

Khirevich S.A.



**Khirevich
Sergey Anatolevich,**
Candidate of Economic Sciences,
Associate Professor, Associate
Professor of the Department
of Building Design and Real
Estate Expertise; Siberian
Federal University (SFU); 79
Svobodny Ave., Krasnoyarsk,
660041, Russian Federation;
ID RSCI: 4102-4526,
Scopus AuthorID: 57217205809,
ORCID: 0000-0002-7067-5631;
skhirevich@sfu-kras.ru

Basics of scenario development
of urbanized territories

The need for scenario planning for the development of urbanized territories in the context of rapid changes in the social, economic and environmental environment is discussed. Modern cities and urbanized territories face many challenges, including climate change, population growth, economic instability and social conflicts. Despite the existence of various methods and approaches to the development of urban spaces, many of them do not take into account the dynamic nature of the processes, which leads to insufficient flexibility and management efficiency. Statically defined options for territorial development actually negate their flexibility and, as a rule, are not implemented properly. The author proposes to introduce a comprehensive level-sectoral approach to scenario development of territories, which will adapt to changes in real time, that is, have a dynamic nature. This approach includes the integration of various aspects of planning and management, both within various sectors of the economy and taking into account different levels of territorial development. It emphasizes the importance of interaction between different sectors and levels of governance, which contributes to more effective adaptation of cities to new challenges and requirements. As a result of applying this approach, it is possible to improve the quality of life of city residents, improve the environmental situation and create a more sustainable infrastructure. The paper also emphasizes that scenario planning is a key tool for achieving effective management of urbanized areas in conditions of uncertainty and rapid change in the external environment, ensuring sustainable and harmonious development of cities and their suburbs in the long term.

Keywords: territorial development, strategy, quality of living environment, scenario approach, dynamically balanced development

Russia needs a long-term development strategy focused on improving the quality and standard of living of people, modernizing and increasing the competitiveness of the national economy, and reducing environmental and climate risks. Therefore, in modern socio-economic conditions characterized by the instability of the situation on global markets and the aggravation of financial security problems at all levels of government in the Russian Federation, the task of increasing the efficiency of using the internal resources of territorial systems is becoming increasingly urgent. Its solution is based on qualitative forecasting and planning [1].

However, the task of forecasting the development of territories is extremely difficult in itself due to both objective and subjective reasons, among which it should be noted the imperfection of statistical accounting, the significant influence of the external environment, the severe limitation of internal resources, etc. The use of expert methods in this case often does not allow us to fully take into account the totality of influencing factors [2, 3].

There are various classifications of approaches in the field of territorial system modelling in Russian and foreign literature. In particular, four aggregated classes can be distinguished, differing in the logic of system construction, the methods of formalization and modelling used [4, 5]:

- models of general economic equilibrium;
- models based on the use of probabilistic and statistical methods;
- models of system dynamics and other simulation-type models;
- models based on the use of various intelligent information technologies.

One of the widely used methods in forecasting socio-economic processes is the scenario approach. The scenario approach is one of the widely used methods in forecasting socio-economic processes. The classical method of scenario planning consists in identifying basic quantitative and qualitative development trends and tracking changes in society under their influence. General principles and methods of scenario development for long-term forecasts of socio-economic development are presented in a number of works, however, in each specific case, the scheme for constructing forecast scenarios is determined by the tasks facing the developers and the specifics of the forecasting object [6, 7].

