ELIT
Economic Laboratory Transition
Research Podgorica

Montenegrin Journal of Economics

For citation:

Akhmetova, A., Nakipova, G., Mussatayeva, A., Omarova, A., Kunyazova, S., Gusmanova, Z. (2024), "Analysis of the State Management System for the Development of Cities and Urban Agglomerations", *Montenegrin Journal of Economics*, Vol. 20, No. 4, pp. 173-186.

Analysis of the State Management System for the Development of Cities and Urban Agglomerations

ASSEL AKHMETOVA[1], GULMIRA NAKIPOVA[2], ASSEMGUL MUSSATAYEVA[3], AINURA OMAROVA[4], SAULE KUNYAZOVA[5] and ZHANAR GUSMANOVA[6]

[1] PhD student, Karaganda University of Kazpotrebsoyuz, Karaganda, Kazakhstan, e-mail: ahmetova.2017.86@mail.ru
[2] Professor, Karaganda University of Kazpotrebsoyuz, Karaganda, Kazakhstan, e- mail: nakipovage@mail.ru, ORCID: 0000-0001-6754-246X
[3] Associate Professor, Academy of Public Administration under the President of the Republic of Kazakhstan, Astana, Kazakhstan, e-mail: m_assem1984@mail.ru, ORCID:0000-0002-7089-3516
[4] Professor, Karaganda Buketov University, Karaganda, Kazakhstan, e-mail: ainuraphd@mail.ru, ORCID: 0000-0001-9808-4908
[5] Professor, ToraigyrovUniversity, Pavlodar, Kazakhstan, e-mail: kunjazovas@mail.ru, ORCID: 0000-0002-5538-5839
[6] Associate Professor, Karaganda University of Kazpotrebsoyuz, Karaganda, Kazakhstan, e-mail: ainuraphd@mail.ru, Scopus ID: 57199262431

ARTICLE INFO

Received October 03, 2023
Revised from November 02, 2023
Accepted December02, 2023
Available online October 15, 2024

JEL classification: 015, 011, 010

DOI:.. 10.14254/1800-5845/2024.20-4.15**.**

Keywords:

Strategic analysis,
regional youth policy,
regional personnel policy,
regional staffing,
strategic planning,
regional economy.

ABSTRACT

Urbanization plays an important role in the development of the country, forming urban centers of economic activity, innovation and socio-cultural events. The study allows determining how effectively the state is managing this process, as well as what changes and improvements can improve the quality of urban life. The study of public management of the urbanization process in Kazakhstan will identify problems, good practices and potential for improving the management of urban development, which ultimately can help improve the quality of life of citizens and ensure the sustainable development of the country. The relevance of the study lies in the fact that the analysis of public management of the urbanization process in Kazakhstan will identify problems, successful practices and potential for improving the management of urban development, which ultimately can help improve the quality of life of citizens and ensure the sustainable development of the country. The purpose of the study is to evaluate the effectiveness and improve public administration of the urbanization process in Kazakhstan to ensure sustainable and high-quality urban development and improve the quality of life of citizens.

INTRODUCTION

The development of modern society has entered an era dominated by technology and efficiency, leading enterprises and governments to overestimate the role of efficiency in the process of rapid development, while ignoring the fundamental goal of social development. The degree of urbanization has increased significantly, but the problems that exist in the city are becoming more and more serious. Cities are complex systems that require a rational distribution of resources. The study reveals what mechanisms and tools are used to optimize the use of land, financial and technical resources. The study of public administration of the urbanization process in Kazakhstan is of high relevance and importance for a number of reasons:

- In the world there is an intensive movement of the population from rural areas to cities. This global process has a great impact on the social, economic and environmental dynamics of the country;
- cities play a key role in the economic development of the country, providing infrastructure, workforce, business opportunities and innovation;
- the growth of the urban population requires the development of policies on housing policy, social infrastructure and education to ensure a quality lifestyle for citizens;
- urbanization can lead to problems of pollution, overpopulation and the need for effective management of natural resources;
- the need to develop urban plans, infrastructure, transport, etc. to ensure smooth and sustainable development;
- optimal use of land resources and management of land relations is an important aspect of state policy;
- the development of urbanization can contribute to the creation of innovative environments by attracting young professionals and entrepreneurs;
- the study of urbanization management in Kazakhstan can provide an opportunity to draw lessons from world practice and apply them to local conditions;
- the study can provide valuable recommendations for improving the public administration of urbanization, optimizing processes and increasing efficiency;
- urban development and urbanization management can be aligned with national development strategies and international commitments.

The study of public management of the urbanization process in Kazakhstan can contribute to the optimization of urban development strategies, improve the quality of life of citizens, sustainable use of resources and create an enabling environment for innovation and economic growth, as well as identify problems, good practices and potential for improving urban development management, which ultimately can help improve the quality of life of citizens and ensure the sustainable development of the country.
The issues of sustainable development of cities and the achievement of a high level of urbanization are included in the strategic program documents and plans of the Government of the country.

1. LITERATURE REVIEW

The scale of urbanization around the world is gradually growing, increasingly capturing the suburban areas of megacities and the countryside. However, the dynamics and direction of urbanization processes are constantly changing under the influence of various factors (Gibbs, 1963). These processes received a theoretical explanation in the concept of differential urbanization, justified by Geyer and Kontuly (1993). This concept was followed by such modern urbanists and geographers as W. Lever (1993), C. Xing & J. Zhang (2017), as well as demographers (Molyarenko, 2013 Nefedova & Pokrovsky, 2015). The essence of this theory is that the stages of urbanization are determined by the ratio of the growth and migration rates of the urban and rural population, which can be differentiated depending on the size of cities and settlements. In general terms, the stages of urbanization can usually be classified as follows:

- Stage of low urbanization. At this stage, the urban population is a small proportion of the total population of the country. The predominantly rural population. Migration to cities is limited and urban growth is slow.

