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Article

Trap and dilemma of urbanisation: Comparative analysis and conclusions for accelerated urbanisation policies

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Abstract: As urbanisation increases, questions arise about the desirability of further urban growth, as it was not accompanied by corresponding economic growth, and social and environmental problems began to grow in the largest cities in the world. The objective of the article is to substantiate the limits of urbanization growth in Kazakhstan based on the study of theoretical views on this process, analysis of the dependence of social and economic parameters of 134 countries on the urbanisation level and calculation of the urbanisation level that contributes most to economic growth and social well-being. To achieve the goal, the following tasks have been set and solved: theoretical views on the process of urbanization have been generalized; a hypothesis has been put forward about the emergence of an "urbanization trap" in which the growth of large cities is not accompanied by economic growth and improvement of social well-being; an analysis of the dependence of socio-economic indicators on the level of urbanization has been carried out on the example of 134 countries of the world; the level of urbanization that maximizes economic growth and social well-being is calculated; the necessity of the development of small towns in Kazakhstan is substantiated. To solve the problems, the methods of logical analysis, analogies and generalizations, economic statistics, index, graphical, Pearson correlation analysis, Spearman and Kendall rank regression based on models in SPSS were used. As a result, the following conclusions are made: the hypothesis of a possible deterioration of socio-economic indicators in large cities is confirmed; the best positive result is demonstrated by the level of urbanization of 50%–59%. The recommendations are justified: in Kazakhstan, it is necessary to adhere to the level of urbanization no higher than 59%; the growth of urbanization should be ensured through the development of small towns; it is necessary to improve the methods of managing the process of urbanization and develop individual city plans.

Keywords: urbanisation; town; urbanisation limits; urbanisation challenges; economic growth; social well-being

1. Introduction

In the current conditions of the economic crisis, the complex geopolitical situation and climate change, the problems of hunger, poverty and food security arise again, as in the days of Malthus. In our view, it is not the growth rate of the global population but of the urban population, i.e., the urbanisation rate—that merits greater attention. Recently, the process of urbanisation has intensified significantly, mainly due to migration from rural to urban areas with increasing industrialization rates, the development of road and transport infrastructure, increase in mobility of production factors, and the formation of a comfortable urban environment for persons to live in.

According to forecasts by 2050 the share of urban population in the world is expected to increase up to 70%. In Japan, the Republic of Korea, the urbanisation rate already reached 91.1% and 81.4% in 2021 respectively, and in the future, in the USA, Canada, it may reach a maximum of 90% (UNDESA, 2018). And this is quite understandable. Cities concentrate the main resources of economic growth, create jobs, provide households with higher income, more comfortable living conditions, better access to goods and services—educational, medical, housing ones and utilities, transport, etc. Therefore, there is an increasing debate about the limits, efficiency and expediency of further urban growth among demographers and regionalists. This issue is also quite acute for Kazakhstan.

The level of urbanization in Kazakhstan has also increased significantly over the past 20 years and reached 62.1% by the beginning of 2022 (Bureau of National Statistics, 2022). However, in our country, the urban population increased unevenly. Only large cities grew at an accelerated pace, becoming millionaires in a short period. Thus, in Astana, the capital of Kazakhstan, the population grew by 360.7% in 2000–2022, in Almaty—by 82.6%, in Shymkent—by 195.8%. At the same time, the population of 32 medium-sized and small towns gradually decreased, in 14 cities the number does not reach the threshold level of the city established by law. Unregulated growth of large cities causes great risks for their sustainable development and human well-being, which is associated with the limitations of land, water and other elements of natural potential. In many large cities, the engineering, housing and communal and transport infrastructure is unevenly distributed, the imbalance in the development of urban areas is increasing, slum suburbs often appear, the environmental, epidemiological and criminogenic situation is deteriorating.

A study (OECD, 2006) also points to the increasing negative effects of the growth of major cities, stressing that metropolitan cities can be both engines of economic growth and persistent focal points of unemployment and poverty, high crime rates, traffic congestion and environmental degradation. Based on the above, we assume that in modern conditions of increasing urban population growth and its concentration in large cities, a new phenomenon appears—the so-called “urbanization trap”. The purpose of the article is to substantiate the limits of urbanization growth in Kazakhstan based on a study of theoretical views on this process, analysis of the dependence of social and economic parameters of 134 countries on the urbanisation level and calculation of the urbanisation level that maximizes economic growth and social well-being. In accordance with the goal, the tasks were solved: to confirm or refute the hypothesis of the dependence of socio-economic indicators on the level of urbanization on the example of 134 countries of the world; to determine the level of urbanization that maximally contributes to economic growth and social well-being; to justify the existence of limits to the growth of urbanization in Kazakhstan; to substantiate the need for the development of small towns in Kazakhstan; to develop recommendations for improving the management of this process.

2. Review of literature

In today’s world, cities are the organizing and structuring elements of territories and national economies. Cities are the places where most financial and commodity

markets are concentrated and where the decisions that determine the whole course of economic life are taken. While the absolute number of cities grows steadily, it is predominantly the large metropolitan areas where more and more of the world's population is accumulated. According to World Urbanisation Prospects, more than 40% of urban population lives in metropolitan cities with over 1 million persons, including 22% of urban population living in cities with 1–5 million persons and 41% of urban population living in cities with less than 300,000 persons (World Urbanisation Prospects, 2018). It is estimated (UN, 2020) that population growth will be concentrated in cities and the number of urban dwellers will reach 6.7 billion over the next 30 years. Urbanisation is accompanied by an increase in the function of cities, a change in the settlement system, the spread of urban lifestyles, the largest cities define new standards of quality of life and reference points for the development of society.

