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FINANCIAL CAPACITY OF TERRITORIAL COMMUNITIES: THEORETICAL, METHODOLOGICAL AND PRACTICAL ASPECTS

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ФІНАНСОВА СПРОМОЖНІСТЬ ТЕРИТОРІАЛЬНИХ ГРОМАД: ТЕОРЕТИКО-МЕТОДОЛОГІЧНІ ТА ПРИКЛАДНІ АСПЕКТИ

Анотація. *У публікації досліджено концептуальні засади та прикладні аспекти оцінювання фінансової спроможності територіальних громад в умовах децентралізації та воєнного стану. Проаналізовано сучасні підходи до трактування поняття «фінансова спроможність», зокрема в контексті бюджетної самодостатності, платоспроможності та ефективного використання ресурсів. Визначено, що фінансова спроможність виступає важливою характеристикою загальної спроможності громади забезпечувати надання якісних публічних послуг та реалізовувати власні повноваження. Оцінено*

переваги й недоліки представлених у науковій літературі методичних підходів до оцінювання фінансової спроможності територіальних громад. Підкреслено необхідність вироблення уніфікованої системи такого оцінювання з урахуванням як базових, так і додаткових показників. Обґрунтовано доцільність застосування інтегрального підходу до класифікації громад за рівнем фінансової спроможності, що дозволить підвищити ефективність державної регіональної політики та фінансового управління на місцевому рівні.

Використано метод кластеризації для стратифікації територіальних громад за рівнем їх фінансової спроможності. Проведений аналіз дав можливість порівняти територіальні громади за рівнем їх фінансової спроможності, виявити групи ризику для розробки пріоритетів фінансової політики та стимулювання розвитку територій.

Ключові слова: *фінансова спроможність, територіальна громада, місцевий бюджет, децентралізація, міжбюджетні трансферти, оцінювання.*

Abstract. *The publication examines the conceptual foundations and practical aspects of assessing the financial capacity of territorial communities under conditions of decentralisation and martial law. Contemporary approaches to interpreting the concept of «financial capacity" are analysed, particularly in the context of budget self-sufficiency, solvency, and the efficient use of resources. It is established that financial capacity serves as a critical characteristic of a community's overall ability to provide quality public services and to exercise its delegated powers. The advantages and disadvantages of methodological approaches to assessing the financial capacity of territorial communities, as presented in the scientific literature, are evaluated. The necessity of developing a unified assessment system that incorporates both basic and supplementary indicators is emphasised. The feasibility of applying an integrated approach to the classification of communities based on their level of financial capacity is substantiated, as this would enhance the effectiveness of national regional policy and financial governance at the local level.*

The clustering method was used to stratify territorial communities according to their financial capacity. The analysis made it possible to compare territorial communities in terms of their financial capacity, identify risk groups for the development of financial policy priorities, and stimulate the development of territories.

Key words*: financial capacity, territorial community, local budget, decentralisation, interbudgetary transfers, assessment.*

In a democratic society, local self-government plays a crucial role in the realisation of the state's functions as a social institution. Generally, territorial communities are responsible for providing the most essential public goods that determine the quality of life for the population and the level of satisfaction of their daily needs. However, the complete provision of these benefits at the local level is possible only when the territorial community is sufficiently equipped with financial resources, meaning it has an adequate level of financial capacity. The formation of the financial capacities of territorial communities occurs within a complex economic, political, and security environment encompassing a significant number of factors of various natures.

In recent years, the full-scale war with russia has been the primary factor influencing the financial capacity of territorial communities in Ukraine. It undermines the economic potential of our country and diminishes public authorities' ability to provide citizens with essential public goods. Furthermore, in the context of wartime, territorial communities require additional financial resources. This necessity arises from increased budgetary expenditures on financial and material support for the Armed Forces of Ukraine, assistance to victims of hostilities, and the establishment of safe conditions for delivering educational, medical, and other services. Given these circumstances, the issue of ensuring the financial capacity of territorial communities during wartime remains pertinent and is becoming increasingly popular for study.