- Stage of accelerated urbanization. At this stage, higher rates of urban population growth begin. Migration from rural areas is increasing due to better economic opportunities, access to education and services. Cities begin to actively develop and expand.
- Stage of mature urbanization. At this stage, the majority of the population already lives in cities. Migration rates may rise steadily or stabilize, but in general, cities become home to the majority of the population.
- Stage of post-urbanization. At this stage, the growth rate of the urban population slows down. Cities reach a certain level of population and infrastructure saturation. The focus can be on improving living conditions, reconstruction and renewal of the urban environment.

The stages of urbanization may differ in different countries and regions depending on economic development, demographic factors, political decisions and other circumstances. This classification represents the general picture and may vary depending on specific conditions. Developed countries as a whole have reached a stable stage of urbanization, with more than 70% of the population living in urban areas. Thus, the focus of global urbanization has shifted to developing countries, and the global model of urbanization is rapidly changing (Wei et al., 2018). As the largest developing country in the world, China plays an important role in the global urbanization pattern. In nearly 30 years from 1949 (foundation of the state) to 1978 (reform and opening up), the country's tortuous path of development (Chen C. et al., 2018) meant that China's urbanization rate only increased from 10.64% to 17.92 % with an average annual growth rate of 1.81%. Throughout the history of China's urbanization, achievements and challenges have been closely linked to national politics. This is also the main reason why China's urbanization is different and separate stages. The expansion of urban land damages the urban ecosystem, so it is necessary:

- to carry out the coordinated development of various factors of new urbanization,
- promote new urbanization, while taking into account the current needs of the city,
- development of rural territories.

To assess the quality of new urbanization in cities and make decisions, experts and scientists have created various index evaluation systems (Fang et al., 2015), using the entropy method (Zhao and Wang, 2022), the method of coefficients of variation (Zhao and Wang, 2018), peer review method (Yang and Lu, 2016), as well as other subjective and/or objective approaches to index calculation.

Thus, we can conclude that the evolution of urbanization processes gradually leads to the fact that its level is already determined not only by the share of the urban population in the country, but also by the degree of its concentration in large cities, settlement in agglomerations, the spread of urban lifestyle and urban culture. Large differences in fertility, mortality, the number of children, the culture of family traditions in large cities and rural areas lead to the differentiation of demographic processes in cities of different sizes and functional types, which, in turn, affects the quality of urbanization processes.

It is important to develop targeted urbanization strategies and policies that will promote a balance between urban development and the conservation of natural resources, as well as ensure the quality of life for all residents.

2. RESEARCHMETHODOLOGY

State management of the urbanization process in Kazakhstan is a complex multidimensional process that requires attention to the social, economic, environmental and infrastructural aspects of urban development. Here are some key steps and principles that can help in effective public management of urbanization (Figure 1).

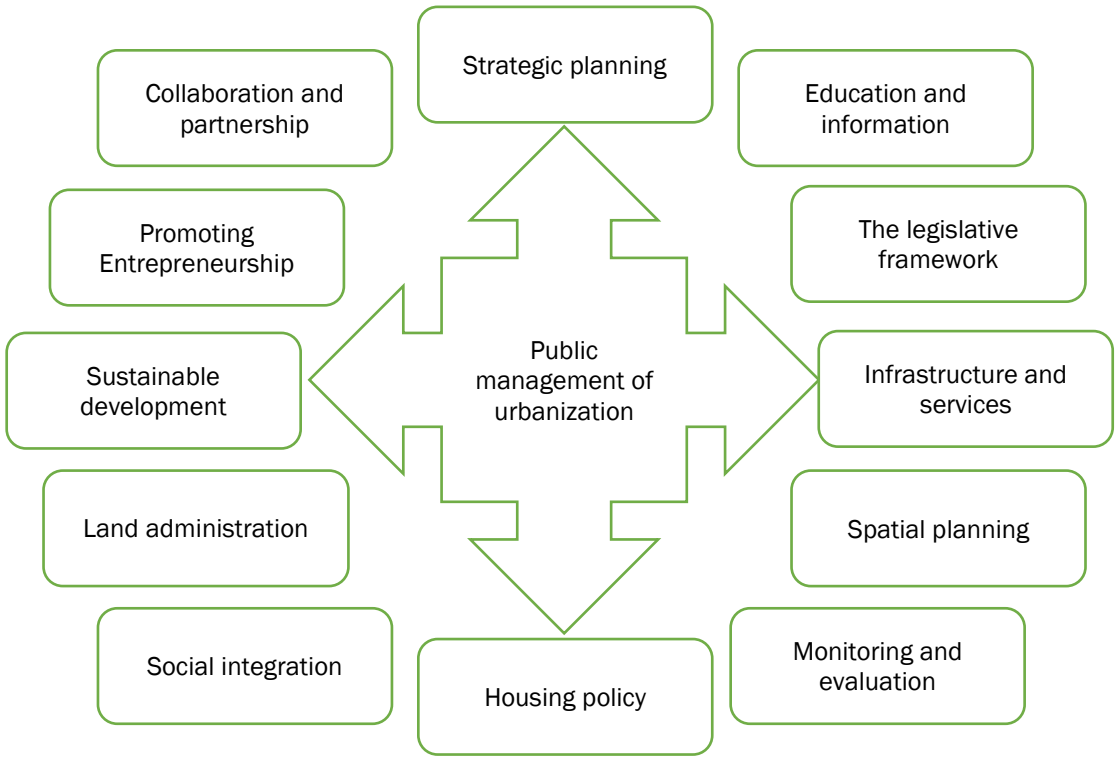

Figure 1. State management of urbanization

Source: Compiled by the author

According to Figure 1, the state management of urbanization includes:

