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RESEARCH ARTICLE
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Impact of Economic and Social Factors on Urban Development: A Comprehensive Analysis of Cities in Kazakhstan

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Abstract

This study presents a comprehensive analysis of the development dynamics of cities in Kazakhstan, focusing on the interplay between economic and social factors and their impact on the Gross Regional Product (GRP). Employing a dataset encompassing a range of indicators, cities were categorized into development groups (Highly Developed, Moderately Developed, Less Developed) based on normalized composite scores. The study aimed to test two central hypotheses through Partial Least Squares Regression (PLSR) analysis: firstly, that economic factors are significant positive determinants of GRP, overshadowing the influence of social factors; and secondly, that social factors significantly influence GRP, with economic factors playing a lesser role. The analysis revealed that economic factors, including SME activity, retail trade, fixed capital investment, and tax revenue, exhibited a substantial impact on GRP, whereas social factors like population growth, average salary, and income levels showed relatively less influence. The findings underscore the predominance of economic determinants in shaping regional productivity, providing critical insights for strategic urban development planning and policy-making. By highlighting the differential impacts of economic and social factors on urban development, this study contributes to the broader understanding of regional growth dynamics and offers a data-driven foundation for targeted developmental initiatives in Kazakhstan's urban centers.

Keywords: Urban Development, Economy, Economic Factors, Social Indicators, Regional Productivity

SCSTI: 06.61.53

JEL Code: O11, O31, O32, O33

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1. INTRODUCTION

The study of metropolitan development and economics is a critical area of research, especially in the context of rapid urbanization and globalization. Understanding how urbanization and economic processes influence each other. Moreover, the pandemic has exposed new challenges and emergencies in densely populated areas, highlighting the importance of redefining urban policies and services based on local characteristics and needs. Personalization of services and trusting relationships between sellers and buyers make a significant contribution to social interactions and define the identity of neighborhoods. Understanding how local commercial activities can contribute to sociality and sustainable communities is also key. Personalization of services and trusting relationships between sellers and buyers make a significant contribution to social interactions and define the identity of neighborhoods (Tricarico & De Vidovich, 2021). Understanding these interactions is critical to developing sustainable development strategies that promote economic growth, social stability, and improved quality of life in metropolitan areas. This is particularly relevant in the context of current global challenges such as climate change, urban growth and migration, which require an integrated and multidisciplinary approach to research and planning.

In the evolving landscape of urban development, understanding the intricate balance between economic vitality and social well-being is crucial for sustainable growth. This is particularly pertinent in the context of Kazakhstan, a nation experiencing rapid urban transformation and economic diversification. This study delves into the developmental dynamics of Kazakhstan's cities, aiming to unravel the complex interplay between economic and social factors and their cumulative impact on urban prosperity, as measured by the Gross Regional Product (GRP). The urban centers of Kazakhstan present a unique canvas for this exploration. Ranging from bustling metropolises like Almaty and Astana to emerging cities such as Kokshetau and Konaev, these urban areas are at varying stages of development, each contributing uniquely to the nation's economic and social fabric. This diversity offers an ideal setting to investigate the multifaceted nature of urban development.

The primary aim of this analysis is to investigate the relative influence of economic and social factors on the Gross Regional Product (GRP) of cities in Kazakhstan. This objective stems from two central hypotheses crafted to understand the dynamics of urban development within the country. The first hypothesis posits that economic factor—encompassing aspects like small and medium enterprise (SME) activity, retail trade, fixed capital investment, and tax revenue—have a significant and positive impact on the GRP, whereas social factors—such as population growth, income levels, and average salaries—are expected to exert an insignificant, possibly negative or neutral, impact.

In many countries, SMEs constitute a significant part of the economy, contributing to job creation, innovation and economic dynamism. Conversely, the second hypothesis inverts this relationship, proposing that social factors are the significant drivers influencing the GRP, with economic factors playing a less consequential role.

Through robust statistical methods, including Partial Least Squares Regression (PLSR) analysis, this study aims to dissect these hypotheses, providing empirical insights into the economic and social dynamics shaping urban centers in Kazakhstan. By doing so, the analysis endeavors not only to contribute to the academic understanding of regional development but also to offer practical guidance for policymakers in prioritizing areas for investment and intervention to stimulate regional growth and prosperity.

2. LITERATURE REVIEW

Research on the development of megacities and the impact of various economic factors is key to understanding current trends in urbanization and economic growth. Urbanization is usually accompanied by an increase in population density, which creates larger markets for informal businesses. More potential customers in urban areas increases sales and revenue for businesses. Urban areas typically have higher income levels and a diversity of economic activities, which creates favorable conditions for the growth and development of informal enterprises. Understanding the dynamics of urbanization and urban concentration allows us to formulate effective urban policies and development strategies that promote optimal resource allocation, sustainable growth, and avoidance of the negative consequences of over- or under-concentration of population in cities. This is especially important for developing countries, where urbanization processes are occurring against a backdrop of rapid economic and social change (Henderson, 2003).