Main text of the study. The concept of a capable community entered scientific circulation with the onset of the reform of local self-government and territorial organisation of power. The goal of this reform was to strengthen the position of local self-government by forming a system of territorial communities in Ukraine that are capable in various aspects. The primary approaches to their formation were outlined in a special Methodology approved by the Cabinet of Ministers of Ukraine in 2015. This document defines a capable territorial community as a community that can «independently or through the relevant local self-government bodies ensure an adequate level of public services, in particular in the field of education, culture, healthcare, social protection, housing and communal services, taking into account human resources, financial support and infrastructure development of this administrative-territorial unit» [15]. There are two main emphases in this definition: first, the focus on the purpose of the territorial community, which should ensure that the collective needs of its residents are met by providing them with high-quality public services; second, the criteria for identifying the capacity of the territorial community, namely the availability of the necessary financial resources, staffing and infrastructure capabilities to provide public services of appropriate quality.

Thus, financial capacity should be considered as one of the dimensions of the overall capacity of a territorial community. However, the position that the financial component is the leading one in determining the capacity of a territorial community is gaining more and more support among the scientific community. According to I. Vakhovych and I. Kaminska, financial resources can link and, in some way, even replace other types of resources that are necessary for the provision of high-quality public services [5]. This opinion is shared by A. Pelekhaty. He notes that «thanks to this ability of financial resources, financial capacity is a priority in the development of the territorial community, is the basis and key to the successful implementation of the reform of the local government system in Ukraine» [14]. Indeed, if a community lacks human resources or developed infrastructure, but has sufficient financial resources, the local government can use the mechanism of inter-municipal cooperation to solve the problem of access to quality public services for the residents of the territorial community.

Despite the surge in attention to local finance and the increasing number of scientific publications on the financial capacity of territorial communities, the definition of this concept and methodological approaches to its assessment are still under debate. From the total number of definitions of the financial capacity of territorial communities, we can summarise several approaches to its understanding, namely:

– financial capacity of the territorial community as a quantitative characteristic of the formation of revenues of all economic entities in the respective territory, i.e., revenues of local governments, business entities and households. According to S. Sember, O. Chubar, and K. Mashiko, a financially capable community can ensure an adequate level of satisfaction of the needs of its members, and also can solve the whole range of social and economic problems [17], using not only the community budget, but also the incoming cash flows of business entities and households. These resources of business and population can potentially be used for the socio-economic development of the community [17]. We believe that such an interpretation of the financial capacity of a territorial community is debatable, since business and the population use their funds to meet their individual needs, not collective ones. These funds can only become a source of funding for public needs through the mechanism of taxation (i.e., in the formation of local budget revenues) or through charity (which is voluntary, and therefore public authorities have no influence on it). This understanding of the financial capacity of a territorial community may reduce the objectivity of its assessment:

– financial capacity of the territorial community as a quantitative characteristic in the formation of local budget resources. According to this approach, a financially capable community is one that possesses sufficient financial resources in the local budget to ensure the proper provision of public services to its residents. This understanding of the financial capacity of a territorial community is more prevalent in the academic community. A. Buriachenko and I. Filimoshkina include educational, medical, cultural services, social protection of the population, and housing and communal services, with local governments being responsible for their provision [4]. I. Liutiy and N. Spasiv emphasise that the financial capacity of a territorial community is determined by its own local budget revenues and other revenues as provided for by law. Taken together, these resources serve as a foundation for the socio-economic development of the territory and the improvement of residents' well-being [10]. A similar explanation of the financial capacity of a territorial community can be found in the publications of M. Pasichnyi and R. Obukhov [13], I. Hrynchyshyn [6], and other scholars. M. Pasichnyi and R. Obukhov assert that the correspondence between budget revenues and expenditures, i.e. its balance, is a crucial aspect of the financial capacity of a territorial community. I. Hrynchyshyn observes that financial resources exceeding the necessary amount for the provision of public services should be viewed as a source for sustainable and inclusive community development. O. Bezpalko indicates that the financial capacity of a community is determined by whether its own sources of revenue to the local budget are adequate for local governments to address issues of local importance [2];

