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FORECASTING A CITY'S SOCIO-ECONOMIC DEVELOPMENT ON THE EXAMPLE OF IVANO-FRANKIVSK

The article proposes an algorithm for assessing and forecasting a city's socio-economic development, evaluating its level on the basis of a selected system of indicators on the example of Ivano-Frankivsk, and outlines the main directions its socio-economic development. Despite the significant amount of research in this area, the complexity and scale of current problems, and the need for territorial development of Ukraine justify the need for methodological tools to determine the level of change and the main directions of socio-economic development. To study changes in the socio-economic development of cities, it is recommended to use the method of integrated assessment, as this approach provides information on the overall dynamics of their development, taking into account a wide range of indicators that determine favorable and inhibitory trends.

Regarding the forecasting of further changes on the basis of various dependencies, the ranking of models by the approximation coefficient and by the deviation of the calculated integrated indicator and its predicted value should be applied. This approach to forecasting makes it possible to identify the trend of future changes in the model of approximation, which determines the reliability and accuracy of such forecasting. The assessment of socio-economic development on the example of Ivano-Frankivsk showed a low level of changes in the city's development and their further reduction while maintaining the current situation for the period 2018-2020.

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The article also outlines the main directions of increasing the city's development by restoring and increasing industrial production, introducing innovative technologies, and increasing product competitiveness by attracting investment, creating new jobs, upgrading, reconstructing and modernizing fixed assets, increasing production capacity and increasing business efficiency by expanding the market, increasing exports, promoting the introduction of advanced energy and resource-saving technologies, and the use of alternative energy sources. Greater efforts are also needed from cities to attract financial resources through grants and programs and to involve local people in addressing socio-economic and environmental issues, which will improve their well-being and quality of life.

Funding for development programs can be expanded through loans from local governments. Despite the transfer of executive power to local governments and the expansion of their fiscal autonomy, most problems still remain. Therefore, in order to revive the local credit market, it is first necessary to ensure the stability of the political and economic situation in the country and to implement a number of institutional and structural reforms.

Keywords: *city's socio-economic development indicator, model, approximation, forecast*

Problem Statement. Socio-economic development of cities is one of the priority directions of the national regional policy, the goal of which is to create appropriate conditions for improving the standard of living and social welfare of each citizen. The complexity and magnitude of the current problems of socio-economic development of the local and regional level and their dynamics require research and formation of the scientific-methodological basis for assessing the development of socio-economic processes occurring in cities and regions. In addition, under martial law in Ukraine today, the problem of restoring livelihoods and urban development became urgent. Since the beginning of the full-scale invasion of Ukraine by the Russian Federation, a significant number of residential buildings, educational institutions, kindergartens, medical institutions, factories and enterprises were damaged, destroyed or seized. Therefore, there is an urgent

need to expand research, taking into account the regional peculiarities of socio-economic development of cities.

The analysis of recent studies and publications. Socio-economic studies of cities and regions were carried out by such scholars as Averkyna M., Valchuk V. [1], Balatskyi Ye. [2], Buriachenko A. [3], Karlova O., Huliak R. [4], Kovalevska A., Zelenskyi S. [5], Kravtsiv V. [6], Marchenko O., Avanesova N. [7], Olshanska O. [10], Poluiaktova O. [11], Prykhodchenko T. [12], etc.

For example, Averkyna M. and Valchuk V. [1] explore the theoretical foundations of the provision of socio-economic development of cities, establish factors and problems of influence, consider foreign experience on this issue and methods of assessment, as well as the construction of integral taxonomic indicator and offer directions to ensure the socio-economic development of cities.

Based on the modeling of structural equations Ye. Balatskyi [2] considered the nature of the relationship between the socio-economic development of Sumy and the revenue and expenditure components of its budget.

Buriachenko A. [3] analyzes the stages of development of regional theory and determines the ways of building a partnership between local institutions.