Cities as growth poles or drivers. Cities that concentrate productive capacity and developed systems of goods turnover create the majority of the gross domestic product. According to Jacobs (1985) the main wealth of national economies is formed and concentrated exactly in cities. According to research by McKinsey (2012), the population of 423 cities in developing countries will increase by 40% and their GDP per capita will more than double (from $13,000 to $31,000 per year) by 2025. More than 80% of global GDP is created in cities according to the World Bank (2023). However, GDP is probably not the only measure of a city's contribution to economic development. So, for example, in Kazakhstan, the 3 largest cities account for 10.2% (Astana), 18.5 (Almaty), 3.1% (Shymkent) of the gross regional product, 11.5%, 20.6%, 1.9% of foreign trade turnover. At the same time, however, Almaty and Shymkent absorb more than 25% of foreign trade revenue, having a passive foreign trade balance.

The concentration of population and production in cities has several advantages for both producers and consumers. And increased scale of production creates cost saving effect that increase the production profitability. This effect is also generated by internal economies of scale (lower costs to purchase raw materials) and location-related economy (lower transport costs). Large cities provide a favourable environment for the development of diversified production of goods and services. The production of many goods and services is not feasible for economic reasons in smaller localities due to thresholds (Zanadvorov and Zanadvorova, 2003).

According to the theory of central places, large cities are centres of vast zones that include other, smaller cities, and "organize" the economies of these zones. The larger the city, the more it contributes to realization of production concentration effects in its territory, giving impulses to development of its own economy and then, to development of economies of smaller cities in its territory and the economy of the whole united zone as a whole (Glukhova, 2006).

Migration and urbanisation risks. The World Social Report 2020 (UNDESA, 2020a) notes that the urbanisation quality will largely determine economic, spatial and social aspects of future inequality. Despite the positive effects of urbanisation, it notes the possible negative risks of urbanisation, such as overcrowding, rising crime rates, pollution, increase in inequality and social exclusion. Attention is also drawn to the fact that Gini coefficients of income inequality are higher in cities than in rural areas in 36 out of 42 countries.

The OECD Cities Study (2006) notes that one should not overestimate the potential of metropolitan cities. They face a variety of challenges, including the emergence of large and persistent focal points of unemployment, poverty and social exclusion; an increase in the informal economy and informal employment; high levels of crime and spatial polarisation; the costs of overcrowding and congestion in transport systems; the negative economic effects of agglomeration effects; and increased geodynamic hazards. For example, Parnreiter (2002) notes that there is inequality in the concentration of resources and activities between global cities and other cities in the country, although the degree of this inequality may vary across countries. The acquisition of the functions of global cities by megacities also gives rise to a number of contradictions.

Urbanisation dynamics and its limits. Particular attention should be paid to the urbanisation level in developing countries where the urbanisation level is relatively low. Shaban et al. (2022) note that the idea common in the academic literature that urbanisation stimulates economic growth has been theoretically argued rather than empirically tested. The authors point out that accelerated urbanisation programmes in India resulted from the expectation that urbanisation would result in economic growth served to liberalize urban policies as opposed to rural and settlement development policies. Cities pull financial and human resources, and imbalances in resource allocation between rural and urban areas have not unequivocally led to economic growth. Shaban et al. (2022) show a dominant unidirectional causal relationship from economic growth to urbanisation. Chen (2012) discusses the urbanisation level curves by considering two types of curves, the S-curve (for developed countries) and the J-curve (for developing countries), noting that in developed countries which reached an urbanisation level of 75% the process has stabilised and counter-urbanisation processes are observed.

In developing countries, urbanisation is in an active growth phase (Xu et al., 2019; Shepard, 2015). They note that China's urban initiatives and rapid urbanisation have resulted in 'ghost towns', blurring and displacing traditional socio-cultural structures with a culture of universal consumption. In many cases, uncontrolled urbanisation goes hand in hand with widespread poverty with a lack of infrastructure and investment for its development; increase in pressure on health systems as manifested in the COVID-19 pandemic; deterioration of climate, increase in social instability (rising violence, crime, social unrest) (Zurich Insurance Group, 2023). The question of over- and under-consumption, the optimum urbanisation level or urban concentration, is also relevant. Henderson (2003) notes that urbanisation is a temporary phenomenon, and that national public policies and undemocratic institutions contribute to an excessive concentration of a country's urban population in one or two major metropolitan areas. Henderson (2003) shows that rapid urbanisation has often occurred against a background of low or negative economic growth. He shows that the best concentration degree depends on the level of the country development and size.

Thus, Sassen's theory of the global city, as conceived by the author, was an analytical construct, but in practice it became the rationale for the transformation of urban policy aimed at achieving the status of a global city, especially in developing countries (Sassen, 2001). This is clearly evident in Latin American countries. In

addition, in developing countries, under the influence of theories of the megacities, global city and urbanization, disproportionately large material resources are mobilized in order to build the largest, global cities, diverting funds from solving other problems. As such an example, the transformation of Mumbai into a global financial center is often cited (Zhivotovskaya and Chernomorova, 2008). But these same ideas were used in Kazakhstan. The task was set to create 4 megacities in the coming years. This has greatly affected internal migration flows, which can lead to the concentration of more than 30% of the country's population in 3 megacities.

3. Methodology

Correlation analysis was used to identify the degree of relationship between the variables and the trend of one variable under the influence of the other one. The Pearson correlation coefficient was used to assess the closeness (strength) of the relationship between the variables if: the relationship in question is linear; variables are measured in strong scales (relational or interval) (Kharchenko, 2001). Pearson correlation coefficient was calculated with the use of the Equation (1) in the following form:

$$r = \frac{\sum_{i=0}^{n}(x_i-\bar{x})(y_i-\bar{y})}{\sqrt{[\sum_{i=0}^{n}(x_i-\bar{x})][\sum_{i=0}^{n}(y_i-\bar{y})]}} \quad (1)$$

where x_i, y_i—numerical values of the variables in question; *n*—the sample size.