The financial capacity of the territorial community is a quantitative and qualitative characteristic pertaining to the formation and utilisation of local budget resources. Thus, H. Mykhailiv [11] and A. Pelekhaty [14] argue that financial capacity is determined not only by the volume of financial resources available to the community but also by the effective structure of the sources generating these resources, alongside the quality of their distribution and efficient utilisation. As a result, the community can not only tackle destabilising factors of socio-economic development but also secure its stability in both the short and long term. We believe that this understanding of the financial capacity of

a territorial community most accurately captures the essence of the concept, although it presents some controversial points. On the one hand, it is an objective fact that the greater the financial resources at a local government's disposal, the more financially capable the territorial community becomes. However, local governments do not aim to form budgetary resources as an end in itself. This process is intricately linked to the financing of public services. As A. Sen noted, it is not merely the amount of income that matters but the opportunities it affords. Therefore, if the allocation and utilisation of a substantial volume of budgetary resources are poorly conceived, the indicators of meeting community residents' needs for public services may be inadequate. Hence, the financial capacity of a territorial community can only be objectively assessed when the quality of budgetary resource allocation across individual functions and powers of local government is taken into consideration. On the other hand, the structure of budgetary resources is less significant in evaluating the financial capacity of a territorial community. When organising the provision of public services, it is primarily the volume of budgetary resources that the community can allocate for this purpose that holds importance. The source or method of acquiring these funds is of secondary concern. Nevertheless, the structure of budgetary resources reflects the qualitative aspect of the financial capacity of the territorial community, that is, whether it can independently meet its financial needs.

T. Kutsenko and Y. Sirenko present a detailed model for ensuring the financial capacity of a territorial community, taking into account the full range of tools employed by local governments to attract financial resources for the provision of public services. The authors describe various budgetary instruments, such as taxes and fees, as well as expenditures under targeted budget programmes. They also characterise the components of the model that ensures the financial capacity of the community, such as investment, grants, credits, and others, revealing both their advantages and problematic aspects [9]. We believe that this understanding of the model for ensuring the financial capacity of territorial communities is useful for assessing real and potential sources of financial resources for providing public services. However, this approach does not address the importance of the internal potential of a territorial community in ensuring its financial sustainability and the role of the local government's own efforts in this process.

Depending on the significance of its financial resources for local governments to fund public services for the population, several modifications of financial capacity can be distinguished, ranging from complete financial dependence to financial self-sufficiency. This distinction clarifies the terminological conflict regarding the relationship between the concepts of financial capacity, financial self-sufficiency, and the financial autonomy of a territorial community. If a community, due to its limited economic potential, has a small base of its own revenues and relies on transfers from other budgets to form its budgetary resources, this model of ensuring financial capacity manifests as financial dependence. As the state has established standards for the provision of basic public services to all citizens, the government is compelled to provide intergovernmental transfers to ensure the financial viability of such a community. If the proportion of own revenues within the community's budgetary resources gradually increases, the model of ensuring its financial viability transitions to financial autonomy. This autonomy may involve varying degrees of reliance on budget transfers for budget revenues. Ultimately, when a

territorial community possesses sufficient own budget resources to independently finance the provision of public services to its residents, this model of ensuring the financial capacity of the community takes the form of financial self-sufficiency (Fig. 1).

Thus, the interpretation of the financial capacity of territorial communities remains a subject of scientific debate. The question of developing a methodology for its objective assessment is equally contested among scholars. For example, between 2017 and 2018, as part of the U-LEAD with Europe Programme and the SKL International project, the Ministry of Regional Development determined the financial capacity of territorial communities using four coefficients: 1) own revenues per capita; 2) level of budget subsidisation (share of basic/reverse subsidies in revenues); 3) share of expenses for the maintenance of the administrative apparatus funded by own resources; 4) capital expenditures per capita [12]. A. Buriachenko and I. Filimoshkina criticise this approach and note that these indicators are only partially acceptable for assessing the financial capacity of a territorial community. «None of them reflects the relationship between the available own financial resources and the amount of funds spent on the exercise of powers» [4]. Researchers argue that, in determining the financial capacity of territorial communities, it is advisable to use the ratio of own budget revenues to expenditures for the exercise of their own powers. However, such an innovation requires a change in the structure of the expenditure portion of the budget (in accordance with the division of expenditures into own and delegated).

