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Editors
Recep EFE
İsa CÜREBAL
László LÉVAI

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Editors: Recep EFE, İsa CÜREBAL, László LÉVAI



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Problems and Prospects of Sustainable Development of Largest Cities of The Republic of Kazakhstan: Case of Astana

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Abstract

Sustainable development of the modern city is an urgent task, which provides the high quality of the urban and natural environment. The purpose of this article is to study the problems and prospects of transition of major cities of Kazakhstan to sustainable development. Major cities of Kazakhstan being as the political, cultural and economic bridge between Europe and Asia, are performing a linking function in sustainable development of the whole country. The article focuses on the capital of Kazakhstan – Astana city. Astana is a young capital, which is developing dynamically transformed into a Smart City. The population of the capital of Kazakhstan from 1998 to 2014 increased from 326.9 thousand to 852.9 thousand people. In structure of population prevails the working age population (71.6%), there are high birth rate (29‰) and low mortality (4.3‰) of the population in the country. Research methods used in writing this article are: a comparative geographical, statistical, cartographic and GIS. Results of the study revealed the competitive advantages of development of the capital and the prospects for its further sustainable development. In accordance with the Strategic Plan of Sustainable Development of Astana city until 2030, Astana should develop as the capital, administrative and cultural center, as well as the center of innovation, the city of future - Smart City. In this connection it is necessary to stimulate the development of traditional industries and services outside of the city, improve the quality of life of population, and improve environmental living conditions.

Key Words: capital city, quality of life, sustainable development

INTRODUCTION

In the second half of the XX century activated participation of world cities in the movement related to sustainable development. The term "sustainable development" has a long history, beginning with the Declaration of the first UN Conference on the Environment (Stockholm, 1972) and works of the Club of Rome early seventies of the last century, when it was realized the connection between environmental problems, economic and social development of the state.

Sustainable urban development should ensure the creation of a beautiful and healthy city beloved by residents, providing full satisfaction of their needs.

The generally accepted in the world community the principles of sustainable development suggest that the economy is equally a need to focus on the needs of the present, and to preserve the ability of future generations to meet their own needs.

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Sustainable development of the modern city - is a balanced stable socio-economic and environmental development, based on the rational use of the resource potential of the city, not exceeding the maximum permissible load on the environment and urban ecosystems.

Socio-economic processes, the structure of industrial production and specialization have a distinctly pronounced regional character and they are influenced substantially by territorial differences. In this connection there is need for special consideration of the problems of transition to sustainable development of individual regions: regions, cities and districts. Sustainable development strategy should be implemented in specific territories, as each territory has its own distinctive features: a set, scale and nature of the problems of sustainable development, approach to their solution, and the tools used to implement such approaches.

Astana – the young capital, which is developing dynamically, transformed into a Smart City. This is its comparative advantage compared to other major cities of Kazakhstan (Development Program of Astana city for 2016-2020, 2015). The main goal of the sustainable development of the Astana city is to increase the level and quality of life of population through the best use of internal and external factors that ensure the dynamic development of the economic and social sphere while preserving the reproductive potential of the natural complex.

Study Area

Concept of Transition of Kazakhstan to sustainable development for 2007-2024 defines the vision of principles, the basic mechanisms of achieving stability in all spheres of life of the republic (Concept of Transition of Kazakhstan to sustainable development for 2007-2024, 2006). This requires that economic, social, environmental and political factors of development have been integrated and treated as a single process aimed at increasing the quality of society.

The dynamic development of major cities at present provides for a presence of mechanism of effective management. In the construction of the concept of sustainable development of economy and social sphere of large cities the important role plays works of classics of economic science. At the root of the theory and practice of a market economy were J. Adams, A. Smith, D. Rikardo, J. Keynes, M. Friedman, E. Dolan, P. Samuelson, A. Nordhaus, C. McConnell, S. Brue, R. Murphy. Theoretical, methodological and applied problems of the market economy rose in numerous works of Kazakh economists: N. Nazarbayev, A. Koshanov, K. Sagadiev, U. Baymuratov, E. Turkebayev et al.

Significant contribution to the research and problem solving of functioning management and development of large cities made by Russian scientists M. Branch, G. Golts, A. Gutnov, O. Kudryavtsev, G. Lappo, B. Horev, A. Treyvish. For foreign authors, whose works are of greatest interest include E. Atkinson, J. Stiglitz, V. Ostrom, Le Corbusier and others.

