t include the concept for the “value” and the importance of the investments in human capital.¹

In 1993 Gary Becker defines human capital as “the knowledge, information, ideas, skills and health of the individuals”.² The definition includes another dimension of human capital – the health of the individuals.

Oscar Wilde words which are of present interest are: “A cynic knows the price of everything and the value of nothing”. They refer to contemporary organisations which think of the workforce rather as an expense than as an asset which should be encouraged and developed over time. The transition from production economy to knowledge-based economy is accompanied by a change in the paradigm for organisational assets. The traditional concept says that physical assets bring about economic success. Gary Becker supports the thesis that physical resources can explain a comparatively small part of the income growth in most countries.³

1.1.2. Human capital formation

Human capital formation is a process that results from investments in education, health, on-the-job training, migration and information. In the 21st century, a number of countries around the world, including Bulgaria, follow modern global trends which are expressed in the establishment of new living standards and formation of human capital which are in sync with time. The monitoring of the process of human capital formation requires a framework that identifies all factors involved in the process (families, workers, companies that provide employment, public agencies that provide educational services, teachers).

On-the-job training is important because it provides specific skills that are not usually acquired through formal education or vocational training. The distinction between general and specific skills was first made by Gary Becker (1962). According to him general skills increase the productivity of workers with different employers and specific skills increase their marginal productivity in their current job.

¹ Schultz T. “Investment in Human Capital”, *The American Economic Review*, Vol. 51, No1 (Mar., 1961);

² Becker G., “Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education”, Third edition, The University of Chicago Press, 1993;

³ Becker G., “Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education”, Third edition, The University of Chicago Press, 1993;

1.1.3. Methods for human capital measurement

Human capital measurement can serve as an insight into the drivers of economic growth and can be used for assessment of a country's long-term sustainable development as well as for measuring the performance and productivity of the educational sector.

The cost-based approach measures human capital through investments made by individuals, households, employers and governments.^{4 5} This approach is based on information on all investments made in human capital production.

The income-based approach measures human capital through the future income that investments in human capital will generate in a person's life. The cost-based approach focuses on investment and the income-focused approach focuses on the results from human capital investments.

Another monetary measure is the residual approach which is applied by the World Bank through detailed accounting. This approach measures human capital as the difference between total wealth and the sum of output and natural capital.

The indicator-based approach assesses human capital on the basis of indicators for performance in education. It should be emphasized that the indicator approach refers to relatively simple indicators that cannot directly measure human capital. In general, these are substitutes that do not apply economic accounting principles (discounting, depreciation, interest rates).

1.1.4. Human capital and economic growth

Education has been considered as a key factor for economic growth since the introduction of the American economist Robert Solow's growth model.⁶ Although Solow does not explicitly focus on education in his growth theory, the key role of technology in his model gives reason why the focus should be on education. Educated population is needed for technological innovation to happen.

The link between education and economic development is realized through the labor market. Skills acquired in the education system should be used by companies in the production of goods and services so that workers are paid wages that are commensurate with their productivity.

1.2. Population Ageing. Theoretical Aspects and Silver Economy Models

1.2.1. Population Ageing and Silver Economy

Population ageing is undoubtedly one of the global challenges which modern world is facing. When examining demographic ageing the emphasis in most cases is on strategies and mechanisms for balancing socio-economic effects which are directly reflected in the budget deficit of pension systems, reduced labor demand, pressure on the health care system and others.

The conceptual framework of demographic ageing is shaped by the dominant theory of population – the demographic transition theory. Among the most significant works for the development of the theory of demographic transition is the book of the French demographer Adolf Landry "The Demographic Revolution" from 1934 which formulated the model of the

⁴ Schultz T. "Investment in Human Capital", The American Economic Review, Vol. 51, No. 1 (Mar., 1961)

⁵ Kendrick W. John, "The Accounting Treatment of Human Investment in Capital", 1974, <https://doi.org/10.1111/j.1475-4991.1974.tb00927.x> ;

⁶ Solow, R. 1956. "A Contribution to the Theory of Economic Growth." Quarterly Journal of Economics 70(1):65-94; Достъпно към 20.10.2021 г. на: <http://piketty.pse.ens.fr/files/Solow1956.pdf> ;

transition.⁷ According to Landry the demographic transition includes three stages: basic (high fertility and high mortality), intermediate (high fertility and relatively low mortality) and modern (low fertility and low mortality; population stabilization regime).

Population ageing is a process caused by declining fertility and increasing life expectancy that occur during the demographic transition. In some countries (with high net migration) the age structure of the population is also influenced by international migration. Europe was the first region in the world to enter the transition in the late 19th and early 20th centuries with reduced fertility and increased life expectancy. This is the reason why many of the countries in the region have the largest share of elderly population.

Population ageing poses a number of economic challenges to countries and this process is expected to have a negative impact on economic growth and labour supply. At the same time, ageing economies are expected to face fiscal costs related to ageing which may pose a risk to fiscal sustainability.

The concept for silver economy encompasses a wide range of concepts and areas of interest related to both the challenges and the opportunities offered by the ageing population. According to a widely accepted definition, not only in Europe but also in the world, the silver economy includes all economic activities, goods and services designed to meet the needs of the population over the age of 50. The concept for silver economy has its origins in the so called "silver market" which emerged in Japan, the country with the highest share of population over the age of 65, in the 1970s. Technological innovations will be one of the key factors for the development of silver economy. Automated homes, artificial intelligence, the Internet of Things, eHealth and other smart city-specific services (digital cities) will accompany the development of the silver economy.

The essence of silver economy can be expressed with actions in two main directions. One of them is the promotion of professional development of the elderly, efforts to preserve them as part of the labour force and the social sphere – counteracting their social exclusion. The second direction is the creation of economic conditions that use the existence of specific needs of the elderly people in the field of production, consumption and services.

At the beginning of the 21st century, the World Population Summit in Madrid (World Health Organization, 2002) identified active ageing as a key goal of the health and social policies aimed at elderly people. The World Health Organization defines active ageing as a process of optimization of the opportunities for health, participation and security in order to improve the quality of life of older people.⁸

1.2.2. Age structure of the population and economic growth. Theoretical models

As people's economic behavior and needs change at different stages of life, a change in the age structure of a country's population can have a significant effect on its economic development. If young people require investment in health and education, people aged 25 to 54 provide work and savings, and elderly people need health care and retirement income.

Several studies have shown that reducing the age dependency ratio of young people (the under working age population divided by the working age population) contributes to the economic miracle in East Asia. More generally, there is evidence that reducing the age dependency of young people in developing countries can create opportunities for economic growth, provided that policies (openness to trade, flexibility in the labour market) which benefit from the "demographic dividend" are conducted.

According to the neoclassical model of growth, population growth reduces economic growth due to the dilution of capital. However, studies using data from different countries

⁷ Landry A., Girard A., "La Revolution Demographique", INED, 1982, (230);

⁸ WHO, "Active Ageing: A Policy Framework", Geneva, Switzerland, 2002; Достъпно към 20.10.2021 г. на: https://www.who.int/ageing/publications/active_ageing/en/ ;

have found that population growth has little effect on economic growth. The American macroeconomist Robert Barro introduces a set of demographic variables in the "convergent" models of economic growth.⁹

1.2.3. Germany's Model

The increasing life expectancy combined with the low birth rate (about 2/3 lower than the level needed for the natural reproduction of the local population) has a fundamental role in the demographic ageing of the population. Therefore, the number of elderly people is increasing while the number of children is decreasing. Life expectancy in Germany is projected to continue to rise, reaching 85 years for men and almost 90 years for women in 2050.¹⁰

Until the 1980s, the elderly in Germany were considered as a low-income consumer group whose consumer habits had not been studied in detail. Meanwhile, this perception has changed significantly. A number of studies confirm the existing trend of older people improving income.¹¹ It should be noted that the group of adults is quite heterogeneous - some of them are economically active while others are at retirement age.

In Germany, the silver economy is considered as a sector of the future that is worth developing because it is to the interests of both the elderly and other players in the economy. The growth of this sector is expected to improve the quality of life and create new jobs.

The tourism sector has preconditions to attract customers from the target group of adults. After retirement older people in Germany have much more free time and in most cases have the financial means to make full use of it. The consumer behavior of older people shows that they spend a large share of their income on travel.¹²

Due to the growing number of elderly people who need specific services and care, experts see the potential for development in the field of assisted living through the use of information technologies.

1.2.4. Japan's Model

Japanese population is ageing rapidly in parallel with the growing market for the elderly. The healthcare system is the most promising because its clients are constantly growing. Among the main issues that need to be revised are the rules prohibiting the mixing of public and private health insurance as well as the financing of profitable hospitals. Demand for medical care is expanding and kindergartens are of greater importance for more Japanese because women are starting to work full-time in tight labor market conditions.

The healthcare sector is the most promising sector of the silver economy in Japan. The demand for health services from the elderly is intensifying. The average cost for health care services for the people over the age of 70 is about three times higher than the cost for the middle-aged people.

Wealthy seniors are attracted by the construction of luxury homes and holiday properties. Their number increases significantly when the people born during the baby boom reach retirement age.

⁹ Barro R.J., "Determinants of Economic Growth: A Cross-Country Empirical Study", Cambridge, (1997);

¹⁰ Statistisches Bundesamt, "Bevölkerung Deutschlands bis 2050 β 11. Kordinierte Bevölkerungsvorausberechnung", (2006);

¹¹ Bäcker G., Naegele G., Hofemann K., Bispinck R., "Sozialpolitik und soziale Lage in Deutschland", 4th edition, vol.2 (VS Wiesbaden, 2008);

¹² Gesellschaft für Konsumforschung, 50plus (GfK, Nürnberg 2002) 11, R. Heinze, Der Demographische Wandel als Wirtschaftsmotor;

23% of Japanese household spending is on food.¹³ Japan's food market is worth \$ 700 billion, and the high-quality food market is growing rapidly.

Machines have become an integral part of everyday life, whether they are office machines, factory robots or car navigation. Robots will play an important role in life and will help the elderly as well as the rapidly ageing workforce. The factories use more than 400,000 robots and Japan, a major exporter of robots, exports robots which account for 60% of world exports.

Chapter 2. THE DEMOGRAPHIC SITUATION IN BULGARIA: DEVELOPMENT AND TRENDS WITH A FOCUS ON THE LAST 30 YEARS (1990 – 2019)

2.1. General demographic trends, number and age structure of the population in Bulgaria

The balance between births, deaths and external migration determines the number of the population in Bulgaria. When the natural increase is positive (difference between births and deaths) and the foreign migration balance is positive, the population grows and vice versa. The interaction between the three main pillars of demographic development outlines the dynamics in the values of all demographic indicators.

The general demographic picture in Bulgaria after 1990 is characterized by a process of depopulation in the country which continues in the second decade of the 21st century and a process of population ageing which manifests itself in the negative natural growth. Both processes are resulting from long-term demographic trends that began in the 1930s. Firstly, the steady decline in the birth rate which has been decreasing from 31.4 ‰ in 1930, except for the period after the Second World War (1946-1950), to reach 8.8 ‰ (in 2019). Secondly, changes in the overall mortality rate should be taken into consideration as well. Between 1900 and 1970 the mortality rate in the country was decreased, reaching its lowest value in 1970 of 9.1 ‰. That was followed by a gradual increase in mortality, reaching 15.1 ‰ in 2019 - the highest value in 40 years. Changes in birth and death rates affect the country's natural population growth which has been declining since 1930 with the exception of the period after World War II (1946-1950) when growth was reported, reaching a negative value of - 0, 4‰ in 1990. The values of the natural growth in Bulgaria after 1990 are negative and the lowest reported value was in 2019 (-6.7 ‰).

2.2. Internal and external migration of the population in Bulgaria

Migrations are the third main group of demographic processes that affect the demographic development of the population.

Bulgaria has been losing population since the beginning of the 20th century until today as a result of the international migration. The only exception is the period 1910 - 1926, when refugees from Thrace, Mizia, Macedonia, the western suburbs, Timoshko and Dobrudzha settled in the country due to changes in state borders.

The changes in the social and economic situation in the country after 1989 led to the manifestation of new factors and conditions that affected the migration behavior of the population. According to NSI estimates about 650 000 Bulgarians left the country between 1989 and 1996. After 1990 the majority of Bulgarians emigrated to Western Europe, the United States and Canada.