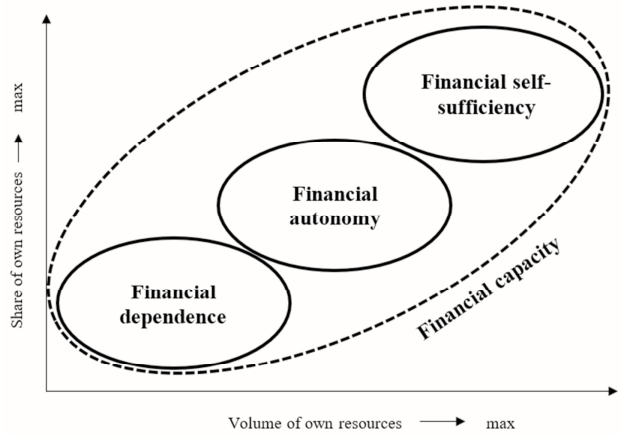

Fig. 1. Models for ensuring the financial capacity of a territorial community based on the contribution of its own revenues to the formation of its budgetary resources.

Source: created by the authors

I. Liutiy and N. Spasiv continued to criticise the methodology for assessing the financial capacity of territorial communities from the U-LEAD with Europe Programme. They employed a cluster approach to rank territorial communities by their financial capacity. Based on the results, the researchers argue that only indicators such as the dynamics of local taxes and fees (year-on-year), as well as own revenues per capita, are

decisive for the level of financial capacity. All other coefficients are of lesser importance [10]. However, it is difficult to concur with this position, as both indicators proposed by I. Liutiy and N. Spasiv are complementary. This may lead to a reduction in the objectivity of the assessment.

T. Bondaruk, I. Bondaruk, and M. Dubyna examine the indicators of the budget's financial capacity in the context of assessing its financial sustainability. However, of the five assessment indicators proposed by the researchers, two (the ratios of local budget revenues to consolidated budget revenues and GDP, respectively) are unsuitable for assessing the financial capacity of a particular territorial community, as they are intended for macroeconomic analysis. Additionally, the coefficients for the ratio of own revenues and tax revenues to local budget expenditures are partially duplicated [3, p. 66].

The Department of Finance of the Lviv Oblast State Administration proposes an original approach to assessing the financial capacity of communities. When determining the required co-financing amount for regional targeted programmes by local governments, the index of relative financial capacity of communities is used. This index is calculated as the ratio of tax and fee revenues, along with basic subsidies per resident of the community, to the corresponding indicator for the region as a whole [18]. Although somewhat controversial, this indicator allows for an assessment of the budgetary resources per capita that a local government can target for specific use. This rationale is evident, as local governments are essentially just the administrators of funds in the case of subventions. In contrast, a grant as an intergovernmental transfer allows local authorities to make independent decisions regarding its targeting.

O. Kopyluk, O. Muzychka, P. Pelekh, and E. Tatsii propose their own methodology for assessing the financial capacity of a territorial community. According to the researchers, this methodology is based on indicators that characterise the main financial aspects of the community's activities. They suggest using the following indicators to evaluate the financial capacity of a community: the dynamics of general fund revenues (excluding transfers); a tax capacity index based on general fund revenues, excluding transfers; the level of subsidisation; the ratio of administrative expenditures to budget tax revenues; the share of labour costs in total budget expenditures; and per capita indicators of own revenues and development expenditures [8]. In our opinion, supplementing the methodology for assessing the financial capacity of communities with a tax capacity index may be a rational decision. However, some indicators of this methodology are debatable: firstly, it is unclear why the authors compare administrative expenditures solely with budget tax revenues, as the economic interpretation of this indicator is questionable; secondly, scholars propose determining the level of subsidisation as the ratio of the basic subsidy to the general fund revenues, but this does not characterise the dependence of the community's financial capabilities on interbudgetary transfers in general, merely on a part of them. Furthermore, there is a question regarding the economic content and feasibility of calculating this indicator. Although all communities share the commonality of receiving subsidies for the provision of educational services or individual social protection programmes, they can also enhance their financial capabilities through other subsidies. However, the receipt of funds from these subsidies is not guaranteed and requires efforts from local government.

O. Rudachenko, Y. Tararuev, and Y. Shevchenko argue that the financial capacity of a territorial community is determined by its ability to finance socio-economic development using internal and external sources of capital. They propose utilising the following set of indicators to assess the financial capacity of communities: «efficiency of financial resource use; efficiency of administrative activities of territorial communities; financial autonomy of territorial communities; expenditure on wages per 1 community resident; share of wage expenditure in their total amount; expenditure on housing and communal services per community resident; share of capital expenditure in total expenditure; expenditure on culture per community resident; expenditure on physical education and sports per community resident; share of expenditure on education in total expenditure» [16]. We consider this approach to assessing the financial capacity of territorial communities to be highly debatable. Firstly, the economic interpretation of indicators regarding the efficiency of financial resource use and the administrative activity of the territorial community, as well as its financial autonomy, is unclear, as the publication provides no explanation. Secondly, there are concerns about whether it is appropriate to calculate the amount of budget expenditures on wages per 1 resident of the community, as the significance of this indicator is unclear. Thirdly, it is uncertain why this methodology combines absolute and relative indicators of budget expenditures on social services (per capita expenditures on culture, physical culture, and sports, but the share of expenditures on education in total expenditures).