- Strategic planning. Development of long-term strategies for the development of cities and regions, defining priority areas, goals and objectives.
- Legislative framework. Development and improvement of laws and regulations governing the process of urbanization, land relations, planning and construction.
- Infrastructure and services. Providing access to basic infrastructure facilities such as water supply, electricity, sewerage and transport infrastructure.
- Spatial planning. Development of master plans for cities and regions, taking into account the sustainable use of land, the development of residential, commercial and industrial zones, as well as the protection of natural resources.
- Housing policy. Implementation of programs to provide affordable housing for citizens, including support and subsidy measures.
- Land administration. Regulation and control over land relations, ensuring transparency in the use of land.
- Sustainability. Integrating the principles of sustainable development into urbanization processes, including reducing environmental impact, efficient use of resources and the creation of environmentally friendly conditions.
- Promoting entrepreneurship. Support for the development of small and medium-sized businesses, the creation of business zones and incubators to stimulate economic activity in cities.
- Social integration. Development of social programs aimed at the integration of migrants, providing access to education, healthcare and social services.
- Monitoring and evaluation. Continuous monitoring and evaluation of the effectiveness of urbanization measures and programs, making adjustments based on the analysis of the results.
- Collaboration and partnership. Involvement of civil society, business sector and international organizations in the planning and implementation of urbanization strategies.
- Education and information. Raising awareness of residents about urban development plans, public participation in discussion and decision-making.

Public management of urbanization requires the coordination of various ministries, departments and levels of government, as well as active interaction with citizens and other stakeholders. At present, the real problem of regional policy lies not in the low proportion of the urban population, but in highly uneven development. And the policy of urbanization has largely contributed to this. Internal migration processes have become, in fact, unmanageable. It is necessary to understand that urbanization is not so much an economic process as a social one. Almost all large cities are surrounded by belts of semi-rural and semi-urban settlements, where acute social problems are accumulating.

A high level of urbanization on the scale of state development has a positive impact on economic growth. At the same time, in the absence of a comprehensive urbanization policy, the risk of negative externalities from the local concentration of resources increases. On the one hand, cities are becoming "points of growth" that have a multiplicative effect on regional development, ensuring the accelerated development of urban infrastructure, diversifying the labor market, stimulating investment, developing the service sector, forming new industries, and creating scientific potential. On the other hand, the accumulation of huge labor, financial and production resources in relatively limited spaces increases the disproportions in the socio-economic development of the region.

Urbanization processes can take place in different places and at different levels, including global, national, regional and local. It is important to take into account the characteristics of each of these areas and develop urbanization strategies that will meet the specific needs and goals of each level and territory (Table 1).

Table 1. Urbanization processes

No	*Process*	*Peculiarities*
1	Cities and urban agglomerations	Urbanization processes are the most noticeable in large and small cities, where there is population growth, the construction of new residential complexes, infrastructure and commercial facilities.
2	Suburbs	Urban expansion leads to an increase in the number of suburban settlements and new residential areas, forming a suburban area of mixed land use.
3	Peripheral regions	Urbanization can have an impact on sparsely populated peripheral areas where infrastructure development, road construction and communications take place.
4	Economic zones	As part of the development of industry and business, new economic zones, industrial parks and territories for innovation can be created, which is also a form of urbanization.
5	Tourist areas	Tourism development can stimulate urbanization in areas that are attractive for recreation and entertainment.
6	Developing areas	Urbanization can also extend to areas with a low level of development, when the state directs investments in infrastructure, social services and housing construction.
7	Ecological zones and nature reserves	Uncontrolled urbanization can put pressure on natural resources and threaten ecosystems.
8	Areas of influence of megacities	Urbanization in one place can have an indirect impact on nearby territories, causing their transformation and growth.

Source: Compiled by the author

Urbanization processes can be diverse and vary depending on the region, economic factors, sociocultural characteristics and government policies.

Global processes of urbanization are characterized by two complementary trends. On the one hand, the number of cities themselves is growing. On the other hand, there is a trend towards the enlargement of already existing cities. If the first cities numbered from several hundred to several thousand people, and the size of these cities did not exceed the distances that can be covered on foot, then at the moment there are 33 megacities in the world with a population of more than 10 million people. It is expected that by 2030 the number of megacities will reach 43. The city budgets of such megacities as Tokyo, New York, Los Angeles, Seoul, London, Paris, Shanghai exceed the national budgets of some countries.

Such megacities are not only drivers of national economies, but also represent points of growth for the global economy. Megacities, as well as the agglomerations and conurbations they create, are centers of attraction for the population due to the development of infrastructure, a high level of security, education and healthcare, and wide opportunities for self-realization. The migration of the population to large cities, allowing citizens to expand their opportunities and improve the quality of life, is one of the manifestations of the principle "people to infrastructure".

At the end of 2022, the level of urbanization in Kazakhstan amounted to 61.5%. This is the bar that the authorities intended to achieve only by 2025, but came out earlier. Over the past five years, the proportion of the urban population in the country has increased by almost 4 percentage points. The proportion of villagers decreased accordingly, amounting to 38.5% by January 1, 2023.

In quantitative terms, from 2018 to 2022, 1.5 million inhabitants increased in cities (plus 14.7%), the number of citizens approached 12 million people. In rural areas, the trend is different. The rural population in the last five years has decreased by 193 thousand (minus 2.5%), amounting to 7.5 million people (Figure 2).