The scenarios of the long-term development of the Russian economy presented in the forecast developments of various organizations can be roughly divided into two groups: "thematic" and "complex" scenarios. The "thematic" scenarios are based on some motivated ideas about the preferences of various groups of the population in the future socio-economic development of the country (for example, government, scientific, cultural, and other elites). The experience of developing such scenarios is reflected in the work of the Centre of Macroeconomic Analysis and Short-term Forecasting for Russia: scenarios of "super-industrial modernization", "leap into globalization", "economic isolationism", "energy autism" [8]. In "complex" scenarios, various combinations of external and internal factors are grouped depending on the assessment of the "degree of favorability" of development conditions (low, medium, high; pessimistic, realistic and optimistic; etc.). According to this principle, the scenarios of medium-term forecasts and the long-term forecast of the Institute of National Economic Forecasting of the Russian

Academy of Sciences (inertial and internally oriented, investment) are formed [9]. In fact, the "pessimistic, realistic and optimistic" scenarios are conservative, innovative and targeted (accelerated) scenarios of the "Long-term forecast of socio-economic development of the Russian Federation for the period up to 2030"¹. In different versions of the long-term forecast, other names of scenarios were used: conservative, energy-based and innovative, but the substantive prerequisites of the three scenarios are approximately the same.

The purpose of this study is to analyze the methodological aspects of the existing scenario approach and to form the theoretical foundations of the scenario development of urbanized territories, taking into account the basic directions of the theory of dynamic equilibrium.

Forecast scenarios involving spatial aspects of development are being developed for regions of one country or group of countries, and they can also be roughly divided into "meaningful" and "complex" ones. A "meaningful" approach to constructing spatial development scenarios is more common in the study of spatial interactions for groups of countries within the framework of integration associations² [10]. The advantage of a "meaningful" approach is the detailed elaboration of alternative strategies for the spatial distribution of the population and economic activity. The scenarios of the territorial development of the EU countries in the long term until 2030 and 2050 are built in accordance with possible strategies for the development of the European area³. An integrated approach to the development of spatial development scenarios includes a systematic analysis of the current situation, the involvement of stakeholders and the application of a systematic approach that considers the territory as a complex interconnected system [11]. An important aspect is the creation of alternative scenarios, taking into account uncertainty factors and assessing their impact on the social, economic and environmental spheres.

There are also works that consider scenarios for the development of residential and commercial real estate within certain territorial systems under conditions of uncertainty [12, 13].

The peculiarity of the approach proposed by the author in urbanized areas, when quantifying forecast scenarios, is as follows. Depending on the hypotheses embedded in the spatial scenario, priorities for the spatial distribution of resources and economic activity are formed, which, in turn, determine the dynamics of the development of each territory and the trajectory of the economy as a whole as a summary indicator of the dynamics of individual territories. It is recommended to use the spatial distribution of investments in the territorial context as a control parameter in the calculations. Differences in investment dynamics are proposed to be considered across 8 industry complexes: agriculture, mining, processing, energy, trade, transport and communications, commercial services and social services. Thus, it is possible to form a spatial structure of investments in the final form, relative to the spatial distribution of investments across various industry complexes.

Thus, the principle described above will make it possible to use an integrated level-sectoral approach when developing scenarios for the development of territories. The essence of the proposed approach is to take into account not only various management levels within a territorial feature (quarter, microregion, urban area, city, urban district, municipality, municipal district, agglomeration, subject

of the federation — territory, region, federal district, country, international association), but also the existing state and forecast prospects for the development of industries within the boundaries of the territories under consideration (industry, agriculture, forestry, construction, other types of activities in the field of material production, agricultural services, transport, communications, trade and catering, logistics-technical supply and sales, procurement, information and computing services, real estate operations, general commercial activities to ensure the functioning of the market, geology and exploration of the subsoil, geodetic and hydrometeorological services, housing, utilities, non-industrial types of consumer services, health care, physical education and social security, public education, culture and art, science and scientific services, finance, credit, insurance, pension provision, management, public associations).

The sum of the sectoral and regional components is important for scenario calculations for spatial development options. It characterizes the differentiation of investment distribution in the regional context. The implemented indicator thus acts as a differentiated supplement to the national component. This methodological technique represents the value of projected economic growth in the region as the sum of nationwide and geographically differentiated components.