Besides, Spearman and Kendall rank regression coefficients ρ_0 were used to analyse the interdependence between rank series. Spearman's ρ_0 is interpreted similarly to Pearson correlation coefficient and can take values in the same range (−1; +1). The Equation (2) was used to calculate this coefficient:

$$r = 1 - \frac{6\sum_{i=1}^{l} d_i^2}{l(l^2-1)} \quad (2)$$

where $\sum_{i=1}^{l} d_i^2$—sum of the squares of the rank differences; *l*—number of paired observations.

Kendall coefficient was used to measure the relationship between qualitative features characterising objects of the same nature, ranked according to the same criterion. This coefficient can also take values from −1 to +1 and is determined by Equation (3) (Bear et al., 2008):

$$t_a = \frac{n_C - n_D}{\left[\frac{n(n-1)}{2}\right]} \quad (3)$$

where n_C—number of matching pairs; n_D—number of inconsistent pairs; *n*—number of observations.

Determination of other characteristics of the relationship, including direction, as well as the presence of dependencies was based on regression analysis. The study used the linear regression method, SPSS models. It was assumed that the relationship between the dependent variable (*Y*) and the independent variable (*X*) can be expressed by a linear equation of a simple linear regression model according to Equation (4) proposed by Montgomery et al. (2012):

$$Y = b + b_1 x + e \quad (4)$$

where *Y* is a dependent variable (regressor); *x* is an independent variable (predictor);

b - b1 is a regression coefficient (change in the mean value of y under a single change) *x*; *e*—is a prediction error.

The correlation levels are grouped according to Nasledov (2011) (**Table 1**):

- strong positive relationship: $r > 0.70 \leq 1.00$,
- moderate positive relationship: $r > 0.30 \leq 0.69$,
- weak positive relationship: $r > 0.01 \leq 0.29$,
- weak negative relationship: $r > -0.01 \leq 0.29$,
- moderate negative relationship: $r > -0.03 \leq -0.69$,
- strong negative relationship: $r > -0.70 \leq -1.00$.

Table 1. Correlation matrix.

Method	Code	Correlation coefficient							
		UL	**GDP**	**GNIPC**	**UER**	**SP**	**PL**	**HL**	**HLE**
Pearson	UL	1.000	0.157	0.572**	0.075	0.731**	0.679**	0.636**	0.652**
	GDP	0.157	1.000	0.232**	−0.097	0.175*	0.218*	0.169	0.180
	GNIPC	0.572**	0.232**	1.000	−0.173*	0.720**	0.802**	0.724**	0.641
	UER	0.075	−0.097	−0.173*	1.000	−0.010	−0.082	−0.251**	−0.044
	SP	0.731**	0.175*	0.720**	−0.010	1.000	0.966**	0.818**	0.894
	PL	0.679**	0.218*	0.802**	−0.082	0.966**	1.000	0.842**	0.861
	HL	0.636**	0.169	0.724**	−0.251**	0.818**	0.842**	1.000	0.766
	HLE	0.652**	0.180	0.641	−0.044	0.894	0.861	0.766	1.000
Kendall's Tau-b	UL	1.000	0.362**	0.584**	0.086	0.507**	0.488**	0.465**	0.466
	GDP	0.362**	1.000	0.446**	−0.108	0.369**	0.363**	0.341**	0.386
	GNIPC	0.584**	0.446**	1.000	0.001	0.782**	0.788**	0.668**	0.691
	UER	0.086	−0.108	0.001	1.000	0.021	−0.012	−0.083	0.028
	SP	0.507**	0.369**	0.782**	0.021	1.000	0.867**	0.656**	0.727
	PL	0.488**	0.363**	0.788**	−0.012	0.867**	1.000	0.677**	0.709**
	HL	0.465**	0.341**	0.668**	−0.083	0.656**	0.677**	1.000	0.603
	HLE	0.466	0.386	0.691	0.028	0.727	0.709**	0.603	1.000
Spearman's Roe	UL	1.000	0.524**	0.784**	0.125	0.713**	0.683**	0.638**	0.650**
	GDP	0.524**	1.000	0.636**	−0.156	0.530**	0.527**	0.504**	0.541
	GNIPC	0.784**	0.636**	1.000	0.014	0.930**	0.929**	0.853**	0.879
	UER	0.125	−0.156	0.014	1.000	0.040	−0.009	−0.121	0.040
	SP	0.713**	0.530**	0.930**	0.040	1.000	0.973**	0.844**	0.904**
	PL	0.683**	0.527**	0.929**	−0.009	0.973**	1.000	0.862**	0.804**
	HL	0.638**	0.504**	0.853**	−0.121	0.844**	0.862**	1.000	0.812**
	HLE	0.650**	0.541	0.879	0.040	0.904**	804**	0.812**	1.000

Notes: **. Correlation is significant at the 0.01 level (double-sided). *. Correlation is significant at the 0.05 level (double-sided). Calculated in IBM SPSS.

4. Results

4.1. Analysis of the relationship between the urbanization and socio-economic development

The task of the first stage to study the extent to which the urbanisation level has an impact on the social and economic parameters of countries based on correlation and regression analysis. Besides, the objective was to study the relationship between the urbanisation level and a country's population size and density. The analysed indicators, their coding, units of measurement, hypotheses, and data sources for first stage research are presented in **Table 2**.

Table 2. Hypotheses of the first stage and results of correlation analysis.