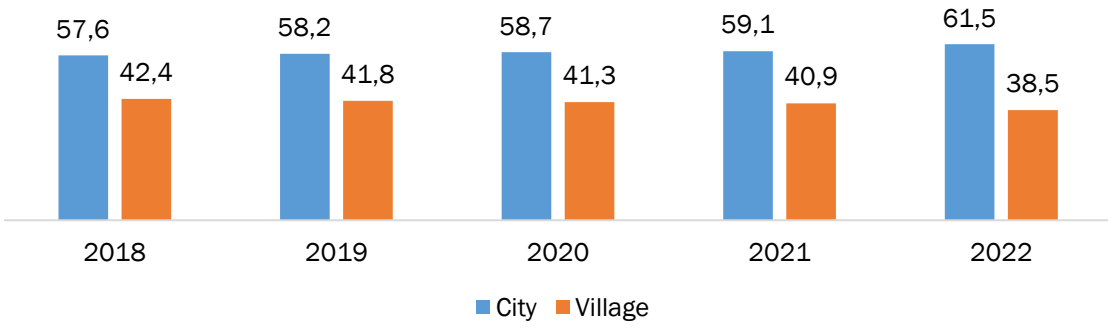

Figure 2. Shares of urban and rural population, in %

Source: https://turantimes.kz/

In rural areas, the trend is different. The rural population in the last five years has decreased by 193 thousand (minus 2.5%), amounting to 7.5 million people. Partially for this "minus" in the answer, the outflow of the population from the villages. Thus, in 2022, the migration balance of the rural population amounted to minus 67 thousand people (Figure 3).

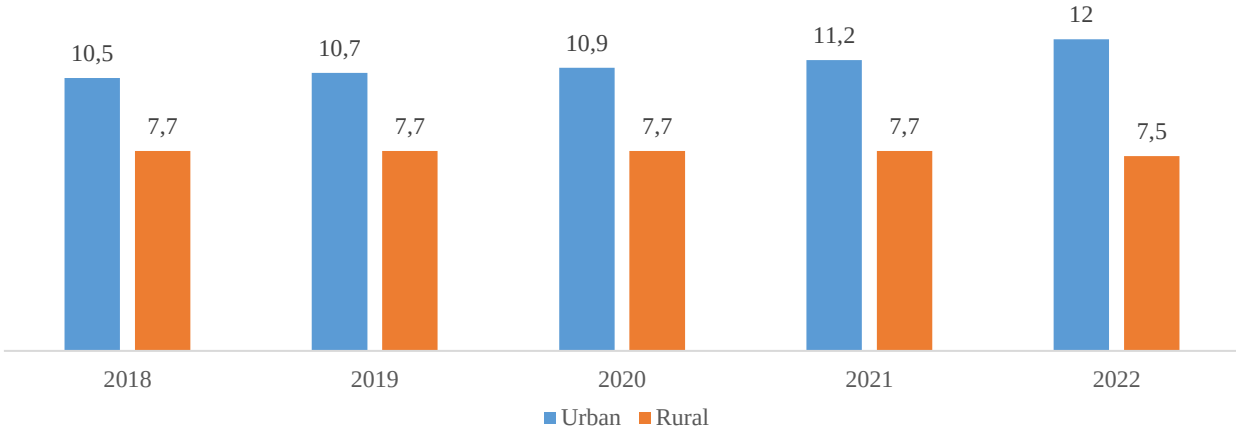

Figure 3. Population, million people

Source: https://turantimes.kz/

The villagers moved both within Kazakhstan, to larger settlements, and abroad. The main direction within the regions is to the largest cities of the region. Regional migration statistics show that all regional centers, except for Konaev, have a positive balance. At the same time, the growth in cities compared to their population was not so significant and was unlikely to have a serious economic effect. For example, the balance of intra-regional migration of Karaganda for 2022 amounted to 3.3 thousand people. For a mining capital with a population of half a million, this is only 0.6%. Another example is Turkestan, where the balance of migration at the expense of the inhabitants of their region amounted to only 583 people (0.3% of the total).

However, only megacities and the Almaty region in 2022 had positive indicators of the difference between arrivals and departures. All other regions had a negative balance. This means that more people leave these territories than they come there. Moving between regions last year had two main directions. Residents of the southern regions traveled to the nearest major cities, Almaty and Shymkent, while citizens of the northern and central regions moved to Astana, less often to the southern capital.

The most pronounced urbanization occurred only in Almaty and Astana. A positive migration balance in these megacities has been observed for many years. Last year, the population of the capital was replenished by 33.8 thousand Kazakhstanis from the regions. In Almaty, internal migrants added 35.3 thousand people to the total population of the city.

If existing trends continue, the population of the northern regions of Kazakhstan will decrease by a total of 600 thousand people by 2050. The number of people living in the south (excluding Almaty and Shymkent) will increase by 1.6 million citizens. As a result, the population density in the southern regions will be four times higher than in the northern ones.

An analysis of urban demographic statistics over the past three decades shows a connection between demographic changes in small and medium-sized urban settlements with a population of 20 to 200 thousand people and their proximity to the nearest large city with a population of more than 200 people. thousands of people. In particular, distance and population in cities are negatively correlated.

In other words, cities located in close proximity to major cities often tend to grow faster than distant cities. Interestingly, this pattern persists even for the period of the 1990s, when Kazakhstan experienced the largest population decline after the collapse of the Soviet Union compared to other former Soviet countries. For example, for 1990-2000. its population declined by 8.9% mainly due to the emigration of ethnic minorities (Rowland, 2001). However, cities located less than 50 km from large cities experienced an average population decline of 5.5%, while cities located between 50 and 150 km from large cities experienced the smallest change, with a population decrease of only 2%. ,5%.