The issues of the activity of the city as a socio-economic system are considered by Karlova O. and Huliak R. [4]. Their studies reveal the dialectical connection of the elements that constitute the system of the city, generalize the regularities of the functioning of the city and its development, and also offer the mechanism of its management on the basis of the theory of the basic cycle of systems management.

The authors [5] investigate the essence of socio-economic development of the city and the specific features of the implementation of participatory urban management.

In his research Kravtsiv V. [6] considers the trends of socio-economic development of the region in Ukraine under the influence of the implementation of modern reforms that determine the potential risks and prospects of Ukraine's transition to a model of sustainable endogenous growth. His work emphasizes the importance of cities as centers that form the dynamics of economic activity in providing endogenous development of regions, and outlines the determinants of economic development of the village in modern conditions. The priorities were determined and

mechanisms for ensuring sustainable endogenous growth of national, regional, and local features were analyzed, the impact of administrative regional reforms and fiscal decentralization on the socio-economic development of Ukrainian regions was assessed.

Marchenko O. and Avanesova N. [7] in their article investigate the essence of the category "city", on this basis the key characteristics of urban settlements is formulated, as well as the main indicators of sustainable urban development in the spheres of life are analyzed.

Olshanska O. [10] considered and analyzed the methodological aspects of the evolution of regional economic research and identified current trends in regional economic theory.

Poluiaktova O. [11] defines the goals and criteria of economic and social development, highlighting a number of issues affecting the political and economic characteristics of the acceleration concept.

Prykhodchenko T. [12] systematizes and improves the methodology of research and management of regional development.

Despite the significant amount of scientific research in this direction, the complexity and scale of modern problems and the territorial development of Ukraine justify the need to define the level of socio-economic development of cities and its main directions. This determines the particular relevance and multidimensionality of scientific research on regional economic issues aimed at the formation of scientific-methodological foundations and methodological tools for assessing socio-economic processes objectively occurring at the level of regions and cities of Ukraine.

Formulation of the aims of the article. The aim of the article is to develop an algorithm for assessing and constructing a model for predicting changes in the socio-economic development of the city, as well as the justification of ways to improve it on the example of Ivano-Frankivsk.

In order to achieve the aim, this study presents an algorithm for assessing the level of changes in socio-economic development. The author has conducted and presented the results of the assessment based on the selected system of indicators on the example of Ivano-Frankivsk, which helped to identify the main directions of socio-economic development of this city.

Presentation of the main material of the research. To study the changes in the socio-economic development of the city, it is recommended to use the method of integral assessment, because this approach provides

information about the overall level of development of the city, taking into account a wide range of factors affecting it.

In our opinion, to assess the level of change in the socio-economic development of Ivano-Frankivsk, we used a set of indicators that better describe this development, namely:

Economic level:

1) indicators of sales of industrial products and indicators of development of SMEs: the sales of industrial products (goods, services) per capita, sales of products (works, services) by medium enterprises, product sales by small businesses, the number of employees of small businesses, and financial results of small business before taxation;

2) financial indicators of the city: local financial revenues per unit of population (excluding transfer payments), the share of the local financial development budget in the total local budget, local budget expenditures, taxes and fees receipts to the state budget, tax debt of taxpayers to local budgets;

3) indicators of investment and foreign economic activity: capital investment per capita (excluding investments from the state budget), exports and imports of goods per capita.

An important component of the economic and social development of each local society is the development of tourism. It has a great impact on the employment, development of small and medium-sized enterprises, and the promotion of transport, utilities, information, production and service infrastructure. Modern tourism is one of the fast-growing sectors of the world economy and can be considered as a separate economic activity. Therefore, the economic level can be supplemented by indicators of tourism services sphere, namely the number and income of tourism entities, tourism fee and the volume of taxes paid by these entities.