Among scholars conducting in-depth research on the financial capacity of local communities, the assessment methodology developed by the working group of experts at the Centre for Political and Legal Reforms, led by Y. Kaziuk, receives significant support. This methodology was created by scholars as part of the U-LEAD with Europe programme. It is based on the Methodology for the Formation of Capable Territorial Communities, which was approved by the Cabinet of Ministers of Ukraine in 2015 [15]. Following this methodology, researchers propose to assess the financial capacity of communities using a set of 11 indicators. These indicators comprehensively characterise the proportions of the formation and utilisation of financial resources. They include: the level and structure of local budget revenues, with particular emphasis on the role of own revenues and transfers in shaping the community›s financial capabilities; and the structure of local budget expenditures in line with functional and economic criteria for their distribution [20]. This forms the information base for a comparative analysis of the financial capacity of territorial communities and the development of state policy in the area of local self-government.

The working group proposes to categorise the entire set of indicators for assessing the financial capacity of communities into basic and supplementary indicators. The first group includes the following indicators: the amount of general fund budget revenue per capita; the ratio of administrative expenditures to local budget revenue; the level of budget dependence on subsidies; and the share of capital expenditures within their overall structure. According to Y. Kaziuk, in certain cases, the basic set of indicators of the financial capacity of a territorial community may be supplemented with other indicators such as expenditures on administration, education, or housing and communal services per capita, fiscal return on community land, and so forth. [20].

R. Fedorets criticises this approach to assessing the financial capacity of communities, deeming the set of indicators insufficient. Like other scholars, he proposes incorporating a community tax capacity index into the assessment methodology, which would enable comparisons of a particular community's financial capacity relative to the national level. Conversely, R. Fedorets argues that it is essential to disregard the indicators regarding the share of transfers and local taxes and fees in local budget revenues, advocating instead for an assessment that considers only the share of subsidies in the budget. The scholar further contends that education is a crucial aspect of balanced community development; thus, it is necessary to augment the list of indicators of community financial capacity with an indicator of education expenditure per student [19]. In our view, it is inappropriate to confine the indicators regarding the structure of budget resource formation solely to the budget›s dependence on subsidies. This oversimplifies the criteria for evaluating the financial capacity of territorial communities. To form an objective understanding of the model for ensuring a community›s financial capacity, it is vital to measure not only the contribution of local resources to budget formation but also the degree of reliance of the local budget on transfers. R. Fedorets› proposal to utilise the indicator of education expenditure per student is also contentious. On one hand, significant variations in this indicator among communities may stem from the unique characteristics of the educational institutions› network and enrolment. This may necessitate a differentiated approach to financing. On the other hand, education is funded through a combination of the community›s own resources and external funding, such as educational subsidies. In contrast, expenditures on culture and sports are entirely the responsibility of the local government.

We share the scientific position of the expert group led by Y. Kaziuk and find the set of indicators they proposed for assessing the financial capacity of local communities reasonable. However, the most contentious aspect of such an assessment is the choice of methodology for consolidating factor indicators into an integrated indicator and the subsequent stratification of territorial communities based on their financial capacity. According to M. Baranovskyi, it is advisable to use a method for normalising the initial factor indicators, which involves converting these indicators into partial indices, alongside further calculations to derive the integrated indicator of community capacity. To differentiate communities by their level of financial capacity, the scientist proposes applying a scale of criteria developed with regard to European practice in delineating problem areas. This scale divides communities into five groups, from high to low capacity [1]. Experts from the U-LEAD with Europe programme, Y. Kaziuk and V. Wenzell, conducted a thorough comparison of different methods for consolidating factor indicators and forming an integrated assessment of the financial capacity of a territorial community. Based on the results of this comparison, they concluded that the adapted model of Ken Brown›s 10-point test was the most advantageous. This model involves dividing communities into quartiles according to the values of factor indicators, assigning assessment points for each parameter, and then grading local communities based on the consolidated score of their financial capacity [20].