The severity of the issues related to sustainable development of large cities, as well as the morphology of the economic space, require their deep and thorough research. Despite the availability of publications, these issues have not been sufficiently addressed in the review of scientific developments and are the subject of constant debate among scientists. The need for an integrated, systematic approach to the problem of sustainable development of large cities, as well as the need for new theoretical and practical generalizations caused relevance, defined purpose and main objectives of the study.

It should be noted that research on sustainable development of large cities in Kazakhstan are under-represented. In our view, it is appropriate to draw the attention of

scientists and experts in the sustainable development issues of large cities such as Astana, which currently is promising basis for integration into the world economic community.

The current pace of development of the world economy placing new demands on the development of economic systems and determines the need for a holistic theoretical and methodological basis ensuring sustainable development of large cities, the study of problems of development of economy at the national level.

Cities - the most important links of the entire system of territorial organization of the population, framework of unified social and economic development of Kazakhstan. At the beginning of 2015, in 87 cities of Republic of Kazakhstan (including Baikonur, operating under lease of Russian Federation), 2 cities of the republic value, 38 regional and 47 district value, and in 30 settlements, with the status of settlements with urban population resided 9 868.6 thousand people (56.6% of the total population of the Republic of Kazakhstan).

MATERIALS AND METHODS

The information base served as the official data of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, the Departments of Statistics of Astana and Akmola region (<http://www.stat.gov.kz>, <http://www.astana.stat.kz>, <http://www.akmola.stat.gov.kz>).

To analyze the potential of Astana were examined data on socio-demographic and economic indicators of Astana city in dynamics for 1998-2014 years., Ie, for the period of formation and the becoming of the Capital.

For data processing were used software packages ArcGIS, DemProj, and module Statistical Analyst.

In writing the article were used as a common scientific and geographical methods: statistical and comparative geographical analysis, cartographic.

RESULTS AND DISCUSSION

1. Development dynamics of the large cities of the Republic of Kazakhstan

The population of the Republic of Kazakhstan at the beginning of 2016 amounted to 17 670.9 thousand people, including urban population of 10 066.7 thousand people, accounting for 57%.

In 2015, there were 87 cities in Kazakhstan, of which only three cities had a number of population of over 500 thousand people (Almaty, Astana, Shymkent). Number of cities with number of population over 100 thousand people - is 22, in which resided 43% of the population of the country (Demographic Yearbook of Kazakhstan, 2015, p. 7-10). The proportion of the population living in cities, especially large cities is constantly growing.

The vast majority of cities of Kazakhstan today presented the so-called "small" and "medium-sized" cities with a population of less than 100 thousand residents. In 2014, the number of small towns with population less than 50 thousand people was in Kazakhstan 59. The population of more than 50 thousand people, but less than 100 thousand people, to date, have cities such as Ridder, Baikonur, Balkhash, Satpayev, Kentau, Stepnogorsk, Zhanaozen, Shakhtinsk.

Almost all the "small" and "medium-sized" cities were characterized by population decline during the 1990s, mainly due to active migration due to the deteriorating economic situation and the social and living conditions of life (number of population of small towns, usually, depends on the state of the city-forming enterprises). Since 2002, in a number of such urban settlements there has been population growth (for example, the cities

Stepnogorsk, Balkhash, Zhezkazgan, Saran, Lisakovsk, Turkistan, Schuchinsk, etc.). However, at the present stage, there are the cities of regional and district values, where the number of population continues to decline (eg, Shakhtinsk, Aksu, Arkalyk, Ayagoz, Zyryanovsk, Ridder, Abay, Karkaraly, Aral), in which were registered 1423.5 thousand people (Nyusupova G.N., 2010, p. 147-151).

Today, Kazakhstan has the only urban "millionaire" – Almaty city. The number of population over 1 million people was formed in the Almaty city to the beginning of 1982. Thus, Almaty is the only metropolis in Kazakhstan. During the period from 1989 to 2015 the population of Almaty increased by 582 thousand people from 1 121.4 thousand to 1 703.5 thousand people (Table 1). Especially rapidly Almaty city developing since 2001. The share of the population of the Almaty city in the number of urban population of Kazakhstan is also increasing: in 1989 it amounted to 11.9%, then from 1999 to 2002. - 13.4%, in 2009 15.7%, in 2015 - 17.3%. There are the data of the official statistics, but in Almaty city focused sufficiently large number of unregistered population (migrants from other regions and rural areas, migrant workers from neighboring countries and others.). According to the 2015 data in Almaty city the number of population is 1 703.5 thousand people, and in Almaty agglomeration about 2.5 million people.