Atawodi and Ojeka (2012) studied the relationship between tax policy, the growth of small and medium enterprises (SMEs) and its impact on the Nigerian economy. The results showed that there is a significant negative relationship between taxes and the ability of a business to self-sustain and expand. Thus, for the prosperity and growth of small and medium-sized enterprises, an adequate tax policy is necessary, which is not an obstacle to their development. Thus, favorable tax policies can not only strengthen the growth of these businesses, but also contribute to overall economic development and improvement of life in metropolitan areas by providing jobs, increasing access to services and improving income distribution. Effective taxation is critical to ensure sufficient funding for local budgets. Woodward et al. (2021) highlighted the importance of SME development, particularly in the informal sector in developing country economies, especially in the context of promoting economic growth and poverty reduction. Moreover, using the example of Africa, the authors showed that urbanization externalities play a significant role in determining the success of informal microenterprises.

Agglomeration is beneficial in cases where the agglomeration economy (the positive benefits from it exceed the additional costs) is realized. Shmidt et al. (2016) conducted a comparative analysis of the regional center and the entire region according to the main socioeconomic indices in static and dynamic conditions and made conclusions about the position of the city and the region based on such socioeconomic indices as the average monthly nominal accrued wages, the cost of fixed assets, investments in fixed capital, new housing construction, the volume of retail trade turnover, the volume of self-produced goods shipped, work performed and services performed in the region. Retail in the process of urbanization contributes to the development of infrastructure, attracting investment and improving the business environment in cities and regions (Voroshilov, 2020). Economic activity concentrated in a specific geographic area leads to the formation of strong economic networks and clusters (Ascani et al., 2020). The spatial concentration of economic activity in urban agglomerations creates conditions for increased productivity, innovation and economic growth (Liu & Zhang, 2021). This is driven by ease of access to markets, resources, information and technology, as well as the ability for businesses and organizations to collaborate and collaborate more closely. This principle emphasizes the importance of agglomerations as engines of economic development and innovation.

Another factor is population density in urban agglomerations, which affects social and economic processes (Huang et al., 2020). Compact living of the population in agglomerations helps to increase the efficiency of infrastructure use, reduce transport and communication costs and create conditions for strengthening social ties (Yao et al., 2022). It can also lead to improved quality of life through access to educational, cultural and health care facilities.

Thus, spatial interaction occurs, which is a particularly significant indicator in regional urban development policy. Moreover, Tan et al. (2016) considered spatial interaction to be one of the key socioeconomic drivers of urban growth. This indicates that, over time, interactions represented by population migration, flows of information and goods play a more important role than the individual socioeconomic drivers of an individual city (Surya et al., 2020; Lei et al., 2021).

The significant role of SMEs in the city's economy is noted, in particular in the volume of investments, the number of jobs, the share in the formation of the regional product and tax revenues. SMEs make a significant contribution to the city's economy, especially in terms of investment, job creation, and in generating regional domestic product and tax revenue (Obaturov, 2014). SMEs are one of the main driving forces of the economy, increasing GDP and contributing to economic diversification. influencing the level of employment and are able to reduce social tension. Also, the development of entrepreneurship contributes to the innovative development of the economy. Thus, industrial development and entrepreneurship affect sustainability of urbanization and growth of cities (Alpatov & Yakushkina, 2017).

To summarize, the literature review indicated key factors which affect the economy development. The indicators include economic (GRP, SME, retail) , financial (taxes, investments) and social indicators (population growth, population income).

3. METHODOLOGY

This study employed a mixed-method approach to analyze the development levels of cities in Kazakhstan. The research process included four main stages (see Figure 1).

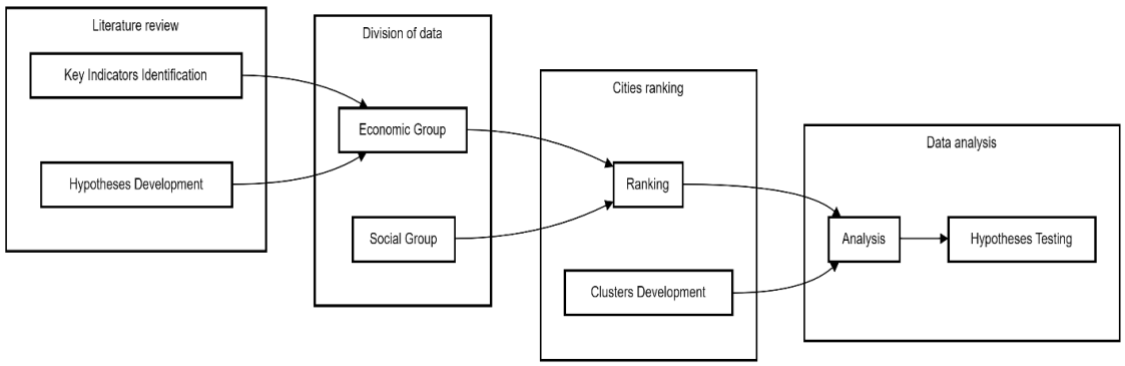

FIGURE 1. Stages of the research

Note: compiled by authors

The study employed descriptive statistics and Partial Least Squares Regression (PLSR). The dataset comprised indicators for different cities across multiple years, including variables such as population growth, average salary, and various economic metrics. The data was normalized using the Min-Max Scaler, facilitating a balanced comparison across various indicators. Next, cities were classified into three development categories - highly developed, moderately developed, and less developed - based on composite scores calculated from the normalized indicators. Scatter plots were generated, visually depicting the trends and development levels of different cities. For the final phase, PLSR analysis was conducted to test two hypotheses related to the impact of social and economic factors on the Gross Regional Product (GRP) of the cities.