№	Indicators for analysis	Coding	Unit of measurement	Hypotheses	Result
0.	Urbanization level	UL	%		
1.	Gross Domestic Product	GDP	USD million	H1: Growth in the urbanisation level contributes to the country's GDP level	Confirmed
2.	GNI per capita ranking	GNIPC	USD	H2: Growth in the urbanisation level contributes to an increase in the per capita gross national income level	Confirmed
3.	Unemployment rate ranking	UER	%	H3: Growth in the urbanisation level contributes to a reduction in the country's unemployment rate	No confirmed
4.	Social progress ranking	SP	Index	H4: Growth in the urbanisation level contributes to the social progress of the country	Confirmed
5.	Prosperity level ranking	PL	Index	H5 Growth in the urbanisation level increases the country's prosperity rate	Confirmed
6.	Happiness level ranking	HL	Index	H6: Growth in the urbanisation level contributes to the country's level of happiness	Confirmed
7.	Healthy Life Expectancy	HLE	Index	H7: Growth in the urbanisation level contributes to an increase in the country's healthy life expectancy	Confirmed
8.	Population ranking	P	Persons	H8: Growth in the urbanisation level depends on the size of the country's population	No confirmed
9.	Population density ranking	PD	Persons per km²	H9: Growth in the Growth in the urbanisation level depends on the population density in the country.	No confirmed

Notes: Data sources UNDESA (2020b, 2022a, 2022b), World Bank (2022a, 2022b), ILO (2022a, 2022b), (Social Progress Imperative (2022), Legatum Prosperity Index (2023), UN World Happiness Report (2023), Life Expectancy Index (2022).

Out of 237 countries ranked by population size and density, 134 were selected as present in all the rankings of interest at the same time. The calculations were performed using IBM SPSS. Based on the correlation analysis, a correlation matrix was compiled, where a higher level of correlation corresponds to a more intense colour. From the data of the correlation matrix it follows that the urbanisation level has a strong direct linear relationship with the social progress level (0.731), a moderate positive relationship with the prosperity and happiness levels, the healthy life expectancy (0.679; 0.636, 0.652 respectively). A positive linear influence of urbanisation on the gross national income per capita level is evident (0.572). Thus, H2, H4, H5, H6 and H7 hypotheses confirmed. There is a weak but positive relationship between the level of GDP and the level of urbanization (0.157), which allows us to confirm hypothesis H1. (Annex A, Tables A.1–A.7) (Annex, 2023). An additional argument in favour to accept the relationship is the statement about the significance of lower modulo correlation coefficients when the sample size is large. In our case the

sample size is large enough—134 countries. It is worth noting the strong interdependence of the following parameters from the other correlations: Gross national income per capita with levels of social progress, prosperity and happiness, and healthy life expectancy; social progress level with levels of prosperity, happiness, and healthy life expectancy; prosperity level with the level of happiness and healthy life expectancy; happiness level with healthy life expectancy (**Table 1)**.

The hypothesis (H3) about the reverse effect of urbanization on unemployment was not confirmed. (Annex A, Table A.3) (Annex, 2023). Although a weak, but positive relationship is observed (0.075P; 0.086K; 0.125Sp). There is a negative correlation between unemployment and most of the analysed parameters (except the urbanisation level). This impact is obvious. For example, an increase in unemployment reduces gross national income per capita (−0.173) and happiness level (−0.251) quite noticeably (**Table 1)**.

The obtained results are confirmed by all three methods used: Pearson correlation, Kendall's rank correlation and Spearman's correlation. The fidelity degree of the relationships obtained is determined based on the statistical significance level (ρ-level), i.e., the estimated measure of confidence in the correctness of the result. A higher p-value which represents the probability of error associated with the extension of the observed result to the entire data set, corresponds to a lower confidence level in the relationship found in the sample between the variables. In scientific studies, the significance level is taken as 0.05 or less (in some cases, it may be taken as 0.1). Most of the dependencies obtained by us are confirmed by ρ-values not exceeding 0.1 (**Table 3**).

Table 1. Correlogram of the interpretation of the p-level correlation coefficient.

Method	**Code**	***P*-level correlation coefficient**							
		UL	**GDP**	**GNIPC**	**UER**	**SP**	**PL**	**HL**	**HLE**
Pearson	UL	1.000	0.070	<0.001	0.389	<0.001	<0.001	<0.001	<0.001
	GDP	0.070	1.000	0.007	0.263	0.043	0.011	0.051	0.037
	GNIPC	<0.001	0.007	1.000	0.045	<0.001	<0.001	<0.001	<0.001
	UER	0.389	0.263	0.045	1.000	0.905	0.344	0.003	0.611
	SP	<0.001	0.043	<0.001	0.905	1.000	<0.001	<0.001	<0.001
	PL	<0.001	0.011	<0.001	0.344	<0.001	1.000	<0.001	<0.001
	HL	<0.001	0.051	<0.001	0.003	<0.001	<0.001	1.000	<0.001
	HLE	<0.001	0.037	<0.001	0.611	<0.001	<0.001	<0.001	1.000
Kendall's Tau-b	UL	1.000	<0.001	<0.001	0.144	<0.001	<0.001	<0.001	<0.001
	GDP	<0.001	1.000	<0.001	0.065	<0.001	<0.001	<0.001	<0.001
	GNIPC	<0.001	<0.001	1.000	0.982	<0.001	<0.001	<0.001	<0.001
	UER	0.144	0.065	0.982	1.000	0.722	0.840	0.159	0.637
	SP	<0.001	<0.001	<0.001	0.722	1.000	<0.001	<0.001	<0.001
	PL	<0.001	<0.001	<0.001	0.840	<0.001	1.000	<0.001	<0.001
	HL	<0.001	<0.001	<0.001	0.159	<0.001	<0.001	1.000	<0.001
	HLE	<0.001	<0.001	<0.001	0.637	<0.001	<0.001	<0.001	1.000

Table 2. (*Continued*).