As a result, the volume of investments in fixed assets in the forecast period within the boundaries of the territory (ln^t) is proposed to be calculated as follows:

$$ln^t = ln^s + ln^{lok}; \quad (1)$$

$$ln^s = ln_{ret}^s = T_r^{ln}; \quad (2)$$

$$ln^{lok} = ln_{ret}^{lok} \cdot T_r^{ln} + \left(\frac{\sum_{i=1}^n Ind_{ter}}{n} - 1 \right), \quad (3)$$

where ln^s — volume of investments in fixed assets in the forecast period within the boundaries of the territory under consideration, due to the country-wide economic dynamics;

ln^{lok} — volume of investments in fixed assets in the forecast period within the boundaries of the territory under consideration, due to the specifics of territorial development conditions;

ln_{ret}^s — volume of investments in fixed assets, due to the country-wide economic dynamics, in the retrospective period for the territory under consideration;

T_r^{ln} — growth rate of investments in fixed assets in the retrospective period in the territory under consideration;

ln_{ret}^{lok} — volume of investments in fixed assets determined by regional development conditions in the retrospective period for the territory under consideration;

Ind_{ter} — territorial indicators of sustainable socio-economic development.

During the study of several dozen indicators, the following model was prepared:

$$ln_{ret}^{lok} = f(Ind_{ter}). \quad (4)$$

¹ Forecast of the long-term socio-economic development of the Russian Federation for the period up to 2030. The Ministry of Economic Development of Russia. 2013. URL: www.consultant.ru/document/cons_doc_LAW_144190 (Accessed: 09.03.2025). (rus.).

² European Territorial Scenarios 2050. ESPON 2050. URL: <http://www.et2050.eu> (Accessed: 09.03.2025).

³ Long-term forecast of the economic development of the Eurasian Economic Union until 2030. Moscow, June 2015. URL: <http://eurasianstudies.org/wp-content/uploads/2017> (Accessed: 09.03.2025).

Here, the following indicators are used as territorial indicators of sustainable socio-economic development, normalized to the average Russian level: enterprises' own funds; investments in fixed assets from the federal budget; multiplier of investments in fixed assets from the federal budget; input of fixed assets; share of total investments in fixed assets aimed at modernizing production; volume of housing construction and so on.

The value of the above value determines the increased investment activity in the region and, as a result, more intensive inter-regional economic cooperation along the established production chains.

A dynamically balanced approach to the development of urbanized territories should be based on the principles of sustainable development and systemic thinking, which allows for flexible response to changes, integration of economic, social and environmental aspects, as well as involvement of various stakeholder groups in the planning process. It should facilitate risk forecasting and management, take into account the long-term consequences of decisions and actively use modern technologies for data analysis, considering the city as a complex interconnected system. This will ensure an integrated and sustainable approach to development, contributing to the harmonious coexistence of different interests and improving the quality of life for future generations.

As the main indicator characterizing the balance of a particular scenario of development of an urbanized territory, the author proposes to introduce the index of sustainable development (sustainability) (I_{sd}). Which acts as the following function:

$$I_{sd} = f(GP, IN, B, NWF, Inf, ER, QLE, LP, UR, KR, PH, Ot), \tag{5}$$

where GP is the gross product of the territory;

IN is the volume of investments;

B is the budget balance;

NWF is the national wealth fund;

Inf is the inflation rate;

ER is the exchange rate of the national currency;

QLE is the quality of the living environment;

LP is the labour productivity;

UR is the unemployment rate;

KR is the key rate;

PH is the price of hydrocarbons;

Ot is other factors.

At the same time, I_{sd} at different stages of cyclical development can take different values: ≥ 1.0 — growing; $\leq 1.0-0.5$ — average falling; $\leq 0.5-1.0$ — average growing; $\leq 0.5-0.1$ — crisis.

The influence of this or that factor on the sustainability index is presented in Table.

Thus, it can be noted that the historical experience of Russia and the experience of other countries shows that sustainable development is impossible without full-fledged strategic planning adapted to the realities of the modern socio-economic system of Russia.

Strategic programmes and projects of the state at the federal and regional levels should be aligned with the strategies and programmes of state corporations, as well as take into account the plans of private business.