For Ivano-Frankivsk, tourism is a promising sphere of economic life, but today this city is not perceived as a tourism destination, but rather as a city for transit to the Carpathians, and tourists are limited to one-day walks in the regional center. In addition, the growth of income of the tourism industry by 2019 changed in 2020, when the pandemic COVID-19 led to the collapse of the global international and Ukraine's tourism industry. The tourism industry of the territorial community of Ivano-Frankivsk was also affected by the unfavorable epidemic situation. As a consequence, the tourist flow decreased by about 40% compared to 2019.

Improving the tourist attractiveness of Ivano-Frankivsk, however, remains a priority area for socio-economic development and requires a search for new, creative approaches, combining the efforts of local authorities and tourism entities.

Social level:

1) indicators of social welfare and standard of living: the volume of construction work per capita; social facilities commissioned through different sources of funding (total area of new buildings, secondary schools, preschools, hospitals); commissioned residential houses (newly built) with a total area per 10.000 persons;

2) labor market characteristics: average annual number of population, registered unemployed per vacancy;

3) indicators of living standards: average monthly salary of full-time employees, wage arrears (the 1st day of the next month of the reporting period), average size of pension (at the end of the reporting period);

4) indicators characterizing educational provision and the environment: coverage of children (3-5 years) by pre-school educational institutions, air emissions of pollutants from stationary sources per capita.

All of these characteristics are the basis for determining the comprehensive characteristics of socio-economic development.

To calculate the composite indicators, you need to perform the following steps.

1. Divide them into those that contribute to the development of the city, and those that hinder this development, and therefore - positively or negatively affect the level of socio-economic development of the city.

2. Since the selected indicators are not proportional, it is necessary to bring them to a single numerical measure, that is, to standardize them with numerical values from 0 to 1.

Standardization of indicators, the growing value of which leads to a positive impact on the development of the city, will be carried out according to the formula:

$$Z_i = \frac{x_{i\phi} - x_{i\,min}}{x_{i\,max} - x_{i\,min}}, \tag{1}$$

and indicators whose increasing value leads to a negative impact on the social and economic development of the city, will be calculated according to the formula:

$$Z_i = \frac{x_{i\,max} - x_{i\phi}}{x_{i\,max} - x_{i\,min}}, \qquad (2)$$

where Z_i – a standardized indicator that has a positive impact on urban development (negative);

$x_{i\,\phi}$ – the actual value of the ith indicator contributing to the city's development (inhibiting);

$x_{i\,max}$ – the maximum value of the ith indicator that contributes to the city's development (inhibiting);

$x_{i\,min}$ – the minimum value of the ith indicator that contributes to the city's development (inhibiting).

3. To assess the level of economic and social development by group indicator, we apply the formula:

$$I_{rj} = \sum_{i=1}^{n} Z_i V_i, \qquad (3)$$

where I_{rj} – a group indicator characterizing the economic (social) level of development of a city;

Z_i – a standardized indicator that promotes (inhibits) the development of the city;

V_i – the weighting factor of the standardized indicator that promotes (inhibits) the development of the city;

n – the number of indicators that contribute to (inhibit) the development of the city.

3. Let us form two composite indicators - economic and social development of the city. Let us calculate each proposed composite indicator according to the formula:

$$K_{e(c)k} = \sum_{j=1}^{m} I_{rj} V_j, \qquad (4)$$

where $K_{e(c)k}$ – a comprehensive indicator characterizing the economic (social) level of the city's development;

I_{zj} – j a group indicator characterizing the economic (social) level of the city's development;

V_j – weighting coefficient of the economic (social) level indicator.

m – the number of indicators in the j group.

The group indicators of social and economic development are shown in Figures 1 and 2, respectively.