Table 1: Dynamics of number of population of major cities of Kazakhstan, people

Cities	1989	1999	2009	2015
Astana	276003	326939	613006	872655
Almaty	1121395	1128989	1365632	1703481
Aktobe	252978	253088	391669	450154
Atyrau	147234	142497	240570	302242
Aktau	160744	143396	169809	185876
Zhanaozen	48300	48871	113014	140641
Karagandy	507318	436864	460039	498055
Kokshetau	135424	123389	147295	159488
Kostanay	223558	221429	214961	231911
Kyzylorda	150425	157364	230422	277810
Pavlodar	329681	300503	336810	358895
Petropavl	239606	203523	202454	216234
Rudnyi	125245	109515	122980	130103
Semey	317112	269574	324492	343523
Taldykorgan	118623	97996	146844	165290
Taraz	303961	330125	320634	362993
Temirtau	213551	170481	176496	185533
Turkistan	77692	102505	142899	256924
Oral	199522	195459	247236	288400
Oskemen	322221	310950	314953	333350
Shymkent	380091	423902	603499	885799
Ekibastuz	135006	127197	125012	152762

Source: Compiled by authors based on Committee of Statistics data (The Committee of Statistics of the Republic of Kazakhstan, 2016).

Significant population growth of Almaty city was due to suburbs. The high density of rural settlements, their proximity and the expansion of the area around Almaty city, played a crucial role in deciding on the inclusion of the villages and towns in the city limits. Active development of Almaty neighborhoods by building houses, cottages also played a role in getting the status of the city of nearby villages. Especially these processes developed rapidly the past 15 years, which contributed to the expansion of the limits of the urban agglomeration. Only in 1999, expanding the boundaries of the Almaty city has led to an increase in population of 8.7 thousand people. And in 2014 the expansion of the city limits was 23.2 ha, as a result of number of population increased by 94.1 thousand people.

Dynamics of the number of population of Astana city represents special interest. Astana in 1997 became the capital of the Republic of Kazakhstan. Since that time, the city is experiencing, so to speak, "urban boom." The constant influx of population in Astana leads to the fact that the city's population is growing very rapidly. Thus, from 1989 to 2015 the number of population of Astana increased 3.2 times (from 276.0 thousand to 872.7 thousand people). Accordingly, increased and its share in the urban population of the Republic: in 1989 - 2.9%, in 1999 - 3.9%, in 2009 - 7%, in 2015 - 8.8%. Capital status gives Astana additional attractiveness, both for internal migrants as well as for migrant workers from other countries, foreign investors, businessmen, entrepreneurs of different level and tourists. Focusing in the city a large number of population of young ages contributes to increase its numbers and by birth. In addition, people are seeking different options of resettlement in the capital itself.

It should be noted that only since 2005, Astana has become the second most populous city in Kazakhstan. In the period from 2000 to 2004 inclusive, the second place by largest population held Shymkent city. Since 2000, the Shymkent city by number of population has moved into second place in the republic, "displacing" the Karagandy city to the third place, which for many years was regarded as the second city in Kazakhstan by number of population and in terms of socio-economic development (since 2001 population of Karagandy becomes smaller than population of Astana). By the beginning of 2003 the number of population of Astana city has exceeded 500 thousand people. Although in the preparation of a master plan development of the capital it was assumed that the half-million mark the city will reach only by 2010, and all projects were associated with this target population. To date, the number of population of Astana city is 872.7 thousand people.

Although, in the first years of the transfer of the capital (1997-2000 years) a number of rural settlements have been introduced in the metropolitan area (conurbation), in the near future a significant growth in the number of citizens due to the inclusion of new rural settlements is not expected. At this time around Astana city there is no zone of closely spaced rural settlements. Nevertheless, in comparison with 1997, there has been an increase in urban areas in 2.7 times, that achieved by the development of new, uninhabited area.