This methodology ensures a high level of objectivity in the assessment; however, its drawbacks include the cumbersomeness and complexity of obtaining the final results.

An alternative to its application could be cluster analysis, a method of multidimensional statistics and machine learning that groups objects into clusters (groups) based on their similarities. Unlike classification, clusters are not predefined but are formed automatically during the analysis.

The purpose of cluster analysis is to identify the internal structure of data, to divide objects into homogeneous groups by a set of features (factors, indicators), which allows: identify hidden patterns; segment objects for further analysis; make informed decisions.

The main stages of cluster analysis [7]:

1. Selection of features (indicators) for clustering.
2. Normalization (standardization) of data.
3. Selecting a clustering method (k-means, hierarchical, etc.).
4. Determining the number of clusters.
5. Building a cluster model.
6. Interpretation of the results.

Cluster analysis is used in economics (market segmentation, regional analysis); sociology (population grouping); healthcare (patient profiles); geoinformatics (territorial analysis); machine learning (dimensionality reduction, preliminary analysis).

Mathematical model of cluster analysis

Suppose we have n objects (e.g., territorial communities), and for each object we have collected p economic, social, or other indicators. Then each object can be represented as a set of numbers:

$$x_i = (x_{i1}, x_{i2}, \ldots, x_{ip}), \quad i = 1,2,\ldots,n \tag{1}$$

The purpose of cluster analysis:

To divide all objects into K groups (clusters) C1, C2, ..., CK so that objects in the same group are similar to each other and objects from different groups are as different as possible.

To understand how similar two objects are, the distance between them is used. Most often, it is the Euclidean distance. Distance between xi and xj:

$$d_{ij} = \sqrt{(x_{i1} - x_{j1})^2 + \ldots + (x_{ip} - x_{jp})^2}\,,\ i \neq j; i, j = 1,2,\ldots,n\,. \tag{2}$$

The smaller this distance is, the more similar the objects are.

For each cluster CK, the center (centroid) is calculated:

$$\mu_k = \frac{1}{|C_k|} \sum_{x_i \in C_k} x_i \tag{3}$$

where is the number of objects in cluster k.

The search for the best partitioning is reduced to minimizing the total squared distance from each object to the center of its cluster:

$$J = \sum_{k=1}^{K} \sum_{x_i \in C_k} \| x_i - \mu_k \|^2 \quad \to \min \tag{4}$$

This is the classic objective function of the k-means algorithm.

To assess the financial capacity of territorial communities in Ternopil Oblast, we will use a list of 11 key indicators based on a methodology developed by an expert group led by Y. Kaziuk. The analysis covers the data set for 2024 (Table 1):

1. General fund revenues per capita, (UAH).
2. General fund expenditures per capita, (UAH).
3. Expenditures on maintenance of the management apparatus per capita, (UAH).
4. Capital expenditures per capita, (UAH).
5. Level of subsidization of budgets, (%).
6. Share of administrative expenses, (% of general fund revenues).
7. Share of budget expenditures on labor remuneration, (% of general fund expenditures).
8. Share of capital budget expenditures, (%).
9. Expenditures on culture, physical education and sports per capita, (UAH).
10. Share of transfers in the budget revenues, (%).
11. The share of local taxes and fees in the revenue side of the general budget fund without transfers, (%).

Cluster analysis (k-means method) was used to group communities according to the similarity of these financial characteristics. Before clustering, these indicators were normalized, as they have different units of measurement and scales (hryvnia per capita and percentages).

As a result of data normalization, all indicators were brought to a common scale (from 0 to 1) (Table 2).

We used min-max normalization:

$$x_{it}^{*} = \frac{x_{it} - x_i^{\min}}{x_i^{\max} - x_i^{\min}}, \tag{4}$$

where i – is the indicator index, $i = \overline{1,11}$; t – is the territorial community index, $t = \overline{1,55}$.

Selecting the number of clusters.

The optimal number of clusters was determined using the «elbow» method. The «elbow» method is a graphical way of determining the optimal number of clusters in cluster analysis, in particular when using the k-means algorithm.

The essence of the method is as follows:

for different numbers of clusters k, the within-cluster variance (WSS) is calculated – the total distance of points to the centers of their clusters.

