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IMPROVING STRATEGIC MARKETING PLANNING IN THE FORMATION OF DEVELOPMENT PRIORITIES FOR MONOTOWNS IN THE REPUBLIC OF KAZAKHSTAN

The importance of the research is highlighted by the special role of monotowns, which are closely monitored by the government as they face growing socio-economic issues while also playing a crucial role in the country's economy. This article aims to develop and test a methodological approach to strategic marketing planning for establishing development priorities for monotowns in Kazakhstan. The study presents monotowns analyzed over different periods: 27, 20 and 9 monotowns of Kazakhstan. Current and future priorities for 9 monotowns are defined based on available statistical socio-economic indicators grouped by areas of territorial marketing. The research objectives include developing a methodological approach to strategic marketing planning, conducting typology, identifying the advantages and disadvantages of monotown development, creating a simulation modeling tool for socio-economic development using artificial intelligence technology, and determining strategic priorities development of monotowns. Data collection, processing, and analysis methods include content, comparative, factor, and cluster analysis, typology, and artificial intelligence modeling methods (supervised learning, error correction, BFGS optimization). The STATISTICA software version 13 was utilized for data analysis and forecasting. The results indicate that the strategic marketing planning tools developed are useful for establishing scientifically grounded development priorities for monotowns in Kazakhstan. This research is beneficial for government bodies aiming to devise socio-economic development strategies for monotowns.

Key words: monotown, strategic marketing planning, typology, development priorities, factor analysis, cluster analysis, simulation modeling.

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Қазақстан Республикасындағы моноқалалардың даму басымдықтарын қалыптастыруда стратегиялық маркетингтік жоспарлауды жетілдіру

Зерттеудің өзектілігі мемлекет тарапынан аса назар аударылып отырған моноқалалардың рөлінің ерекшелігімен анықталады: олар әлеуметтік-экономикалық мәселелердің шиеленісу аймағында орналасқан, сондай-ақ ел экономикасының дамуы үшін маңызды орын алады. Аталған мақаланың соңғы мақсаты – Қазақстандағы моноқалалардың даму басымдықтарын қалыптастыруда стратегиялық маркетингтік жоспарлаудың әдістемелік тәсілдерін әзірлеу және оны сынақтан өткізу болып табылады. Мысалыға зерттеудің әртүрлі кезеңдеріндегі моноқалалар мынандай мөлшерде ұсынылды: Қазақстанның 27, 20, 9 моноқаласы. Көзіргі және алдағы уақыттағы аумақтық маркетингтік жекелеген салалары бойынша топтастырылған қолжетімді статистикалық әлеуметтік-экономикалық көрсеткіштер негізінде 9 моноқаланы дамытудың басымдықтары анықталды. Зерттеудің міндеттері болып: моноқалаларының даму басымдықтарын қалыптастыруда стратегиялық маркетингтік жоспарлауды жетілдірудің әдістемелік тәсілдерін әзірлеу, моноқалалардың дамуындағы артықшылықтары мен кемшіліктерін анықтау, типологиясын жүргізу, жасанды интеллект технологиясының негізінде моноқалалардың әлеуметтік-экономикалық дамуының имитациялық моделінің құралдарын әзірлеу, Қазақстанның

гиялық даму басымдықтарын анықтау. Мәліметтерді жинау, өңдеу және талдаудың әдістемесі ретінде контент, салыстырмалы, факторлық, кластерлік талдау, типология, жасанды интеллектіні құру моделі (мұғаліммен оқыту, қателерді түзеу, BFGS – оңтайландыру) әдістемесі қолданылды. Мәліметтерді өңдеу, талдау, болжау үшін STATISTICA бағдарламалық кешенінің 13 нұсқасы пайдаланылды. Зерттеу нәтижелері – стратегиялық маркетингтік жоспарлаудың әзірленген құралдарын Қазақстан Республикасының моноқалаларын дамытудың ғылыми негізделген даму басымдықтарын қалыптастыру мақсаттары үшін пайдалану орынды екенін көрсетті.

Түйін сөздер: моноқала, маркетингтік стратегиялық жоспарлау, типология, даму басымдықтары, факторлық талдау, кластерлік талдау, имитациялық моделдеу.

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Совершенствование стратегического маркетингового планирования в формировании приоритетов развития моногородов Республики Казахстан

Актуальность исследования определяется особой ролью моногородов, являющихся объектом пристального внимания со стороны государства: они находятся в зоне обостряющихся социально-экономических проблем и в то же время играют важную роль в экономике страны. Целевое назначение настоящей статьи – разработка и апробация методического подхода к стратегическому маркетинговому планированию в формировании приоритетов развития моногородов Казахстана. В качестве примера были представлены моногорода в разные периоды исследования в следующем количестве: 27, 20, 9 моногородов Казахстана. В текущем и будущем периоде определены приоритеты развития 9 моногородов на основе доступных статистических социально-экономических показателей, сгруппированных по отдельным сферам территориального маркетинга. Задачами исследования явились: разработка методического подхода к стратегическому маркетинговому планированию в формировании приоритетов развития моногородов Казахстана, проведение типологизации и определение преимуществ и недостатков развития моногородов, разработка инструментария имитационного моделирования социально-экономического развития в моногородах на базе технологии искусственного интеллекта, определение стратегических приоритетов развития моногородов Казахстана. В качестве методов сбора, обработки и анализа данных были использованы контент, сравнительный, факторный, кластерный анализ, типологизация, методы построения моделей искусственного интеллекта (обучение с учителем; коррекция ошибок; BFGS-оптимизация). Для обработки, анализа данных, прогнозирования использовался программный комплекс STATISTICA версии 13. Результаты анализа показывают, что разработанный инструментарий стратегического маркетингового планирования целесообразно использовать для формирования научно обоснованных приоритетов развития моногородов Казахстана. Проведенное исследование полезно для органов государственной власти с целью разработки стратегий социально-экономического развития моногородов.

Ключевые слова: моногород, маркетинговое стратегическое планирование, типологизация, приоритеты развития, факторный анализ, кластерный анализ, имитационное моделирование.

Introduction

The integrated development of various urban functions is essential for sustaining cities. This is important for any kind of city, including monotowns. The latter, which arose as a reaction to the demand for production and social progress, may eventually fall into a depressed state without any supportive conditions or flexible strategic and tactical decisions. Many examples prove this. In Australia, their history demonstrates that the peripheral monotowns act as outposts, developing

around a homogeneous, mono-industrial base and depending heavily on external investments (Roger, 2008). Typically, changes in the viability of the core industry directly affect many aspects of urban life (Halseth, 2000). Other monotowns worldwide are similarly affected, often existing in critical conditions (Kirsten, 2016).

Kazakhstani authors also note the transformation of monotowns into high-risk areas and the challenges of urban sustainable development (Borbasova et al., 2021; Maimuranova et al., 2022). It's known that if these problems remain unresolved, they can

accumulate and grow both quantitatively, eventually turning into a cycle of unsolved problems.

In this context, there is an urgent need to define strategic development priorities for monotowns in Kazakhstan. These priorities should align with a model of sustainable urban development, and this model must be dynamic, as cities must evolve; otherwise, their condition will deteriorate, leading in some cases to collapse or transition into other forms of territorial entities. Currently, there are 20 monotowns in Kazakhstan according to the order of the Minister of National Economy (Kuantyrov, 2023). Previously, the list included 27 towns, but some have revitalized through economic transformations, such as Saran and Tekeli, while others lost their status (Rakhimbai, 2024). That's why this updated 20 monotowns' list is now the subject of study in many scientific works.

The aim of this study is to develop and test a methodological approach to strategic marketing planning for forming development priorities for monotowns in Kazakhstan.

The research object is the system of strategic marketing planning in establishing development priorities for varying numbers of territorial entities in Kazakhstan: from the existing 27 to the current 20 with complete statistical data in the current period for 9 monotowns. The subject of the study encompasses methods, tools, and indicators of strategic marketing planning in shaping development priorities for monotowns. To achieve the research goal, the following hypothesis was formulated: employing a methodological approach to strategic marketing planning for setting development priorities of monotowns, based on territorial marketing and artificial intelligence methods, will clarify the values of target indicators for their development and yield scientifically grounded priorities for growth.

Literature review

In the scientific literature, the issue of strategic planning for cities, from large to small, has been a field of research for scholars from various countries over different periods.

Many studies highlight that urban management in monotowns should be strategic and systematic (Caiuz, 2019) to prevent the rapid decline of these territories' economies over the long term (Halseth, 2000). Regarding the application of various structural blocks of strategic planning to analyze the development of monotowns, some authors argue for including analysis of external and internal development strategies, strategic goals and priorities,

key scenarios for socio-economic development, and mechanisms for implementing decisions (Sharnin, 2014). Strategies for the development of monotowns in the international context include protection, restoration, enhancement, and preservation of territories (Santi, 2019). It is also noted that there is a lack of research on the dynamics of shrinking cities as places where innovative activity can be maximized rather than hindered by changing environmental conditions (Cristina Martines-Fernandez, 2007).

In foreign practice, when establishing development priorities, cases concerning small cities are currently examined as effective examples for addressing problems and formulating differentiated strategies. Chinese authors' research suggests that transformational development in small cities could present new opportunities, supported by a scientific method: investigate characteristics – assess characteristics – develop characteristics for sustainable development (Xuegin et al., 2019). In Portugal, a sustainable urban development strategy was adopted prior to 2020, including special programs for restoration, resettlement of populations, combating desertification, and reducing urban waste (Make Cities and Human Settlements Inclusive, Safe, Resilient, and Sustainable, 2017). Strategic planning has been implemented for medium-sized cities outside Lisbon and Porto, with populations over 50,000, resulting in the creation of “urban management” entities (Jose, 2018).

The literature review reveals strategic priorities for monotown development, including their integration into urban agglomeration centers (Ivanova, 2012); transitioning from “crisis” and “risk” territories to “development” areas, reconstruction by city-forming enterprises (Stuvoy, 2022); developing a national monotown restructuring program (Kutergina, 2015; Rotenberg, 2014: 54); diversifying the economy through enhanced economic cooperation with major cities and rural areas, within both traditional (industrial) and innovative sectors (Kozhevnikov, 2023); and developing modern mechanisms for the digitalization of urban socio-economic systems (Kunanbaeva et al., 2020).