To date, dynamically developing large cities of Kazakhstan (in addition to the Almaty and Astana) are Karagandy, Shymkent, Aktobe, Atyrau, Taraz, Oral, Oskemen.

2. Problems and prospects for sustainable development of the Astana city

Under the sustainable development of Astana city is understood the continuous improvement of quality of life of population. The concept of quality of life is determined primarily by the presence of the work and the appropriate remuneration, the state guaranteed minimum package of health services, education and social welfare, environmental quality and engineering infrastructure, public safety, political stability (Strategic Plan for Sustainable Development of Astana city until 2030, 2006).

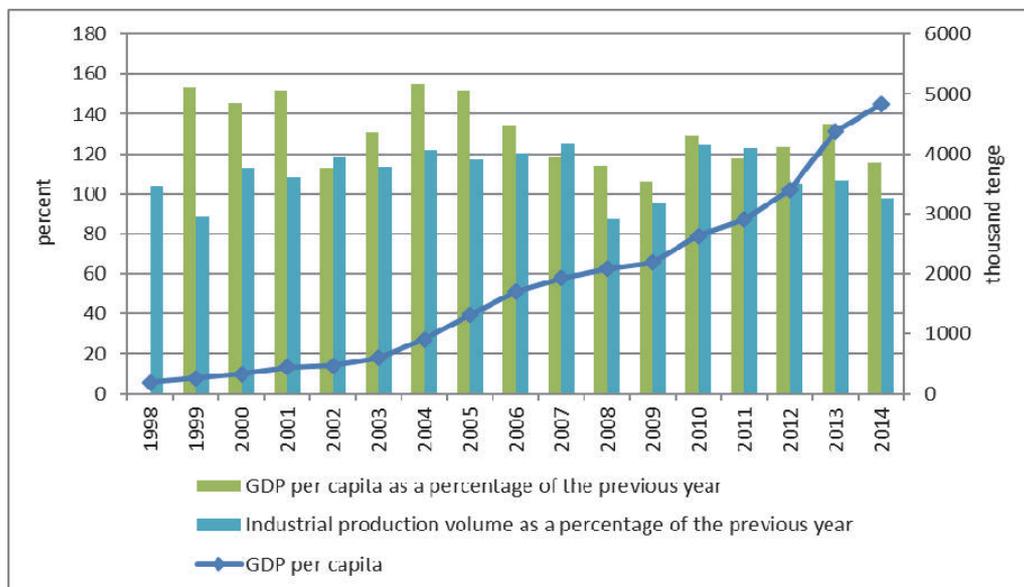
At the same time, priority in achieving sustainable development of the city is given to the person providing the worthy conditions of life and development as a person.

2.1. Development of Urban Economics

The desire of the city to the development of a diversified economy, the introduction of information technologies, innovations implies a high rate of growth of all sectors of the economy: industry, construction, retail and wholesale trade, transport and communications, and other types of services that will allow Astana in 2030 to become one of the thirty the most competitive cities in the world.

Acquiring the status of capital city of Astana marked the prospects for the development of its economy. At the end of 2014 the volume of gross regional product of Astana city amounted to 4 023.8 million tenge, for the city accounting for 10.3% of total GDP. In the structure of GRP the largest share occupy trade and services (86.8%), including the services - 64.2%, wholesale and retail trade - 22.6%. The share of industrial production and construction is 3.6% and 9.6% respectively.

The volume of GDP per capita by the end of 2014 amounted to 4 826.6 thousand tenge, which is twice the average for the country (2 258.1 thous. tenge). Nominal growth of this indicator in comparison with the year 2013 (4376.1 thousand tenge) was 10.3%, an increase in 2012 (3396.1 thousand. tenge) 42% (Figure 1).