The declining population is due not only to the low birth rate, but also to the open external borders after the democratic changes. It was the waves of emigration after 1989 that

¹³ Asia Pacific Trade Council, Report of the Japan Market Advisory Group April 2007, British Columbia (2007); Достъпно към 20.10.2021 г. на: www.asiapacifictradecouncil.ca/pdf/japan_report.pdf ;

caused the decline in the population of Bulgaria by 33%. This also affected on the fertile contingent.

Table 1:
Immigrants and emigrants between 2010 and 2019 (number)

Year	Immigrants	Emigrants	Met migration
2010	3 518	27 708	-24 190
2011	4 722	9 517	-4 795
2012	14 103	16 615	-2 512
2013	18 570	19 678	-1 108
2014	26 615	28 727	-2 112
2015	25 223	29 470	-4 247
2016	21 241	30 570	-9 329
2017	25 597	31 586	-5 989
2018	29 559	33 225	-3 666
2019	37 929	39 941	-2 012

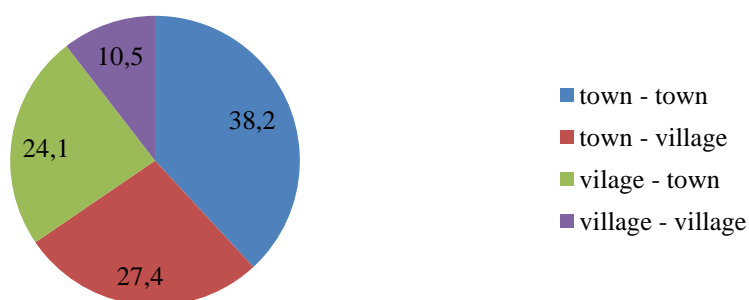
Source: NSI

Table 1 shows that external migration contributes to the increase of the negative population growth.

The internal migration is also increasing its scope. Population is more and more concentrated in big cities. 511 thousand people changed their usual place of residence between 2001 and 2011.

128,179 people took part in the resettlements in the country in 2019. Figure 1 shows that the directions of migration flows have undergone insignificant changes compared to 2009. Again, the share of the city-city migration flow is the highest (38.2%), and the lowest in the village - village (10.5%).

Figure 1: Internal migration in 2019



Source: NSI, Author's processing

2.3. Birth rate and fertility in Bulgaria

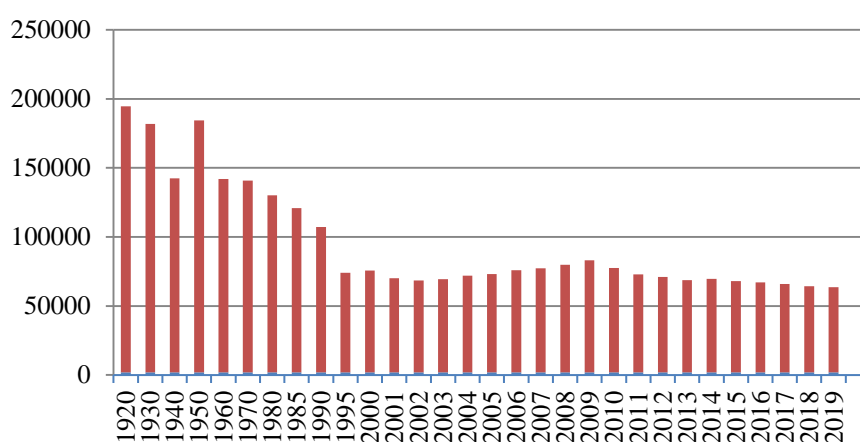
The reproduction of the population or its constant renewal is quantified by its natural movement. Birth and death rates are the main variables that characterize natural movement. Directly related to the birth rate is the marriage rate which is a major factor influencing the number of births and is directly related to birth rate. Population reproduction determines the

demographic situation.¹⁴ The age and sex composition of the population are determined by births and deaths.

Since 1989 the birth and death rates have exchanged their positions in the reproductive process. The birth rate is declining instead of rising or staying at a stable acceptable level. Mortality is rising instead of falling and maintaining a high level for a certain period of time - from 12.5 ‰ in 1990 it reaches 15.5 ‰ in 2019.

Figure 2 shows that the number of live births in the country last exceeded one hundred thousand in 1990 when they were 105,180. Since 1990 the number of live births has been progressively declining to reach its lowest level in 2019 (61,538). One of the factors that determine the number of live births is the number of women of reproductive age. There is a clear trend of decline in the number of women of childbearing age which in itself leads to decline in the number of live births.

Figure 2: Number of live births in Bulgaria between 1920 and 2019

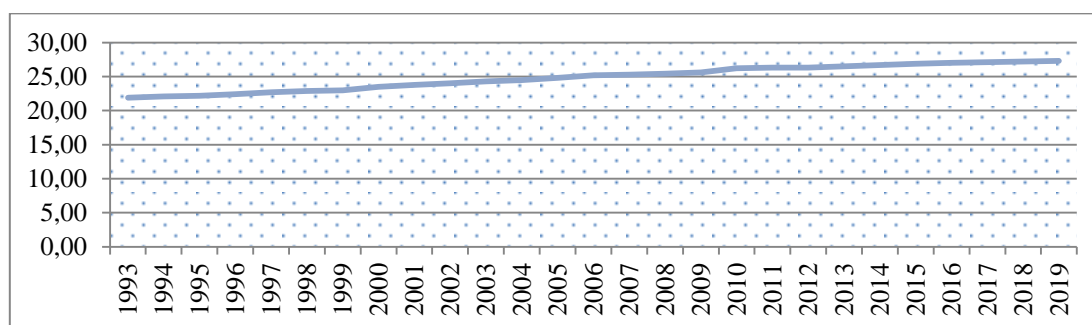


Source: NSI, Author's processing

The total number of live births in Bulgaria has decreased by 16.48% in just 20 years (from 2000 until 2019). The decrease in the birth rate is due to a number of factors, the key role being played by the number of women of childbearing age which was 2,068 thousand in 1990 and 1,464 thousand in 2019 – a decrease of 29.21% .

The total fertility rate is one of the main indicators characterizing women's fertility. In 2019, the average number of live births per woman is 1.58 which is increase by 0.02 compared to 2018.

Figure 3: Mean age of women on giving birth to their first child (1993 – 2019)¹⁵



Source: NSI

¹⁴ Минков М., „Демография“, Албатрос, 1999, (123-124);

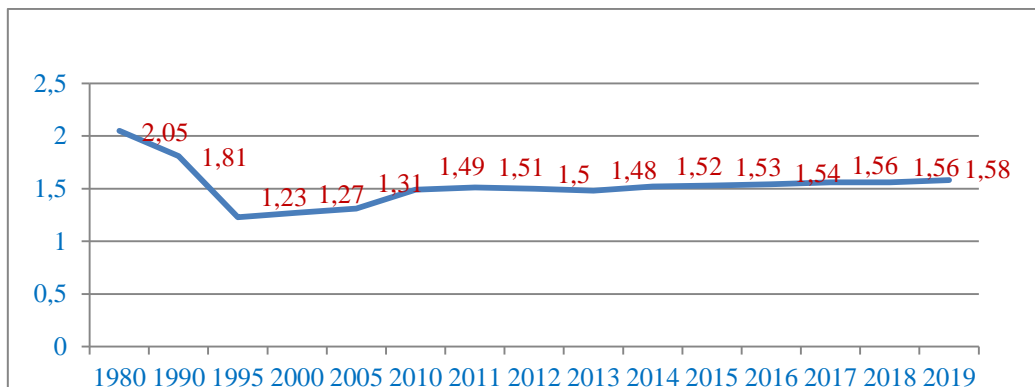
¹⁵ NSI; Accessed on: 20.10.2021 at: www.nsi.bg ;

Relatively low age of women on giving birth to their first child and on average to one child is observed in the last decades of the 20th century in Bulgaria. The mean age of women at the birth of their first child has increased by 5.4 years between 1993 and 2019.

Giving birth to a first child before marriage is a trend which stands out when considering the mean age of women at the birth of the first child and at the conclusion of the first marriage. Extramarital births have outnumbered births inside marriages since 2006.

Total fertility rate is one of the main indicators that characterizes female fertility. Figure 4 traces the changes in the Total Fertility Rate between 1980 and 2019.

Figure 4: Total fertility rate in Bulgaria (1980 – 2019)

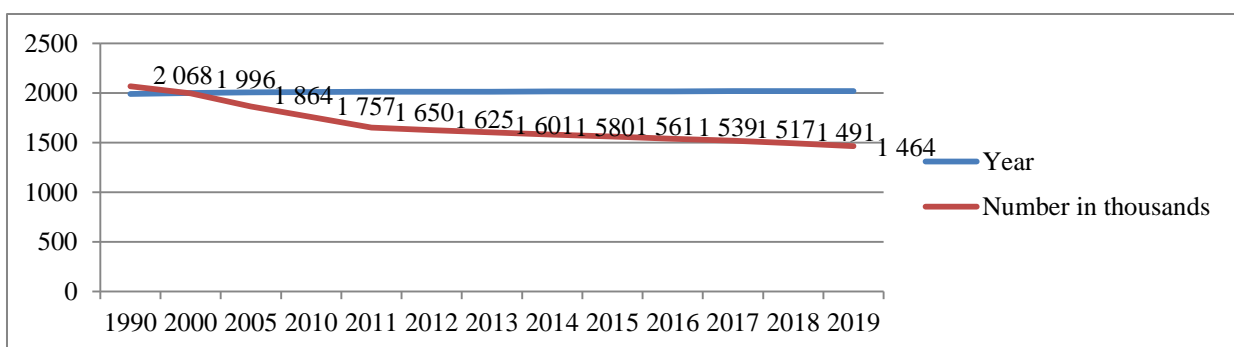


Source: NSI, Author's processing

The number of women of childbearing age (15-49 years of age) has a significant impact on the birth rate in the country. The number of birth contingents and their fertility determines the nature of the population reproduction.

Figure 5 traces the changes in the number of women aged 15 to 49 between 1990 and 2019.

Figure 5: Number of women aged 15 – 49 (1990 – 2019 г.) in thousands



Source: NSI, Author's processing

The birth contingent of the country has decreased by 604 thousand between 1990 and 2019. The number and structure of the birth contingent in the country is a result of demographic processes over the past 50 years. These are the live-born female children who have lived to enter the maternity ward. The decrease is a result of the deaths in this contingent and the migration processes.

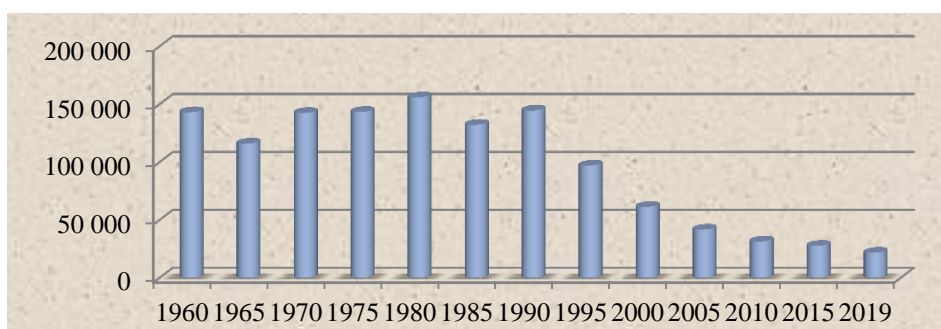
2.4. Induced abortions

Demographers share the understanding that abortion rates are difficult to measure, not only in countries where they are illegal, but also where they are legal. The issue of abortion is often overlooked when discussing demographic developments. Beyond the relationship between abortion and female rights and the health consequences they have, their role in terms of fertility and population growth should be assessed. Experience has shown that no country has achieved a total fertility rate below 2.2 without abortion.

Optional abortion is performed in Bulgaria at the patient's insistence on terminating the pregnancy for personal reasons. In addition to voluntary abortion, there are miscarriages and abortions on medical grounds. Abortion for medical reasons is performed in the presence of severe fetal abnormalities or life-threatening conditions of the pregnant woman.