To enhance strategic planning in territorial policy its necessary to review methodologies employed to determine the development priorities of monotowns. The most common methods for analyzing regional development include economic-mathematical modeling using regression, cluster analysis, linear programming, and hierarchy analysis (Kutergina, 2015); Monte Carlo methods (Sharnin, 2014). Other authors propose using cluster analysis to categorize monotowns into groups, describing a con-

ceptual model based on the principal-agent interaction (Shastitko, 2016) and multivariate classification models, discriminant analysis (Stimson et al., 2001).

Based on the conducted literature analysis, this research will focus on assessing the socio-economic situation of monotowns through a combination of analytical methods and strategic planning tools.

Methodology

This research is based on official data and works in strategic planning (Kulay, 2022; Borbasova et al., 2021; Kunanbaeva et al., 2020; Kutergina et al., 2015; Rotenberg, 2014; Pattanayak, 2019; Bheemanna, 2023; Bower, 2007).

The developed methodological approach is based on comparative, factor, cluster analysis, the typology of monotowns, and the construction of artificial intelligence models, specifically adaptive neural networks. Concerning the latter, it is noteworthy that during a recent meeting of the National Council on Science and Technology, the President of Kazakhstan (Tokayev, 2024) emphasized the development of artificial intelligence in areas such as security, medicine, banking, logistics, and education, highlighting a need for its active application in other sectors. This article attempts to adapt these methods for creating a simulation modeling toolkit for socio-economic development in monotowns, aiming to establish target indicators that can also effectively determine their strategic development priorities in the future. Within the study's neural network construction, a paradigm was chosen: supervised learning for the neural network; error-correction as the learning rule; a multilayer neural network architecture; and the BFGS optimization algorithm (Pattanayak, 2019:35).

To create the information base, typology of monotowns by overall socio-economic development level, neural network models, and forecasts based on those models, the STATISTICA software version 13 is used.

The indicators for data collection and analysis comprise available data on socio-economic situation of 27, 20, and 9 monotowns in Kazakhstan across different periods (Statistical Yearbook of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, 2013-2022). These indicators can be attributed to specific areas of territorial marketing.

Demographic, industrial, economic, and social aspects of a monotown, in the symbiosis of their

development, can be considered as the main directions of territorial (urban) marketing. Individually or collectively, these can serve as key criteria to assess the level of activity for each indicator, which may provide citizens with a sense of satisfaction with their place of residence and their life, in the context of the interrelation between its level and quality (TM1, TM3, TM4, TM5, TM6, TM8, TM9, TM10, TM12); the development of industrial activity – growth potential or decline in the availability of necessary resources, productive activity, sectoral specialization (TM2), uninterrupted operation of industrial enterprises (TM5); the attractiveness of the territory in terms of employment (TM3, TM12); corporate social responsibility in creating infrastructure for environmental protection and the functioning of industrial infrastructure in the urban landscape (TM4); the volume of residential construction and infrastructure (TM6); the investment climate for renewing fixed assets to develop production potential (TM7); the well-being of the population in terms of access to medical and educational services and infrastructure expansion in these areas (TM8, TM9); the availability of skilled labor in employment sectors (TM10); and innovative activity and competitiveness (TM11) (Figure 1).

It is important to highlight that the indicators mentioned in Figure 1, while serving as indicators of the socio-economic development of monotowns, still have an indirect manifestation in the context of territorial marketing.

Results and discussion

Methodological approach to strategic marketing planning in the formation of development priorities for monotowns

In this study, the authors have developed a methodological approach to strategic marketing planning for the formation of development priorities for monotowns in Kazakhstan. A distinctive feature of this approach is the use of territorial marketing indicators and artificial intelligence.

Let's examine the step-by-step process of strategic marketing planning in more detail (Figure 2). Note that the first four blocks focus on analyzing the current state of monotowns, while the following ones determine strategic target indicators and development priorities, considering the socio-economic indicators in different areas of territorial marketing for both the present and future periods.

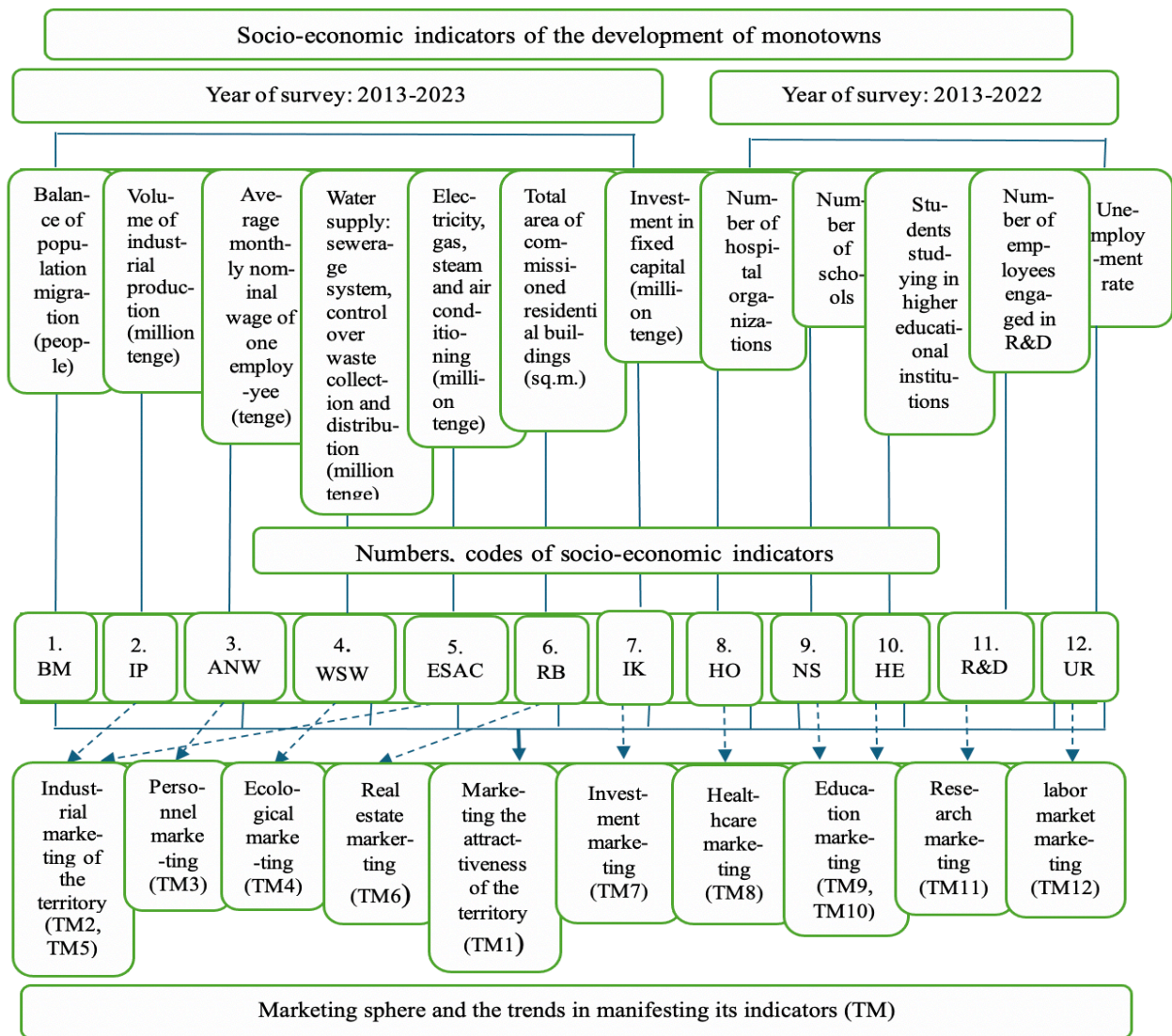


Figure 1 – Socio-economic indicators of monotowns development across various spheres of territorial marketing
 Note – compiled by the authors

The first stage focuses on collecting statistical data on the indicators presented in Figure 1. The subsequent stages involve analytical procedures. In the second stage, the overall index of socio-economic development of the monotown is calculated by standardizing the data to bring them onto a comparable scale for further analysis.

It should be noted that the methodology of index formation through additive convolution has proven its applicability in many studies, particularly in (Abramov et al., 2019: 69).

Based on this methodology, a formula for calculating the general socio-economic development index of monotowns was developed in this study.

$$I = \sum P \times V \tag{1}$$

where:

- I* – overall index of socio-economic development;
- P* – standardized value of the socio-economic indicator in various spheres of territorial marketing;
- V* – weighting coefficient.

The higher the value of *I*, the greater the overall level of socio-economic development of the monotown.

This index can be identified as an integral level of attractiveness, indicating economic stability, investment and innovation appeal, satisfaction with socio-economic conditions, and quality of life.