	2016	2017	2018	2019	2020
■ Industrial sales and SME indicators	0,06	0,22	0,34	0,19	0,18
■ Financial performance of the city	0,06	0,21	0,26	0,24	0,20
■ Investment and external economic activity indicators	0,26	0,09	0,14	0,14	0,02

Роки
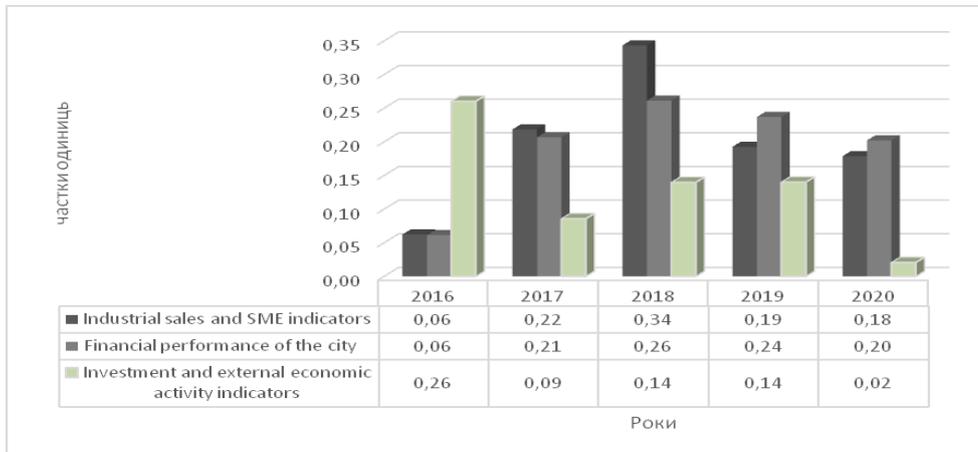
Figure 1. The dynamics of group economic indicators of development change in Ivano-Frankivsk

Source: calculated and compiled by the author based on [14–16].

	2016	2017	2018	2019	2020
■ Social welfare and standard of living indicators	0,00	0,06	0,06	0,14	0,07
■ Labour market indicators	0,12	0,01	0,13	0,22	0,15
■ Standard of living indicators	0,09	0,11	0,15	0,15	0,16
■ Characteristics of educational provision	0,00	0,17	0,17	0,00	0,01
□ Environmental protection indicators	0,00	0,03	0,20	0,19	0,19

Роки
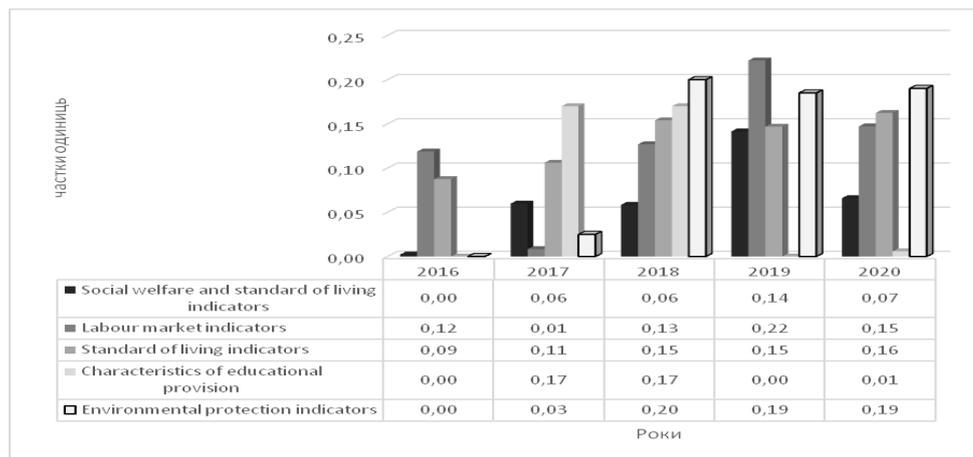
Figure 2. The dynamics of group social indicators of development change in Ivano-Frankivsk

Source: calculated and compiled by the author based on [14–16].