Statistics on abortions (including legal abortions at will) in Bulgaria have been kept since 1956. The largest number of abortions in our country was registered in 1961 when they numbered 169 060. After a slight decline in subsequent years, the number of abortions was on the rise again in the early 1970s. The number of abortions performed in medical institutions between 1960 and 2019 can be traced in Figure 6.

Figure 6: Number of abortions performed at medical institutions in Bulgaria (1960 – 2019)



Source: NSI, Author's processing

The number of abortions exceeded that of births for a long period of time between 1977 and 1999. Statistics divide abortions into several types: medical indications, spontaneous, optional and criminal (others). According to the National Center for Public Health and Analysis 83.2% of abortions in 1965 were performed at will, 84.01% in 1970, 87.31% in 1980, and 88.22% in 1990. The number of abortions has declined only after the year 2000 – they gradually decreased from 61,378 in 2000 to its lowest value of 21,864 in 2019. It is noteworthy that after 2000 the share of voluntary abortions has decreased significantly – from 78.46% in 2000 to 63.21% in 2019.¹⁶

A review of the data on births and abortions in Bulgaria between 1956 and 2019 shows that 5 969 829 abortions were performed in the country. For comparison, in the same period the number of births was 6 708 870. Abortions cannot be ignored when the demographic processes in the country are analyzed. They change the demographic picture significantly especially in the years when their number exceeds births.

It is undeniable that there is a favourable trend of declining abortions in the country over the last 20 years but the real picture can only be seen in comparison with the indicators of abortions in the other EU Member States. In 2019, the number of abortions per 1,000 live

¹⁶ Справочник „Здравеопазване“, НЦОЗА; Accessed on: 20.10.2021 at: https://ncpha.government.bg/uploads/magazines/healthcare/healthcare_20_Bul.pdf ;

births in Bulgaria is 355.3 which is the highest value for the EU. The case is not isolated - Bulgaria ranks first in the EU in the number of abortions per 1,000 live births in the last six years (from 2014 until 2019).

2.5. Marriages, cohabitations and divorces in Bulgaria

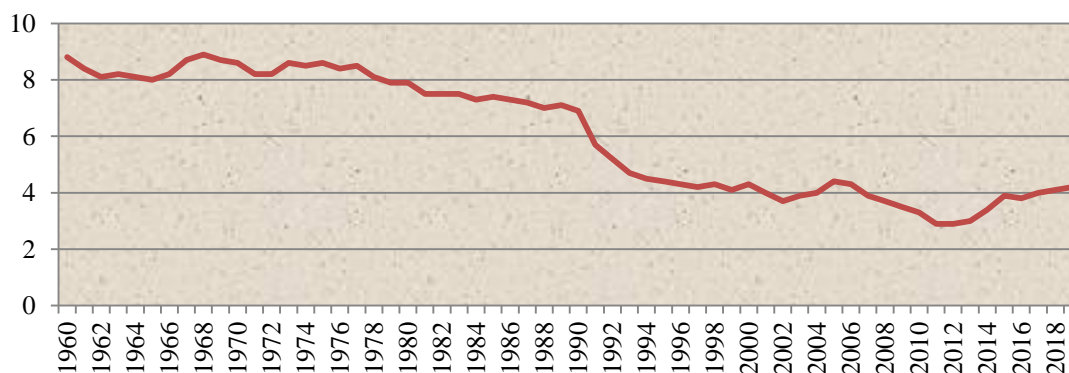
In contrast to births and deaths which are of paramount interest to demographers, marriage is not a biological but a social event. Historically, demographers have been interested in marriage mainly because of its close relationship to fertility. When changes in fertility levels are examined, they are often explained by concurrent changes in marriage.

The interaction between three complex social systems – society, family and personality determines the reproduction process of the population. A study of the relationship between the three systems can outline trends in population development.¹⁷ In this regard, the understanding of the characteristics and functions of the family is a structural value for Bulgarians. This value has undergone serious transformations during the transition period in Bulgaria.

The family as a legal union is losing its significance not only in Bulgaria, but also in other EU member states. One of the most affected values in the period of transition in our country is the perception of the nature and functions of the family.

One of the key indicators when considering marriages is the Crude Marriage Rate (it shows the number of marriages per 1 000 people from the average annual population) which is calculated in per mille. Marriage rate in Bulgaria was over 8 ‰ between 1960 and 1978, with the highest value of 8.9 ‰ registered in 1968. After 1978 there was a trend of permanent decline. Marriage trends in the country can be traced in Figure 7.

Figure 7: Crude marriage rate in Bulgaria (1960 – 2019) in ‰¹⁸



Source: NSI, Author's processing

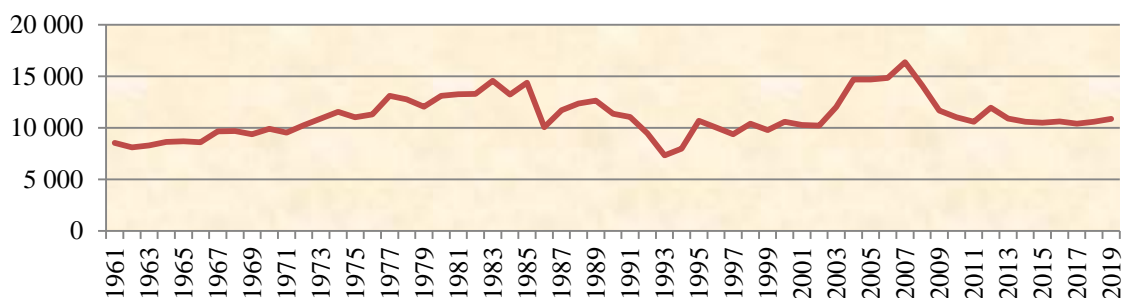
The analysis of the trends in the formation and dissolution of a family which is based only on statistics on marriages and divorces cannot give a complete picture. Legal alternatives to marriage such as cohabitations are becoming more common.

Intense increase in divorces in Bulgaria was registered between 2004 and 2007 when divorces exceeded 14,000 a year and peaked in 2007 (16,347 or 2.2 per 1,000 people) which was the highest value for the entire period between 1960 and 2019. The peak values between 2004 and 2007 are followed by a period of decline. Figure 8 traces the dynamics in the number of divorces over the last 60 years.

¹⁷ Минков М., „Демография“, Албастрос, 1999, (43);

¹⁸ Eurostat; Accessed on: 20.10.2021 at: <https://ec.europa.eu/eurostat/web/population-demography/demography-population-stock-balance/database>

Figure 8: Number of divorces in Bulgaria between 1961 and 2019 in %



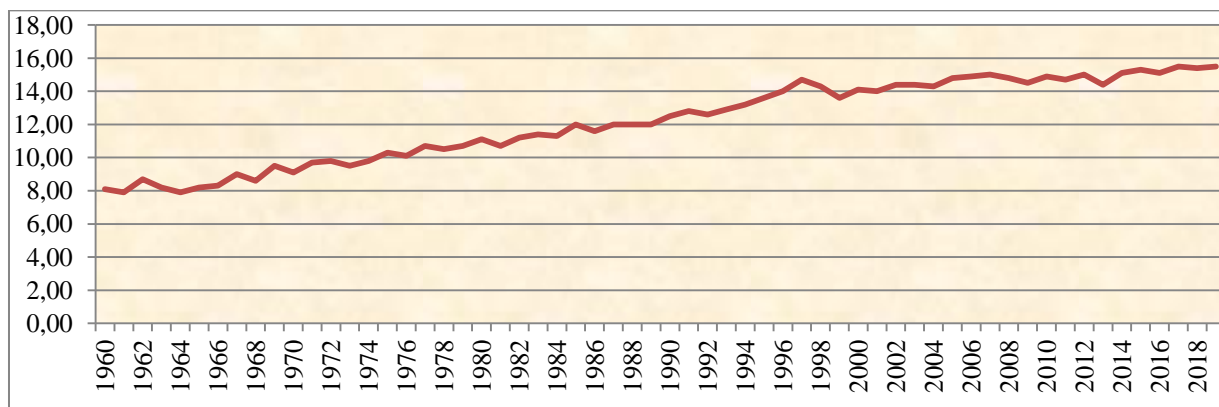
Source: Eurostat, Author's processing

A comparative examination of marriages and divorces in Bulgaria shows that the marriage rate in the country has been steadily declining since 1990 from 6.9 ‰ to 4.2 ‰ in 2019. At the same time, the divorce rate varies in widely limits in the same period with the lowest values in 1993 and 1994 (0.9 ‰) and the highest value in 2007 (2.2 ‰).

2.6. Mortality in Bulgaria

Since 1960 the death rate with some fluctuations has been steadily increasing and reaching its highest values for the entire period of 15.5 ‰ in 2017 and 2019. This is a trend that is difficult to reverse in the next 10 years. Figure 9 displays the values of the Total Mortality Rate between 1960 and 2019.

Figure 9: Crude Mortality Rate in Bulgaria between 1960 and 2019 in %



Source: Eurostat, Author's processing

Among the main reasons for the current mortality rates in the country is the demographic ageing of the population and the high mortality of people over 65 years of age. The fact that there are significant differences in mortality rates at regional level cannot be overlooked. For example, in 2019 the mortality rate in the North-West region is 20.5 ‰, and in the South-West region – 13.7 ‰. The high mortality rates, combined with the low life expectancy in Bulgaria compared to other EU member states account for the need for radical changes in the country's healthcare system which should be linked to the demographic forecasts and the changing needs of the population from different age groups.

The fact that in 2019 our country ranks first in mortality not only in the EU but also in the world according to UN data is alarming.¹⁹ It is followed by Ukraine (15.2 ‰), Latvia (14.7 ‰), Lithuania (13.8‰). The main causes of death in Bulgaria in 2019 are diseases of the cardiovascular system (64.4% of all deaths). Second are cancers (16.9%). The share of other causes of death is relatively small.

The infant mortality rate in the country is significantly higher than the rate in the middle-aged population. After 1939 there was a sharp decrease in infant mortality in Bulgaria from 138.9 per thousand live births it reached 13.6 per thousand in 1988. After 1990 infant mortality rose and in 1997 it was 17.5 per thousand. Since 2000 infant mortality has been declining but Bulgaria is still with the highest values among the other EU member states in this respect.

Another measure of mortality is the premature mortality rate. Death that occurs before the age of 65 is considered premature. The relative share of deaths under the age of 65 of the total number of deaths is expressed by the Premature Mortality Rate. In 2019 the indicator reached a value of 20.5%, which is its lowest value since 1990. There are significant differences between men and women in the values of the indicator of premature mortality. In 2019, the premature death rate was 13.1% for women and 27.4% for men.

2.7. Population ageing in Bulgaria

This chapter will address the case of Bulgaria in the context of the global process of demographic ageing. Socio-demographic changes will be considered for the purposes of the scientific justification of the demographic situation in the country and for the development of theoretical and methodological tools.

The main goal of this chapter is to clarify the demographic processes that have led to changes in the age structure of the population and acceleration of the ageing process in Bulgaria. UN and NSI projections for the country's population will also be reviewed.

The official retirement age in Bulgaria in 2019 is 61 for women and 64 for men. For the purposes of this dissertation, the age group of people over 60 will be considered as ageing population. It should be noted that the definition of ageing in terms of chronological or retirement age can be defined as subjective. There are people over the age of 60 who do not consider themselves as elderly. On the other hand, people with health conditions or disabilities are considered elderly before reaching the age of 60. The following criteria are used in gerontology for characterization of ageing. 1) Chronological ageing - people age over time. An example of the chronological definition of an elderly person is retirement age. Chronological age alone is rarely an accurate indicator for biological, psychological or social age.²⁰ 2) Biological ageing - when determining the biological age, characteristics such as posture, skin condition, hair colour, sensory condition and others are taken into account.²¹ Therefore, each society has its own definition of the social role and activities that are expected from members of society depending on their age and level of maturity.