Method	Code	*P*-level correlation coefficient							
		UL	**GDP**	**GNIPC**	**UER**	**SP**	**PL**	**HL**	**HLE**
Spearman's Roe	UL	1.000	<0.001	<0.001	0.151	<0.001	<0.001	<0.001	<0.001
	GDP	<0.001	1.000	<0.001	0.072	<0.001	<0.001	<0.001	<0.001
	GNIPC	<0.001	<0.001	1.000	0.870	<0.001	<0.001	<0.001	<0.001
	UER	0.151	0.072	0.870	1.000	0.647	0.917	0.164	0.645
	SP	<0.001	<0.001	<0.001	0.647	1.000	<0.001	<0.001	<0.001
	PL	<0.001	<0.001	<0.001	0.917	<0.001	1.000	<0.001	<0.001
	HL	<0.001	<0.001	<0.001	0.164	<0.001	<0.001	1.000	<0.001
	HLE	<0.001	<0.001	<0.001	0.645	<0.001	<0.001	<0.001	1.000

Note: calculated by SPSS.

When H8 and H9 hypotheses tested by the linear regression method (Annex A. Tables A.8,9) (Annex, 2023). the influence of population size and density on the urbanisation level was not confirmed (**Table 4**). There is a weak correlation determined from the small values of the coefficient modules (0.77; 0.151 by Pearson; 0.065; 0.051 by Kendall; 0.097; 0.062 by Spearman) in this case according to the values of the correlation coefficients presented in **Table 4**.

Table 3. Correlation matrix.

Method	Code	Correlation coefficient		
		P	**PD**	**UL**
Pearson	P	1.000	0.011	-0.077
	PD	0.011	1.000	0.151
	UL	-0.077	0.151	1.000
Kendall's Tau-b	P	1.000	0.070	-0.065
	PD	0.070	1.000	-0.051
	UL	-0.065	-0.051	1.000
Ro Spearman	P	1.000	0.099	-0.097
	PD	0.099	1.000	-0.063
	UL	-0.097	-0.063	1.000

Note: calculated by SPSS.

Thus. the validity of the results is clear. Models of the dependence of the parameters in question on the urbanisation level were determined based on regression analysis. The most effective models obtained were selected to meet the requirements based on the values of statistical significance and R-square. The calculation of their coefficients is presented in Annex A (Table A.10) (Annex, 2023). The resulting scatter diagrams also show a positive linear relationship. Moreover. the relationship between population size and density and urbanisation is negative in some cases. This aspect. as well as the *p*-values of the significance of the relationships indicate the urbanisation level dependence on a more significant number of factors not taken into account.

4.2. Levels of urbanization and socio-economic progress

The task of the second stage is to determine what level of urbanization most contributes to the growth of socio-economic indicators of countries' development. For this purpose. countries grouped according to their urbanisation level into groups: 50%–59%. 60%–69%. 70%–79%. 80%–89%. 90%–100% (Annex A. Table A.11) (Annex, 2023). The following hypotheses were put forward to solve the problem (**Table 5**). The results of the correlation and regression analysis are presented in **Table 6**. It should be noted that models with R^2 values greater than 0 were considered due to the small sample size of the analysis. They showed the statistical significance of the models obtained. The closeness of the relationship can be clearly seen in the scatter plots—the closer the points are to the straight line. the stronger the linear relationship and the higher the Pearson correlation coefficients (Annex A. Figure A.10) (Annex, 2023).

Table 4. Hypotheses of second stage and results.

№	**Hypotheses**	**Result**
H1	The highest levels of social parameters achieved at the urbanisation level of 50%–59%;	Confirmed
H2	The highest levels of social parameters achieved at the urbanisation level of 60%–69%;	Not confirmed
H3	The highest levels of social parameters achieved at the urbanisation level of 70%–79%;	Confirmed
H4	The highest levels of social parameters achieved at the urbanisation level of 80%–89%;	Not confirmed
H5	The highest levels of social parameters achieved at the urbanisation level of 90%–100%;	Not confirmed

Table 5. Comparative analysis of the positions of countries with different urbanisation levels and Kazakhstan in the world rankings.

		Austria	**Kazakhstan**	**Argentina**
Urbanization level	%	59	57.5	92
GDP	$ billions	477.1	190.8	491.5
	Rank	30	55	26
GNI per capita	$ thousand	53.3	10.0	10.07
	Rank	22	88	87
Unemployment rate	%	05.04	04.09	12
	Rank	110	122	40
Social progress	Index	88.05	71.21	79
	Rank	11	65	41
Prosperity level	Index	79.7	59.53	61
	Rank	14	69	58
Happiness level	Index	7.163	6.144	6
	Rank	11	44	52
Healthy life expectancy	years	72.4	63.4	68.4
	Rank	16	105	41

As can be seen from the results. a positive result shows an urbanisation level of 50%–59%. Thus. the strongest positive correlation of parameters is noted with the level of healthy life expectancy (0.882). social progress (0.739). A positive impact is

observed on levels of prosperity (0.312) and happiness (0.194) despite the low correlation coefficients. nevertheless. A negative correlation is observed when the interaction with the unemployment rate is analysed. It also confirms the positive effect of its reduction. Thus. H1 hypothesis was confirmed. A greater reduction in unemployment observed at the 70%–79% urbanisation level but low levels of correlation coefficients observed for other dependencies—social progress (0.223). prosperity (0.200). happiness level (0.210). and healthy life expectancy (0.343). Overall. it should be noted that H3 hypothesis also holds true. All the other three hypotheses (H2. H4. H5) are not confirmed. as there are negative phenomena in these cases:

(1) Increase in the unemployment rate (0.202). the Pearson coefficients of happiness (−0.001) and healthy life expectancy (−0.087) have a negative sign at an urbanisation level of 60%−69%;

(2) Decrease in all the coefficients (worst case) at an urbanisation rate of 80%−89%;

(3) Decrease in social progress was found but even in cases of positive correlation. the level of the correlation coefficient was very low (0064; 0.049) at the urbanisation level of 90%−100%.