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

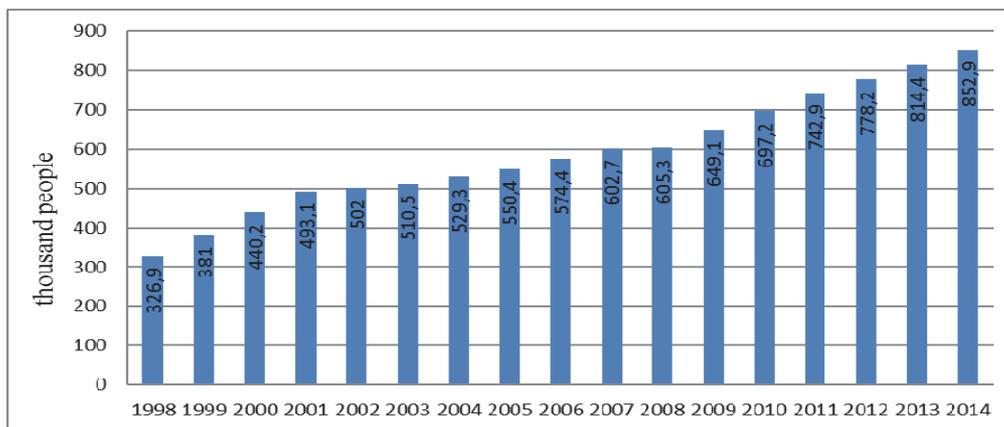
Figure 1: Dynamics of the major economic indicators of Astana for 1998-2014 years

During the study period (1998-2014) industrial output increased from 20.2 billion tenge in 1998 to 344.7 billion tenge in 2014. The growth index in 2013 relative to 2012 was 6.7%, there was a decline of up to 2% in 2014.

2.2. Socio-demographic indicators of the development of the city

The dynamics of the total number of population of Astana city for 1998-2014 years was generally positive. The number of population in 2014 was 852.9 thousand people. Compared

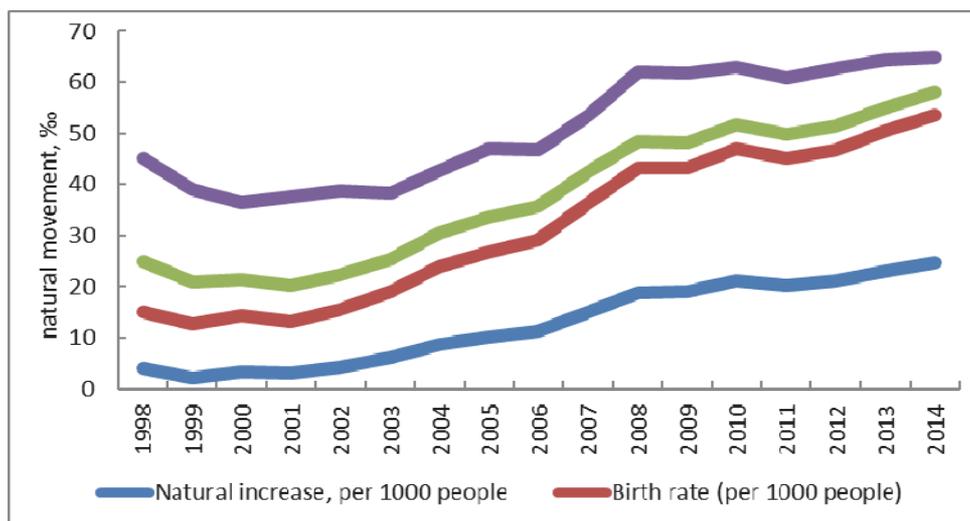
to 1998 the population increased by 526 thousand people, or by 160.9%, from 326.9 thousand people in 1998 to 852.9 thousand people in 2014 (Figure 2).



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

Figure 2: The number of population of Astana city for the 1998-2014 years

At the same time the natural increase rose from 4 per 1,000 people in 1998 to 24.7 per 1000 in 2014. The natural increase of the population during the study period underwent various changes, if in 1998 the natural growth rate was 4‰, followed by a decline to 2.1‰ in 1999. Since 2001, the indices of natural population growth had a positive upward trend (Figure 3).



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

Figure 3: Natural movement indicators of population of Astana for the period 1998-2014 years

This is due mainly to the rapid increase in the birth rate, which increased by 2.5 times since 1998, this figure increased from 11‰ to 28.96‰ in 2014 (3rd place among the regions,