The conducted literature review allows to identify key indicators for the study of urbanization process development. The indicators were then divided into two main groups economic and social (see Figure 2).

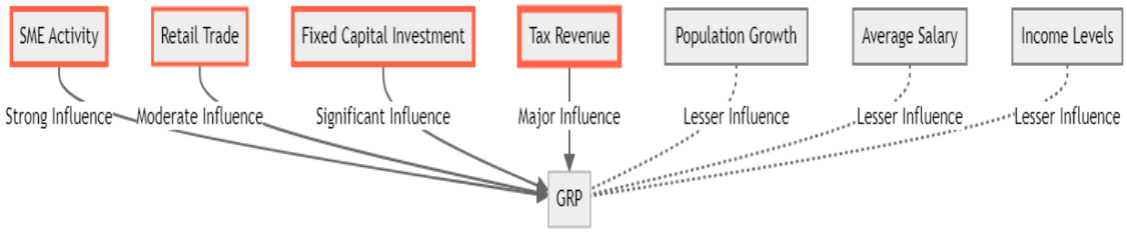

FIGURE 2. Hypotheses

Note: compiled by authors

By offering a comprehensive analysis of the economic and social indicators and their correlation with urban development, this study aims to contribute to the broader understanding of urban growth dynamics. It seeks to provide a nuanced perspective on how cities in Kazakhstan can leverage their unique economic and social assets to foster a thriving, resilient urban environment. This research not only adds to the academic discourse on urban development but also serves as a guide for policymakers and urban planners in strategizing future developmental initiatives.

4. FINDINGS AND DISCUSSIONS

In Kazakhstan urban population accounts for 57.4% of the country's total population living in cities. Three large cities with a population of over a million include Almaty, Astana and Shymkent, where 22% of the country's population lives. Over the past five years, there has been a positive trend in the main socio-economic indicators of urban development, especially in Almaty, Astana and Shymkent. Residents' welfare, gross regional product, economically active population, and wages have all improved, with cities also witnessing increases in industrial production and fixed investment. Almaty and Astana, the largest cities, play an important role in the socio-economic development of the country, serving as centers for business, cultural, innovation, financial, and political activities. Shymkent is also important in the fields of oil, chemical, food industry and mechanical engineering, although the socio-economic state of the city is characterized by moderate development due to high density (Kangalakova & Satpayeva, 2023).

This plot illustrates varying trends in population growth across different cities. While some cities exhibit a steady increase, others show more fluctuating patterns. Cities with significant population growth might be experiencing urbanization, often associated with economic opportunities, better infrastructure, and services. This can lead to increased economic activity and development. Rapid population growth can strain city resources and infrastructure, necessitating careful urban planning and investment in public services, housing, and transportation.

In Figure 3, we are providing dynamics of average salary trends and population growth trends in cities for 2010-2020. The data, analyzed over a decade, indicates a clear pattern: cities with higher salary growth rates tend to experience more significant population increases.