The natural increase in the country was 9.7 per thousand after the Liberation between 1891 and 1895. At the beginning of the 20th century, the population of Bulgaria was young, as evidenced by the expansive population pyramid. The expansive pyramid means that the population is not growing significantly and has a large share of young people (Figure 10). The data from the 1900 census shows that the share of the population in the age group from 0 to 19 years is 51.15%. The share of the population aged 60 or over is 8.4% of the total

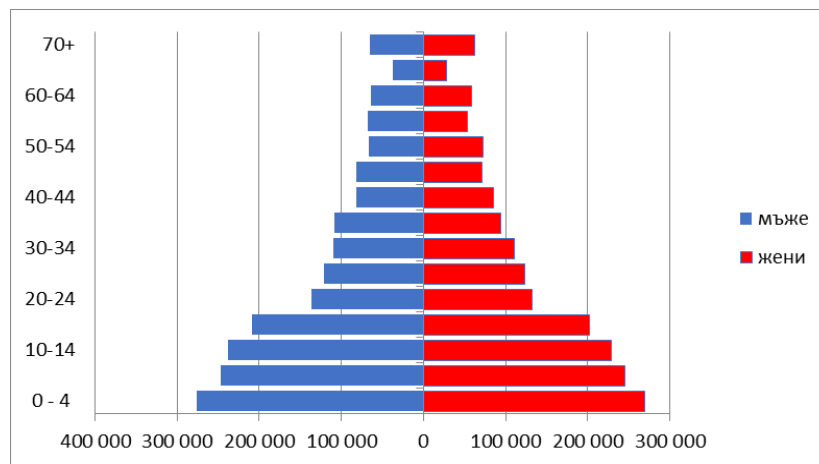
¹⁹ World Mortality 2019, United Nations Department of Economic and Social Affairs, Data Booklet; <https://www.un.org/en/development/desa/population/publications/pdf/mortality/WMR2019/WorldMortality2019DataBooklet.pdf> ;

²⁰ Aiken, Lewis, R., "An Introduction to Gerontology", Thousand Oaks, Calif., London: Sage, 1995;

²¹ Иак там;

population. The expansive pyramid shows that the population has high levels of both births and deaths.

Figure 10: Population Pyramid in Bulgaria in 1900

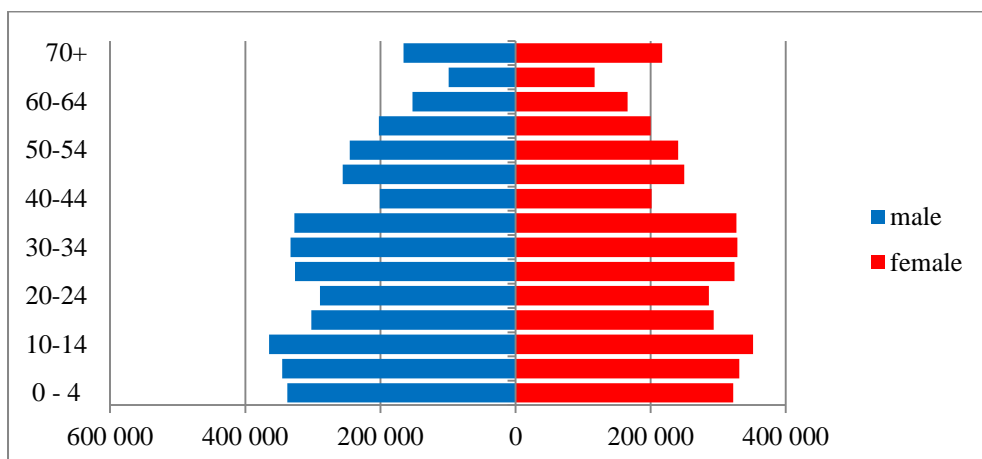


Source: NSI, Author's processing

The analysis of the data on the key demographic indicators in the first half of the 20th century shows that changes in the regime of population reproduction in Bulgaria have occurred as a result of the demographic transition and the influence of socio-economic factors in Bulgaria. The reproductive attitudes of the population are also changing which leads to a gradual and relatively smooth decrease in the birth rate and a corresponding decrease in natural growth. It should be noted that the migration behaviour of the population also affects the age structure and the relative share of the individual age groups. Kliment Naydenov and Toni Traikov note that the increased number of emigrations from Bulgaria between the two world wars mainly affected people of working and reproductive age. The population pyramid in 1960 is stationary characterized by low birth rates and low mortality.

There was a trend of declining birth rates after 1950 which was accompanied by a slight decrease in mortality. This led to decline in natural growth which registered its lowest value since the beginning of the century in 1967, namely 6.0 ‰. Since the middle of the 20th century the ageing process of the population has been accelerating. Figure 11 shows the population pyramid in 1960.

Figure 11: Population Pyramid in Bulgaria in 1960

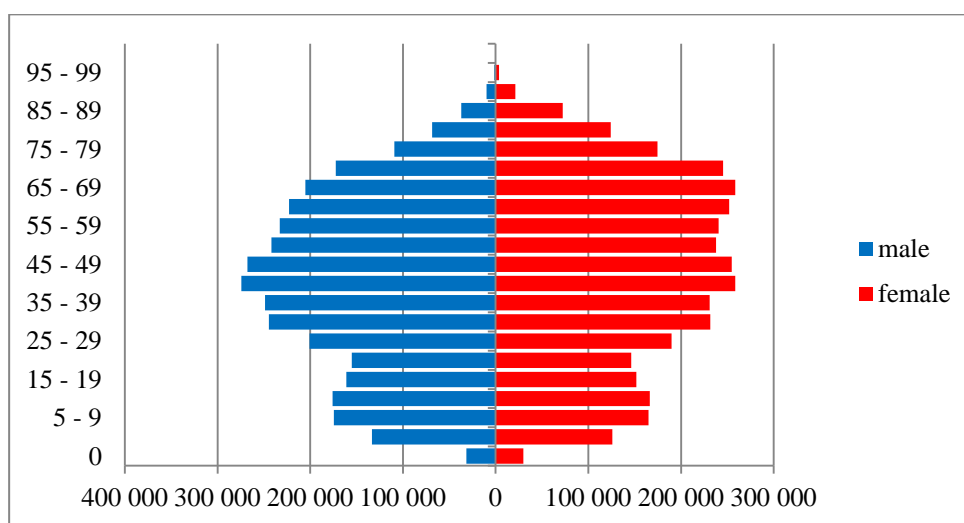


Source: NSI, Author's processing

Bulgaria entered the third stage of the demographic transition in the mid-1970s which characterizes with declining birth rates and rising mortality. It lasted until the 1990s. The process of population aging leads to significant changes in the age structure which from progressive in the early twentieth century became stationary after the middle of the century and constrictive at its end. Then the share of the population aged 60 and over is close to the share of the population under 20, with data of 21.77% and 22.34%, respectively.

The ageing of the population has intensified between 2000 and 2019 as a result of which in 2019 the share of the population aged 60 and over is already 28.47%, and that of the population under 20 is 18.92%. Figure 12 presents the population pyramid in 2019 which is already strongly constrictive.

Figure 12: Population Pyramid in Bulgaria in 2019



Source: NSI, Author's processing

The ageing of the population in Bulgaria is most clearly manifested in the values of the natural increase which is negative after 1990 and reaches its lowest value of -6.7 ‰ in 2019. The process of depopulation in the country which continues in the second decade of the 21st century is the result of long-term demographic trends that originate in the 1930s.

The aging of the population also leads to an increase in the median (average) age of the population. The average age of the population in the country has been steadily increasing since 1960 when the value of the indicator was 30.3 years and reached 44.5 years in 2019.

Глава 3: MEASUREMENT OF THE HUMAN CAPITAL POTENTIAL IN BULGARIA BETWEEN 2000 AND 2019. ANALYSIS OF THE IMPACT OF THE DEMOGRAPHIC SITUATION IN BULGARIA ON THE DEVELOPMENT OF HUMAN CAPITAL AND SILVER ECONOMY

3.1. Measurement of the potential of human capital in Bulgaria between 2000 and 2019

3.1.1. Approaches for measuring human capital. Indicators for human capital potential

In economics, the comparative advantages and the opportunities for economic modernisation are defined by the accumulated human capital. Human capital is a complex factor of production which influences the development of economy and society as well as

workforce, innovations, knowledge, quality of life and intellectual activity which in turn guarantee for the effective functioning of human capital.

In contemporary economic growth theories human capital is considered as one of the key factors for economic development because it contributes to economic growth not only by increasing productivity but also by creating conditions for new concepts and innovations. Garry Becker adds that human capital facilitates their distribution.²²

On the basis of the theory for human capital development, the sources for its formation and the economic growth theory as well as after taking into account the limitations of the data available at the National Statistical Institute, the most appropriate method for measuring the potential of human capital in Bulgaria is the statistical one. The research of Elvir Akemtshin and co., who measure the potential of human capital in regions of the Russian Federation, is used as a basis for selection of particular indicators. These indicators are used for the calculation of the General Index of Human Capital in Bulgaria by region.²³

A government decree of the Council of Ministers of the Republic of Bulgaria divides Bulgaria into six planning regions. The Regional Development Act, in force since 20th February 2004, regulates the public relations related to planning, programming, management, resource provision, state support, control and assessment of the regional development.

Each of the planning regions includes the territory of several provinces in the country. In December 2007 the borders of some regions are changed on the request of Eurostat about the territorial units in the framework of the European Union, according to which there needs to be a minimum of 800 thousand and maximum 3 million residents in one region.

In compliance with art 4 (3) of the Regional Development Act the regions which form level 2 are planning regions and not administrative territorial units and their territorial scope is as follows:

1. Northwest Region – includes the provinces Vidin, Vratza, Lovech, Montana and Pleven;
2. North Central Region – includes the provinces Veliko Turnovo, Gabrovo, Razgrad, Russe and Silistra;
3. Northeast Region – includes the provinces Varna, Dobrich, Turgovishte and Shumen;
4. Southeast Region – includes the provinces Burgas, Sliven, Stara Zagora and Yambol;
5. Southwest Region – includes the provinces Blagoevgrad, Kyustendil, Pernik, Sofia and Sofia (capital municipality);
6. South Central Region – includes the provinces Kurdjali, Pazardjik, Plovdiv, Smolyan and Haskovo

The following indicators for the potential of human capital in Bulgaria at regional level are used.

Indicators for the educational potential in the planning regions: Number of students in the educational institutions (universities, specialised higher education institutions and scientific organisations) per 1 000 people Z_1 ; Share of the population aged 25 – 64 with higher education Z_2 ; Number of universities, specialised higher education institutions and independent colleges Z_3 ; Number of general and special schools Z_4 ; Number of students at general and special schools per 1 000 people Z_5 .

²² Becker G., “Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education”, Third edition, The University of Chicago Press, 1993;

²³ Akhmetshin E., Sharafutdinoc R., Gerasimov V., Dmitrieva I., Puryaev Aidar, Ivanov E., Miheeva, N., “Research of Human Capital and Its Potential Management on the Example of Regions of the Russian Federation”,(2018), Достъпно към 20.10.2021 г. на: <https://www.abacademies.org/articles/Research-of-human-capital-and-its-potential-management-on-the-example-of-regions-of-the-russian-federation-1528-2651-21-2-172.pdf> ;

Indicators for the health potential in the planning regions: Number of beds in in-patient health establishments per 100 thousand people Z_6 ; Life expectancy Z_7 ; Crude death rate Z_8 ; Number of in-patient health establishments Z_9 ; Number of the population Z_{10} .

Indicators for the labour potential in the planning regions: Average Gross Salaries of the employees under labour or service contract in leva Z_{11} ; Economic activity rate Z_{12} ; Unemployment rate Z_{13} ; Number of the population Z_{14} ; Gross Domestic Product Z_{15} .

Indicators for social and cultural potential in the planning regions: Number of the visits to theatres and museums Z_{16} ; Number of registered crimes against the personality and the property of citizens Z_{17} ; Average alcohol consumption per person in litres Z_{18} ; Number of theatre performances Z_{19} ; Number of cultural institutions – museums, theatres, libraries and cinemas Z_{20} .

Indicators for intellectual potential in the planning regions: Share of the employed in high technology sectors (high technology industry and knowledge intensive service) as a percentage of the general employment Z_{21} ; Total intramural R&D expenditure as percentage of GDP Z_{22} ; Share of scientists and engineers from the total number of the population Z_{23} ; Number of researchers Z_{24} ; Number of persons (staff) employed in R&D Z_{25} .