5. Let us calculate the value of the integral indicator of socio-economic development of the city using the formula:

$$I = \sum_{k=1}^{t} K_{e(c)k} V_k ,$$ (5)

where $K_{e(c)k}$ – a comprehensive indicator of a city's economic (social) development;

V_k – the weighting coefficient of the complex indicator of the economic (social) development level of the city;

t – the number of comprehensive indicators.

6. Based on the expert evaluation, the results are processed by means of a pairwise comparison method and the weighting effect of each group of indicators and the weighting coefficient of the complex indicators, in other words, economic and social development, are established.

The results of calculating the integral indicator depend to a large extent on the method of assessing the impact of indicators on the final result.

Based on the results of expert evaluation and processing of the results by the method of pairwise comparisons, the weighting influence of the indicators of each group and the weighting coefficients of the integrated indicators, namely economic and social development, were established.

7. We will carry out indicator forecasting using MS Excel according to different types of approximating dependencies, such as linear, logarithmic, polynomial, power, exponential, and linear filtering ones, and assess the possibility of using one or another forecasting model by ranking the dependencies according to criteria that characterize the reliability and robustness of the obtained forecasts.

Construct a trend line using theoretically appropriate dependencies and evaluate each result.

To determine the reliability of the forecast, we use the value of the error of approximation (R^2). In ranking by this criterion, the model that approximates the maximum error is given the rank with the lowest value. The results of the ranking by approximation value (R^2) are shown in Table 1.

Table 1

Ranking results for approximation error (R^2)

Type of approximation	Forecasting model	R^2	Rank
1. Linear	$y = 0.0138x + 0.1002$	$R^2 = 0.2477$	7
2. Logarithmic	$y = 0.0446\ln(x) + 0.099$	$R^2 = 0.4167$	5
3.3. Polynomial of the second order	$y = -0.0184x^2 + 0.1241x - 0.0284$	$R^2 = 0.8604$	3
3.4. Polynomial of the third order	$Y = -0.0039x^3 + 0.0166x^2 + 0.0325x + 0.0368$	$R^2 = 0.8885$	2
3.5. Polynomial of the fourth order	$y = 0.0102x^4 - 0.1265x^3 + 0.5233x^2 - 0.7999x + 0.4784$	$R^2 = 1$	1
6. Exponential	$y = 0.0955e^{0.1181x}$	$R^2 = 0.3306$	6
7. Stepwise	$y = 0.0955x^{0.3696}$	$R^2 = 0.5234$	4

Source: calculated by the author.

In order to determine the consistency of the projections, it is recommended to compare the values obtained from each model with the integral indicator of socio-economic development for the year 2021. Certainly, the closer the predicted value is to the actual value, the more realistic the chosen model will be. In ranking by this criterion, the model with the lowest deviation value is given the lowest order. The results of the ranking are presented in Table 2.

Table 2

Ranking result by deviation from the actual value

Type of approximation	Integral indicator of socio-economic development	Forecast value of the integral indicator of socio-economic development	Deviation	Rank
1. Linear	0.13	0.183	-0.053	2
2. Logarithmic	0.13	0.179	-0.049	1
3.3. Polynomial of the second order	0.13	0.053	0.077	5
3.4. Polynomial of the third order	0.13	-0.013	0.143	6
3.5. Polynomial of the fourth order	0.13	0.413	-0.283	7
6. Exponential	0.13	0.194	-0.064	4
7. Stepwise	0.13	0.185	-0.055	3

Source: calculated by the author.

The final evaluation result for the parameters in question is defined as the sum of the ranks obtained by adding partial ranks. The minimum sum of the ranks corresponds to the maximum acceptable model for all the criteria involved in the evaluation. The overall scores are presented in Table 3.

Table 3

Total model ranks

Type of approximation	Rank 1	Rank 2	Total rank
1. Linear	7	2	9
2. Logarithmic	5	1	6
3.3. Polynomial of the second order	3	5	8
3.4. Polynomial of the third order	2	6	8
3.5. Polynomial of the fourth order	1	7	8
6. Exponential	6	4	10
7. Stepwise	4	3	7

Source: calculated by the author.