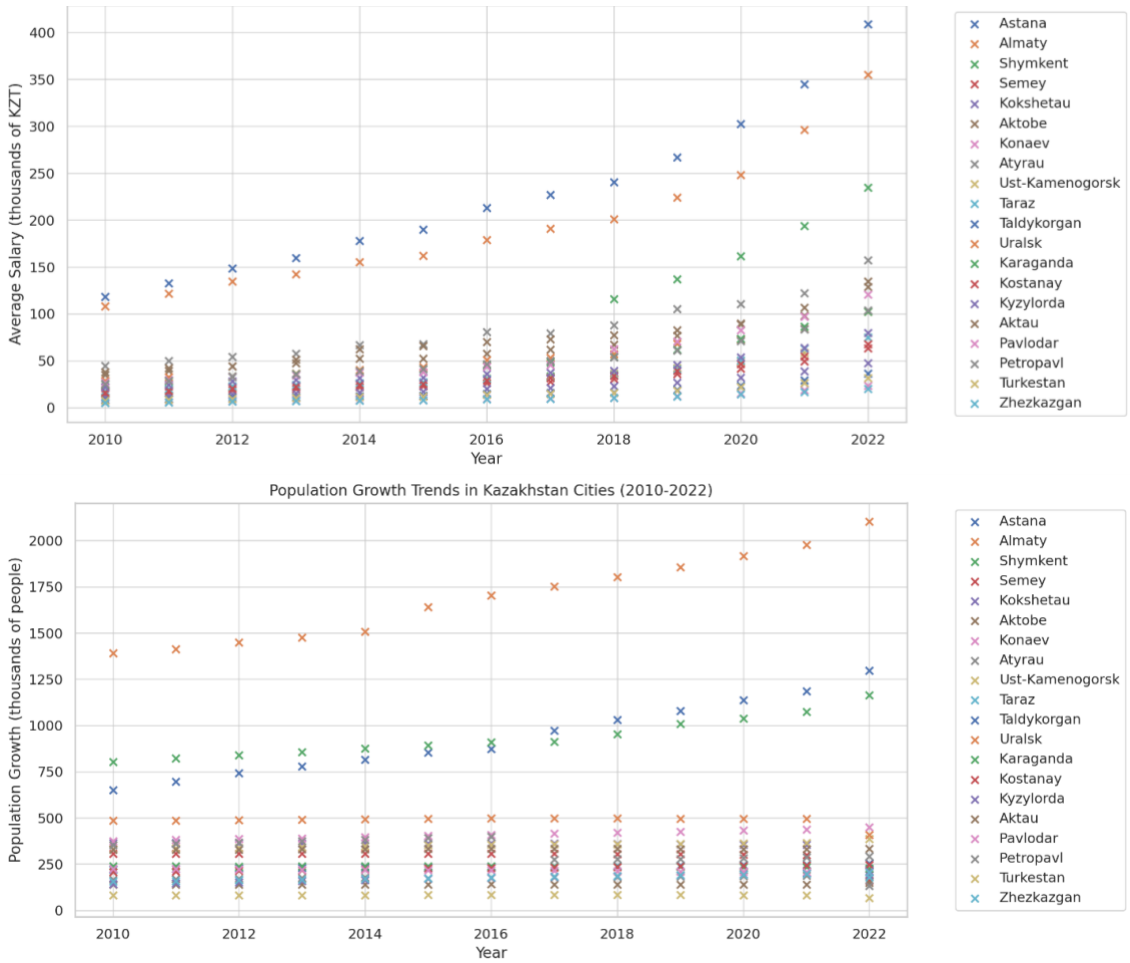

FIGURE 3. Dynamics of average salary trends and population growth trends in cities for 2010-2020

Note: compiled by authors based on Bureau of National Statistics (2022)

The scatter plot generally shows an upward trend in average salaries across most cities over the years. This indicates economic growth and possibly an increase in the standard of living in these cities. The scatter plot also reveals significant variations in average salaries between cities. Some cities consistently show higher average salaries (like Astana and Almaty), which might be due to a concentration of high-paying industries, better job opportunities, or a higher cost of living. Increasing average salaries can attract more skilled workers to these cities, potentially leading to urbanization and economic development. However, it could also indicate rising income inequality if the growth is not uniform across different sectors or regions.

This plot illustrates varying trends in population growth across different cities. While some cities exhibit a steady increase, others show more fluctuating patterns. Cities with significant population growth might be experiencing urbanization, often associated with economic opportunities, better infrastructure, and services. This can lead to increased economic activity and development. Rapid population growth can strain city resources and infrastructure, necessitating careful urban planning and investment in public services, housing, and transportation.

This trend underscores the attractiveness of economically booming areas, as individuals migrate towards cities offering better employment opportunities and living standards. Further

statistical analysis, suggesting that salary trends are a significant predictor of population growth in urban areas. This analysis provides valuable insights for policymakers and urban planners in understanding the interplay between economic incentives and urban migration patterns, aiding in the formulation of strategies for sustainable city development.

Figure 4 shows the dynamics of the population with an income below the subsistence level and trends in the development of small and medium-sized businesses for 2010-2022.