Each of the values can be turned into indices from 0 to 1 bu using the following formulas:

$$Z_i^p = (Z_i - Z_{\min}) / (Z_{\max} - Z_{\min}) - \text{for positive effect} \quad (1)$$

$$Z_i^p = (Z_{\max} - Z_i) / (Z_{\max} - Z_{\min}) - \text{for negative effect} \quad (2)$$

where Z_i^p is an individual index for indicator i for region p ;

Z_i : the value of Z for region p ;

Z_{\max} and Z_{\min} : Maximum and minimum values of Z for the region.

The first step is the calculation of the indices of educational, health, labour, social and cultural and intellectual potential in the planning regions. Then the integrated (total) index of human capital can be calculated. The relative importance of each indicator and each index is equal and can be calculated through formulas 1 to 8:

$$\text{Index of educational potential: IEP} = (Z_1 + Z_2 + Z_3 + Z_4 + Z_5) / 5 \quad (3)$$

$$\text{Index of health potential: IHP} = (Z_6 + Z_7 + Z_8 + Z_9 + Z_{10}) / 5 \quad (4)$$

$$\text{Index of labour potential: ILP} = (Z_{11} + Z_{12} + Z_{13} + Z_{14} + Z_{15}) / 5 \quad (5)$$

Index of social and cultural potential:

$$\text{ISCP} = (Z_{16} + Z_{17} + Z_{18} + Z_{19} + Z_{20}) / 5 \quad (6)$$

Index of intellectual potential:

$$\text{IIP} = (Z_{21} + Z_{22} + Z_{23} + Z_{24} + Z_{25}) / 5 \quad (7)$$

The Total index of human capital (TIHC) = (Educational potential + labour potential + health potential + social and cultural potential + intellectual potential) / 5 (Formula 8).

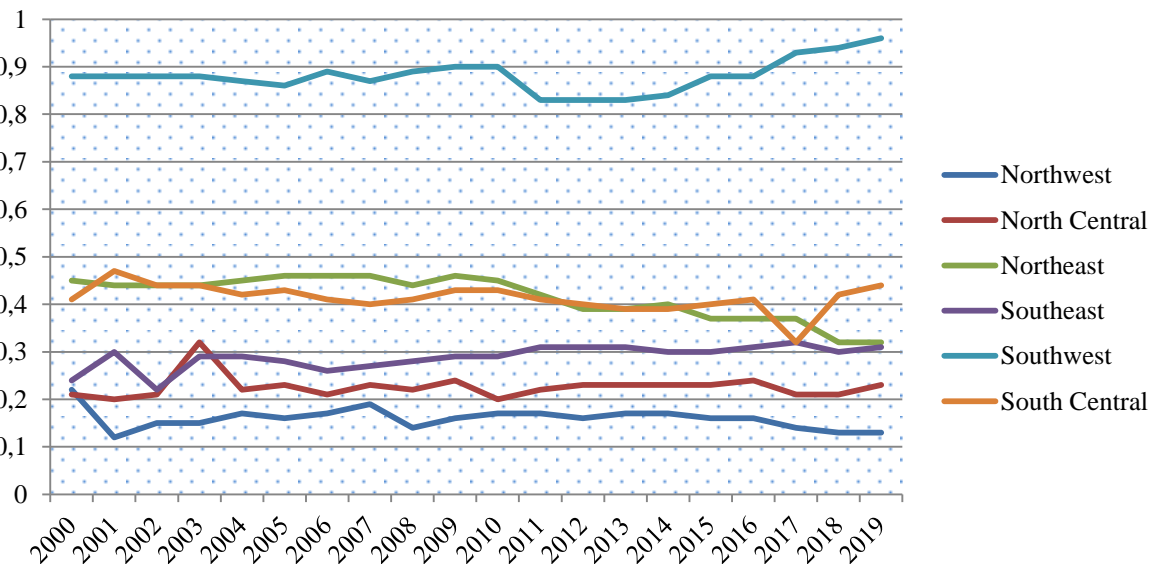
$$\text{TIHC} = (\text{IEP} + \text{IHP} + \text{ILP} + \text{ISCP} + \text{IIP}) / 5 \quad (8)$$

3.1.2. Educational potential in Bulgaria by planning regions

The state of the educational system in Bulgaria over the past 30 years has been under the influence of the demographic processes. It plays a key role in the country's economic development and has impact on the population health and the life expectancy. Despite the fact that education influences to a great extent the human and economic development, its state and quality are defined by demographic, economic, social, cultural and political factors. Labour productivity and highly qualified workforce are key factors for economic growth in the knowledge-based economy. Bulgaria needs to achieve a level of competitiveness which corresponds to the European standards. The demographic trends of decline in the number of the workforce set high requirements on the skills and knowledge of the labour resources.

The Index of the educational potential can be calculated using: $IEP = (Z_1 + Z_2 + Z_3 + Z_4 + Z_5) / 5$. The results from the calculations are presented in Figure 13.

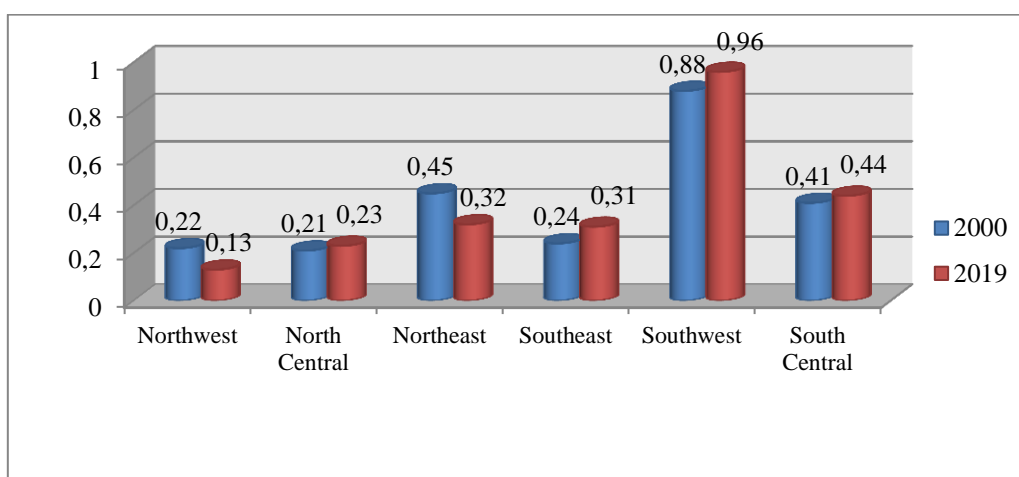
Figure 13: Index of the educational potential in Bulgaria by planning regions (2000 – 2019)



Author's calculations

Figure 13 shows that the Southwest region has the highest educational potential in 2000 with Index value 0,88. In 2019 the Index value is higher (0,96). Growth is observed also in the South Central region where the Index is 0,41 in 2000 and reaches 0,44 in 2019. There is growth by 0,7% in the Southeast region where the Index value is 0,31 in 2019. The Index of the educational is the highest in the Southwest region and the South Central region in the end of the researched period. There is a decline in the other four regions. The highest decline is registered in the Northeast region – by 0.13 points (from 0.45 in 2000 the index lowered to 0.32 in 2019). The Northwest region has the third highest educational potential followed by the Northeast and North Central regions. The Northwest region has the lowest educational potential in the country with a value 0.13 in 2019 (a decline by 0.9 points compared to 2000).

Figure 14: Index of the educational potential by region in 2000 and 2019



Author's calculations

Figure 14 shows the values of the Educational Potential Index in the first and last year of the study period. The differences between the regions, which are in times, are clearly outlined. The educational potential of the Southwest region is more than 7 times higher than that of the Northwest region in 2019, the difference being 4 times in 2000. The difference between the Southwest and South Central region (which is second in educational potential in the country) in 2019 is more than 2 times.

The study of the educational potential in the planning regions in Bulgaria between 2000 and 2019 shows that the conditions which predetermine the imbalances in the regional development were created in the first years after the democratic changes in Bulgaria. First, the population is unevenly allocated on the territory of the regions. The number of the population is declining in all regions but with different pace. The most unfavourable trends in the demographic situation can be observed in the Northwest and North Central region. The population of the Northwest region declined by 339 thousand between 2000 and 2019. The situation in the Southwest region is slightly better as well as in some areas of the South Central, Northeast and Southeast regions. The number of the population is a factor which guarantees better social and economic development. The uneven allocation of the population results from the uneven location of the big and medium-sized cities on the territory of the country which practically defines the parameters of the regional development. Those cities are Sofia, Plovdiv, Varna, Burgas, Russe, Stara Zagora and Pleven.

The state and quality of the education which forms the educational potential of Bulgaria are determined by the demographic situation and the reforms undertaken in the system. The provinces Veliko Turnovo, Sofia-city, Varna, Plovdiv, Gabrovo and Blagoevgrad have been established as university centres. Meanwhile there are provinces without universities or subsidiaries such as Montana, Turgovishte and Pazardjik. The total number of the higher education institutions in 2019 is 54 of which 24 are in the capital. This confirms the thesis that the higher education system is strongly polarized and fragmented. The imbalances in the allocation of the universities go together with a wide range of subjects which don't correspond to the labour market needs. The declining number of the students is due to the demographic factors, the low quality of the university education as well as the choice of young people to study abroad. The low birth rate is a direct reason for the decreasing number of the schools and the students which turns out to be a long-lasting trend.

The connection between demography and education is a two-way process which is deeply studied in scientific literature. Education plays a key role for changes in population characteristics.

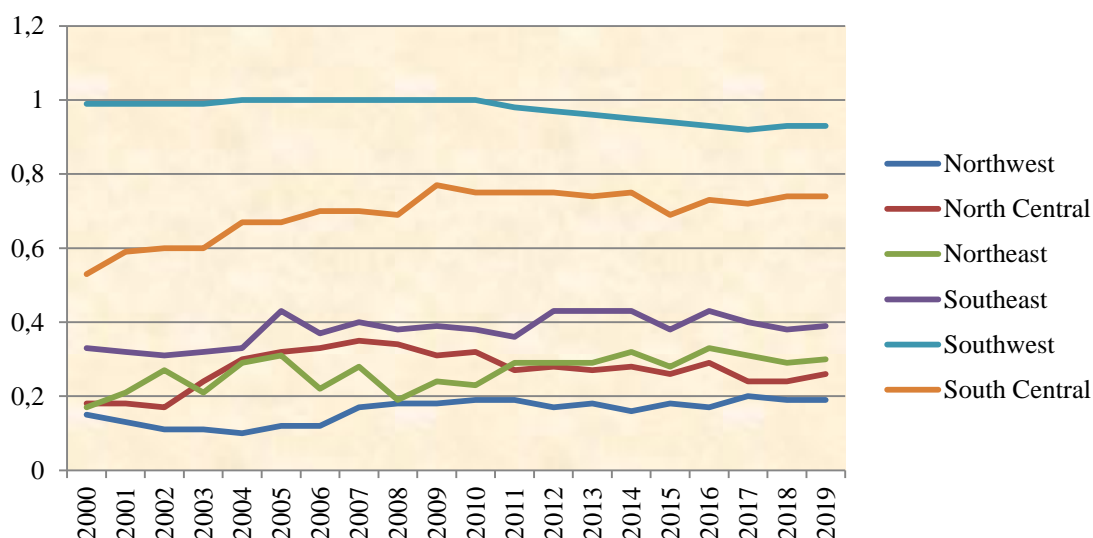
Population growth dynamics which is mainly defined the birth rate is of key importance for education planning. These demographic characteristics need to be used as a starting point for the educational policies which should aim at more even allocation of secondary and tertiary institutions as well as of school and university students in level 2 regions in Bulgaria. Urgent measures need to be taken for limiting the significant disparities in educational potential at regional level.

The European Commission Education and Training Monitor 2019 points out that the modernization of education in Bulgaria is an ongoing process but the educational system still does not match enough the needs of the labour market.²⁴ The demographic trends and the growing shortage of skills show that Bulgaria needs to invest more in establishing skills in the present and future workforce. The participation of elderly people in the education and training is still low. This age category of the population needs to improve their skills and to requalify.

3.1.3. Health potential in Bulgaria by planning regions

The Index of the Health Potential can be calculated with **Formula 4** $IHP = (Z_6 + Z_7 + Z_8 + Z_9 + Z_{10}) / 5$. Figure 15 presents the results between 2000 and 2019.