Using a scenario approach to develop spatial development forecasts allows us to assess the long-term consequences of implementing alternative strategies for territorial development, link the macroeconomic forecast with real socio-economic processes taking place in the regions, identify sources of growth, the nature of which is related to space, and identify the most acute problems in the development of regions.

REFERENCES

1. Nizamutdinov M.M., Oreshnikov V.V. *Methodological and practical aspects of the problem of modelling and scenario forecasting of the development of the territorial system of the municipal level. Economic analysis: theory and practice.* 2017; 16:7(466):1204-1216. DOI: 10.24891/ea.16.7.1204 (rus.).

2. *Economic analysis: theory and practice = Economic analysis, ed. LLC "Finanspress". Moscow, Finance and Credit, 2017; 16(7):198. URL: <https://biblioclub.ru/index.php?page=book&id=466593> (rus.).*

3. Dikunov S.A., Brovko A.S., Dikunova M.S. *Institutes of regional innovation structure development. Actual problems of humanities and socio-economic sciences.* 2016; 10-4:27-31. EDN VVZIJP. (rus.).

4. Stroeve P.V. *Transformations of the spatial structure of Russia. Bulletin of the Institute of Economics of the Russian Academy of Sciences.* 2014; 4:61-70. EDN SMLIUF. (rus.).

5. Mukhametzhah S.O., Junusbekova G.A., Daueshov M.Ye. *The Management of Urban Development for the Regional Economic Growth: The Example of Kazakhstan // Economy of Regions.* 2020; 16(4):1285-1301. DOI: 10.17059/ekon.reg.2020-4-19

6. Mukin S.V. *Algorithm for developing scenarios of socio-economic development. Bulletin of TSU.* 2009; 7(75):75-82. (rus.).

7. Mikheeva N.N. *Assessment of scenarios for the spatial development of the Russian economy until 2030. Scientific papers: Institute of National Economic Forecasting of the Russian Academy of Sciences.* 2017; 15:405-423. DOI: 10.7256/2222-1964.2016.4.19215 (rus.).

8. Belousov A.R. *Scenarios of Russia's economic development for a fifteen-year perspective, Forecasting problems.* 2006; 1:3-53.

9. *Prospects for the development of the Russian economy: forecast until 2030. Ed. by. V.V. Ivanter, M.Yu. Ksenofontov. Moscow, Ankil, 2013: 408.*

10. Kantakumar L.N., Kumar S., Schneider K. *SUSM: a scenario-based urban growth simulation model using remote sensing data. European Journal of Remote Sensing.* 2019; 52(sup2):26-41. DOI: 10.1080/22797254.2019.1585209

11. Astafyev S.A., Sarchenko V.I., Hirevich S.A. *Economic justification of urban planning solutions and improving the comfort of the urban environment : a practical guide. Moscow, Publishing House ASV, 2021; 256. (rus.).*

12. Sarchenko V.I. *Modelling the development of modern cities in conditions of targeted mobility and uncertainty. Bulletin of Irkutsk State Technical University.* 2015; 6(101):266-272. EDN UNSAMB. (rus.).

13. Sarchenko V.I. *Spatial and territorial development of real estate. Bulletin of MGSU.* 2015; 1:103-111.

Основы сценарирования развития урбанизированных территорий

В статье рассматривается необходимость сценарирования развития урбанизированных территорий в условиях стремительных изменений социальной, экономической и экологической среды. Современные города и урбанизированные территории сталкиваются с множеством вызовов, включая изменение климата, рост населения, экономическую нестабиль-

ность и социальные конфликты. Несмотря на наличие различных методов и подходов к развитию городских пространств, многие из них не учитывают динамическую природу процессов, что приводит к недостаточной гибкости и эффективности управления. Статически определенные варианты территориального развития фактически нивелируют их гибкость и, как правило, не исполняются должным образом. Автор предлагает внедрить комплексный уровнево-отраслевой подход к сценарному развитию территорий, который будет адаптироваться к изменениям в реальном времени, т.е. иметь дина-