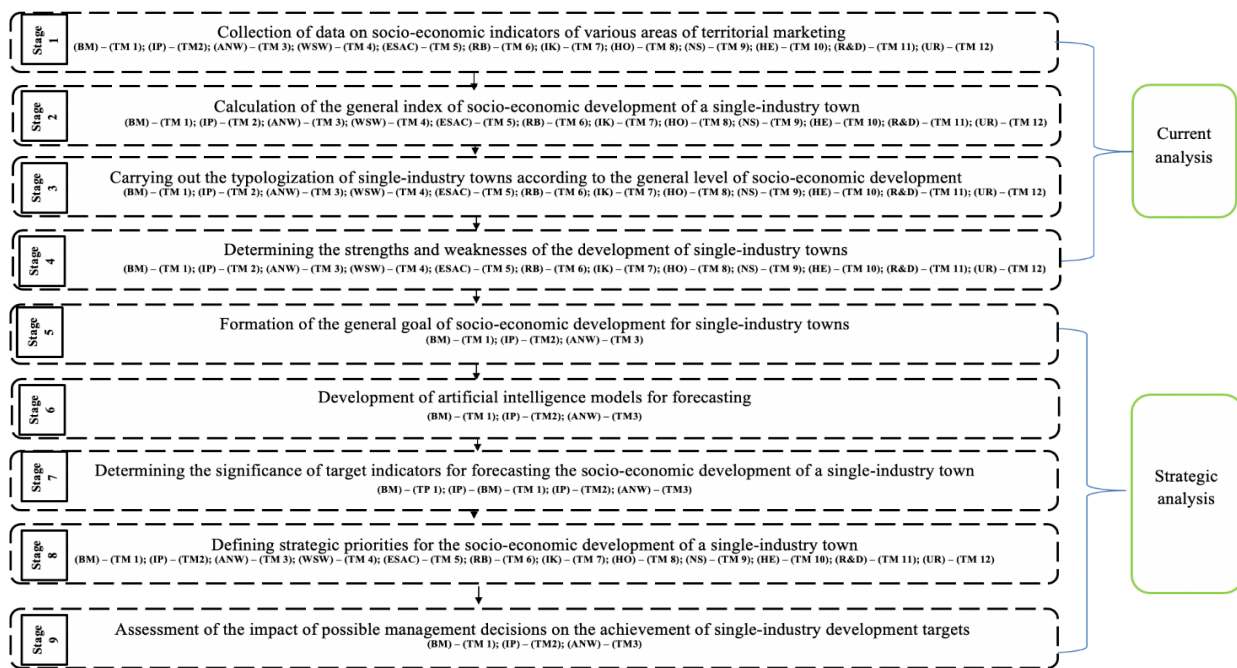


Figure 2 – Methodological approach to strategic marketing planning in the formation of development priorities for monotowns of Kazakhstan

Note – Compiled by the authors based on (Kulay, 2022; Pattanayak, 2019; Bheemanna, 2023; Bower, 2007)

When analyzing the composition of the general socio-economic development index for monotowns, it is necessary to assess factor loadings to determine which indicators have the dominant impact on their position.

The third stage plays a key role in the strategic marketing planning process and aims to typologize monotowns based on I values. For this, cluster analysis using tree clustering and “k-means” is recommended (Kulay, 2022: 110). Based on the analysis results, towns with high, above-average, average, below-average, and low levels of socio-economic development can be identified.

The fourth stage is aimed at identifying the key strengths and weaknesses of monotowns. The results obtained at this stage are essential for further strategic planning, particularly in forming scientifically justified priorities for the development of these towns.

The fifth stage sets the overall socio-economic development goal for monotowns, considering their strengths, specific characteristics, and weaknesses that need to be addressed.

The next, sixth stage is focused on developing AI models for predicting indicators that have the dominant impact on I index in monotowns. These models are needed to determine the values of indicators that characterize the achievement of the general

development goal and to evaluate the effectiveness of management decisions.

Then, based on the AI models created earlier, target indicator values for monotowns are formed.

The final stages are focused on identifying scientifically grounded future development directions for specific monotowns (those that will have the greatest impact on mitigating key weaknesses) and evaluating the potential impact of management decisions on achieving target development indicators using the AI model.

Testing the methodological approach to strategic marketing planning in the formation of development priorities for monotowns of the Republic of Kazakhstan

The analysis of the stages of marketing strategic planning in determining development priorities for monotowns in Kazakhstan revealed the following results

Results of the current analysis in marketing planning

Results of the first stage. Basic statistical socio-economic indicators for the development of monotowns in Kazakhstan were collected for several years. The analysis for 2022 and 2023 assesses the current socio-economic development situation. These years offer statistical data closest to the study period.

Some limitations in gathering full information affected the number of towns studied: in 2022, data were collected and analyzed for all 27 monotowns. In 2023, the Ministry of National Economy of the Republic of Kazakhstan issued an order approving a list of 20 monotowns. The authors based the assessment on data from 20 monotowns in 2022, conducting additional analysis. For 2023, full statistical data were available for only 9 monotowns at the time of the study. Thus, strategic development priorities were identified only for them. Factor analysis used 2022 data for 27 and 20 monotowns, covering all indicators presented in Figure 1. Due to limited 2023

data for 9 monotowns, calculations were made for the following indicator numbers: 1, 2, 3, 4, 5, 6, 7 (Figure 1).

Results of the Second Stage. The calculated overall index of socio-economic development of monotowns is presented in Table 1 and forms the basis for further analysis. It is noted that Tables 1-7 assessments were based on statistical data (Statistical Bulletin of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, 2022-2023) and the results of various types of analysis, which will be indicated in the notes to these tables.

Table 1 – Results of the overall socio-economic development index (I) calculation for monotowns

For 27 monotowns in 2022		For 20 monotowns in 2022		For 9 monotowns in 2023	
Town name	(I) index	Town name	(I) index	Town name	(I) index
Rudny	306,1	Rudny	31,72	Aksu	0,1488
Aksu	201,2	Aksu	18,76	Zhanaozen	0,0510
Zhezkazgan	179,4	Temirtau	6,25	Temirtau	0,0335
Saran	153,8	Ridder	5,69	Balkhash	0,0318
Temirtau	76,3	Zhanaozen	4,85	Khromtau	0,02
Ridder	71,1	Balkhash	4,32	Shakhtinsk	0,0029
Balkhash	51,1	Ekibastuz	3,39	Stepnogorsk	0,0006
Zhanaozen	46,7	Kulsary	2,33	Abay	0,0004
Ekibastuz	45,1	Aksai	1,78	Kurchatov	0,0000005
Kulsary	27,7	Satpayev	1,35		
Aksai	22,9	Khromtau	1,15		
Altai	9,8	Shakhtinsk	0,7		
Khromtau	1,9	Stepnogorsk	0,5		
Zhitikara	1,4	Zhitikara	0,42		
Lisakovsk	1,35	Lisakovsk	0,35		
Stepnogorsk	1,3	Abay	0,31		
Shakhtinsk	1,2	Kentau	0,23		
Kentau	1,15	Karazhal	0,15		
Abay	0,8	Kurchatov	0,07		
Karazhal	0,1				
Zhanatas	0,05				
Tekeli	0,030				
Arkalyk	0,019				
Serebryansk	0,015				
Kurchatov	0,012				
Karatau	0,006				

Note – Compiled by the authors based on formula (1)

The overall socio-economic development index values vary across different monotowns: the highest is in Rudny (306.1) among 27 monotowns, its position (31.72) also unchanged among 20 monotowns, and among 9 monotowns, the highest is in Aksu

(0.1488), indicating their attractiveness in terms of economic, social, and investment development. Factor load analysis identified significant factors for the overall socio-economic development index (Table 2).

Table 2 – Results of factor load calculations for monotowns in Kazakhstan

Factors influencing, I – the overall level of socio-economic development	Factor load value (factor analysis for monotowns, data 2022-2023)		
	for 27 monotowns in 2022	for 20 monotowns in 2022	for 9 monotowns in 2023
Migration balance	0,93	0,91	0,89
Volume of industrial production (goods, services)	0,81	0,83	0,85
Average monthly nominal wage per employee	0,73	0,76	0,77
Investment in fixed capital	0,65	0,67	0,63
Unemployment rate	-0,55	-0,52	–
Students in higher education institutions	0,51	0,49	–
Number of R&D employees	0,43	0,39	–
Water supply: sewerage system, waste collection and distribution control	0,39	0,41	0,43
Electricity, gas, steam, and air conditioning supply	0,33	0,32	0,37
Number of schools	0,22	0,19	–
Number of hospital organizations	0,11	0,09	–
Total area of commissioned residential buildings	0,07	0,03	0,04

Note – compiled by the authors based on factor analysis results

The results show that the most significant impact on analyzing index *I* is exerted by migration balance, industrial production volume (goods, services), and the average nominal monthly wage of one worker (since the factor loading (Pearson correlation coefficient) between the factor and socio-economic indicator was greater than 0.7, indicating a strong dependence).

An increase in positive migration balance, high industrial production volumes, and nominal wages will indicate greater stability, higher industrial specialization activity, production growth rates, resource-economic potential development, and citizen satisfaction with socio-economic conditions. These factors are crucial for the development of monotowns and should be considered as key targets in socio-economic development strategies.

Results of the Third Stage. The analysis revealed that based on the overall socio-economic develop-

ment index, monotowns can be categorized into various development levels, ranging from high to low. These conclusions were drawn from the cluster analysis conducted using the hierarchical clustering method (Table 3).

The results suggest that dividing the towns into five clusters is appropriate (monotowns with high socio-economic development levels (key towns); above-average socio-economic development; average socio-economic development; below-average socio-economic development; low socio-economic development), as the p-value is statistically significant for five or more clusters (indicating a confidence level of over 95%).

Key monotowns are investment-attractive, as they exhibit all the territorial marketing trends listed in Figure 1: high industrial production levels, better access to social, engineering, and transport infrastructure.

Table 3 – Hierarchical Clustering Results for Monotowns in the Republic of Kazakhstan

Number of clusters	p-value (statistical significance level)		
	Results of cluster analysis using the hierarchical clustering method for monotowns based on data for 2022-2023		
	or 27 monotowns (2022 data)	for 20 monotowns (2022 data)	for 9 monotowns (2023 data)
1	1,00	1,00	1,00
2	0,51	0,47	0,27
3	0,31	0,22	0,12
4	0,15	0,09	0,07
5 or more	<0.05	<0.05	<0.05

Note – Compiled by the authors based on hierarchical clustering analysis results

Thus, the optimal number of clusters by type of monotowns has been determined. The data are significant, indicating a qualitative division of clusters. This information allowed the identification of types of monotowns by their overall level of socio-economic development, which are illustrated in Figures 3, 4, and 5. These towns are located within different clusters with their centers marked.

We see that centers can differ depending on I values.

In Figure 3, it is clear that the I value of the towns of Rudny, Temirtau, Ridder, Ekibastuz, Kulsary, Satpayev, Aksay, Zhitikara, Lisakovsk, Stepnogorsk, Shakhtinsk, Kentau, Tekeli, and Arkalyk is above the average value (cluster center) for their respective group (type of monotown).

In Figure 4, the I value of Rudny, Temirtau, Ridder, Ekibastuz, Kulsary, Shakhtinsk, Stepnogorsk, and Zhitikara is above the average value (cluster center) for their respective group (type of monotown).

gorsk, and Zhitikara is above the average value (cluster center) for their respective group (type of monotown).