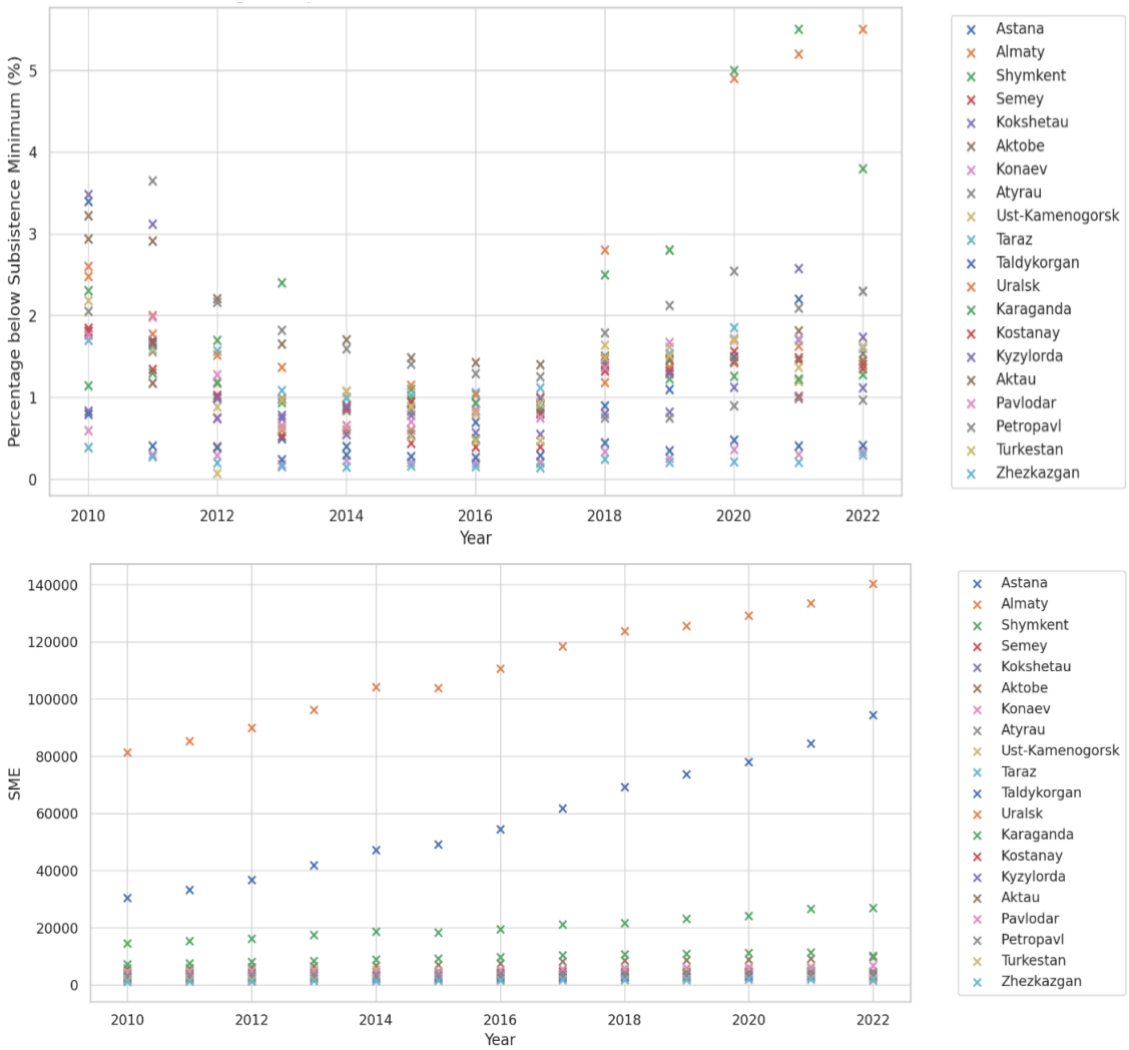

FIGURE 4. Dynamics of the population with an income below the subsistence level and trends in the development of SME in cities for 2010-2022

Note: compiled by authors based on Bureau of National Statistics (2022)

The plot shows the percentage of people with income below the subsistence minimum in each city over the years. Data analysis shows that with an increase in the number of SMEs in the region, there is a tendency to decrease the proportion of the population living below the poverty line. An increasing trend in this percentage can be a cause for concern, indicating growing poverty or economic hardship. A higher percentage of the population below the subsistence minimum in a city suggests economic challenges, such as insufficient job opportunities, low wages, or high living costs. This can also point towards increasing economic inequality within the city. Policy

implications: For policymakers, a rising trend in this indicator may necessitate interventions like social welfare programs, employment initiatives, and efforts to control the cost of living.

An upward trend in SME activity indicates economic growth and diversification. SMEs are often crucial for job creation, innovation, and contributing to the GDP. Variations among cities suggest that some areas may have more favorable conditions for SMEs, such as better access to finance, markets, or supportive local policies. A robust SME sector can enhance economic resilience, particularly in facing economic downturns, as SMEs can adapt more quickly to changing market conditions.

In Figure 5, we are providing data on retail trade and fixed assets in cities, between 2010 and 2022.