мический характер. Этот подход включает в себя интеграцию различных аспектов планирования и управления как в рамках различных отраслей экономики, так и с учетом разных уровней территориального развития. Он акцентирует внимание на важности взаимодействия между различными секторами и уровнями управления, что способствует более эффективной адаптации городов к новым вызовам и требованиям. В результате применения данного подхода возможно повысить качество жизни горожан, улучшить экологическую ситуацию и создать более устойчивую инфраструктуру. В статье также подчеркивается, что сценарное планирование является ключевым инструментом для достижения эффективного управления урбанизированными территориями в условиях неопределенности и быстрого изменения внешней среды, обеспечивая устойчивое и гармоничное развитие городов и их пригородов на долгосрочную перспективу.

Ключевые слова: территориальное развитие, стратегия, качество среды жизнедеятельности, сценарный подход, динамически сбалансированное развитие

СПИСОК ИСТОЧНИКОВ

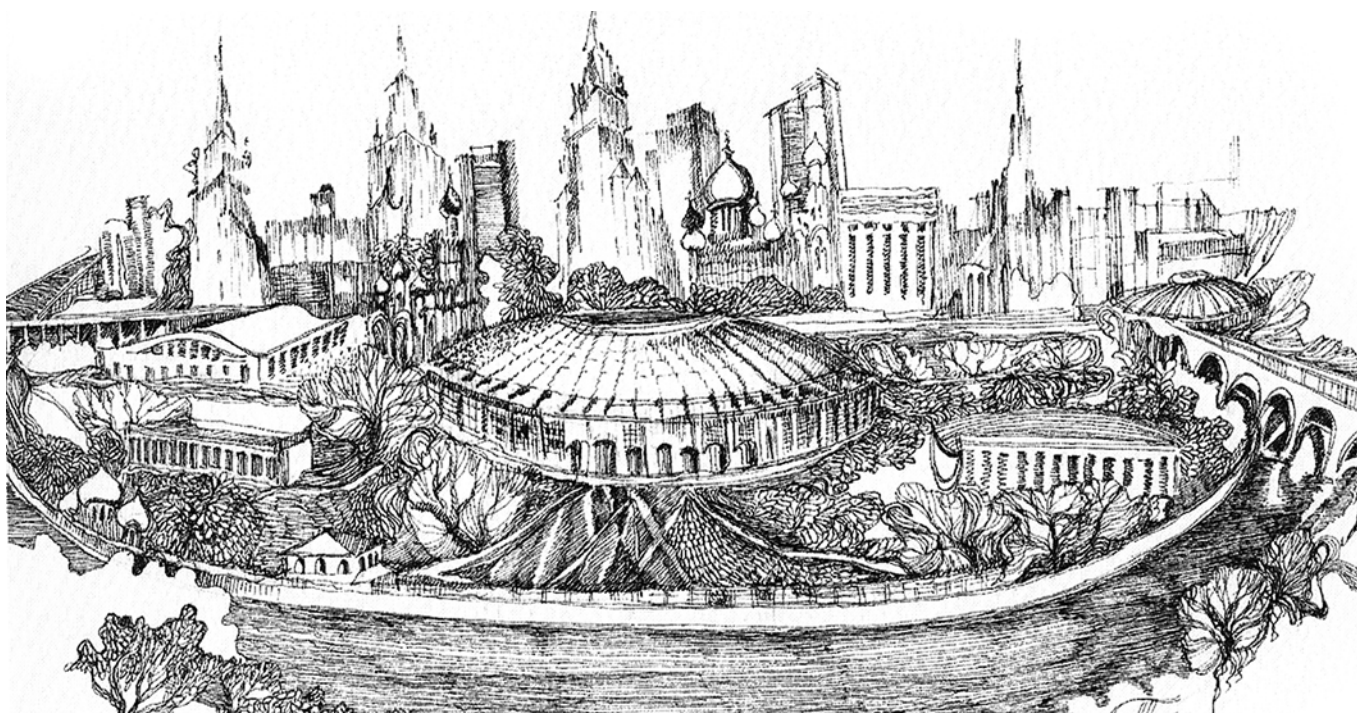
1. Низамутдинов М.М., Орешников В.В. Методические и практические аспекты задачи моделирования и сценарного прогнозирования развития территориальной системы муниципального уровня // *Экономический анализ: теория и практика*. 2017. Т. 16. № 7 (466). С. 1204–1216. DOI: 10.24891/ea.16.7.1204
2. *Экономический анализ: теория и практика = Economic analysis*, изд. ООО «Финанспресс». М. : Финансы и кредит, 2017. Т. 16. Вып. 7. 198 с. URL: <https://biblioclub.ru/index.php?page=book&id=466593>
3. Дикунов С.А., Бровко А.С., Дикунова М.С. Институты развития региональной инновационной структуры // *Актуальные проблемы гуманитарных и социально-экономических наук*. 2016. № 10–4. С. 27–31. EDN VVZJJP.
4. Строев П.В. Трансформации пространственной структуры России // *Вестник Института экономики Российской академии наук*. 2014. № 4. С. 61–70. EDN SMLIUF.
5. Mukhametzhani S.O., Junusbekova G.A., Daueshov M.Ye. *The Management of Urban Development for the Regional Economic*