Figure 15: Index of the health potential by region (2000 – 2019)

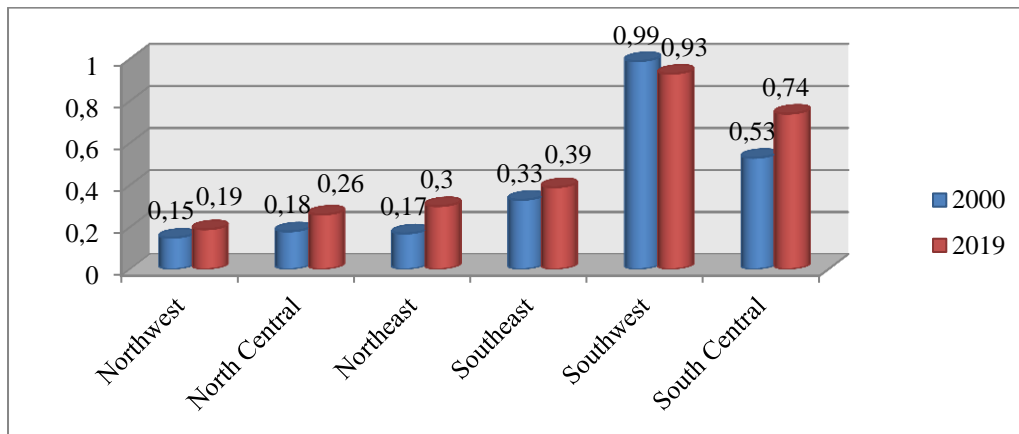


Author's calculations

The analysis of the achieved results shows that the health potential in the Northwest region is the lowest in the country – the change between the first and the last year of the studied period is negligible 0,15 in 2000 and 0,19 in 2019. The health potential is also low in the North Central region with a slight growth from 0,18 in 2000 to 0,26 in 2019. The results are similar in the Northwest region where the Index of the Health Potential is 0,30 in 2019. The value of the Index in the Southeast region in 2019 is 0,39 – there is a rise compared to 2000 by 0,06. The Southwest and South Central region have the highest health potential in the country with values 0,93 and 0,74 in 2019.

²⁴ Мониторинг на образованието и обучението, 2019, България; Accessed on: 20.10.2021 г. at: https://ec.europa.eu/education/sites/default/files/document-library-docs/et-monitor-report-2019-bulgaria_bg.pdf ;

Figure 16: Index of the health potential in Bulgaria in 2000 and 2019



Author's calculations

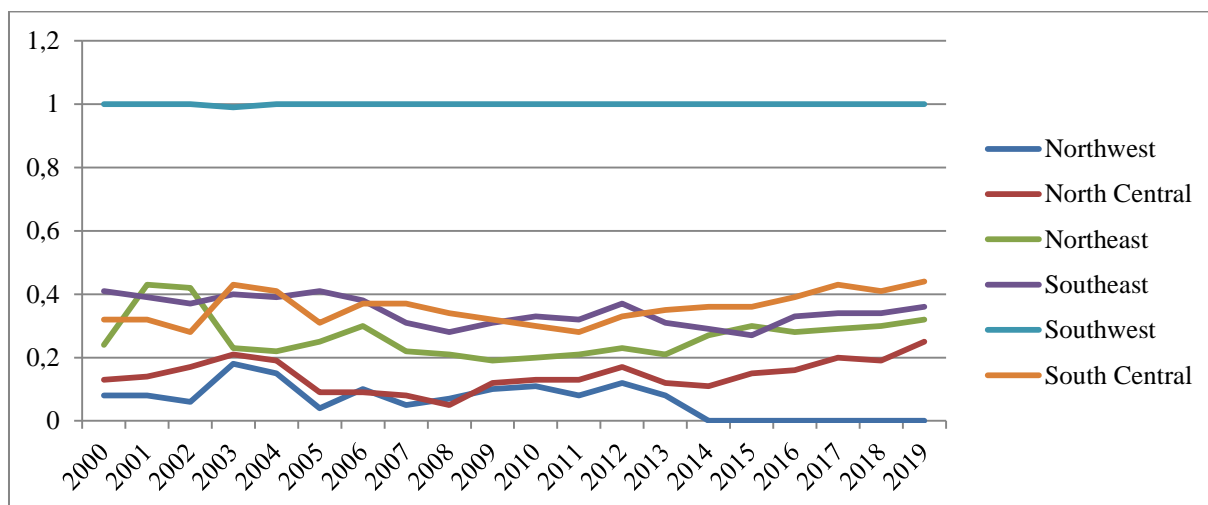
Figure 16 shows the intraregional differences in the values of the health potential in 2019. The difference between the Southwest and South Central region is 1.3 times in favor of the Southwest. The health potential of all other regions in the country is 2 to more than 5 times lower than the potential in the Southwest region (with the highest value in the country in 2019). Regional disparities observed in the health potential are smaller than the differences in the educational potential.

The study of the health potential at regional level between 2000 and 2019 shows that the unbalanced development of the regions in North and South Bulgaria which was initially established has intensified over the years. Serious disproportions can be observed between the regions in the healthcare sector. The Northwest region is characterized by the highest pace of population decline and population ageing, by the highest Crude death rate (significantly higher than the average in the country) and with the lowest life expectancy in the country. The values of the Index of health potential are extremely low also in the other two regions in North Bulgaria compared to the values in the regions in South Bulgaria. Hospitals and hospital beds are unevenly allocated on the territory of the country which means that people don't have equal access to health services especially those living in small and distant from the big cities settlements. Population decline and population ageing as well as depopulation and impoverishment in the suburban areas are problems which require consistent health policy and targeted measures to be resolved. The uneven allocation of the resources on the territory of the country questions the overall regional development because all the regions in the country except for the Southwest region are already lagging behind compared to the average values at EU level related not only to the healthcare but also to education, labour market, culture, innovations. All measure which will be undertaken in the medium and long-term will have to be tied with the demographic forecast and the changing needs of the population in all age groups.

3.1.4. Labour potential in Bulgaria by planning regions

Formula 5: $ILP = (Z_{11} + Z_{12} + Z_{13} + Z_{14} + Z_{15}) / 5$ will be used for the calculation of the Index of the Labour Potential in the planning regions. Figure 17 displays the results:

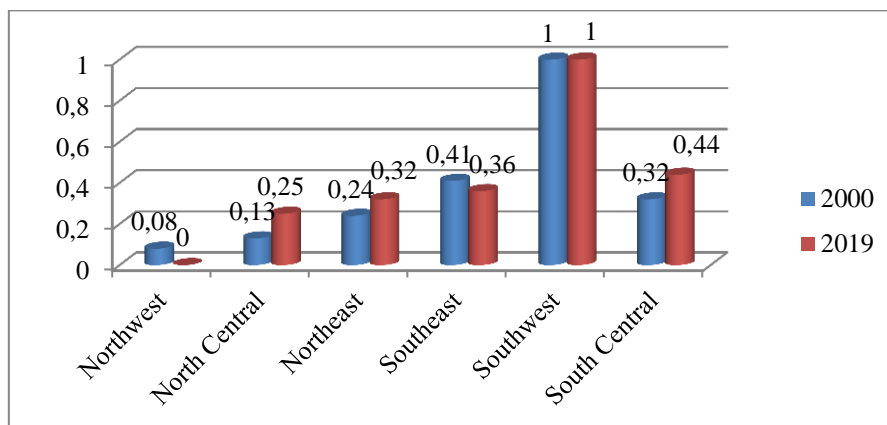
Figure 17: Labour potential in Bulgaria by region (2000 – 2019)



Author's calculations

The results from the calculations of the labour potential of the planning regions in Bulgaria do not differ from the calculations of the Index of the educational and health potential. In 2019 the Southwest region has a leading position in terms of labour potential with a value of the index which is 1.00. It is followed by the South Central region with a value of 0.44, the Southeast (0.36), the Northeast (0.32), the North Central (0.25) and the Northwest (0.00).

Figure 18: Index of the labour potential in 2000 and 2019



Author's calculations

In 2019, the index of the labor potential of the Northwest region tends to 0.00, and that of the Southwest has the maximum value of 1.00. Regional differences in labor potential between the Southwest and other regions of the country except the Northwest vary from 2.3 to 4 times in 2019.

Labour market and human capital are interrelated. On the one hand the labour payment depends on the investments in human capital. On the other hand human capital consists of knowledge, skills and other inborn and acquired characteristics which depend on the individual and are defined by his productivity. As a result of the political, economic and

social reforms in Bulgaria after 1990, structural changes in the employment set in. The changes in the labour market are followed by new requirements for the skills and qualifications of the workforce. All these processes lead to significant changes in the labour payment, the economic activity, the unemployment, the GDP and together with the uneven allocation of the population on the territory of the country and the constant population decline over the past 30 years form significant regional differences in the labour potential. The differences are triple, quadruple and quintuple. The research confirms that these differences are intensifying with time.

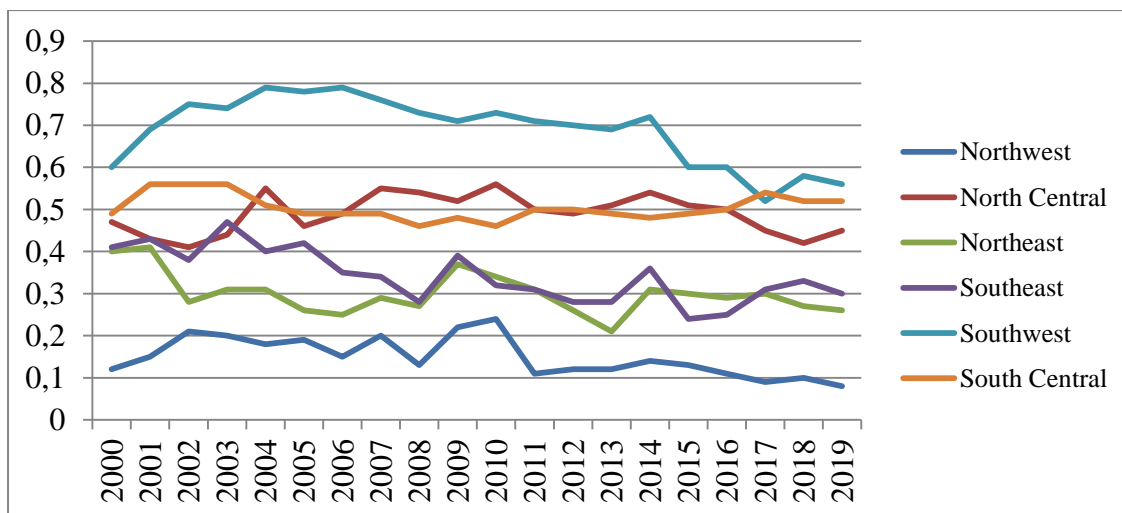
3.1.5. Social and cultural potential in Bulgaria by planning regions

The fourth component of the human capital which will be studied is the social and cultural potential.

The interconnection between the sociocultural environment and human capital has a two-sided manifestation. On the one hand the sociocultural environment creates conditions for the individual to receive schooling and influences the individual's investment priorities and opportunities. The sociocultural environment has an impact on the economic subjects through moral, psychological and traditional limitation which it imposes in the process of realization of economic interests.²⁵

The Index of the social and cultural potential in the planning regions can be calculated with Formula 6: $ISCP = (Z_{16} + Z_{17} + Z_{18} + Z_{19} + Z_{20}) / 5$. The results from the calculations are presented in Figure 19.