Thus, from the above calculations it is clear that the logarithmic relationship is the most appropriate model for forecasting, so we will apply this trend line to make the forecast.

Using the critical and normative values of the indicators it is possible to assess the level of changes in the socio-economic development of the city from 0 to 1 as follows: 1) the range from 0 to 0.2 will reflect a low level of change in socio-economic development; 2) that from 0.2 to 0.4 will reflect a change below average; 3) the range from 0.4 to 0.6 will reflect an average level of change in development; 4) that from 0.6 to 0.8 reflects a sufficient level of change in socio-economic development and 5) the range from 0.8 to 1 reflects a high level of change in socio-economic development of the city. Having determined the integral indicator of the level of change of socio-economic development of Ivano-Frankivsk, we can say that during the study period there were insignificant changes in the level of development of the city, by 2018 there was a gradual increase in this indicator, but already in 2019 it decreased by 15%, and in 2020 - by a further 20% compared to 2018 to reach 0.13. The reason for this is the coronavirus pandemic.


	2016	2017	2018	2019	2020
Economic level	0,12	0,17	0,25	0,19	0,14
Social level	0,05	0,07	0,15	0,15	0,12
Integral indicator of socio-economic development	0,09	0,12	0,20	0,17	0,13

$$y = 0,0446\ln(x) + 0,099$$
$$R^2 = 0,4167$$
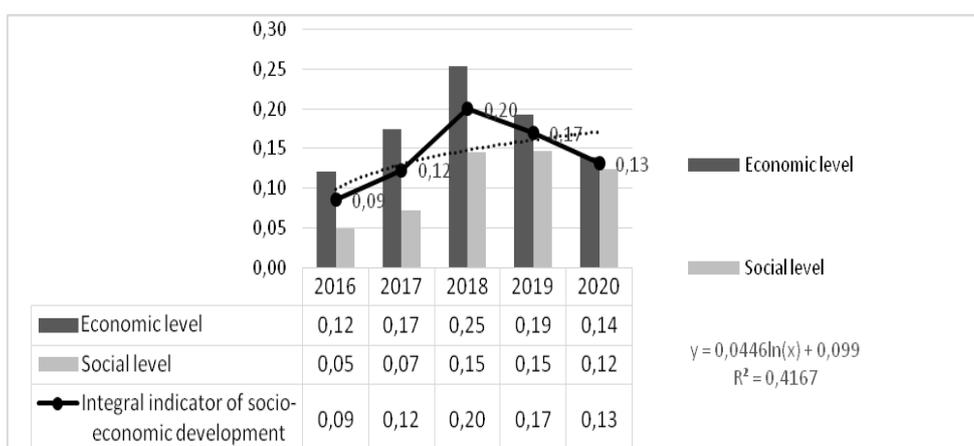
Figure 3. Integral indicator of Ivano-Frankivsk socio-economic development

Source: calculated and compiled by the author.

The forecast of changes of social and economic development shows that in future a slight tendency of growth will remain, namely the growth will make I = 0.0446*ln(6) + 0.099 = 0.17, however for keeping the tendency of social and economic development of Ivano-Frankivsk it is necessary to restore and increase industrial output, implement innovative technologies, increase competitive ability of production via investments, creating new jobs, renovation, reconstruction and modernization of the main assets, and building up the production capacities. It is also necessary to

increase the efficiency of companies through market expansion, boosting exports, promoting the implementation of advanced energy- and resource-saving technologies, and by using alternative energy sources.