In Figure 5, the I value of Zhanaozen and Shakhtinsk is above the average value (cluster center) for their respective group (type of monotown).

The data from Figures 3, 4, and 5 indicate that the designated monotowns exhibit stronger trends in territorial marketing within their respective groups (types of monotowns). Additionally, the results reveal recurring monotowns in various clusters: in the 1st cluster – Aksu; in the 2nd – Temirtau, Balkhash, Zhanaozen; in the 3rd – Khromtau; in the 4th – Shakhtinsk, Stepnogorsk, Abai; and in the 5th – Kurchatov. This suggests that these monotowns have remained in the same cluster over recent years and are beginning to form the core of stable segments.

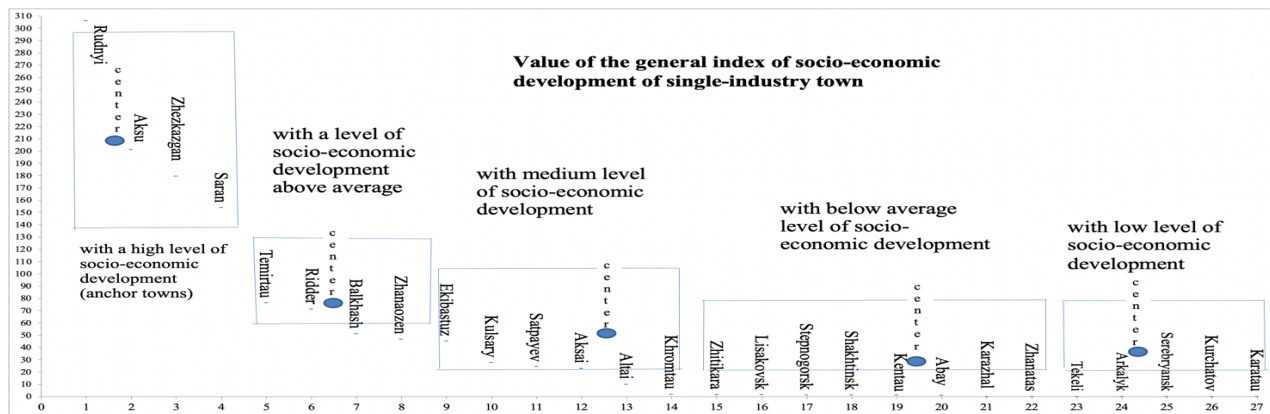


Figure 3 – Types of monotowns by overall level of socio-economic development among 27 monotowns in 2022

Note – compiled by the authors based on cluster analysis using the “k-means” method

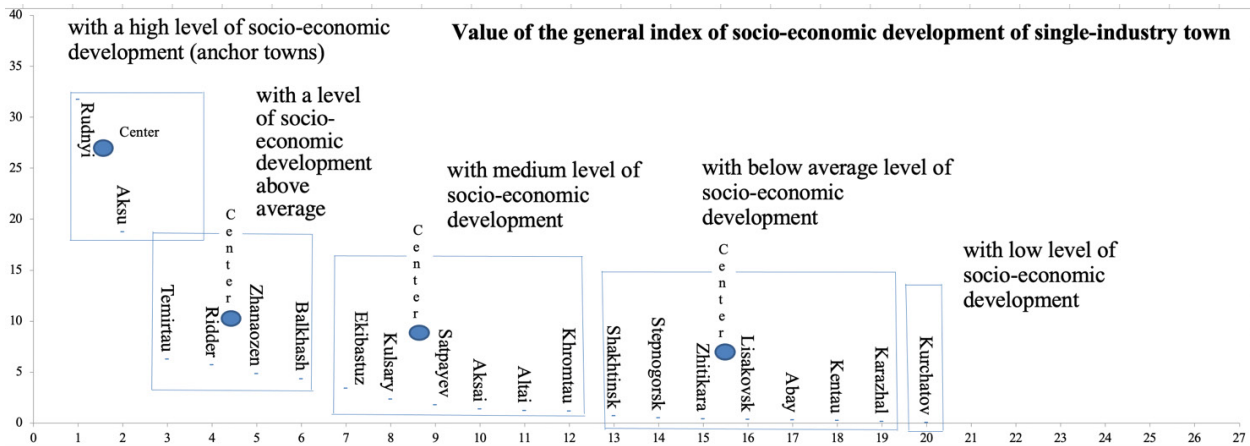


Figure 4 – Types of monotowns by overall level of socio-economic development among 20 monotowns in 2022
 Note – compiled by the authors based on cluster analysis using the “k-means” method

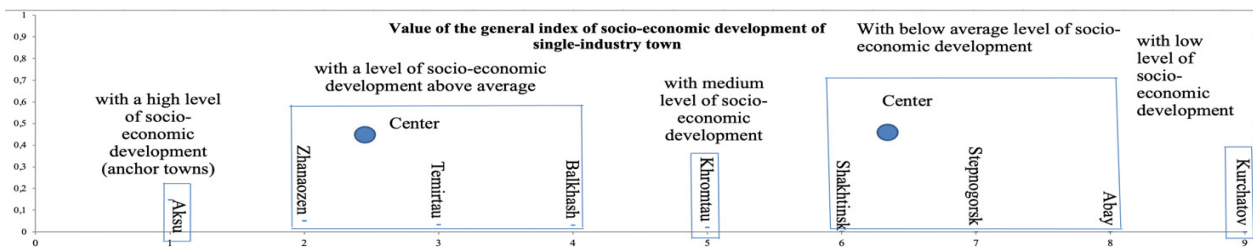


Figure 5 – Types of Monotowns by Overall Level of Socio-Economic Development Among 9 monotowns in 2023
 Note – compiled by the authors based on cluster analysis using the “k-means” method

Kurchatov’s inclusion in the fifth cluster can be explained by its low values across most indicators of overall socio-economic development compared to other monotowns (Table 1). The findings from the study are supported by relative verification: Kurchatov is currently a small town located between Semipalatinsk and Pavlodar in Eastern Kazakhstan. It is characterized by inadequate engineering and road infrastructure, low levels of investment in fixed assets (20 times lower compared to Aksu), a shortage of personnel in socially significant specialties, poor technical equipment of enterprises, etc.

The results of the fourth stage are presented in the identification of the strengths and weaknesses in the development of 9 monotowns (Figure 6).

These are characteristic of monotowns such as Aksu, Balkhash, Zhanaozen, Khromtau, and others. The main disadvantages for these monotowns during the same period are: negative migration balance; high wear of engineering networks; environmental issues; reduction in industrial production (goods and services); decrease in the total area of newly constructed residential buildings; and dependence on

city-forming enterprises. These issues are prevalent in monotowns such as Kurchatov, Shakhinsk, Abay, Stepnogorsk, and others. Other points outlined in Figure 6 represent specific development characteristics of individual monotowns.

The analysis conducted revealed improvements in the following indicators for the cities studied from 2021 to 2023: average nominal monthly wage, investments in fixed capital, electricity and gas supply, and economic diversification at various stages.

The current analysis presented (results of stages 1-4) in marketing planning enables further strategic assessment and the prioritization of single-industry town development.

Results of strategic analysis in marketing planning

The results of the fifth stage are presented by defining the general objectives for socio-economic development across the 9 monotowns:

- Aksu: maintain leadership in socio-economic development through the priority development of non-resource sectors, accelerated industrial growth, and agro-industrial complex as drivers for improving living standards.

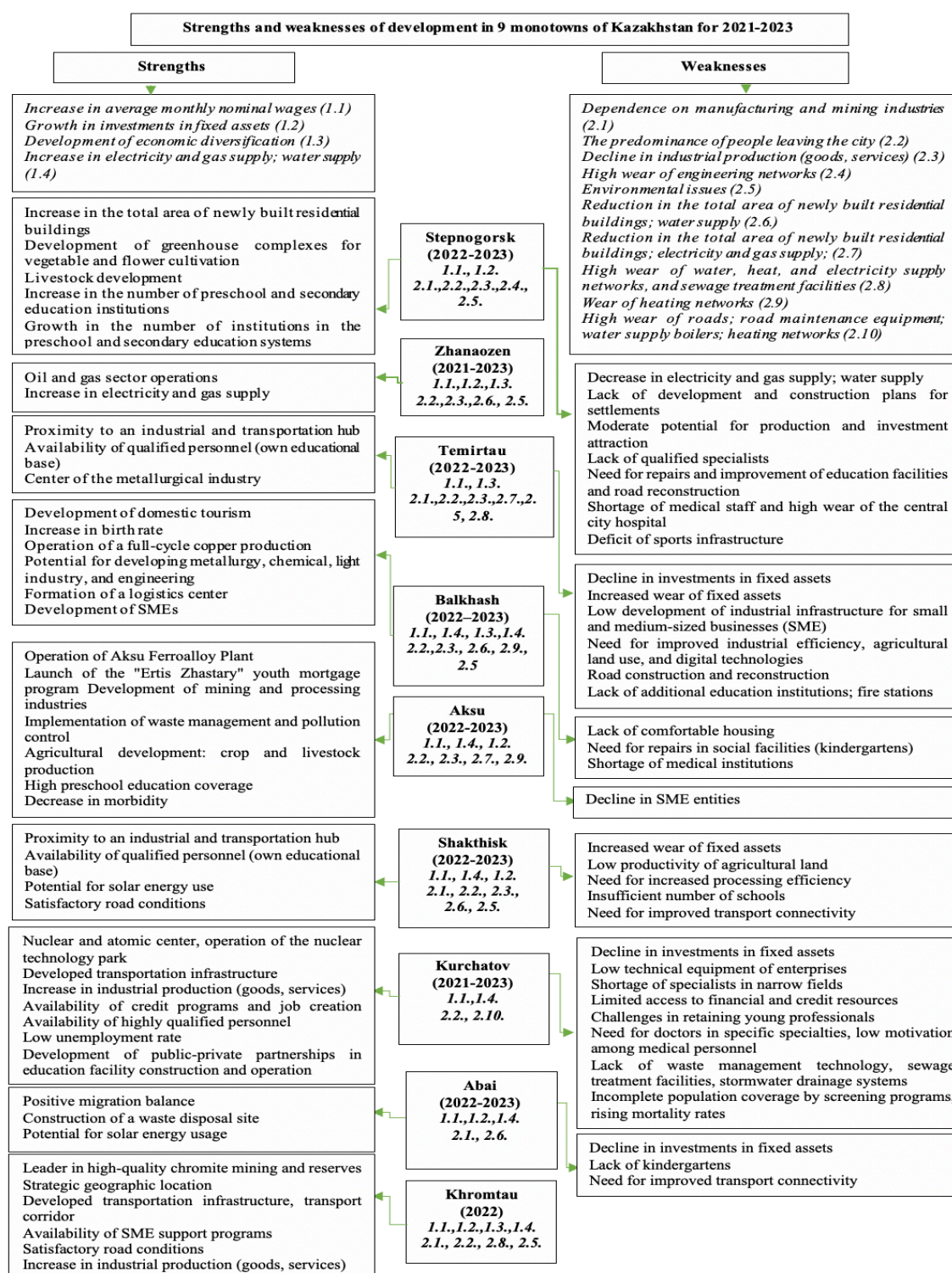


Figure 6 – Strengths and weaknesses of development in 9 monotowns of Kazakhstan for 2021-2023