In the following decades, the overall demographic profile of the country began to improve, and small and medium-sized cities generally showed positive demographic dynamics. In both 1999–2009 and 2009–2019, we see that cities located in close proximity to major cities showed the highest growth rates. On average, these cities around large cities grew twice as fast as very remote cities located more than 250 km from large cities (Figure 4).

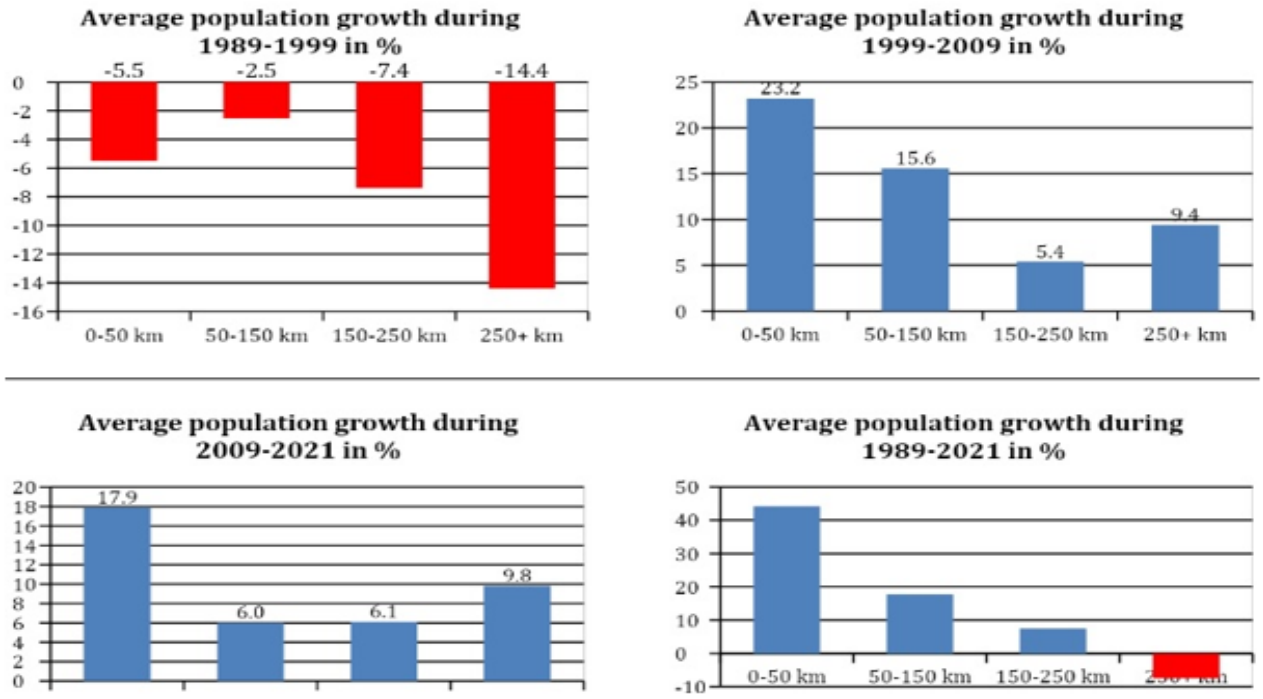

Figure 4. Population change in cities and medium-sized cities of Kazakhstan since 1989

Source: https://citypopulation.de/en/kazakhstan/cities/

According to the baseline scenario of the demographic situation, by 2050 the population of Astana, Shymkent and Mangistau region will double (compared to 2022). The number of citizens in the East Kazakhstan and Abay regions will decrease by 15-16%, in Kostanay - by 22%, in North Kazakhstan - by 34%. People move to where they could improve their living conditions and find higher paying jobs. In terms of the development of the labor market and social infrastructure, neither regions nor megacities are ready for such migration (Figure 5).

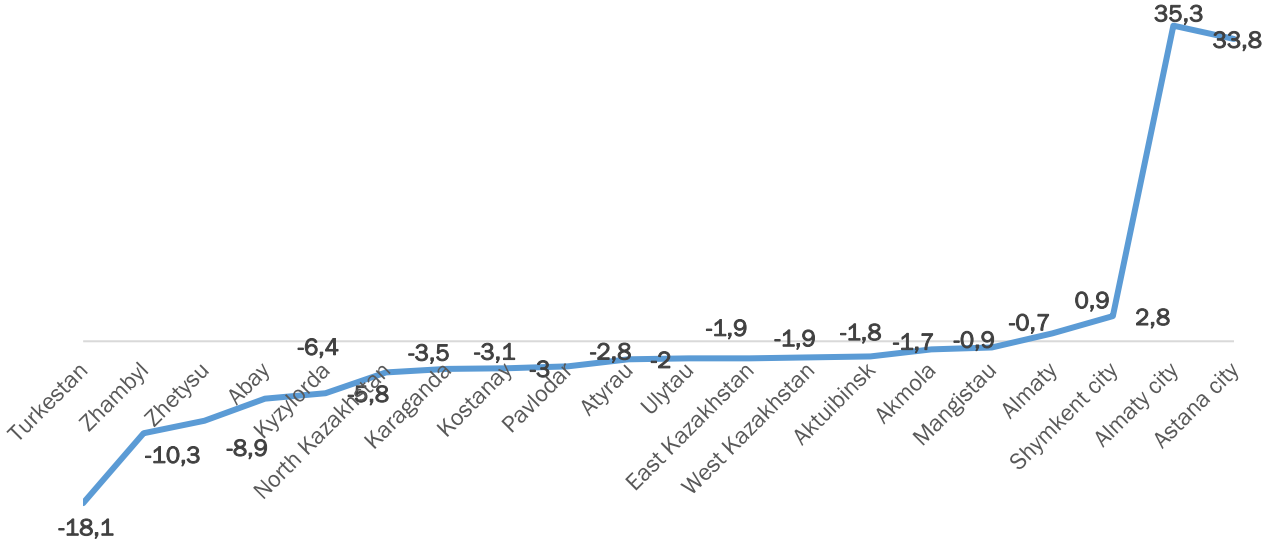

Figure 5. Balance of interregional migration in 2022, thousand people

Source: https://ranking.kz/digest/regions-digest/megapolisy-ostayutsya-tsentrami-prityazheniya-dlya-vnutrennih-migrantov-regiony-pokazyvayut-stabilnyy-migratsionnyy-ottok.html