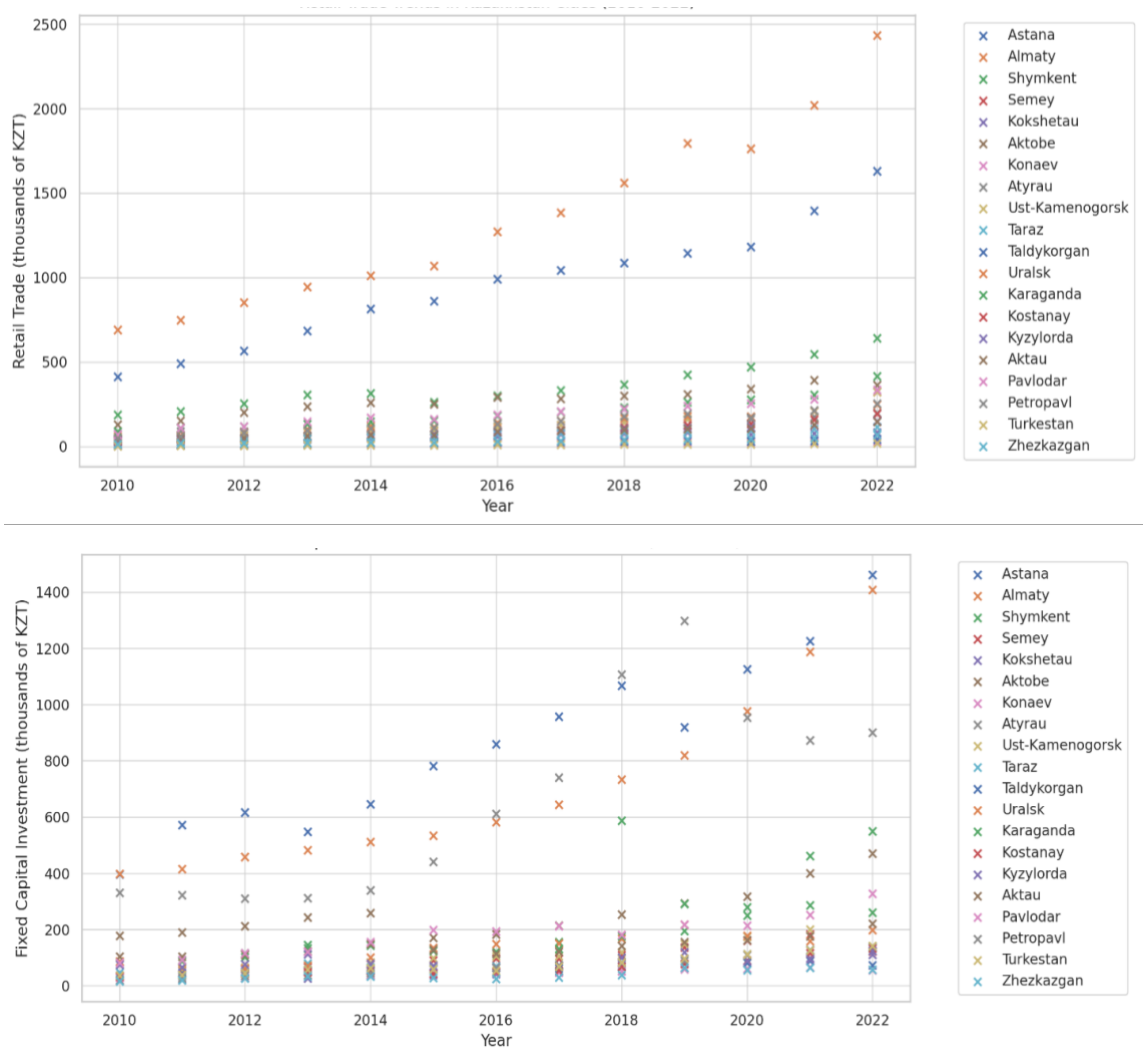

FIGURE 5. Dynamics of retail trade trends and fixed assets in cities, Kazakhstan 2010-2022

Note: compiled by authors based on Bureau of National Statistics (2022)

An analysis of data over the past ten years shows that cities with active development of fixed assets often experience higher growth rates in retail trade. This indicates that investments in fixed assets, such as infrastructure, technology and production facilities, contribute to strengthening the

retail sector, improving the availability of goods and services to the population. An increase in retail trade typically indicates higher consumer spending, which is a sign of economic health and consumer confidence. Differences in retail trade volumes between cities can reflect varying levels of economic activity, disposable income, and population density. Growing retail trade can signal broader economic development, as it often correlates with improvements in infrastructure, increased urbanization, and higher standards of living.

An increase in fixed capital investment is a strong indicator of economic development. It suggests that businesses are investing in physical assets like machinery, buildings, and infrastructure, which can boost productivity and economic growth. Higher levels of fixed capital investment can also indicate business confidence in the economic environment, reflecting expectations of future profitability and growth. Variations between cities in terms of investment levels can highlight regional disparities in economic development. Cities attracting more investment typically offer better infrastructure, a skilled workforce, and business-friendly policies.

In Figure 6, we are providing data on tax revenue budget trends in Kazakhstan between 2010 and 2022.