Note – *Italics indicate advantages and disadvantages for all studied single-industry towns; ** advantages and disadvantages of individual polygenes are highlighted in a standard font; ***Compiled by the authors based on sources (Statistical Yearbook of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, 2022-2023; Approval of the Comprehensive Plan for Socio-Economic Development of Stepnogorsk, Akmolinsk Region for 2023–2027; Approval of the Comprehensive Plan for Socio-Economic Development of Balkhash, Karaganda Region for 2023–2027; Approval of the Comprehensive Plan for Development of the Karaganda Agglomeration for 2024-2028 (draft); Comprehensive Plan for Socio-Economic Development of Mangystau Region for 2021–2025; Socio-Economic Development Results of Aksu Region for the First Half of 2024; Development Program for Kurchatov City, East Kazakhstan Region for 2021-2025).

- Zhanaozen: stimulate further development of the oil and gas sector, diversify the economy, enhance energy efficiency, and create conditions for human capital development.
- Temirtau: promote accelerated industrial growth, economic diversification, and competitiveness through favorable conditions for investment and innovation.
- Balkhash: intensively develop industry, tourism, social, and logistical infrastructure while addressing environmental issues.
- Khromtau: reduce dependence on city-forming enterprises through economic diversification, modernization of the transport corridor, and increased innovation to enhance living standards.
- Shakhtinsk: achieve accelerated industrial growth considering the environmental situation to create favorable conditions for living and self-realization.
- Stepnogorsk: support the growth of economic diversification and innovation as a foundation for developing the social sector and human capital.
- Abai: achieve accelerated industrial and internal tourism growth as drivers of socio-economic development.

- Kurchatov: enhance the monotown’s position through sustainable and dynamic development of the economy, social sector, infrastructure, and scientific potential.

Results of the sixth stage. Further analysis was conducted at the strategic evaluation level, based on the development of artificial intelligence models to forecast indicators that significantly impact the overall socio-economic development of monotowns. The AI models for predicting migration balance and related forecasts were developed in the study by Mishchenko I.V., Krayushkin M.G. (Mishchenko et al., 2024: 13) and are not discussed in this article.

The construction of AI models for forecasting industrial production (goods, services) by monotowns was based on this indicator and factors (Table 4) affecting it from 2013 to 2022.

Based on the correlation analysis, it has been determined that the most significant factors influencing the volume of industrial production (goods, services) are investments in fixed assets; water supply, sewage systems, and waste collection and distribution control; supply of electricity, gas, steam, hot water, and air conditioning; and wages (as the Pearson correlation coefficient values are above 0.7).

Table 4 – Correlation coefficients between industrial production volume (goods, services) and Factors Affecting it

Factor affecting industrial production volume (goods, services) in monotowns	Pearson Correlation Coefficient
Investments in fixed assets	0,91
Water supply; sewage system; waste collection and distribution control	0,79
Supply of electricity, gas, steam, hot water, and air conditioning	0,78
Average monthly nominal wage per worker	0,71
Number of employees engaged in R&D	0,15
Note – Compiled by the authors based on the results of the correlation analysis	

An increase in these indicators suggests a rise in the potential for updating fixed assets, attractiveness of the area for labor application, implementation of investment projects, creation of industrial infrastructure, and the standard of living for residents.

To identify trends in industrial production volume dynamics, an autocorrelation analysis was conducted, and cluster analysis was used to create representative groups using tree clustering and k-means (Table 5). The results indicated that it is advisable to construct forecasting models using data from 2017 to 2022, with three clusters, as these have statistically significant autocorrelation coefficients and cluster numbers (i.e., p-values below 0.05).

The models’ error was less than 5 percent. According to Table 5, the production volume clusters are of high quality, as the distance from the cluster center is consistently less than 1. Otherwise, the accuracy of the target indicators used to model the socio-economic development of monotowns would significantly decrease. It is important to note that monotowns in Cluster 1, characterized by high production volumes, show the highest level of resource-economic potential and industrial specialization activity.

Monotowns in Cluster 2 exhibit a medium level of development in the mining industry, metal ores, and industrial zones.

Table 5 – Results of Absolute Verification of Neural Network Modeling and Cluster Determination for Modeling the Volume of Industrial Production (Goods, Services) in Monotowns for 2017-2022

Monotown	Distance from cluster center*	Deviation of actual data from model values (model error), %** (Results of absolute verification for 2022)
Cluster 1 (monotowns with high production volume)		
Temirtau	0,9006	2,3
Aksu	0,0922	2,5
Balkhash	0,5403	1,7
Rudny	0,6196	2,3
Ekibastuz	0,3867	2,1
Ridder	0,5756	4,7
Stepnogorsk	0,4453	4,4
Cluster 2 (monotowns with medium production volume)		
Zhitikara	0,5711	3,9
Lisakovsk	0,2375	2,9
Satpaev	0,7272	4,5
Aksai	0,4064	3,1
Kentau	0,2508	2,7
Karazhal	0,1678	4,2
Shakhtinsk	0,2815	1,3
Cluster 3 (monotowns with low production volume)		
Abai	0,4986	1,3
Zhanaozen	0,6628	1,2
Altai	0,3980	2,7
Kulsary	0,8046	1,7
Khromtau	0,7753	1,8
Kurchatov	0,3980	4,2
*Note – Compiled by the authors based on k-means clustering and neural network modeling results		

Monotowns in Cluster 3 show relatively low levels of resource-economic potential and development in the mining and oil-gas industries.

Further, as an example, Figure 7 presents a neural network model for forecasting production volume for Cluster 1, the most significant cluster.

The model's operation (Figure 7) can be described as follows. The main factors for evaluating the model are indicators 3, 4, 5, and 7 from Figure 1. The model multiplies the factor values by the neural network's weight coefficients for each connection (in this case, there are 84 weight coefficients). According to the absolute verification results of the built model (Table 5), this model is deemed suitable for forecasting as it is accurate. Similar models can be developed for Cluster 2 and Cluster 3 in terms of production volume.

Similarly, models were developed for forecasting the average monthly wage of a worker. Figure 8 presents the forecasting model graph for the first cluster (monotowns with high wage levels) among the three clusters (Cluster 2: monotowns with average wage levels; Cluster 3: monotowns with low wage levels).

The absolute verification of the model's performance shows that it is suitable for forecasting the average monthly nominal wage per worker due to its high accuracy. Similar models can be developed for Clusters 2 and 3 regarding wages.

Results of Final Stages (7, 8, 9). Based on the scientifically grounded analytical data from stages 1-6, key strategic priorities for the socio-economic development of monotowns can be identified, as well as the target values for these indicators (Table 6).

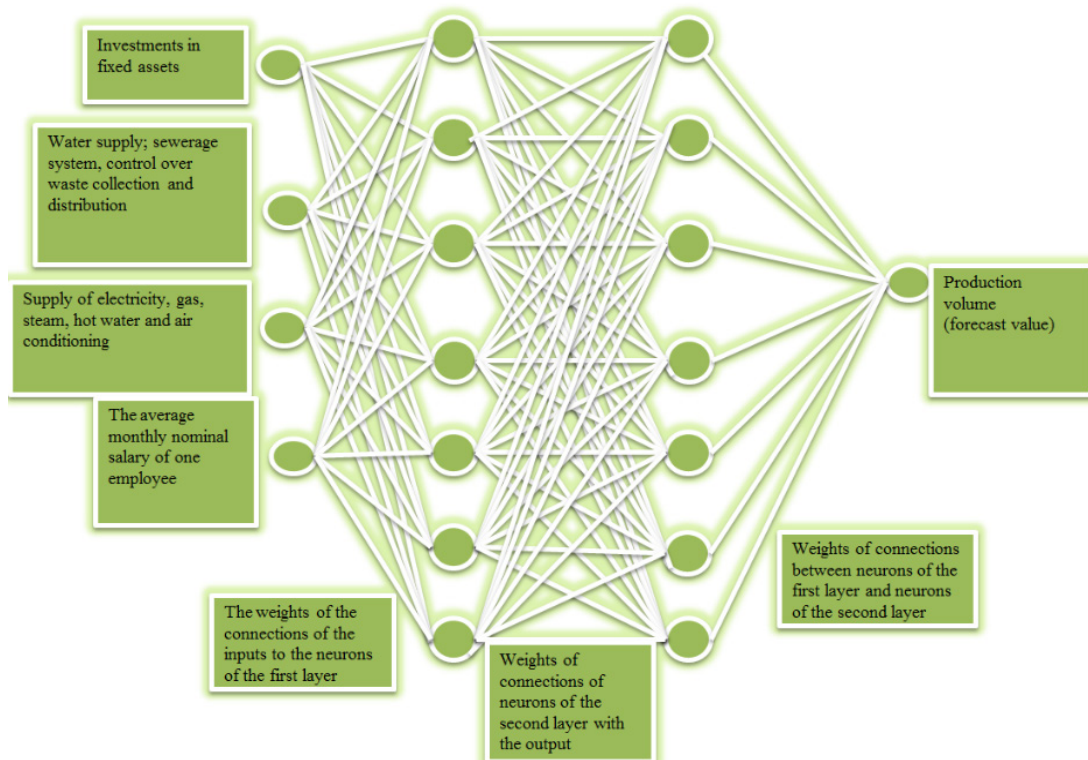


Figure 7 – Neural Network Graph for Forecasting Production Volume for Cluster 1
 Note – Compiled by the authors based on neural network modeling results