In the process of their development, Kazakhstan cities face various problems. For each type of city, the problem space has specific features - these are the problems of the functioning of single-industry towns, and the difficulties of transitioning to an eco-format in industrial cities and megacities, and migration pressure on urban spaces, and much more. The reasons for urbanization are as follows:

- Firstly, approaches to city management have changed. The state is no longer the only participant in urban planning and the organization of life in cities. Modern Kazakhstan cities function on the basis of partnership responsibility of local executive bodies and urban communities. The principle of focusing on the economic viability of cities has been replaced by the principle of fairness and livability. This conclusion was reached by a group of UNDP experts during the preparation of the National Human Development Report in the Republic of Kazakhstan for 2019: "Urbanization as an accelerator of inclusive and sustainable development in Kazakhstan."
- secondly, urban spaces, clearly demonstrating the principle of unity in diversity, have become centers of inclusive development in its broadest sense. One of the mechanisms for the development of inclusion was the introduction of the public participation budget. Pilot projects were successfully implemented in the cities of Nur-Sultan and Almaty, and today this practice is being extended to other cities of Kazakhstan. Participatory budgeting is one of the main mechanisms for the wide involvement of the country's citizens in the processes of local community management and the activation of civil initiatives coming "from below".
- thirdly, Kazakhstan cities have become strongholds of digitalization in Kazakhstan. Today, projects focused on the development of "smart" technologies are being implemented in almost all cities of the country. The implementation of the "Smart city" concept allowed Almaty and Nur-Sultan to enter the world rankings of "smart cities".

The processes of urbanization, suburbanization, development of urban agglomerations and megacities in Kazakhstan are intensive. As the coefficient of intensity of urbanization in Kazakhstan shows, the intensity of urbanization processes in the republic is different both in the regional and in the time context (Satpaeva, 2022).

All these problems are in the focus of attention of both the Kazakh public and the city and republican authorities. One of the mechanisms for solving some of the problems of urbanization is the effective infrastructural development of rural settlements. In particular, the Program for the Development of Regions until 2026 includes the modernization of a number of key villages. The program "Auyl - el besigi" is oriented towards achieving the same goal. Today, the world continues the active process of urbanization. Cities are becoming centers of economic growth and prosperity. If in 1960 only 1/3 of the world's population lived in cities, then according to the UN forecast, by 2050 the share of urban residents will reach 68%.

The concentration of the population, the development of sectors of the "knowledge economy" provide cities with higher labor productivity than in other territories. Therefore, competition between cities for talents, investments and other resources is intensifying in the world. With the development of industry, the industrialization of agriculture, the strengthening of Industry 4.0 trends in all countries of the world, the trends of migration of rural residents to cities are intensifying and the pace of urbanization is increasing (Nurlanova et al., 2022).

3. APPLICATION FUNCTIONALITY

Within the course of the research, the authors considered the relationship between the state management of the urbanization process of Kazakhstan and land resources, which can be multifaceted and have several aspects. Below are some ways in which these two factors can interact:

A. Infrastructure and resources. State management of urbanization affects the infrastructure development of cities, including the construction of housing, roads, communications and other facilities. This may require large amounts of natural resources for construction. Consequently, the level of urbanization can have an impact on the demand for timber products and forestry output.

B. Resource consumption in cities. The growth of cities and the increase in population contribute to an increase in the consumption of natural resources for construction, furniture, packaging and other purposes. This may increase the demand for forestry products.

C. Environmental impact. Urbanization may lead to the need to reduce the impact of the urban environment on the natural environment. Increased attention to the environmental sustainability of cities can influence the policy of using forest resources and require more responsible forest management.

D. Transport and logistics. Urbanization increases the need for the development of transport infrastructure for the delivery of goods and services. Timber production and transportation may also be affected by changes in urban infrastructure projects.

E. Land administration. Urbanization raises land management issues for construction and infrastructure projects. This may have an impact on access to forest land and potentially affect forestry output.

F. Environmental policy and certification. Public management of urbanization can stimulate interest in environmental policy and certification. If cities and the state pay more attention to environmental issues, this may affect the demand for forestry products produced in compliance with environmental standards.

In general, the relationship between public management of urbanization and the volume of forest products (services) demonstrates how changes in urban infrastructure, consumer preferences and environmental policies can affect the use of forest resources and forest products. Rural areas and forest resources can have a significant impact on the process of urbanization in the context of urban and human settlement development. This influence can manifest itself in various aspects:

- rural areas and forest lands often become objects of interest for urban development. Decisions about which land can be used for construction and which should remain agricultural or natural can determine the structure and direction of urbanization;
- forest and rural areas often become objects of urban expansion and the formation of suburban areas. However, unbalanced expansion can lead to the degradation of natural resources and the deterioration of the ecological situation;
- rural areas and forest lands perform important ecological functions such as climate regulation, biodiversity conservation and water purification. With improper urbanization, these functions can be disrupted;
- forests and the countryside can provide economic resources such as timber, agricultural products and other resources that can affect the economy of developing cities;
- taking into account forest and rural areas in urban planning can contribute to more sustainable development. The creation of green corridors, protected areas and parks can mitigate the negative impact of urbanization;
- integrating natural resources into urban planning can help create a more sustainable and comfortable living environment;
- rural and forest areas can act as natural barriers, reducing the risk of floods, landslides and other natural disasters.