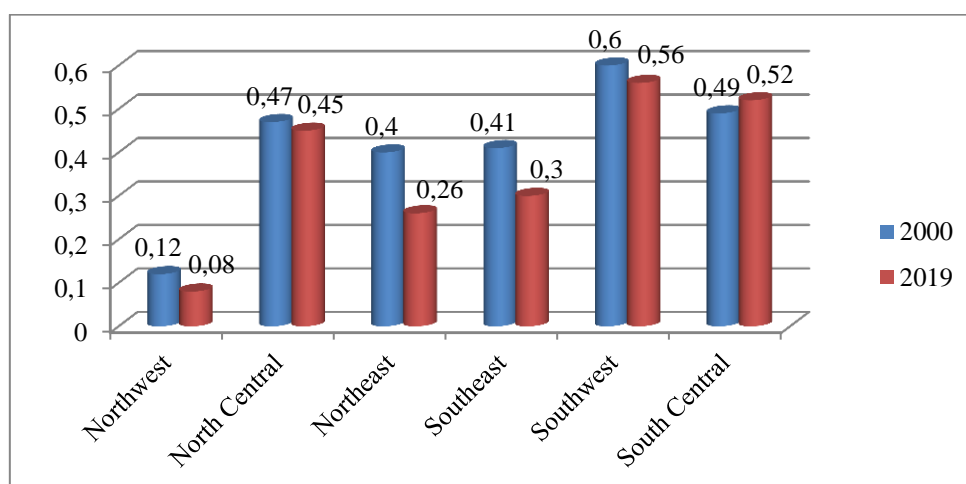
Figure 19: Index of the social and cultural potential by region (2000 – 2019)



Author's calculations

²⁵ Минчев Д., Вълчев К., „Влияние на обществената среда върху качеството на човешкия капитал“. Научни трудове на Русенския университет, 2014, стр. 9;

Figure 20: Index of the social and cultural potential in 2000 and 2019



Author's calculations

After comparing the values of the Index of the social and cultural potential for 2000 and 2019, it is easy to conclude that the index is declining in all regions of the country except for the South Central region where a slight increase is registered. The Southwest region has the highest social and cultural potential in 2019 but it is very close in value to the potential in the South Central and North Central regions. However, there is a sevenfold difference between the Southwest and the Northwest region in 2019. Regional disparities in socio-cultural potential exist but they are not as significant as in those in the education, health and labour potential.

The following conclusions can be made after analysis of the data for each indicator. Theatre and museum visits have been rising in the whole country after 2000 but with different pace at regional level.

The number of registered crimes has decreased significantly in the studied period. The decline in the Southwest and Northeast regions is by 40%, in the South Central region – by 33.3%, in the North Central region – by 30.8%, in the Southeast region – by 29.4% and in the Northwest region – by 23.5%

Alcohol consumption on the other hand has increased significantly over the past 20 years.

Theatre performances have increased in the studied period but the regional differences in the values of that indicator are haven't been dealt with. Theatre performances in the Southwest region (which is in the leading place in 2019) are 4 times more than the performances in the Northwest region (which has the lowest value in 2019).

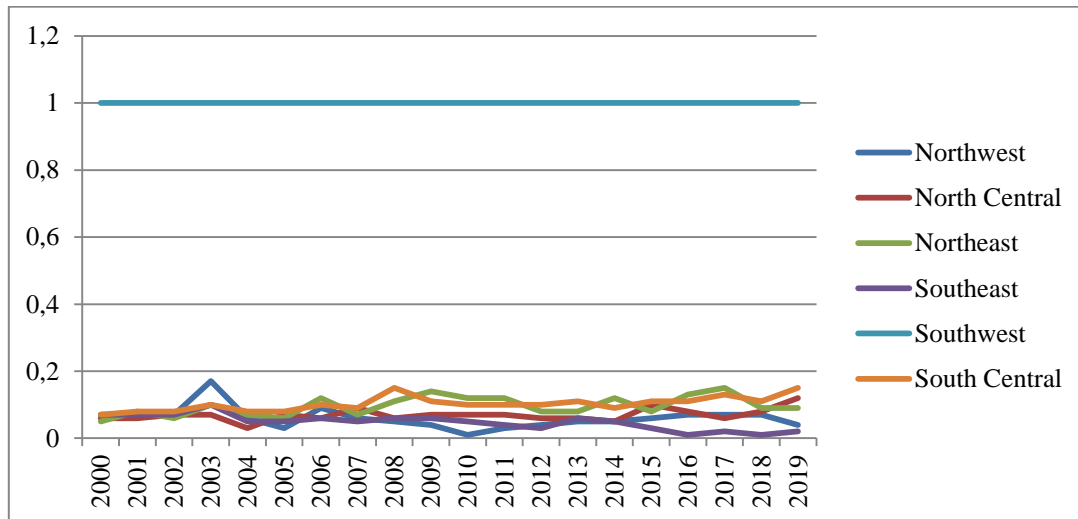
The number of the cultural institutions in the country has decreased significantly in 20 years between 2000 and 2019. The greatest decline can be observed in the Northeast region where the decrease is by 47,4%, followed by the South Central region where the decrease is by 39,6%.

The differences in the Index of the Social and Cultural Potential are not as high as the differences in the indices of the educational, health and labour potential for which the values in the Southwest region are from 0,90 to 1,00. At the same time, the difference between the Southwest and the Northwest region in terms of the Index of the social and cultural potential is still very high – 4.6 times.

3.1.6. Intellectual potential in Bulgaria by planning regions

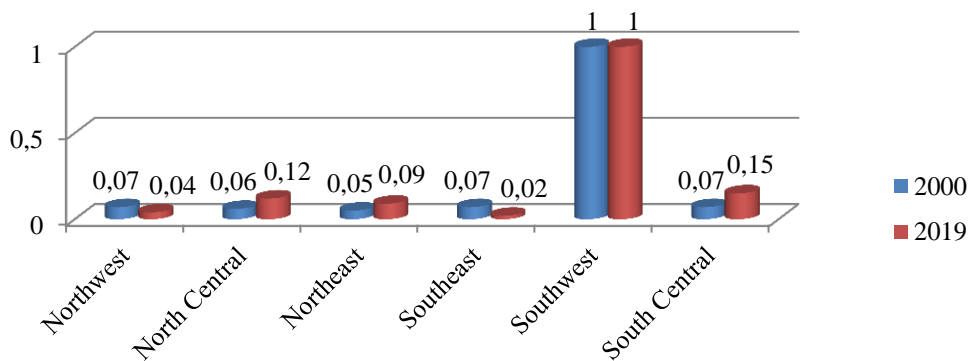
The Index of the Intellectual Potential will be calculated by using Formula 7 $IIP = (Z_{21} + Z_{22} + Z_{23} + Z_{24} + Z_{25}) / 5$. Figure 21 follows the changes in the Index in the studied period.

Figure 21: Index of the intellectual potential by region (2000 – 2019)



Author's calculations

Figure 22: Index of the intellectual potential in 2000 and 2019



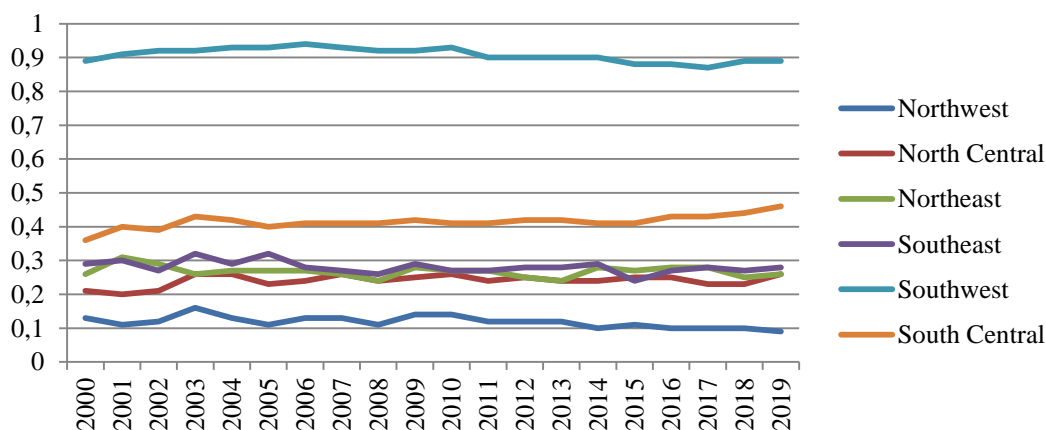
Author's calculations

The analysis of the data between 2000 and 2019 shows that the development of high technologies in Bulgaria has been extremely uneven at the regional level over the last 20 years. High-tech employment is growing at the regional level, but is extremely uneven. The Southwest and Southeast regions are at both poles, and the difference in the values of the index between the two regions is 50 times. The differences in the intellectual potential in 2019 between the Southwest and Northwest, Northeast, North Central and South Central regions are 25, 11, 8 and 7 times, respectively. Based on the calculations in Figure 22, it can be concluded that the largest disparities at the regional level in Bulgaria are observed in relation to the fifth component of human capital - intellectual potential.

3.1.7. Human capital potential in Bulgaria by planning regions

The General Index of Human Capital will be calculated by using Formula 8 = (Educational Potential + Health Potential + Labour Potential + Social and Cultural Potential + Intellectual Potential) / 5. The results from the calculations are displayed in Figure 23.

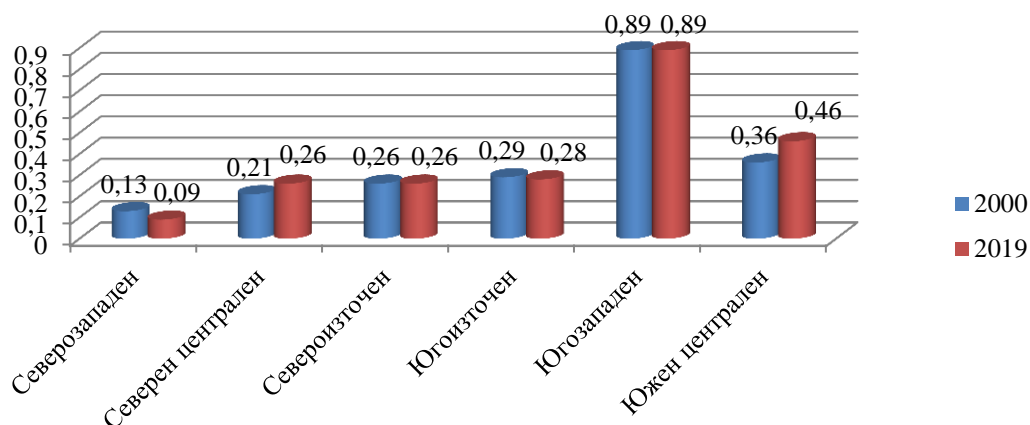
Figure 23: Index of the human capital potential in Bulgaria by region (2000 – 2019)



Author's calculations

Figure 24 compares the data about the human capital potential in the first and the last year of the studied period.

Figure 24: Index of the human capital potential in 2000 and 2019



Author's calculations

The potential of human capital increased in only two of the regions of the country between 2000 and 2019 - by 0.10 points in the South Central region and by 0.05 points in the North Central region. There is no change in the levels of human capital in the Southwest and Northeast regions. A decline was registered in the Northwest and Southeast regions of the country. However, the general trend in human capital potential at the regional level persists - the disparities between the regions persist and deepen to some extent, with differences between the Southwest region, which has the highest values of the human capital index and all other regions will vary from 2 to 3.4 times in 2019.

The study of the potential of human capital in the level 2 regions in Bulgaria by using a statistical method (selection of specific indicators) and index analysis (study of the change in the object of study and its relative importance in the overall result) proves the direct link between demographic processes and the development of the potential of human capital in the country. The analysis of each of the selected indicators clearly outlines one of the most serious problems facing our country – the demographic one.

Population aging and migration, which are typical for other countries in the European Union, in Bulgaria are factors leading to population decline and depopulation of peripheral areas – small settlements with predominantly elderly population without development potential and whose access to services is in question. At the same time, the uneven distribution of the population on the territory of the country is a serious obstacle to the implementation of a successful regional policy. There are serious intraregional disparities in education, health, social policy, cultural and science development. The deepening regional disparities combined with low birth rates, high mortality, low fertility and emigration processes, lead to a reversible loss of skilled labour in level 2 regions with the exception of the Southwest region. According to the GDP per capita indicator (determining the level of development) all regions in Bulgaria with the exception of the Southwest have been among the ten least developed regions in the EU since 2007 until today (for the entire period of the country's membership).

3.3. Prospects for the development of the silver economy in Bulgaria in the context of current demographic trends

3.3.1. Measures for silver economy development in Bulgaria. National Concept for Active Ageing in Bulgaria (2012 – 2030)

The development of the silver economy in Bulgaria in the context of the current demographic situation in the country will be assessed by reviewing the main demographic indicators, as well as by reviewing the main strategic and conceptual documents that outline the directions of its development. The changes that took place in the demographic processes after 1989 continue to affect the demographic development of the country in the first two decades of the XXI century. The population continues to decline mainly as a result of negative natural growth. Table 2 presents data on the main demographic indicators in the country for the last 20 years (2001, 2005, 2010, 2019).