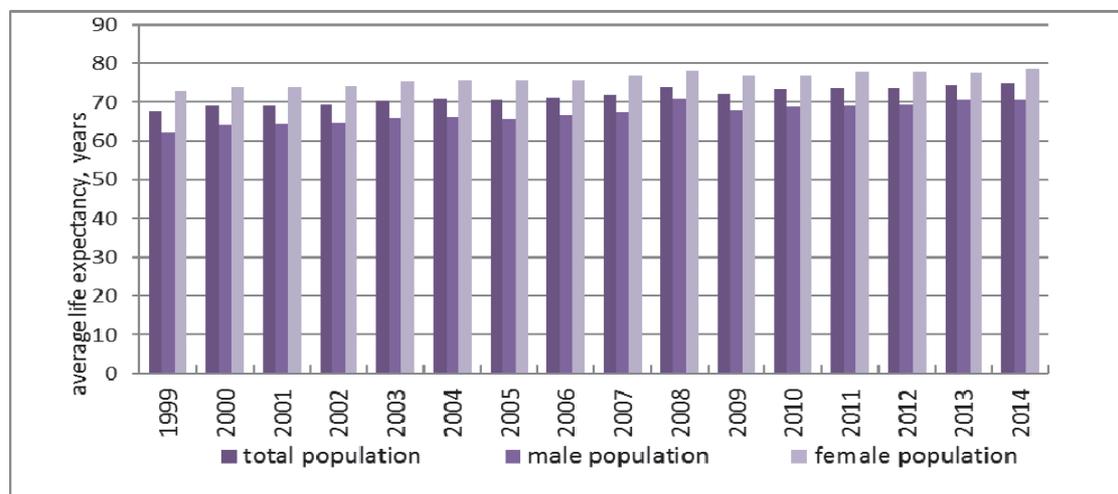
the average for the Republic of Kazakhstan - 23.2‰). The rate of growth birth in Astana generally showed stable positive dynamics only since 2002. The birth rate in 2014 increased in comparison with 1998 at 17.96 births per 1,000 people, as compared to 2004 per 13.59‰.

Indicators of population mortality of Capital decreased from 1998 to 2014 to 56.7% from 9.9 to 4.28 deaths per 1.000 population (the average for the Republic of Kazakhstan the figure is – 7.65‰) and is the lowest in Kazakhstan. In the structure of causes of mortality the largest share takes circulatory system diseases, from which in 2014 died 1193 persons or 33%.

Infant mortality – one of the basic statistic indicators of demography and is an important characteristic of the general state of health and living standards of the population of the country.

In 2014 in the republic were registered 3,868 dead infants up to 1 year. And in the capital, the infant mortality rate in 2014 was - 6.87 cases per 1,000 live births, compared with 1998 this figure was reduced by 2.9 times. So, in 1998 the infant mortality rate was 20.2‰. The main cause of infant mortality is conditions originating in the perinatal period.

The indicators characterizing longevity, is the average life expectancy at birth. Average life expectancy of population in Astana for the period 1999-2014 years increased by 7 years, from 67.58 to 74.89 years. Since 1999, in the city there was an increase in life expectancy, but it also was not stable and uniform. If from 1999 to 2008 years average life expectancy has increased significantly, in 2009 the growth rate of ALE decreased. In general, from 1999 to 2014 the average annual rate of increase in life expectancy was 0.5 years.



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

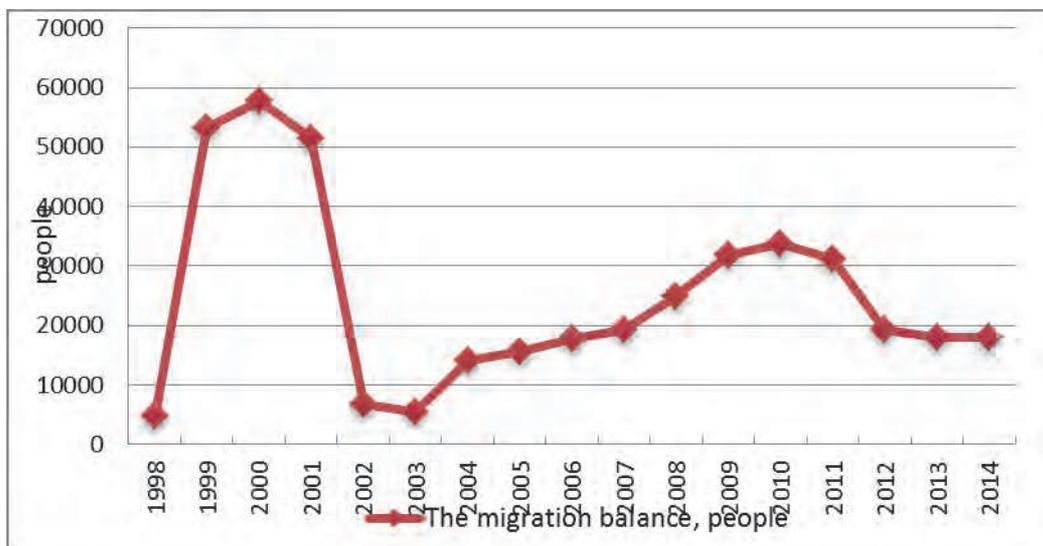
Figure 4: Average life expectancy of population in Astana city for the 1999-2014 years