It should be noted that. in general. the option of 80% or more demonstrates a worse situation. which may be an indication of the exhaustion of the urbanisation benefits. The analysis results suggest that increased urbanisation is not a panacea to solve countries' social and economic problems.

4.3. Comparative analysis of countries with different levels of urbanization

A comparison of country-specific parameters can be made to confirm the data analysis results from 134 countries around the world. Let us compare. for example. the social and economic parameters of two foreign countries with different urbanisation levels: Austria (59%) and Argentina (92%). as well as Kazakhstan (**Table 6**). The table shows that Argentina. with a higher urbanisation rate (92%). lags behind Austria with an urbanisation rate of 59% in almost all parameters except for GDP. the difference in levels between these countries is insignificant. If Kazakhstan’s parameters are compare with that of these countries. a significant lag in all parameters can also seen. except for unemployment. from that of Austria. although both countries are in the same urbanisation group. At the same time. compared to Argentina. Kazakhstan is very close in terms of gross national income per capita. being next in the ranking. as well as the prosperity level. Furthermore. our country has a clear advantage in parameters such as unemployment and happiness levels.

Of course. the results obtained cannot be considered absolutely correct. as the analysis of dependencies does not consider the influence of many other factors that have a significant impact on the result. It is evidenced by the levels of coefficients of statistical significance. However. this circumstance is caused by the limitation of the possibility to conduct a similar but more complete study due to insufficient information.

5. Discussion

5.1. About the “trap of urbanization” hypothesis

Thus. it is clear that there are limits to the urbanisation growth levels. beyond which not only the social and economic parameters do not improve significantly but on the contrary. they may deteriorate. It. in its turn. calls the feasibility to set targets for increase in the urbanisation level into question. The conclusion that increased urbanisation does not always improve social and economic parameters confirms the earlier general assumption or hypothesis of the so-called “urbanisation trap” with increase in concentration of population in large cities.

Researchers from various countries have noted this phenomenon recently. For instance. Glaeser (2012). Glaeser and Gottlieb (2009) point out that many of the cities that were previously the birthplace of new thinking. new art and new technology turn into tourist destinations where property prices are constantly rising. and housing is becoming less affordable for young creatives. Therefore. the authors advocate a more flexible regulation of modern urban development. in particular allowing high-rise buildings in areas adjacent to historic districts. Storper et al.. (2015). Jacobs (1992) also emphasize that sustainable success in the modern world is achieved not by large cities and “museum cities” that are too expensive to live in. and not by industrial cities that lose competitiveness and qualified personnel but by those cities that build affordable housing. have educational centres. create conditions for human capital accumulation. support entrepreneurial spirit. and which attract educated. talented professionals who create and promote innovation.

Engineering and housing infrastructure in large cities is severely worn out. traffic is difficult. and it is expensive to maintain public transport and roads. education and healthcare. adding to the costs of city budgets. Moreover. low-income. marginalised populations are concentrated on the outskirts of large cities. leading to problems of crime. quality of life. ecology. traffic congestion. etc. Limonov et al. (2020) consider that small towns provide more comfort and quality of life. healthier environment and safety with lower deductions for local taxes due to lower land prices.

5.2. On the limits of the growth of the level of urbanization in Kazakhstan

The analysis results and conclusions that there are limits to the urbanisation growth. beyond which further concentration of population in cities. especially large cities. is inefficient and often undesirable. in our view. are applicable to Kazakhstan in full. In our country. unmanaged population growth in metropolitan cities results in increased demographic pressure. especially on land and water resources. increasing problems with social infrastructure and. as a consequence. to growing social tensions. For example. in Kazakhstan largest city. Almaty. the need for housing. kindergartens. schools. hospitals and clinics has increased sharply. not so much due to natural population growth as to the enormous flow of migrants from small towns and villages. For example. the general plan of the city for 2025 approved the need for 100 schools while the deficit of places in schools will reach one million in Kazakhstan as a whole. according to the demographic forecast.

Despite the fact that the level of provision of the population with amenities is

significantly higher than in rural areas. the rapid increase in the number of inhabitants of metropolitan cities may result in a deterioration of this parameter. Thus. our previous studies of the level of provision with such socially important services in three Kazakhstan's megacities. mains gas. central water and heating supply. central sewerage. rubbish collection. telephone and Internet showed that the coefficient of housing amenities decreased from 0.91 to 0.845. (Tleuberdinova et al.. 2022).

Contrary to the widespread perception of a job surplus in big cities. Almaty has the highest official unemployment rate in the country (5.2%). with self-employment rising by 44% and more than twice as high in the capital. Astana. with a population of about 1.3 million. reflecting the precarious nature of employment. Kazakhstan's metropolitan cities had the highest pollution index. reaching 8.0 in Almaty and 7.0 in Astana.

In 2021. Kazakhstan developed and adopted the National Project "Strong Regions—Drivers of National Development" within the framework of the National Development Plan 2025. According to the implementation plan of this project and its parameters. the urbanisation level was to increase to 62.6% by 2025. and it was assumed that this process would be achieved by increase of the population in agglomerations and regional centres by 1.7% annually. In other words. this plan envisaged an increase in urbanisation in the country by further increase in the number of population only in large cities. However. in this project. the development of medium and small cities has not been given due attention. Moreover. more than 3000 rural settlements in Kazakhstan deemed unpromising and will result in their elimination in the near future.