Table 2: Main Demographic Indicators

Indicators	Year			
	2001	2005	2010	2019
Population by 31.12	7 891 095	7 668 180	7 504 868	6 951 482
Population under working age *	1 288 193	1 128 612	1 095 584	1 066 554
Working population population *	4 673 219	4 786 983	4 705 679	4 156 198
Population over working age *	1 929 683	1 752 585	1 703 605	1 728 730
Age dependency ration **	46,8	44,5	46,0	56,4
Ratio between young and elderly people ***	88,5	78,1	77,7	66,7
Demographic substitution ****	123,6	114,7	90,2	66,0
Women of reproductive age (15 – 49 years old)	1 907 430	1 868 081	1 757 380	1 464 277
Mean age of giving birth to a 1-st child (years)	25,1	25,7	26,0	27,3
Natural growth (‰)	-5,4	-5,6	-4,6	-6,7
Live births	68 180	71 075	75 513	61 538
Birth rate (‰)	9,2	8,6	10,0	8,8
Total Fertility Rate	1,74	1,31	1,49	1,58

Deaths	112 368	113 620	110 165	108 083
Crude death rate (‰)	14,2	14,6	14,6	15,5
Child mortality	14,4	10,4	9,4	5,6
Pace of the demographic ageing *****	98,3	98,1	101,7	100,5

Source: NSI

* The age limits for distribution of the population by categories under, in and over working age are determined according to the Ordinance on pensions and length of service, adopted by Decree № 30 of the Council of Ministers (SG, issue 21 / 17.03.2000);

** *Ratio of the population under 15 and over 65 to the population between 15 and 64;*

*** *Ratio of the population under 14 years of age to population over 65 years of age;*

**** *Ratio of the population aged 15 - 19 to the population aged 60 - 64;*

***** *Increase in the relative share of the population over working age compared to the previous year.*

The review of the main demographic indicators shows a steady decline in population which is a result of long-term demographic trends that began in 1930s. The permanent decline in the birth rate which decreased from 31.4 ‰ in 1930 to 8.8 ‰ in 2019 is of paramount importance. Second come the changes that occur in mortality. The overall mortality rate decreased between 1900 and 1970 when it reached its lowest level of 9.1 ‰. Since then mortality in Bulgaria has been steadily rising to reach its highest level in 40 years, namely 15.5 ‰ in 2019. Changes in birth rates and mortality affect the natural population growth in the country. Natural growth has been gradually declining since the 1930s, with the exception of the post-World War II period (1946-1950) when growth was reported, to reach negative levels in 1990. Since then natural growth in Bulgaria has been negative and continues to decline reaching its lowest value of -6.7 ‰ in 2019.

Observations on the age structure of the population after 1990 show the following. The young generation under the age of 14 is 20.11% of the total population, while the elderly over the age of 65 is 13.39% in 1990. In other words, the economically inactive population is about 1/3 of the population but with a predominance of young people about to enter the labor market. In just 10 years, in 2000, the ratio between the share of the population under 14 and over 65 has already changed significantly and is 15.54% and 16.33%, respectively, which shows a deepening trend of population aging. The ratio is even more unfavourable in 2019 when the share of the generation under 14 is already 14.42%, and the share of elderly people over 65 is 21.64%. In comparison, the share of the population aged 65 and over in the EU-28 in total is 20.0%. Bulgaria is among the nine countries in the EU including Italy, Greece and Portugal where the share of the elderly population is over 20.0% in 2019. The fact that the share of the population over 65 in Bulgaria is constantly growing speaks for its demographic aging. In parallel with this process, there is another unfavorable trend, namely the aging of the active population. The population aged 20 to 40 is 27.05% of the total population in 1990, and its share decreased to 23.72% in 2019. At the same time, the share of people aged 50 to 60 increased from 12.39 % in 1990 to 13.71% in 2019.

At the end of the second decade of the XXI century, the unfavorable trends in the demographic situation in the country are deepening. Every year the country's population decreases by nearly 50 000 people. Between 2001 and 2019 the population under working age decreased by 221 thousand people and the number of the population in working age declined by 517 thousand. Over the same period, the age dependency ratio increased by about 10 percentage points from 46.8% to 56.4%. The young-old ratio also decreased from 88.5% in 2001 to 66.7% in 2019. The economically active part of the population is decreasing. The fertile contingent is also declining. Adverse changes in the main demographic indicators explain the decrease in the population, which is emerging as a long-term trend.

The main strategic documents in response to demographic challenges including population ageing are the National Strategy for Demographic Development of the Republic of Bulgaria (2006 - 2020), and subsequently the Updated National Strategy for Demographic Development of the Population in the Republic of Bulgaria (2012 - 2030), National Concept for Active Ageing (2012 - 2030) and National Strategy for Active Ageing in Bulgaria (2019 - 2030). The strategy was adopted by the Council of Ministers with a Decree № 142 on the 15th of March 2019. The two national strategies, respectively for demographic development and active ageing, outline the main goals of the demographic development but the measures for achieving these goals should be updated by taking into account the new opportunities provided by digital technologies.

When planning activities that target ageing population, two main concepts should be taken into account: policies in response to ageing and policies aimed at older people. Policies in these two areas are multi-level, involving different objectives, actions and actors (international, national, regional and local), as well as multisectoral. The project, implementation and evaluation should take into account the activities of public sector institutions (state, regional, local), the commercial sector (private companies such as private pension funds, non-state health care institutions), the non-governmental sector (associations and foundations) and the informal sector (families and mutual aid in local communities). There are three main principles that are essential for the effectiveness of this social policy and they should be respected by all stakeholders. These are the principles of subsidiarity, complexity of needs and site assessment.

3.3.2. Measures for silver economy development. Comparative review Japan and South Korea's approaches

The purpose of the comparative analysis between Japan and South Korea is to examine the strategic differences and similarities in the two countries' approach in building silver economy so that adequate universal policies and activities can be formulated by politicians, researchers, economists, medical professionals and other stakeholders that can be implemented in Bulgaria. The main similarities in the measures taken with regard to the silver economy are a clear, strategic focus on small and medium-sized enterprises as a driving force for innovation in emerging markets, the promotion of technological solutions which boost productivity and support for robotics and artificial intelligence. In addition to that, both countries monitor and evaluate social transformations aimed at the strategic development of future industries that can stimulate economic growth.

With regard to research and science, technology and innovation policies, both countries seek to facilitate administrative processes and regulations in order to create an innovative environment. There are many similarities between Japan and South Korea in the measures in the field of education and lifelong learning aimed at increasing human capital which can balance the declining working age population as a result of aging.

Last but not least, the results achieved by the measures in both countries show that technologies and innovation offer potential solutions to the challenges arising from the demographic transformation towards an aging population.

The specific features of the aging process in Bulgaria require the adoption of measures similar to those in South Korea. The focus should be on improving health and medical care as well as the living environment. In addition to that, leisure and lifelong learning activities should be encouraged.

Conclusion

The conclusion of the dissertation presents the main deductions and results from the analysis of the demographic situation in Bulgaria, the research of the potential of human capital in the country and the review of the state of the silver economy.

The context of modern demographic changes in the world is characterized by processes taking place in three main directions: population growth, changes in fertility and mortality which lead to changes in the age structure of the population. Population ageing is the dominant demographic trend in the 21st century. It reflects increasing life expectancy, declining fertility and progressive population growth.

The research and analytical work in this dissertation confirms the thesis formulated in the introduction and defends the conclusion that demographic processes related to the number, growth and structure of the population influence and largely determine the social, economic and political development of Bulgaria in the long run. However, demographic phenomena do not determine everything because demographic trajectories can be changed through economic measures, political and institutional reforms, changes in technologies, cultural norms and behavior.

The demographic processes in the country are studied in depth and the main trends in the demographic development are outlined in the dissertation. In addition to that, concrete evidence has been presented that adverse trends are deepening and emerging with sustainability. The transformation of demographic processes requires long period of time as well as consistent policies that take into account regional specifics. The approach, which has not been taken in Bulgaria over the last 30 years, should be comprehensive and systematic.

Empirical evidence and consideration of the potential in all areas of society should be at the heart of a systematic approach. This thesis examines two key factors that influence the development of knowledge-based economy, namely human capital and silver economy. Human capital has an important role in the economic development, labor productivity and creation of innovations. Investment in human capital is central to policies aimed at promoting economic growth and social cohesion, as set out in the conclusions of the 2000 Lisbon Summit which aim to make the European Union the most competitive and dynamic knowledge-based economy. Based on the review of the scientific literature on human capital, the following conclusions can be drawn. First, investment in human capital contributes significantly to productivity growth. Second, human capital has a key role in changing and spreading technologies. Third, investing in human capital is more attractive than investing in other assets. Fourth, policies that lead to an increase in the quality and quantity of human capital are compatible with growing social cohesion.

Accelerated population ageing in Bulgaria will affect the composition of the labor force and income and may lead to a slowdown and weakening of economic growth unless timely measures are taken to increase labor productivity in order to maintain good level of production. The measures taken in Bulgaria for the development of the silver economy have not been institutionalized so far and do not outline the specific directions of the development of the silver market. Regional development strategies which outline specific activities aimed at older people are needed. The development of the silver economy requires action in two main directions – promoting the professional development of older people and making efforts to preserve them as part of the labor force and the social sphere – counteracting their social exclusion. The second direction is the creation of economic conditions that use the existence of the specific needs of older people in the field of production, consumption and services and meet demand.

The development of human capital and silver economy in Bulgaria will play a crucial role in overcoming the existing regional disparities in the country regarding the five components of human capital which are studied in this dissertation – educational, health,

labor, socioeconomic and intellectual potential as well as the dominant demographic trend of population aging. There is a consensus in the scientific literature that human capital is a determining factor for productivity, both individually and collectively, and its role is extremely important in today's knowledge economy.

IV. INFORMATION ON THE CONTRIBUTIONS IN THE DISSERTATION WORK

1. A theoretical overview of the development of the concept of human capital, its formation and methods for its measuring is done. Scientific theories and research on the relationship between human capital and economic growth are considered in detail and these were used as a basis for studying the potential of human capital in Bulgaria.
2. A generalized understanding and theoretical overview of the basic concepts and classifications related to the development of silver economy in the context of population ageing is proposed. Theories of population ageing and its impact on economic growth and productivity are discussed. Two successful models of the silver economy are presented – Germany and Japan's models. Particular recommendations for the development of the silver economy in the country have been formulated.
3. An assessment and analysis of the demographic situation in Bulgaria has been made, considering the main factors and indicators that determine the demographic development of the country.
4. The potential of human capital and its components in Bulgaria by planning regions between 2000 and 2019 has been measured. Selection of indicators and statistical method are used for the individual measurements of the educational, health, labour, social and cultural and intellectual potential by region. Based on the results from the research, a detailed analysis of the state of human capital in Bulgaria is prepared as well as the impact of the demographic situation on its development. Conclusions and particular recommendations and ideas for increasing the efficiency of human capital in the country have been formulated.

V. PUBLICATIONS RELATED TO THE DISSERTATION, REPORTS FROM SCIENTIFIC CONFERENCE

1. Kamenova E., "Human Capital Potential in Bulgaria by region 2000 - 2019", First Annual Transform4Europe PhD Conference Proceedings "Societal Transformations and Sustainable Development with Respect to Environment in the Post-Covid-19 Digital Era", December, 2021 (под печат);
2. Каменова Е., Найденов Кл., „Изследване на потенциала на човешкия капитал в България по райони за планиране в периода 2000 – 2019“, Сборник доклади от научни конференции „География и регионално развитие“ – Созопол, септември 2021;
3. Каменова Е., „Раждаемост и плодовитост в България след 1990 г. Сравнителен преглед на показателите на държавите-членки на Европейския съюз“, Сборник доклади от научни конференции „География и регионално развитие“ – Созопол, септември 2020;
4. Каменова Е., „Развитие на човешкия капитал“, Сборник доклади от научни конференции „География и регионално развитие“ – Созопол, септември 2019;

VI. DECLARATION OF ORIGINALITY

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