Then a graph is constructed:

the X-axis is the number of clusters k,

the Y-axis is the WSS value.

When increasing k ceases to significantly reduce WSS, a «break» appears in the graph – this is the «elbow», which indicates the optimal value of k.

Table 1

Indicators for assessing the financial capacity of territorial communities in the Ternopil region for 2024

Name of the territorial community	Current population as of 01.01.2022, including IDPs (thousands)	Area of TC, (km2)	General fund revenue per capita (UAH)	General fund expenditures per capita (UAH)	Administrative expenditures per capita (UAH)	Capital expenditures per capita (UAH)	Budget subsidy level (%)	Share of administrative expenditures (% of general fund revenues)	Share of budget expenditures on labor costs (% of general fund expenditures)	Share of capital expenditures in the budget (%)	Expenditures on culture, physical education, and sports per capita (UAH)	Share of transfers in budget revenues (%)	Share of local taxes and fees in the revenue part of the general fund budget without transfers, (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Velyki Hai	11,133	142	12126,1	12990,2	2015,6	2442,8	0,0%	16,60%	64,90%	15,70%	911,1	19,70%	22,70%
Velyka Berezovytsia	23,086	205	9817,9	10891,3	1438,2	1625,3	0,0%	14,60%	63,90%	12,90%	888	21,00%	37,40%
Ternopil	227,619	167,9	12923,3	14009,4	1080,5	2309,7	0,0%	8,40%	53,00%	13,70%	577,4	16,30%	28,10%
Baikivtsi	12,054	158,5	16469,6	16528,4	3583,4	1155,4	0,0%	21,80%	57,70%	6,50%	1189,4	13,40%	36,10%
Velyki Birky	5,944	65,8	11622,7	12970	2834,1	1793,2	0,0%	24,40%	60,90%	12,10%	488,7	18,40%	38,70%
Trybukhivtsi	8,627	116,2	17662,2	20026,1	1546,9	1911,9	0,0%	8,80%	35,10%	8,60%	490,3	17,90%	7,70%
Bila	10,735	138,1	8782,8	10716,4	1840,3	1616,1	2,8%	21,00%	67,40%	12,90%	720,7	24,30%	42,10%
Husiatyn	15,413	248,2	6929,2	9813,4	1281,5	1388,1	2,7%	18,50%	66,40%	12,10%	702,5	23,30%	33,50%
Pidhorodne	7,278	130,6	10693,2	9884	2580,9	1521,5	3,4%	24,10%	71,50%	13,30%	286,8	20,60%	33,10%
Zboriv	19,017	471	6753	9611,9	1074,9	1051	7,4%	15,90%	75,00%	9,70%	645,9	33,80%	33,60%
Skoriky	8,105	265	7950,4	10282,2	2185,1	2210,2	0,0%	27,50%	74,00%	17,20%	377	27,20%	24,50%
Kozova	24,732	435,1	6849,2	9551,1	1583,4	755,1	0,0%	23,10%	70,30%	7,20%	450,8	26,40%	30,10%
Khorostkiv	13,537	179	7164	9897,8	1487,9	445,1	1,3%	20,80%	67,70%	4,20%	628,6	26,70%	35,10%
Zbarazh	38,415	599,6	6813,8	10251,6	1486,6	619,6	7,3%	21,80%	72,80%	5,60%	714,9	31,80%	34,10%
Pidvolochysk	18,356	352,1	6848,9	9736,7	1611,4	903,5	4,1%	23,50%	74,40%	8,20%	644,5	27,30%	32,70%
Zavodske	6,758	91,1	6713,9	8323,7	1588,6	617,3	3,0%	23,70%	63,80%	6,80%	152,6	25,50%	34,40%
Chortkiv	36,393	153	6133,6	8952	1011,7	592,7	6,6%	16,50%	66,10%	6,00%	434,8	32,30%	27,10%
Borshchiv	28,717	412	5462,8	9265,7	881,1	491,3	17,1%	16,10%	63,50%	5,00%	511,7	39,00%	35,20%