In our opinion. this strategy of regional development and urbanisation in Kazakhstan is unreasonable. short-sighted and very risky. Liquidation of small settlements. recognized as unpromising. and relocation of its residents to large cities deprives them of their usual way of life. housing. land. and for the country increases the threat to violate the integrity of economic space. irrational placement of economic activities in the territory of the country. From 2016 to 2020 the population of small cities decreased from 10% to 39%. with mainly able-bodied qualified personnel moving to large cities in Kazakhstan. A number of small cities in Kazakhstan also experienced a decline in natural population growth.

5.3. Individual urban development plans and prospects for small towns in Kazakhstan

The way out of the critical situation should be the elaboration of individual development strategies for each type of city or a particular city. connected with new technologies and digitalization. service orientation of the economy. expansion of small and medium business and taking into account all its strengths and weaknesses and development opportunities. Strategic plans should include changes in the functions and sectoral structure of the urban economy.

The need for individual development plans in each city taking into account historical. resource. natural-climatic. political. mental. cultural and other characteristics. is noted (Geyer and Kontuly. 1993; Bochko and Zacharchuk. 2020). In their opinion. urbanisation trends should change in the direction from moving persons

from large cities to smaller and smaller satellite towns with socially oriented urban planning and green areas. Besides drastic changes in the profile. functions and sectorial structure of urban economies. strategic plans for urban development must include the development of social infrastructure and other facilities that improve the living conditions of persons. ensure the growth of welfare. a positive trend in fertility and life expectancy and cultural traditions.

Taking into account the global experience. promising strategies for the development of small cities in Kazakhstan should ensure the transition from the "city-factory" model to the "city for people" model with infrastructure development and improvement of living conditions. New markets and services. such as digital. software. information. financial. healthcare. education and tourism. should play an important role in their economies. Greater concentration of production and population in large metropolitan cities does not always mean improved quality of life for all segments of their population. In other words. the social and economic situation in large cities often deteriorates which requires greater attention to the regulation of urbanisation processes.

6. Conclusion

The urbanisation level in Kazakhstan has the potential to be higher than its current level. However. the urbanisation growth should not come solely from the growth of large cities. Given the spatial features of Kazakhstan with its relatively low population density. a focus on the development of the largest cities will have strong consequences in the form of spatial-demographic and spatial-economic imbalances. deterioration of the quality of economic space. its absorption. weakening of local centres and the strength of intra-regional ties. Therefore. a new impetus for the development of small and medium-sized towns and for changes in their specialisation. economy and functional purpose must be created in regional policy. Alongside. revitalisation instruments for rural areas must become an important focus of regional policy. The development of small towns should be directed towards the solution of the following main tasks: stimulation of the rational use of local natural. labour. production and business resources; creation of favourable conditions for the inflow of investments; development of infrastructure. social conditions for the local population. The following support mechanisms for small towns recommended:

(1) Elaboration of individual small town development strategies. Use of economic levers for the development of small towns: targeted programmes of technological modernisation of production in traditional industries; digitalisation programmes for the stimulation of the creation of new knowledge-intensive industries; programs of employment. professional training and retraining of personnel; programs for infrastructure development and improvement of residential areas; housing construction programmes; environmental protection programmes. etc.

(2) Formation of independent budgets of local authorities by improvement of inter-budgetary regulation based on a multi-level approach to the redistribution of value-added taxes (VAT). Introduction of an increasing coefficient for vulnerable localities in the redistribution of value added taxes—from 1.05 to 1.5 depending on the population size. Application of a preferential tax regime for modernisation and infrastructure and SME development. Establishment of minimum social standards per capita.

(3) Provision of concessional loans for setting up industries processing agricultural raw materials and developing cooperation. Using public-private partnership (PPP) mechanisms to set up manufacturing facilities in the manufacturing sector. Application of organizational methods: provision of incentives for the rental of production and office space; provision of a statutory right to accelerated depreciation to encourage technological modernisation of unprofitable production facilities; simplified issue of permits. certificates. licences for entrepreneurial activities.

Thus. in order to avoid the "urbanisation trap" in Kazakhstan. it is advisable to change the centripetal vector of population migration towards metropolitan cities to the centrifugal one. i.e., towards satellite towns. small and medium-sized cities. At the same time. it is recommended to strengthen measures of state support for the development of small towns and ensure their transition to a more progressive specialization of the economy. its digitalization and innovative development.

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References

Annex A. (2023). Available online: https://docs.google.com/document/d/15R9I3MCr7tbOqlEvdk2ucHHXrFjuwW6u/edit?usp=sharing&ouid=115994703329182252077&rtpof=true&sd=true ((accessed on 20 March 2023).

Bear, G., King, B. M., Minium, E. W. (2008). Statistical Reasoning in Psychology and Education. Wiley India Pvt. Limited. p. 612.

Bochko, V. S., & Zacharchuk, E. A. (2020). Individualization of City Development Strategies: Case of Ekaterinburg and Birmingham). Economy of Region, 16(2), 391–405. https://doi.org/10.17059/2020-2-5

Bureau of National Statistics. (2022). Brief results of the National Population Census 2021. Astana. p. 63.

Chen, Y. G. (2012). On the Urbanisation Curves: Types, Stages, and Research Methods. Scientia Geographica Sinica, 32(1), 12–17. http://doi.org/10.13249/j.cnki.sgs.2012.01.12

Geyer, H. S., & Kontuly, T. (1993). A Theoretical Foundation for the Concept of Differential Urbanization. International Regional Science Review, 15(2), 157–177. https://doi.org/10.1177/016001769301500202

Glaeser, E. (2012). Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier. Penguin Books. p. 368.