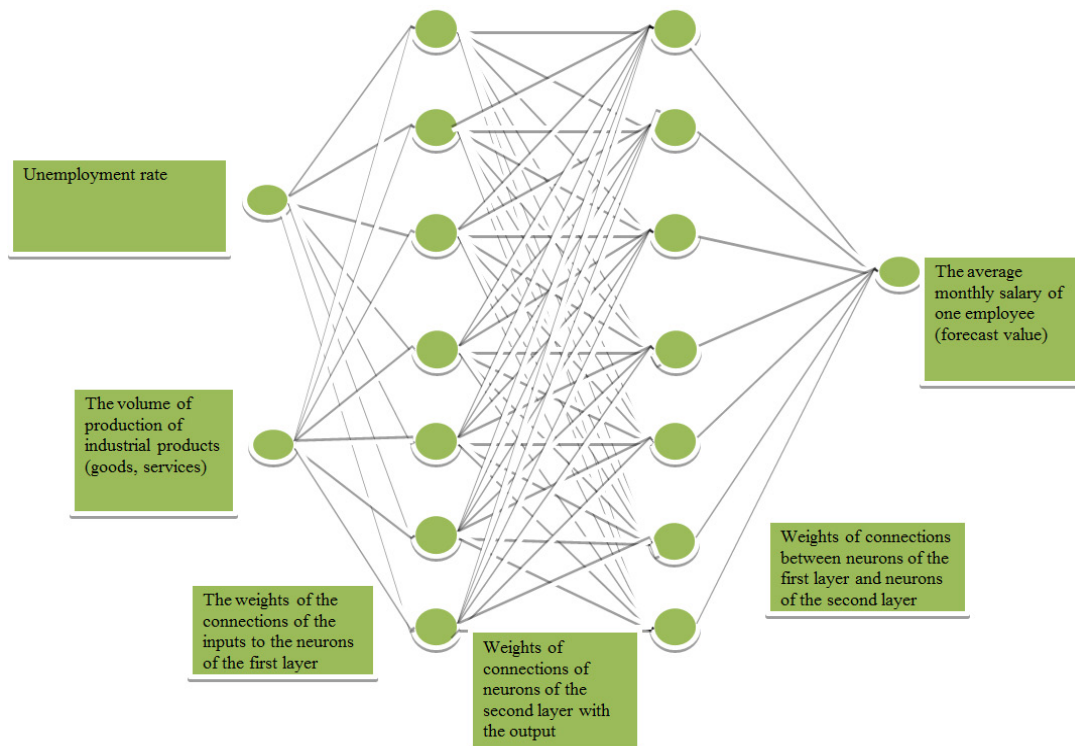


Figure 8 – Neural Network Graph for Forecasting Average Monthly Nominal Wage per Worker for Cluster 1
 Note – Compiled by the authors based on neural network modeling results

Table 6 – Key strategic priorities for the socio-economic development of monotowns

Monotowns	Planned values for socio-economic development indicators	Key strategic priorities of monotown socio-economic development
Aksu	Industrial production volume growth by 1.6 times by 2035 compared to 2023; Nominal wage growth by 2.9 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Developing a preferential credit mechanism, supporting technical and technological modernization of industry and agriculture, and their digital transformation 4. Creating technology parks 5. Promoting innovative activities 6. Grant support for agricultural cooperatives 7. Developing engineering infrastructure 8. Encouraging youth to work in the monotown
Zhanaozen	Industrial production volume growth by 1.4 times by 2035 compared to 2023; Nominal wage growth by 2.7 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Creating cluster associations 3. Creating technology parks 4. Promoting the adoption of eco-friendly and energy-efficient technologies 5. Developing engineering infrastructure 6. Developing social infrastructure 7. Assisting with staffing (including for new investment projects) 8. Developing and implementing targeted workforce training schemes
Temirtau	Industrial production volume growth by 1.8 times by 2035 compared to 2023; Nominal wage growth by 3.1 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Creating cluster associations 3. Supporting the creation of new industrial and agricultural capacities, especially eco-friendly and energy-efficient ones 4. Creating technology parks 5. Developing engineering and transport infrastructure 6. Developing social infrastructure 7. Encouraging youth to work in the monotown
Balkhash	Industrial production volume growth by 1.5 times by 2035 compared to 2023; Nominal wage growth by 2.5 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Creation of a monotown investment profile; 2. Promotion of industrial, agro-industrial, and tourism capacities; 3. Creation of cluster associations, technology parks; 4. Preferential lending; 5. Promoting innovative activities 6. Developing social, engineering, and transport infrastructure 7. Assisting with staffing (including for new investment projects)
Khromtau	Industrial production volume growth by 1.4 times by 2035 compared to 2023; Nominal wage growth by 2.9 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Supporting the establishment of private enterprises 3. Preferential crediting 4. Developing engineering infrastructure 5. Encouraging youth to work in the monotown
Shakhtinsk	Industrial production volume growth by 1.4 times by 2035 compared to 2023; Nominal wage growth by 2.8 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Creation of a monotown investment profile; 2. Promotion of industrial and agro-industrial capacities (especially energy-efficient ones); 3. Creation of cluster associations, technology parks; 4. Preferential crediting 5. Stimulating entrepreneurial and community initiatives 6. Developing social, engineering, and transport infrastructure
Stepnogorsk	Industrial production volume growth by 1.4 times by 2035 compared to 2023; Nominal wage growth by 2.6 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Creating cluster associations and technology parks 3. Supporting the creation of new industrial and agricultural capacities (especially eco-friendly and energy-efficient ones) 4. Supporting the establishment of private enterprises 5. Preferential crediting 6. Developing social, engineering, and transport infrastructure 7. Stimulating the creation of high-performance jobs 8. Assisting with staffing (including for new investment projects) 9. Developing targeted workforce training schemes 10. Supporting relocation for employment

Continuation of the table

Monotowns	Planned values for socio-economic development indicators	Key strategic priorities of monotown socio-economic development
Abai	Industrial production volume growth by 1.4 times by 2035 compared to 2023; Nominal wage growth by 2.4 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Creating special economic zones 3. Creating technology parks 4. Developing engineering infrastructure 5. Developing social and transport infrastructure 6. Stimulating deep processing
Kurchatov	Industrial production volume growth by 1.2 times by 2035 compared to 2023; Nominal wage growth by 2.3 times by 2035 compared to 2023	<ol style="list-style-type: none"> 1. Establishing an investment profile for the monotown 2. Creating cluster associations (including organizations engaged in R&D) 3. Creating technology parks 4. Creating a special economic zone for industrial production 5. Preferential crediting 6. Developing social and engineering infrastructure 7. Developing transport infrastructure 8. Stimulating wage increases (including through direct subsidies for investment projects) 9. Developing and implementing targeted workforce training schemes

Note – Compiled by the authors based on developed AI (neural networking) simulation models and Figure 6

Based on the analysis of Table 6, the most significant strategic priorities include: *enhancing the image of territories by creating an investment profile for each monotown*, highlighting competitive advantages, major enterprises, and providing business recommendations to investors (implementation tool: development of an investment platform with profiles of relevant monotowns, and an audit project for investors, including existing support measures for project implementation). This organizational measure is expected to increase investor interest in monotown development.

To strengthen cooperation between research organizations and real sector enterprises, it is essential to *establish cluster associations and technology parks*. This will lead to a growth in innovative and competitive products in both domestic and international markets.

It is crucial to *develop social, engineering, and transportation infrastructure across all monotowns, particularly in areas where investment projects are being or will be implemented*. Infrastructure budget loans can be used to support this initiative.

Preferential lending is among the priority areas for developing Kazakhstan’s monotowns as it supports the development of SMEs and technical upgrades.

Conclusion

The analysis has led to the development of a methodological approach to strategic marketing planning for setting priorities in the development

of monotowns in Kazakhstan, distinguished by the use of territorial marketing and artificial intelligence tools. The strategic marketing planning process is outlined in stages, integrating various indicators from territorial marketing. The first four stages focus on analyzing the current state of monotowns, while the subsequent stages are for defining strategic targets and socio-economic development priorities.

Testing of the developed methodological approach reveals that the most significant impact on the overall socio-economic development of monotowns comes from migration balance, industrial production volume (goods and services), and the average monthly nominal wage per employee. The application of the developed methodological approach established that the most significant influence on the overall socio-economic development of single-industry towns is exerted by migration balance, industrial production volume (goods, services), and average nominal monthly wage.

The typology identified five types of monotowns: those with high socio-economic development (key), above-average development, average development, below-average development, and low development.

The study identified both advantages and disadvantages in the development of monotowns. Key disadvantages from 2021 to 2023 include negative migration balance, high wear of engineering networks, environmental issues, reduced industrial production volume, decreased residential building area, and dependence on key enterprises.

A simulation modeling tool based on artificial intelligence technology was developed to determine

target values for socio-economic development indicators. The models built were highly accurate (in some cases reaching almost 99 percent).

Key strategic priorities for the socio-economic development of monotowns were determined based on practical implementation of the developed approach. Significant priorities include territorial image marketing through investment profiles, creating cluster associations, technology parks, and developing social, engineering, and transport infrastructure, especially where investment projects are or will be implemented, as well as preferential lending.

The research hypothesis was confirmed: the use of the methodological approach to strategic market-

ing planning, based on territorial marketing and artificial intelligence methods, refined target indicators for monotowns' development, leading to scientifically grounded strategic priorities.