The war has changed not only the everyday life of each of us, but also the social and economic conditions of each region of Ukraine. Throughout the war we witnessed a rapid devaluation of the hryvnia and increased prices for most goods. The development of certain sectors of the economy of Ivano-Frankivsk was redistributed due to the displacement of the population resulting from the full-scale invasion of Ukraine by the Russian Federation. According to Ivano-Frankivsk Mayor Ruslan Martsinkiv, there are currently 45.000 internally displaced people in the city. This, in turn, contributes to increased incomes for some industries and leads to a decrease in others. Various sectors of the economy suffer from disruptions in logistics. For example, the price for a square meter of living space is rising. Real estate prices in towns as far away from the battlefield as possible has risen by 13 per cent since the start of the war. This is due both to the increased demand for housing in the western areas and to the fact that most warehouses and factories with materials are located in the east; due to the intense fighting, businesses closed down and only a few were able to continue operating. There are still goods from different countries in material warehouses, but their delivery requires additional costs. Destruction of rail and road infrastructure and rising fuel prices are forcing the search for new logistics routes and modes of transport. This has an impact on the cost of construction materials. Some materials are made from raw materials produced abroad and transported by sea. It is now difficult for Ukraine to obtain these materials because Black Sea ports do not accept cargoes. Consequently, construction materials increased in price by 20-60% and Ukrainians will have to pay many times more for a square meter.

Also, the growing number of temporarily displaced people in the western regions of Ukraine increases pressure on vacant jobs, schools and kindergartens, transport, etc. Such a situation further requires considerable focus on the socio-economic development of the city of Ivano-Frankivsk and cities in Ukraine as a whole.

It should be noted that it is impossible to ensure an increase in the level of socio-economic development of the city only with the support of local authorities, and state support is also required. Right now, Ukrainian local authorities suffer from insufficient local taxes and fees, while the lack of funds depends on local budgets from subsidies and subventions from the state budget.

As a consequence, greater efforts are also needed by cities to attract financial resources through participation in grants and programs and to involve local residents more actively in socio-economic and environmental issues, which will ultimately improve their well-being and quality of life.

Financing of development programs can be extended by loans from local governments. In many countries around the world, municipal borrowing is an alternative and important source of funding for local economic development. As a consequence, EU loans typically account for 10-15% of local budget revenues. San Marino has the highest rate at 69%, with the Netherlands at 19%, Belgium at 13%, Cyprus at 12%, the Czech Republic at 11% and Spain and France at 10%. The undisputed world leader in terms of volume in the local bond market is the USA [9].

Local borrowing is a series of relationships between local authorities and natural and legal persons, involving the attraction of funds from legal and natural persons and the formation of debt liabilities of local authorities as borrowers. In general, these can include: loans from banks and other financial institutions; bond loans to issue municipal bonds; bill loans involving the issue of treasury bills; mutual lending by local authorities, especially municipal mutual lending banks (mutual municipal banks); and treasury loans from temporarily available state or regional budget funds.

Every form of local lending has a specific scope of application. Loans are mainly used to finance relatively cheap short-term projects; bonded loans are used to finance long-term investments; promissory notes are used to cover the local budget deficit for the year; and mutual and treasury loans are used to cover short-term cash shortages. Domestic bonds play a crucial role in financing high-cost investment projects. Bond loans - as a mechanism for financing local economic development - involve the placement of local government bonds on Ukraine's stock market on terms of maturity, payment and repayment. Bond loans are one of the important tools to finance urgent public needs, such as development of power, water and wastewater systems, transport networks, housing, educational institutions, health, culture, sports, etc.

Ukrainian cities have experience of issuing local bonds. Most of these loans are not of an investment nature, but to finance the reconstruction of public utilities.

According to the authors' team [9] there are many obstacles to the further development of the local credit market. These include the low institutional capacity of local governments to organize their own bond issuance (organizing it through professional intermediaries is quite costly);

limited sources of development budget revenues to repay the principal amount of local debt, which reduces borrowing capacity; borrowed funds are mainly used to finance projects, the effect of whose implementation does not directly cause an increase in local fiscal revenues in the future; and local governments do not consider the possible risks (political, monetary) associated with the repayment of debt obligations.