Glaeser, E. L., & Gottlieb, J. D. (2009). The Wealth of Cities: Agglomeration Economies and Spatial Equilibrium in the United States. Journal of Economic Literature, 47(4), 983–1028. https://doi.org/10.1257/jel.47.4.983

Glukhova, E. V. (2006). On the role of cities in the development of the world economy. Fundamental Research, 4, 25–27.

Henderson, V. (2003). The Urbanisation Process and Economic Growth: The So-What Question. Journal of Economic Growth, 8, 47–71. https://doi.org/10.1023/a:1022860800744

ILO. (2022a). Unemployment Index 2022. International Labour Organization. Available online: http://ilostat.ilo.org/ (accessed on 20 March 2023).

ILO. (2022b). Employment Index 2022. International Labour Organization. Available online: http://ilostat.ilo.org/ (accessed on 20

March 2023).
Jacobs, J. (1985). Cities and the Wealth of Nations: Principles of Economic Life. Vintage. p. 272.
Jacobs, J. (1992). The Death and Life of Great American Cities. Vintage; Reissue edition. p. 458.
Kharchenko, M. A. (2001). Correlation analysis. Voronezh: VSU. p. 31.
Legatum Prosperity Index. (2023). LegatUL Institute. Available online: http://www.prosperity.com/ (accessed on 20 March 2023).
Limonov, L. E. (2020). Urbanistic. Urban economy, development, and management. Moscow: Yurayt Publishing House. p. 822.
McKinsey. (2012). Sustainability & Resource Productivity. Available online: https://gtmarket.ru/news/state/2011/03/28/2774 (accessed on 20 March 2023).
Montgomery, D. C., Peck, E. A., Vining, G. G. (2012). Introduction to linear regression analysis. John Wiley & Sons. p. 872.
Nasledov, A. D. (2011). SPSS 19. Professional statistical data analysis. St. Petersburg: Piter. p. 400.
OECD. (2006). Competitive Cities in the Global Economy. In: OECD Territorial Reviews. OECD. https://doi.org/10.1787/9789264027091-en
Parnreiter, C. (2002). Mexico: The Making of a Global City. In: Global Networks/Linked Cities. London and New York.
Sassen, S. (2001). The Global City: New York, London, Tokyo. Princeton University Press. p. 447. https://doi.org/10.1515/9781400847488
Shaban, A., Kourtit, K., & Nijkamp, P. (2022). Causality Between Urbanization and Economic Growth: Evidence From the Indian States. Frontiers in Sustainable Cities, 4. https://doi.org/10.3389/frsc.2022.901346
Shepard, W. (2015). Ghost cities of China: the story of cities without persons in the world's most populated country. London, UK: Zed Books Ltd. https://doi.org/10.5040/9781350220386
Social Progress Imperative. (2022). Social Progress Index 2022. Available online: http://www.socialprogressindex.com/ (accessed on 20 March 2023).
Storper, M., Kemeny, T., Makarem, N. P., & Osman, T. (2015). The Rise and Fall of Urban Economies. Stanford: Stanford University Press. https://doi.org/10.2307/j.ctvqsdtdq
Tleuberdinova, A., Nurlanova, N. K., & Alzhanova, F. (2022). Social Consequences of the Growth of Kazakhstan's Megapolises and Recommendations for Overcoming. Economics: The Strategy and Practice, 17(4), 58–75. https://doi.org/10.51176/1997-9967-2022-4-58-75
UNDESA. (2018). World Urbanisation Prospect: The 2018 Revision. Available online: http: creativecommons.org/licenses/by/3.0/iga/ (accessed on 20 March 2023).
UNDESA. (2020a). World Social Report-2020. Available online: https://www.un.org/development/desa/dspd/world-social-report/2020-2.html (accessed on 20 March 2023).
UNDESA. (2020b). Urban Population Index. Available online: http://www.un.org/en/development/desa/ (accessed on 20 March 2023).
UNDESA. (2022a). Life Expectancy Index. Available online: http://population.un.org/ (accessed on 20 March 2023).
UNDESA. (2022b). World Population Prospects. Available online: http://population.un.org/ (accessed on 20 March 2023).
World Bank. (2022a). Gross Domestic Product. World Bank Group. Available online: http://www.worldbank.org/ (accessed on 20 March 2023).
World Bank. (2022b). Gross National Income per Capita. World Bank Group. Available online: http://www.worldbank.org/ (accessed on 16 January 2023).
World Bank. (2023). Urban Development. Available online: https://www.worldbank.org/en/topic/urbandevelopment/overview (accessed on 16 January 2023).
World Happiness Report. (2023). Sustainable Development Solutions Network, powered by the Gallup World Poll data. Available online: https://worldhappiness.report/ (accessed on 16 January 2023).
Xu, W., Chen, H., Frias-Martinez, E., Cebrian, M., & Li, X. (2019). The inverted U-shaped effect of urban hotspots spatial compactness on urban economic growth. Royal Society Open Science, 6(11), 181640. https://doi.org/10.1098/rsos.181640
Zanadvorov, V. S., Zanadvorova, A. V. (2003). City economy. Moscow, Akademkniga. p. 272.
Zhivotovskaya, I. G., Chernomorova T. V. (2008). Megacities in the context of globalization. Collection of reviews and abstracts. RAN INION, Moscow. p. 178.
Zurich Insurance Group. (2023). The risks of rapid urbanisation in developing countries. Available online: https://www.zurich.com/en/knowledge/topics/global-risks/the-risks-of-rapid-urbanisation-in-developing-countries (accessed on 13 April 2023).