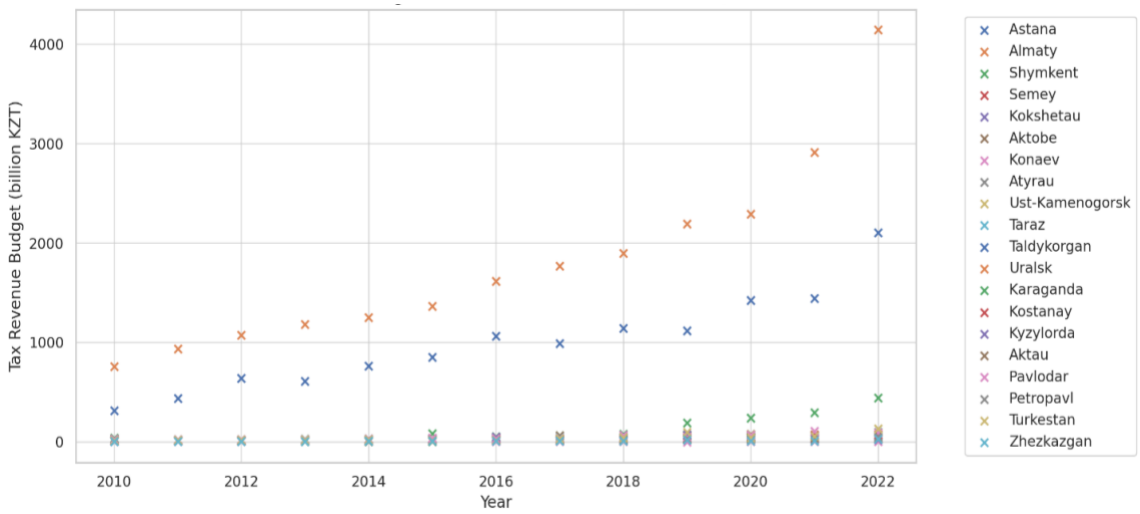

FIGURE 6. Tax revenue budget trends in cities for 2010-2022

Note: compiled by authors based on Bureau of National Statistics (2022)

Tax revenues are a direct indicator of economic activity. Higher tax revenues suggest increased business activity, higher employment rates, and greater consumer spending. Increasing tax revenues imply more resources for local governments, which can be used for public services, infrastructure development, and social programs. This, in turn, can contribute to further economic growth. Variations in tax revenue among cities can indicate the relative economic health of these regions. Cities with consistently higher tax revenue may have more diverse and robust economies.

The analysis encompassed a diverse array of cities across Kazakhstan, each unique in its economic and social characteristics. The cities were evaluated on a spectrum of indicators, both economic (such as SME activity, retail trade, fixed capital investment, and tax revenue) and social (like population growth, average salary, and income levels). Based on these indicators, each city was assigned a composite score, reflecting its aggregate performance across all metrics (see Table 1).

TABLE 1. Categorial ranking composite score

City	Pop. Growth	Income above Sub.Min.	Avg Salary	SME	Retail Trade	Fixed Cap. Investment	Tax Revenue	Composite Score
Astana	0.528	0.530	1.000	0.516	0.725	0.530	0.551	0.689
Almaty	1.000	1.000	0.853	1.000	0.755	0.753	1.000	0.952
Shymkent	0.530	0.968	0.326	0.171	0.219	0.067	0.067	0.365
Semey	0.132	0.370	0.092	0.026	0.020	0.015	0.015	0.114
Kokshetau	0.166	0.296	0.058	0.008	0.011	0.010	0.011	0.084
Aktobe	0.037	0.556	0.262	0.055	0.080	0.089	0.021	0.199
Konaev	0.204	0.038	0.004	0.002	0.003	0.001	0.000	0.038
Atyrau	0.057	0.382	0.340	0.017	0.062	0.056	0.019	0.236
Ust-Kamenogork	0.169	0.457	0.117	0.033	0.057	0.084	0.019	0.139
Taraz	0.093	0.576	0.119	0.020	0.051	0.043	0.020	0.131
Taldykorgan	0.096	0.083	0.032	0.010	0.013	0.010	0.014	0.039
Uralsk	0.252	0.580	0.204	0.097	0.097	0.097	0.012	0.183
Karaganda	0.096	0.497	0.194	0.143	0.143	0.143	0.015	0.168
Kostanay	0.091	0.490	0.107	0.063	0.063	0.063	0.019	0.118
Kyzylorda	0.058	0.662	0.140	0.056	0.056	0.056	0.014	0.143
Aktau	0.155	0.760	0.282	0.056	0.056	0.056	0.011	0.201
Pavlodar	0.083	0.515	0.211	0.136	0.136	0.136	0.026	0.169
Petropavl	0.156	0.863	0.194	0.095	0.095	0.095	0.010	0.196
Turkestan	0.000	0.381	0.025	0.009	0.008	0.000	0.022	0.068
Zhezkazgan	0.061	0.000	0.000	0.017	0.043	0.017	0.005	0.020
Note: compiled by authors								

This comprehensive table includes both social and economic indicators, offering a more holistic assessment of each city's overall development. The "Composite Score" reflects an average of all these indicators, providing a single measure to compare and contrast the cities' development levels.

Higher Composite Scores. Cities like Almaty and Astana rank high, suggesting strong performance and showcased strong economic foundations coupled with robust social indicators. These cities not only excelled in generating higher GRP but also demonstrated significant achievements in social aspects, making them leaders in urban development within the country.

Moderate Composite Scores. Cities such as Aktobe, Atyrau, and Uralsk displayed a balanced mix of economic and social development, though not at the same level as the top-tier cities. They had moderate scores in economic activities and social parameters, indicating steady but slower growth and development.

Lower Composite Scores. Cities at the lower end of the spectrum, such as Zhezkazgan and Taldykorgan, may face significant challenges in both social and economic aspects and may require targeted interventions for development. Kokshetau, Konaev, and Zhezkazgan had lower composite scores, suggesting challenges in both economic and social domains. They lagged behind in key areas such as economic activity, income levels, and population growth, highlighting a need for targeted developmental strategies.