Conclusions

1. Despite the significant number of scientific studies of the socio-economic development of cities, the complexity and scale of contemporary problems and the territorial development of Ukraine justify the need to develop methodological tools to determine the level and main directions of such development.

2. The proposed algorithm for assessing the level of socio-economic development based on the integral method allows taking into account a large number of indicators that have both favorable and inhibitory effects on the development of the city. The conducted forecasting makes it possible to establish the trend of future changes according to the approximation model, which determines the reliability and credibility of such forecasting.

3. The assessment of socio-economic development in the case of Ivano-Frankivsk showed a low level of socio-economic development and a further decline of the situation in 2018-2020. The assessment of the socio-economic development of Ivano-Frankivsk as an example showed a low level of socio-economic development in the city and a further decline in the context of a persisting situation between 2018 and 2020.

4. The main areas of improvement include recovery and expansion of industrial production, introduction of innovative technologies, increasing the competitiveness of products by attracting investment, creating new jobs, renovation, reconstruction, and modernization of fixed assets, increasing production capacity, as well as increasing the efficiency of entrepreneurship through market expansion, increasing exports, promoting advanced energy- and resource-saving technologies, and the use of alternative energy sources. Greater efforts are also needed for cities to attract financial resources by participating in grants and programs and to involve local residents more actively in socio-economic and environmental issues, thereby improving their well-being and quality of life.

Further research will analyze the financing of the city's development programs and assess the impact of investment resources on the city's financial performance.

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ПРОГНОЗУВАННЯ СОЦІАЛЬНО-ЕКОНОМІЧНОГО РОЗВИТКУ МІСТА НА ПРИКЛАДІ ІВАНО-ФРАНКІВСЬКА

У статті запропоновано алгоритм оцінювання та прогнозування соціально-економічного розвитку міста на прикладі Івано-Франківська, проведено оцінювання рівня такого розвитку на основі відібраної системи показників та окреслено його основні напрями. Попри значну кількість наукових досліджень із цієї теми, складність і масштабність сучасних проблем та територіальний розвиток України обґрунтовують необхідність

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формування методичного інструментарію для визначення рівня змін та основних напрямів соціально-економічного розвитку. Для вивчення змін у соціально-економічному розвитку міст рекомендується використовувати метод інтегрального оцінювання, оскільки такий підхід дає інформацію про їх загальну динаміку з урахуванням широкого спектра показників, що визначають сприятливі та гальмівні тенденції.

Для прогнозування подальших змін на основі різних залежностей слід застосувати ранжування моделей за коефіцієнтом апроксимації та за відхиленням розрахованого інтегрального індикатора і його прогнозованим значенням. Такий підхід дає можливість встановити тенденцію майбутніх змін за моделлю апроксимації, що визначає надійність та достовірність прогнозування. Проведене оцінювання соціально-економічного розвитку на прикладі м. Івано-Франківськ засвідчило низький рівень змін, що відбулись у розвитку міста та їх подальше зниження за умов збереження ситуації, що склалася за період 2018–2020 рр.

У статті також окреслено основні напрями зростання рівня розвитку міста шляхом відновлення та нарощення промислового виробництва, впровадження інноваційних технологій, підвищення конкурентоспроможності продукції шляхом залучення інвестицій, створення нових робочих місць, оновлення, реконструкції та модернізації основних засобів, нарощення виробничих потужностей, а також підвищення ефективності підприємництва шляхом розширення ринку, збільшення експорту, сприяння впровадженню передових енерго- та ресурсозберігаючих технологій, використання альтернативних джерел енергії. Необхідні також більші зусилля міст для залучення фінансових ресурсів шляхом участі у грантах і програмах та активнішого доєднання місцевих жителів до вирішення соціально-економічних та екологічних проблем, що забезпечить покращення їхнього добробуту та якості життя.

Ключові слова: *соціально-економічний розвиток міста, показник, модель, апроксимація, прогноз*