In the period 1999-2014 average life expectancy has increased in the whole country by 7.31 years, for men - by 8.44 years and for women by 5.8 years.

Average life expectancy of population in Astana in 2014 was 74.89 years, including 70.62 years for men and women – 78.54. As seen in Figure 4, the average life expectancy for men is lower than in women, and the difference is 7.9 years (Figure 4).

Migration population growth in capital during the period 1998-2014 years was positive, and the balance of migration has increased more than 3.7 times (from 4816 to 17 880 people). The rate of migration growth annually in the order of 17-19 thousand people. For example, in 2014 balance of migration amounted to 17.9 thousand people (2nd place among the regions after the Almaty city, where it was 22.1 thousand people), of which 70.8% are working-age population and 23.5 % - younger than working age.

To the Astana city population mostly comes from Akmola, South Kazakhstan, Karagandy, East Kazakhstan regions and Almaty city.



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

Figure 5: The migration balance of Astana city for the 1998-2014 years (people)

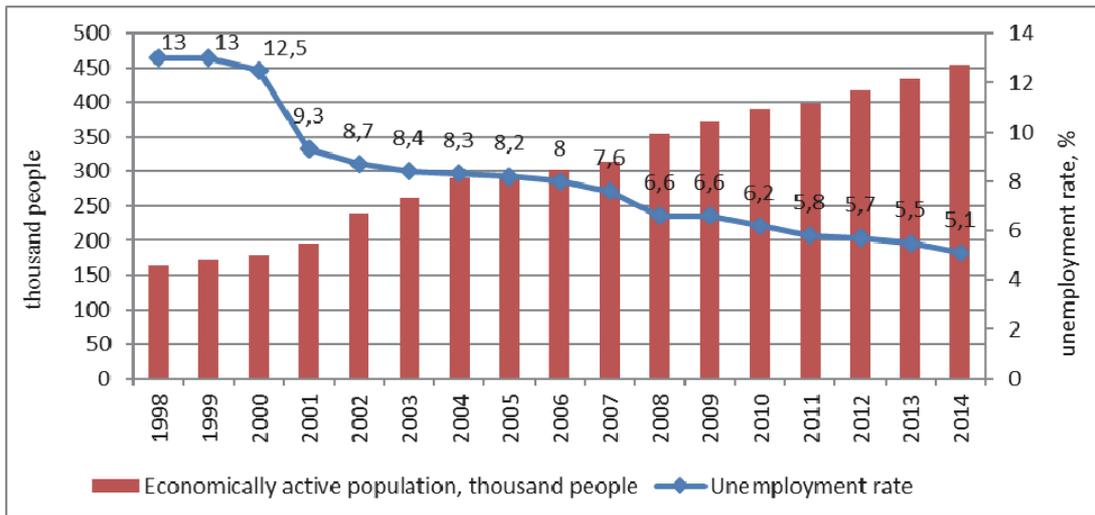
Coverage by education of population of the capital of the aged 6-24 years is one of the main indicators of the level and quality of life in the Republic of Kazakhstan.

Analysis of changes in the values of total enrollment proportion of the population aged 6-24 years for the 1999-2014 years showed that at the present time in Astana 74.9% of the population aged 6-24 years covered by training, compared with 1999, this index increased of 28%.

In Astana there is the largest total share of enrollment of the population by education aged 6-24 years marked in 2008 - 91.5%. The level of education of the population aged 6-24 years has become much increase from 2000 to the present.