- Growth: The Example of Kazakhstan // Economy of Regions*. 2020. Vol. 16. No. 4. Pp. 1285–1301. DOI: 10.17059/ekon.reg.2020-4-19
6. Мукин С.В. Алгоритм разработки сценариев социально-экономического развития // *Вестник ТГУ*. 2009. № 7 (75). С. 75–82.
7. Михеева Н.Н. Оценка сценариев пространственного развития российской экономики до 2030 года // *Научные труды: Институт народнохозяйственного прогнозирования РАН*. 2017. Т. 15. С. 405–423. DOI: 10.7256/2222-1964.2016.4.19215
8. Белоусов А.П. Сценарии экономического развития России на пятнадцатилетнюю перспективу // *Проблемы прогнозирования*. 2006. № 1. С. 3–53.
9. *Перспективы развития экономики России: прогноз до 2030 года : коллективная монография / под ред. В.В. Ивантера, М.Ю. Ксенофонтова*. М. : Анкил, 2013. 408 с.
10. Kantakumar L.N., Kumar S., Schneider K. SUSM: a scenario-based urban growth simulation model using remote sensing data // *European Journal of Remote Sensing*. 2019. No. sup2 (52). Pp. 26–41. DOI: 10.1080/22797254.2019.1585209
11. Астафьев С.А., Сарченко В.И., Хиревич С.А. Экономическое обоснование градостроительных решений и повышения комфортности городской среды : практикум. М. : Издательство АСВ, 2021. 256 с.
12. Сарченко В.И. Моделирование развития современных городов в условиях целевой мобильности и неопределенности // *Вестник Иркутского государственного технического университета*. 2015. № 6 (101). С. 266–272. EDN UNSAMB.
13. Сарченко В.И. Пространственно-территориальное развитие недвижимости // *Вестник МГСУ*. 2015. № 1. С. 103–111.

Об авторе: **Хиревич Сергей Анатольевич** — кандидат экономических наук, доцент, доцент кафедры проектирования зданий и экспертизы недвижимости; **Сибирский федеральный университет (СФУ)**; 660041, г. Красноярск, пр. Свободный, д. 79; РИНЦ ID: 4102-4526, Scopus AuthorID: 57217205809, ORCID: 0000-0002-7067-5631; skhirevich@sfu-kras.ru.

For citation: Khirevich S.A. Basics of scenario development of urbanized territories. *Real Estate: Economics, Management*. 2025; 1:26-29.

Для цитирования: Хиревич С.А. Basics of scenario development of urbanized territories // *Недвижимость: экономика, управление*. 2025. № 1. С. 26–29.



Москва. Панорама Москвы с Воробьевых гор. Л.И. Павлова. Рисунок, тушь, перо.