Research Limitation: issues with insufficient or poor-quality statistical data for socio-economic indicators across many monotowns in Kazakhstan limit the full interpretation of these indicators, which are indirectly related to the study's objectives.

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References

1. Bheemanna, N., & Megeri, M.N. (2023) Prediction of India's demographic and economic variables using the neural network auto-regression model, *International Journal of Statistics and Applied Mathematics*, 11, 44-55.
2. Borbasova, Z., Nessipbayev, R., Mussatayeva, A., Zhetpisbayeva, M., & Baigurenova, M. (2021) Strategic Territorial Development Management (on the Example of the Karaganda Region), *Montenegrin Journal of Economics*, 16 (4), 17-33.
3. Bower, J.L., & Gilbert C.G. (2007) *From Resource Allocation to Strategy*. Oxford University Press, 501.
4. Caiuz, Z.W., & Olungbenga, A. (2019) *The Modern Company Town – Center for American Progress*. Retrieved from <https://www.americanprogress.org/article/modern-company-town/>
5. Cristina Martinez-Fernandez, M., & Chung-Tong, W. (2007) *Shrinking Cities in Australia*. Retrieved from <https://apo.org.au/node/60304>
6. Halseth, G., & Sullivan L. (2000) *Housing Transition in Single Industry «Instant Towns» Prepared for: Canada Mortgage and Housing Corporation External Housing Program*. Geography Program University of Northern British Columbia Prince George.
7. Jose, A.R.F., & Joao S. (2018) *Cities and urbanization in democratic Portugal*. *Mediterranean*, 130.
8. Kirsten, M. (2016) *Regional Development in a Resource Production System: Long Distance Commuting, Population Growth, and Wealth Redistribution in the Western Australia Goldfields*. *Geographical Research*, 54(4), 420-432.
9. Kunanbaeva, K., Rahimova, S., Titkov, A., & Goncharenko, L. (2020) *The «smart city» concept as a strategy for managing the infrastructure of single-industry town*. *E3S Web of Conferences*, 164, 03049. <https://doi.org/10.1051/e3sconf/202016403049>
10. Maimurunova, A., Kazbekov, T., Myrzabek, Zh., Shugaipova, Zh., Saparova B., & Zhugunissova Zh. (2022) *Problems of Sustainable Development of Single-Industry Towns. Example of Karaganda Region*. *Journal of Environmental Management and Tourism*, 13 (3), 707-720.
11. *Make Cities and Human settlements inclusive, safe, resilient and sustainable (2017) National report on the implementation of the 2030 Agenda for Sustainable Development Portugal*, 57-61.
12. Mishchenko, I.V., Krayushkin, M.G., Mezhev, S.I., & Bianchi, I.S. (2024) *Improvement of migration balance forecasting within the framework of management of socio – economic development of single industry towns on the basis of artificial intelligence (on the materials of Kazakhstan)*. *The journal of Economic Research and Business Administration*, 1 (147), 13-29. <https://doi.org/10.26577/jerba202414712>
13. Pattanayak, S. (2019) *Deep Learning with TensorFlow: A Mathematical Approach to Advanced Artificial Intelligence in Python: textbook*. Apress, 480.
14. Roger, H. (2008) *Single Industry Resource Towns*. Chapter 18 in book: *A Companion to Economic Geography*, 290-307.
15. Rotenberg, R.B. (2014) *Strategic regulation of structural transformations in the economy of the single industry town: methodological aspect*. *Economic and social changes: Facts, Trends, Forecast*, 2(32), 54-62.
16. Santi, M. V., & Laiola, G. S. (2019) *Retrofitting of Company Towns' residential buildings: from international best practices to local implementations in Friuli Venezia Giulia region (NE Italy)*. *International Journal of Architectural Technology and Sustainability*, 4(2), 13-29.
17. Shastitko, A., & Fatikhova, A (2016). *Monotowns: a quantitative analysis*. *Baltic Region*, 2 (8), 4-19. <https://doi.org/10.5922/2079-8555-2016-2-1>
18. Stimson, R.J., Baum, S., Mullins, P., & O'Connor, K. (2001) *Australia's regional cities and towns: modeling community opportunity and vulnerability*. *Australasian Journal of Regional Studies*, 1 (7), 23-62.
19. Stuvoy, K., & Shirobokova, I. (2022) *Multiscalar entanglements in the post -socialist city: monotown restructuring, spatial re-ordering and urban inequality in Russia*. *Eurasian Geography and economics*, 5 (63), 625-652. Retrieved from <https://doi.org/10.1080/15387216.2021.1944246>

20. Xuegin, W., Shenghe, L., Olivier, S., & Chengxin, W. (2019) Characteristic Development Model: A Transformation for the Sustainable Development of Small Towns in China. *Sustainability*, 11 (3757), 1-21.
21. Абрамов Н.М., Ошечков М.Е., Краюшкин М.Г. Разработка индекса эффективности инновационного проекта // Управление современной организацией: опыт, проблемы и перспективы. – 2019. – № 10. – С. 66-70.
22. Иванова Н.А., Вяльшина А.А. Проблемы рынка труда монопрофильных городов в условиях экономического кризиса // Журнал: Теория и практика общественного развития. – 2010. – №4. – С. 274-278.
23. Итоги социально-экономического развития Аксуского региона за 1 полугодие 2024 года. – 2024. Retrieved from <https://www.gov.kz/memleket/entities/pavlodar-aksu/documents/details/700033?lang=ru>
24. Кожевников С.А. Модернизация экономики малых городов российского севера на основе активизации муниципальных хозяйственных связей // Север и рынок: формирование экономического порядка. – 2023. – №3, – С.150 -164. doi:10.37614/2220-802X.3.2023.81.010.
25. Комплексный план социально-экономического развития Мангистауской области на 2021 – 2025 годы. – 2021 – 2023. Retrieved from <https://www.gov.kz/memleket/entities/mangystau-uebp/documents/details/508653?lang=ru>
26. Куантыров А. Об утверждении Перечня моногородов Республики Казахстан. – 2023. Retrieved from <https://www.gov.kz/memleket/entities/economy/documents/details/555760?lang=ru>
27. Кулай С.В. Оценка современного состояния и перспектив развития моногородов с учетом деятельности градообразующих организаций (на материалах Кемеровской области) // Диссертация на соискание ученой степени кандидата экономических наук. – Барнаул, 2022. – 261 с.
28. Кутергина Г.В., Лапин А.В. Управление развитием моногородов: отечественные и зарубежные подходы к моделированию // Вестник Пермского университета. Серия: Экономика. – 2015. – №3 (26). – С.69-77.
29. Об утверждении Комплексного плана развития Карагандинской агломерации на 2024-2028 годы (проект). – 2024. Retrieved from <https://legalacts.egov.kz/npa/view?typeComment=9&id=15099975>
30. Об утверждении Комплексного плана социально-экономического развития города Балхаша Карагандинской области на 2023 – 2027 годы // Постановление Правительства Республики Казахстан от 5 сентября 2023 года № 766. – 2023 Retrieved from <https://adilet.zan.kz/rus/docs/P2300000766>
31. Об утверждении Комплексного плана социально-экономического развития города Степногорска Акмолинской области на 2023 – 2027 годы // Постановление Правительства Республики Казахстан от 26 июля 2023 года № 610. – 2023 Retrieved from <https://adilet.zan.kz/rus/docs/P2300000610>
32. Программа развития территории города Курчатова Восточно-Казахстанской области на 2021-2025 годы. – 2021. Retrieved from <https://www.gov.kz/memleket/entities/abay-kurchatov/documents/details/129834?lang=ru&ysclid=m0593uchxe910115190>
33. Рахимбай С. Как в Казахстане будут развивать 20 моногородов. – 2024. Retrieved from <https://24.kz/ru/news/economy/item/650600-kak-v-kazahstane-budut-razvivat-20-monogorodov>
34. Статистика регионов Абайской, Акмолинской, Актюбинской, Алматинской, Атырауской, Восточно-Казахстанской, Жамбылской, Западно-Казахстанской, Карагандинской, Костанайской, Мангистауской, Павлодарской, Туркестанской, Улытауской области // Статистический сборник Бюро Национальной статистики Агентства по стратегическому планированию и реформам Республики Казахстан. – 2013-2023 – <https://stat.gov.kz/ru/region/>
35. Токаев К.К. Выступление Касым-Жомарт Токаева на заседании Национального совета по науке и технологиям при Президенте Республики Казахстан. – 2024 Retrieved from <https://akorda.kz/ru/vystuplenie-kasym-zhomarta-tokaeva-na-zasedanii-nacionalnogo-soveta-po-nauke-i-tehnologiyam-pri-prezidente-respubliki-kazahstan-123423>
36. Шарнин А.В. Совершенствование стратегического планирования развития социальной сферы муниципального района (на материалах муниципального образования «Новокузнецкий муниципальный район») // Диссертация на соискание ученой степени кандидата экономических наук. – Кемерово, 2014. – 140 с.

References

1. Abramov, N.M., Oshchepkov, M.E., & Krayushkin, M.G. (2019) Razrabotka indeksa effektivnosti innovacionnogo proekta [Risks and threats as components of economic security enterprises]. *Upravlenie sovremennoj organizaciej: opyt, problemy i perspektivy*, (10), pp.66-70.
2. Bheemanna, N., & Megeri, M.N. (2023) Prediction of India's demographic and economic variables using the neural network auto-regression model, *International Journal of Statistics and Applied Mathematics*, 11, 44-55.
3. Borbasova, Z., Nessipbayev, R., Mussatayeva, A., Zhetpisbayeva, M., & Baigurenova, M. (2021) Strategic Territorial Development Management (on the Example of the Karaganda Region), *Montenegrin Journal of Economics*, 16 (4), 17-33.
4. Bower, J.L., & Gilbert C.G. (2007) *From Resource Allocation to Strategy*. Oxford University Press, 501.
5. Caiuz, Z.W., & Olungbenga, A. (2019) *The Modern Company Town* – Center for American Progress. Retrieved from <https://www.americanprogress.org/article/modern-company-town/>
6. Cristina Martinez-Fernandez, M., & Chung-Tong, W. (2007) *Shrinking Cities in Australia*. Retrieved from <https://apo.org.au/node/60304>
7. Halseth, G., & Sullivan L. (2000) *Housing Transition in Single Industry «Instant Towns» Prepared for: Canada Mortgage and Housing Corporation External Housing Program*. Geography Program University of Northern British Columbia Prince George.