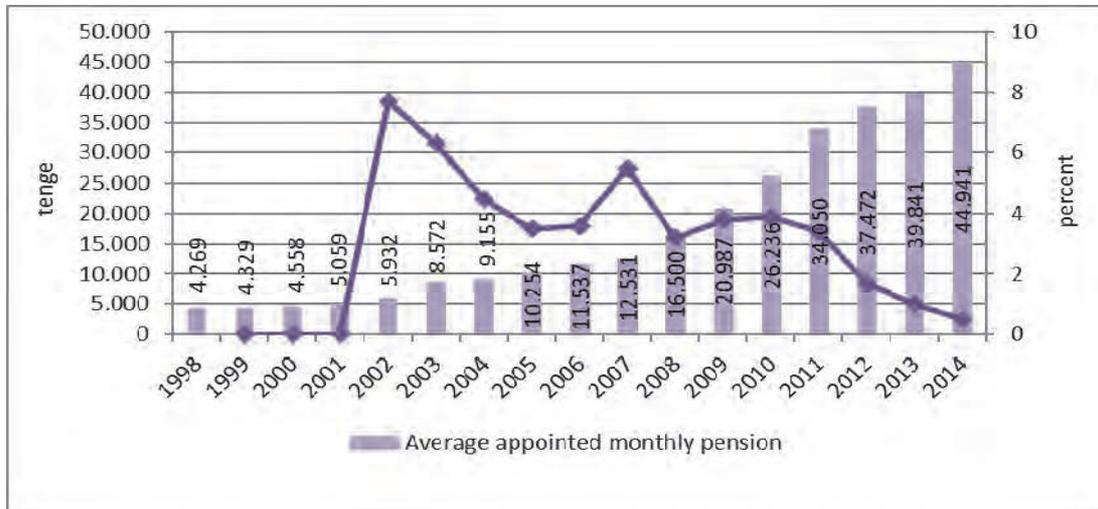
The economically active population in the Astana city in absolute terms has increased over the period of 1998 - 2014. Number of active population increased from 164.2 thousand people to 454.6 thousand people.

Unemployment is extremely important and multi-faceted sphere of economic and social life. The unemployment rate in the capital has decreased significantly over the 1998-2014 years. As compared with 1998 in 2014 the unemployment rate decreased by more than two and a half times (from 13% to 5.1%). And it is lower than average republican population which is 6% (Figure 6).



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

Figure 6: Economically active population and unemployment rate of Astana city for the 1998-2014 years



Source: Compiled by authors based on data of Department of Statistics of Astana (The Department of Statistics of Astana, 2016).

Figure 7: Average appointed monthly pension and share of the population with incomes below the subsistence level

The main indicators of social security determining the level of socio-economic development of any country is the size of pensions and social benefits. Since 1998, the pension system in Kazakhstan has moved from the distributive to the cumulative operating principle.

In Astana, from 1998 until 2003, ie, 5 years increased the average size of pensions in twice (from 4 269 tenge to 8 572 tenge). And for 10 years (1998 - 2015), this figure increased by 4 times (from 4269 tenge to 16 500 tenge).

Over the pension reform years (1998-2009) the average size of pensions in Astana increased by 16 718 tenge. In 2014, this figure reached up to 44 941 tenge and in comparison with 1998 increased by 10.5 times.

An analysis of the proportion of people with incomes below the subsistence level in Astana shows that since 2001 there was a marked decrease in the proportion of the population with incomes below the subsistence minimum, if their share in 2001 was 7.7% of the total population, in 2014 their share was 0.4%, which 7.3 times lower than in 2001 (Figure 7).

CONCLUSION

In accordance with the Strategic Plan of Sustainable Development of Astana city until 2030, Astana should develop as the capital of administrative and cultural center and center of innovative technologies, the city of future - Smart City. In this connection it is necessary to stimulate the development of traditional industries and services outside of the city, improve the quality of life of population, improve environmental living conditions.

Results of the study revealed the competitive advantages of the capital and the prospects for its further sustainable development.

Currently, in Astana implemented a large number of regional programs of socio-economic development of the city.

Astana is located in the center of the country and is geographically centrally located transportation hub of rail and road networks. In the long term there is a real opportunity to significantly improve its place in the international air transport.

The favorable geopolitical position of the capital is determined by the position, which today holds Kazakhstan in Central Asia and in international community, according to two factors: firstly, it's significant reserves of natural resources; secondly, the "advancement" of Kazakhstan in political, economic and social spheres in comparison with its neighbors, making it the undisputed leader and reliable partner in the region.

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