The overall ranking and composite scores of these cities provided a clear picture of the urban development landscape across Kazakhstan. This ranking served as a crucial tool for identifying areas of strength and opportunities for growth, enabling policymakers and stakeholders to strategize development efforts more effectively.

The results from the Partial Least Squares Regression (PLSR) analyses for both hypotheses are as follows (see Table 2).

TABLE 2. Regression analysis results

Hypothesis	MSE	R^2 Score	Coefficient (Economic Factors)	Coefficient (Social Factors)
1	182,172.11	0.926	1507.64	46.25
2	182,172.11	0.926	1507.64	46.25

Hypothesis 1 (Economic Factors' Impact on GRP). The high coefficient for economic factors (1507.64) in comparison to the social factors (46.25) indicates a strong and significant influence of economic factors on GRP. The R^2 Score of 0.926 implies that the model, including both economic and social factors, can explain about 92.6% of the variance in GRP, which is quite substantial. The relatively small coefficient for social factors suggests that their impact on GRP is less significant compared to economic factors.

Hypothesis 2 (Social Factors' Impact on GRP). Similarly, the coefficient values remain the same, which reiterates that economic factors have a more substantial impact on GRP than social factors. The identical R^2 Score further confirms that the model's explanatory power is primarily driven by economic factors. The consistent results across both hypotheses underline the predominant role of economic development in influencing GRP, while social factors play a lesser role.

Nevertheless, it must be considered that the size of firms has crucial impact. Bartlett Bukvič (2001) showed that smaller firms grow faster than larger ones. This means that as the size of the firm increases, the growth of their activities decreases. Rajesh Raj and Mahapatra (2009), supported that SMEs, especially in the manufacturing sector, provide a significant portion of the total number of jobs. Even though SMEs contribute only about 30% of the value added in the manufacturing sector, they alone create 80-85% of the total number of jobs in this sector. This highlights the key role of SMEs in absorbing labor and increasing employment levels, especially in rural areas.

Population and income levels are more important determinants of economic growth than tax revenues and fixed investment. Population growth and rising income levels increase consumer demand and the overall economy, leading to an increase in GDP. On the other hand, tax revenues, although necessary to finance government functions and promote economic development, can have a negative impact on economic growth, since high taxes can reduce investment and discourage entrepreneurial activity. At the same time, investment, including both domestic and foreign direct investment, stimulates economic growth because it contributes to the development of production, the creation of new jobs, the introduction of new technologies and increased labor productivity (Nabi et al., 2020).

The PLSR analyses affirm that economic factors are significantly more influential in determining the GRP of cities in Kazakhstan compared to social factors. This suggests that initiatives focusing on economic development, such as investment in business, trade, and infrastructure, might be more effective in boosting regional productivity and growth. While social factors do contribute to GRP, their impact is comparatively minor in the face of economic influences. This does not diminish the importance of social development but highlights the stronger linkage of economic factors to regional economic output.

5. CONCLUSIONS

This research embarked on a comprehensive exploration of the developmental dynamics of cities in Kazakhstan, rigorously examining the influence of economic and social factors on the Gross Regional Product (GRP). The findings are pivotal in unraveling the complex interplay between these factors and their collective impact on urban development.

The analysis, underpinned by Partial Least Squares Regression (PLSR), tested two hypotheses.

The first posited that economic factors, including SME activity, retail trade, fixed capital investment, and tax revenue, have a significant and positive impact on the GRP. The second hypothesis contrasted this, suggesting that social factors such as population growth, average salary, and income levels are the significant drivers of GRP. The results indicated a pronounced impact of economic factors on GRP, affirming the first hypothesis. In contrast, social factors, while contributing to GRP, had a less substantial influence, lending partial support to the second hypothesis.

These outcomes have profound implications for urban policy and planning. They highlight the crucial role of economic development initiatives in enhancing regional productivity and suggest that investment in economic growth drivers could yield more substantial dividends in urban development. However, the contribution of social factors, albeit smaller, underscores the need for a balanced approach that also addresses social aspects like healthcare, education, and living standards to ensure holistic urban development.

The study's findings provide a valuable framework for policymakers, urban planners, and stakeholders in Kazakhstan. They offer a data-driven foundation for prioritizing economic growth while not overlooking the essential role of social development in crafting sustainable, inclusive urban environments.

In conclusion, this research contributes significantly to the understanding of urban development in Kazakhstan, laying the groundwork for future studies and policy formulations aimed at fostering thriving, resilient urban centers in the country.

AUTHOR CONTRIBUTION

Writing – original draft: Maxat K. Shakibayev, Kuralay M. Balginova.
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Development of research methodology: Kuralay M. Balginova.
Resources: Murat S. Aimurzinov, Aizhan M. Baimukhamedova.
Software and supervisions: Maxat K. Shakibayev.
Data collection, analysis and interpretation: Maxat K. Shakibayev.
Visualization: Maxat K. Shakibayev, Murat S. Aimurzinov.
Writing review and editing research: Maxat K. Shakibayev, Kuralay M. Balginova, Murat S. Aimurzinov.

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