Managing the interaction between rural areas, forests and urbanization processes requires an integrated approach, taking into account the interests of all stakeholders and efforts to achieve a sustainable balance between urban development and the conservation of natural resources. Let's analyze the predicted values of the indicator "Volume of products (services) in forestry", which affects the processes of urbanization in Kazakhstan.

To determine the predicted values, the following steps were performed:

- Checking the time series for anomalous observations. For this, the Irwin criterion was used (Table 2).

Table 2. Checking for the presence of anomalous observations in the time series

Year	*The volume of products (services) in forestry, thousand tenge*	*Observed value of the Irwin criterion*	*Calculation formulas*
01.01.2012	7 786 788		Observed value of the Irwin criterion $\lambda_t = \frac{\lvert y_t - y_{t-1} \rvert}{\sigma_y}, \ t = \overline{2,11}$ Critical value of the Irwin criterion $\lambda_{0,05} = 1,5$
01.01.2013	8 931 653	0,3685	
01.01.2014	8 892 786	0,0125	
01.01.2015	8 751 134	0,0456	
01.01.2016	7 534 940	0,3915	
01.01.2017	9 237 280	0,5480	
01.01.2018	12 731 842	1,1249	
01.01.2019	13 234 374	0,1618	
01.01.2020	15 079 584	0,5940	
01.01.2021	15 836 857	0,2438	
01.01.2022	18 859 632	0,9731	

Source: http://www.stat.gov.kz

Since all observed values of the Irwin criterion are less than the critical value, then with a probability of 95% it can be argued that the original time series does not contain anomalous observations.

– Using the criterion of "ascending" and "descending" series, it was found that the considered time series contains a trend component (Table 3).

Table 3. Checking for a trend

General view of the criterion of "ascending" and "descending" series *(violation of at least one inequality is sufficient for a trend to exist)*	*Estimated values with a chance of error* $0,05 < \alpha < 0,0975$
$\nu(n) > \left[\frac{2n-1}{3} - 1,96\sqrt{\frac{16n-29}{90}} \right]$	3 < 4
$K_{\max} < [K_0(n)]$	6 > 5

– To approximate the initial data, a polynomial of the first degree was chosen as the growth curve:

$$y_t = a_0 + a_1 t + \varepsilon_t ,$$

The parameters of the selected curve were estimated using the least squares method. As a result of data approximation, the following trend model was obtained:

$$y_t = 5222871,16 + 1051898,29t$$

– An assessment of the quality of the resulting model was carried out in two directions: adequacy testing and assessment of the accuracy of the model.

To test the adequacy of the model, a number of residuals were examined, i.e. discrepancy between the levels calculated by the model and actual observations. The most important properties of the residual

component are: the equality of the mathematical expectation to zero, the randomness of the residuals and their compliance with the normal distribution law.

The results of the analysis of a number of residuals in order to check the model for adequacy are shown in Table 4.

Table 4. Checking the adequacy of the model

Property under test	*Used statistics*		*Border*	*Conclusion*
	Name, calculation formula	*Received value*		
Accident	Criterion of "peaks" (turning points) $p > \left[\frac{2}{3}(n-2) - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$	6 > 3	3	Adequate
Normality	RS- criterion $RS = \frac{e_{\max} - e_{\min}}{S}$	3,39	2,80-3,91	Adequate
Equality of the mathematical expectation of the levels of a series of residues to zero	*t*- Student statistics $t_{observ.} = \frac{\left\lvert \bar{e} \right\rvert}{S}\sqrt{n}$	0	2,23	Adequate

Source: own

To assess the accuracy of the model, the average relative approximation error was calculated:

$$E_{rel.} = \frac{1}{n}\sum_{i=1}^{n}\frac{|e_t|}{y_t} \quad 100\% = 12{,}11\%,$$

a value that indicates an acceptable level of model accuracy.

Thus, the model is of sufficient quality and can be used for forecasting.

– To calculate the point forecast, the corresponding values of the factor were substituted into the constructed model $t = n + k$. To build an interval forecast, a confidence interval was determined at a significance level of . The width of the confidence interval was calculated using the formula:

$$U(k) = S_e t_\alpha \sqrt{1 + \frac{1}{n} + \frac{\left(n + k - \bar{t}\right)^2}{\sum_{t=1}^{n}\left(t - \bar{t}\right)^2}},$$

The results of building point and interval forecasts for 2023-2025 are presented in Table 5.

Table 5. Point and interval forecasts of the indicator "Volume of products (services) in forestry" for 2023-2025

Year	$n+k$	$U(k)$	*Point forecast, thousand tenge*	*Interval forecast, thousand tenge*	
				Max	*Min*
2023	13	4 594 480,79	18 897 548,95	14 303 068,15	23 492 029,74
2024	14	4 794 043,82	19 949 447,24	15 155 403,42	24 743 491,06
2025	15	5 010 615,95	21 001 345,53	15 990 729,58	26 011 961,48

Source: own

To manage the impact of urbanization on forestry, it is important to develop policies and strategies that balance economic, environmental and social aspects. This may include sustainable use of forest resources, funding forest projects, applying environmental standards, and encouraging investment in forestry, taking into account the needs of developing cities.