8. Itogi social'no-ekonomicheskogo razvitiya Aksuskogo regiona za 1 polugodie 2024 goda (2024) [Results of socio-economic development of the Aksu region for first quarter of 2024]. Retrieved from <https://www.gov.kz/memleket/entities/pavlodar-aksu/documents/details/700033?lang=ru>
9. Ivanova, N.A., & Vyalshina, A.A. (2012) Problemy rynka truda monoprol'nyh gorodov v usloviyah ekonomicheskogo krizisa [Problems of a labor market in single-industry cities under the conditions of economic crisis]. *Zhurnal: Teoriya i praktika obshchestvennogo razvitiya*, (4), pp. 274-278.
10. Jose, A.R.F., & Joao S. (2018) Cities and urbanization in democratic Portugal. *Mediterranee*, 130.
11. Kirsten, M. (2016) Regional Development in a Resource Production System: Long Distance Commuting, Population Growth, and Wealth Redistribution in the Western Australia Goldfields. *Geographical Research*, 54(4), 420-432.
12. Kompleksnyj plan social'no-ekonomicheskogo razvitiya Mangistauskoj oblasti na 2021 – 2025 gody (2021-2023) [Comprehensive plan for the socio-economic development of the Mangystau region for 2021 – 2025]. Retrieved from <https://www.gov.kz/memleket/entities/mangystau-uebp/documents/details/508653?lang=ru>
13. Kozhevnikov, S.A. (2023) Modernizaciya ekonomiki malyh gorodov rossijskogo severa na osnove aktivizacii mezhmunicipal'nyh hozyajstvennyh svyazej [Upgrading the economies of small towns in the russian north through enhanced intermunicipal economic cooperation]. *Sever i rynek: formirovanie ekonomicheskogo poryadka*, 3, pp.150-164. doi:10.37614/2220-802X.3.2023.81.010
14. Kuantyrov, A. (2023) Ob utverzhdenii Perechnya monogorodov Respubliki Kazahstan [On approval of the List of single-industry towns of the Republic of Kazakhstan]. Retrieved from <https://www.gov.kz/memleket/entities/economy/documents/details/555760?lang=ru>
15. Kulay, S.V. (2022) Ocenka sovremennogo sostoyaniya i perspektiv razvitiya monogorodov s ucheto deyatel'nosti gradoobrazuyushchih organizacij (na materialah Kemerovskoj oblasti) [Assessment of the current state and prospects for the development of single-industry towns, taking into account the activities of city-forming organizations (based on materials from the Kemerovo region)]. *Dissertaciya na soiskanie uchenoj stepeni kandidata ekonomicheskikh nauk*. Barnaul, p.261.
16. Kunanbaeva, K., Rahimova, S., Titkov, A., & Goncharenko, L. (2020) The «smart city» concept as a strategy for managing the infrastructure of single-industry town. *E3S Web of Conferences*, 164, 03049. <https://doi.org/10.1051/e3sconf/202016403049>
17. Kutergina, G.V., & Lapin, A.V. (2015) Upravlenie razvitiem monogorodov: otechestvennye i zarubezhnye podhody k modelirovaniyu [Management of one-industry towns development: Russian and foreign modelling approaches]. *Vestnik Permskogo universiteta*. Seria: Ekonomika, 3 (26), pp. 69-77.
18. Maimurunova, A., Kazbekov, T., Myrzabek, Zh., Shugaipova, Zh., Saparova B., & Zhugunissova Zh. (2022) Problems of Sustainable Development of Single-Industry Towns. Example of Karaganda Region. *Journal of Environmental Management and Tourism*, 13 (3), 707-720.
19. Make Cities and Human settlements inclusive, safe, resilient and sustainable (2017) National report on the implementation of the 2030 Agenda for Sustainable Development Portugal, 57-61.
20. Mishchenko, I.V., Krayushkin, M.G., Mezhev, S.I., & Bianchi, I.S. (2024) Improvement of migration balance forecasting within the framework of management of socio – economic development of single industry towns on the basis of artificial intelligence (on the materials of Kazakhstan). *The journal of Economic Research and Business Administration*, 1 (147), 13-29. <https://doi.org/10.26577/erba202414712>
21. Ob utverzhdenii Kompleksnogo plana razvitiya Karagandinskoj aglomeracii na 2024-2028 gody (proekt) (2024) [On approval of the Comprehensive Development Plan of the Karaganda agglomeration for 2024-2028 (draft)]. Retrieved from <https://legalacts.egov.kz/npa/view?typeComment=9&id=15099975>
22. Ob utverzhdenii Kompleksnogo plana social'no-ekonomicheskogo razvitiya goroda Balhasha Karagandinskoj oblasti na 2023 – 2027 gody (2023) [On approval of the Comprehensive Plan for the socio-economic development of the city of Balkhash, Karaganda region for 2023 – 2027]. *Postanovlenie Pravitel'stva Respubliki Kazahstan ot 5 sentyabrya 2023 goda*. Retrieved from <https://adilet.zan.kz/rus/docs/P2300000766>
23. Ob utverzhdenii Kompleksnogo plana social'no-ekonomicheskogo razvitiya goroda Stepnogorska Akmolinskoj oblasti na 2023 – 2027 gody (2023) [On approval of the Comprehensive Plan for the Social and Economic Development of the City of Stepnogorsk, Akmola Region for 2023 – 2027]. *Postanovlenie Pravitel'stva Respubliki Kazahstan ot 26 iyulya 2023 goda*. Retrieved from <https://adilet.zan.kz/rus/docs/P2300000610>
24. Pattanayak, S. (2019) *Deep Learning with TensorFlow: A Mathematical Approach to Advanced Artificial Intelligence in Python: textbook*. Apress, 480.
25. Programma razvitiya territorii goroda Kurchatov Vostochno-Kazahstanskoj oblasti na 2021-2025 gody (2021) [Development program for the territory of the city of Kurchatov in the East Kazakhstan region for 2021-2025]. Retrieved from <https://www.gov.kz/memleket/entities/abay-kurchatov/documents/details/129834?lang=ru&ysclid=m0593ucbxe910115190>
26. Rakhimbai, S. (2024) Kak v Kazahstane budut razvivat' 20 monogorodov [How 20 single-industry towns will be developed in Kazakhstan]. Retrieved from <https://24.kz/ru/news/economy/item/650600-kak-v-kazahstane-budut-razvivat-20-monogorodov>
27. Roger, H. (2008) Single Industry Resource Towns. Chapter 18 in book: *A Companion to Economic Geography*, 290-307.
28. Rotenberg, R.B. (2014) Strategic regulation of structural transformations in the economy of the single industry town: methodological aspect. *Economic and social changes: Facts, Trends, Forecast*, 2(32), 54-62.
29. Santi, M.V., & Laiola, G. S. (2019) Retrofitting of Company Towns` residential buildings: from international best practices to local implementations in Friuli Venezia Giulia region (NE Italy). *International Journal of Architectural Technology and Sustainability*, 4(2), 13-29.

30. Sharnin, A.V. (2014) Sovershenstvovanie strategicheskogo planirovaniya razvitiya social'noj sfery municipal'nogo rajona (na materialah municipal'nogo obrazovaniya «Novokuzneckij municipal'nyj rajon»)» [Improving strategic planning for the development of the social sphere of a municipal district (based on materials from the municipal formation “Novokuznetsk Municipal District”)]. Dissertaciya na soiskanie uchenoj stepeni kandidata ekonomicheskikh nauk. Kemerovo, p.140.
31. Shastitko, A., & Fatikhova, A (2016). Monotowns: a quantitative analysis. *Baltic Region*, 2 (8), 4-19. <https://doi.org/10.5922/2079-8555-2016-2-1>
32. Statistika regionov Abajskoj, Akmolinskoj, Aktyubinskoj, Almatinskoj, Atyrauskoj, Vostochno-Kazahstanskoj, Zhambylskoj, Zapadno-Kazahstanskoj, Karagandinskoj, Kostanajskoj, Mangistauskoj, Pavlodarskoj, Turkestanskoj, Ulytauskoj oblasti (2013-2023) [Statistics of the Abay, Akmola, Aktobe, Almaty, Atyrau, East Kazakhstan, Zhambyl, West Kazakhstan, Karaganda, Kostanay, Mangystau, Pavlodar, Turkestan, Ulytau regions] Statisticheskij sbornik Byuro nacional'noj statistiki Agenstva po strategicheskomu planirovaniyu i reformam Respubliki Kazahstan. – <https://stat.gov.kz/ru/region/>
33. Stimson, R.J., Baum, S., Mullins, P., & O'Connor, K. (2001) Australia's regional cities and towns: modeling community opportunity and vulnerability. *Australasian Journal of Regional Studies*, 1 (7), 23-62.
34. Stuvoy, K., & Shirobokova, I. (2022) Multiscalar entanglements in the post-socialist city: monotown restructuring, spatial re-ordering and urban inequality in Russia. *Eurasian Geography and economics*, 5 (63), 625-652. Retrieved from <https://doi.org/10.1080/15387216.2021.1944246>
35. Tokayev, K.K. (2024) Vystuplenie Kasym-Zhomart Tokaeva na zasedanii Nacional'nogo soveta po nauke i tekhnologiyam pri Prezidente Respubliki Kazahstan [Speech by the President of the Republic of Kazakhstan Kassym-Jomart Tokayev at the meeting of the National Council for Science and Technology under the President of the Republic of Kazakhstan]. Retrieved from <https://akorda.kz/ru/vystuplenie-kasym-zhomarta-tokaeva-na-zasedanii-nacionalnogo-soveta-po-nauke-i-tehnologiyam-pri-prezidente-respubliki-kazahstan-123423>
36. Xuegin, W., Shenghe, L., Olivier, S., & Chengxin, W. (2019) Characteristic Development Model: A Transformation for the Sustainable Development of Small Towns in China. *Sustainability*, 11 (3757), 1-21.

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