CONCLUSION

Problems of public management of urbanization in Kazakhstan may include aspects such as ineffective urban development planning, insufficient infrastructure, environmental and social issues. Here are some ways to solve these problems:

- Strategic planning. Develop long-term urban development strategies, taking into account economic, environmental and social aspects, as well as forecasting future population growth and infrastructure needs.
- Improvement of urban infrastructure. Investments in transport, water supply, energy, education and healthcare. Development of "smart" cities and the use of new technologies to improve the efficiency of urban services.
- Land planning and management. Creation of a clear system of land zoning to prevent chaotic development and ensure sustainable use of land resources.
- Housing and social policy. Support for affordable housing programs, especially for young families and low-income segments of the population. Development of social support programs for migrants and newly arrived citizens.
- Environmental sustainability. Implementation of environmental standards in construction and infrastructure projects. Development of programs to improve the environmental situation in cities, including waste management and protection of natural resources.
- Community participation. Involvement of citizens and local communities in the decision-making process on urban development through public hearings and consultations.
- Migration management. Develop policies that will promote a more even distribution of population between cities and rural areas. Ensuring the integration of migrants into the urban environment.
- Data management. Collection and analysis of data on urban development, population, infrastructure and other aspects for more accurate planning and decision making.
- Increasing competencies. Training of civil servants, employees of local governments and specialists in the field of urban planning and management.
- Transparency and fight against corruption. Ensuring openness and transparency in the processes of city government, as well as an effective fight against corruption.

These paths can serve as a starting point for improving public management of urbanization in Kazakhstan, but it is also important to tailor approaches to the unique needs and characteristics of each city and region.

REFERENCES

Chen, M., Liu, W., Lu, D., Chen, H., Ye, C. (2018), “Progress of China's New-type Urbanization Construction since 2014: A Preliminary Assessment”, *Cities*, Vol. 78, No. 3, pp. 180–193. doi:10.1016/j.cities.2018.02.012

Fang, C., Ma, H., Wang, J. (2015). “A Regional Categorization for “New-type Urbanization” in China”, *Plos One*, Vol. 10, No. 8, pp. e0134253. doi:10.1371/journal.pone.0134253

Geyer, H.S., Kontuly, T. (1993), “A theoretical foundation for the concept of differential urbanization”, *International Regional Science Review*, Vol. 15, No. 2, pp. 157-177. https://doi.org/10.1177/016001769301500202

Gibbs, J.P. (1963), “The evolution of population concentration”. Economic geography, Vol. 39, No. 2, pp.119-129. https://doi.org/10.2307/142505

Lever, W.F. (1993), “Competition within the European urban system”, *Urban Studies*, Vol. 30, No. 6, pp. 935-948. https://doi.org/10.1080/00420989320080871
Molyarenko, O.A. (2013), “Distributed lifestyle and counter-urbanization processes as factors of rural and urban settlements development”, *Issues of State and Municipal Administration*, Vol. 1, No. 2, pp. 43-63.
Nefedova, T.G., Pokrovsky, N.Y., Al, T. (2015), “Urbanization, desurbanization and rural-urban communities in the face of growing horizontal mobility”, *Sociological Studies*, Vol. 12, No. 12, pp. 60-69.
Nurlanova, N.K., Tleuberdinova, A., Saparbek, N. (2022), “The Main Factors and Trends of Urbanization in Kazakhstan: Analysis and Recommendations”, *Economics: the Strategy and Practice*, Vol. 17, No. 1, pp. 62-79. https://doi.org/10.51176/1997-9967-2022-1-62-79
Satpaeva, Z.T. (2022). “Analysis of the intensity and quality of urbanization in Kazakhstan”, *Young Scientist*, Vol. 431, No. 2, pp. 46-53. https://moluch.ru/archive/431/94765/
Wei, C., Wang, Z., Lan, X., Zhang, H., Fan, M. (2018), “The Spatial-Temporal Characteristics and Dilemmas of Sustainable Urbanization in China: A New Perspective Based on the Concept of Five-In-One”, *Sustainability*, Vol. 10, No. 12, pp. 4733. doi:10.3390/su10124733
Xing, C., Zhang, J. (2017), “The preference for larger cities in China: Evidence from rural-urban migrants”. *China Economic Review*, Vol. 43, No. 2, pp. 72-90. https://doi.org/10.1016/j.chieco.2017.01.005
Yang, W., Lu, X. (2016), “An Assessment of China's New Urbanization Level - Based on the Vertical and Horizontal Levels of the Grade Method”, *Ecologic Horizons*, Vol. 18, No. 3, pp. 199–211
Zhao, C., Wang, B. (2022), “How Does New-type Urbanization Affect Air Pollution? Empirical Evidence Based on Spatial Spillover Effect and Spatial Durbin Model”, *Environment International*, Vol. 165, pp. 107304. doi:10.1016/j.envint.2022.107304
Zhao, J., Ji, G., Tian, Y., Chen, Y., Wang, Z. (2018), “Environmental Vulnerability Assessment for Mainland China Based on Entropy Method”, *Ecological Indicators*, Vol. 91, No. 3, pp. 410-422. doi:10.1016/j.ecolind.2018.04.016

Web site

Official resource of the Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. http://www.stat.gov.kz
Electronic resource: https://turantimes.kz/
Official resource of the Population of all Kazakhstan cities, urban and rural settlements with a population of more than 20,000 people. https://citypopulation.de/en/kazakhstan/cities/.
https://ranking.kz/digest/regions-digest/megapolisy-ostayutsya-tsentrami-prityazheniya-dlya-vnutrennih-migrantov-regiony-pokazyvayut-stabilnyy-migratsionnyy-ottok.html