Continuation of table 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Pidhaitsi	16,236	477,9	7546,2	10875,1	1570,2	259,8	0,0%	20,80%	76,40%	2,30%	667,1	29,30%	24,40%
Lanivtsi	21,442	481,4	6025,1	9995,8	1474,1	1371,1	6,0%	24,50%	75,30%	11,70%	223,9	38,20%	31,60%
Buchach	37,323	531,2	5199,8	9698,7	1201,5	821,6	17,8%	23,10%	74,50%	7,70%	567	42,60%	34,20%
Kremenets	41,611	527	6009,1	10348	1037,3	600	11,0%	17,30%	77,30%	5,30%	558,2	39,50%	31,10%
Shumsk	24,466	637,9	5170,2	9455,9	1297,4	1075,3	9,3%	25,10%	77,70%	9,80%	468,2	38,40%	29,30%
Terebovlia	30,293	444,8	5748	9081,7	1183,9	546,7	11,4%	20,60%	77,70%	5,60%	794,2	34,40%	28,40%
Berezhany	26,259	244	5227,3	8912,5	1134,3	485,9	15,9%	21,70%	68,10%	5,10%	675	36,40%	29,50%
Kupchynets	3,759	89,5	6670,7	10931,1	2386	1103,9	0,0%	35,80%	73,00%	9,00%	416,1	30,80%	35,00%
Ozerna	6,98	168,9	5120,1	9581,1	1391	920,4	18,5%	27,20%	76,30%	8,70%	364,2	45,70%	37,40%
Hrymailiv	9,334	339,9	6179,6	10204,2	2633,6	620,8	4,9%	42,60%	77,40%	5,70%	379,8	34,10%	37,30%
Zolotnyky	7,498	286,8	6240,2	9694,3	1885,4	593,4	0,0%	30,20%	75,90%	5,50%	407,1	34,50%	31,50%
Ivaniv	4,024	109,8	6307,5	8353	1737,9	226,3	0,0%	27,60%	76,20%	2,60%	355	28,40%	30,60%
Skalat	13,143	225,6	6257,5	10235,2	1642,7	524,9	10,7%	26,30%	76,80%	4,80%	587	36,20%	37,50%
Zalishchyky	26,607	351,7	5147,3	9146,2	1444,7	606,6	14,0%	28,10%	75,20%	6,10%	667,7	40,90%	30,40%
Bilobozhnytsia	10,642	272,1	5215,4	8800,5	1437,4	192,4	11,1%	27,60%	74,30%	2,10%	490,5	40,30%	34,50%
Monastyryska	19,025	472,7	4773,5	8405,8	1215	833,9	14,0%	25,50%	78,90%	8,80%	424,4	41,00%	30,40%
Mykulyn	16,974	239,6	5135,5	9131	1197,5	406,4	17,6%	23,30%	76,60%	4,20%	428	41,60%	33,20%
Velyki Dederkaly	6,228	165	4656,9	10360,1	1456,2	234,6	0,0%	31,30%	81,90%	2,10%	342,9	47,30%	36,00%
Kozliv	4,351	95,1	5091,1	9539,8	2419,4	532,2	10,0%	47,50%	64,60%	5,30%	321,8	41,30%	42,20%
Vasylkivtsi	7,941	170,2	5010,6	9824,9	1741	362,2	15,5%	34,70%	83,80%	3,50%	359,9	45,30%	37,20%
Kopychnitsia	12,959	171,8	4676,3	9364,7	1313,1	477,9	22,5%	28,10%	76,80%	4,70%	467,2	46,70%	35,30%
Vyshnivets	17,267	324,3	3744,7	8773,1	1300	1014,9	30,1%	34,70%	77,00%	10,10%	259	50,30%	33,80%
Pochayiv	17,704	218,3	4105,9	9719,2	1109,2	728,3	29,7%	27,00%	79,70%	6,90%	470,8	54,10%	33,00%
Bilche-Zolote	3,918	108,4	5438,8	8918	2099,3	273,8	1,5%	38,60%	75,60%	2,90%	328,9	36,10%	31,50%
Nahiryanka	8,478	181,7	4970,7	8059,3	1448,1	137,1	18,0%	29,10%	74,20%	1,70%	250,5	43,80%	34,50%
Skala-Podilska	10,062	184,9	4694,4	8718,4	1274,4	416,3	18,7%	27,10%	73,60%	4,50%	368,2	43,10%	27,10%
Tovste	18,074	340	4272,2	9014,9	1484,3	838,5	24,2%	34,70%	79,20%	8,30%	263,4	47,70%	34,80%
Mlynets-Podilska	16,295	245,2	2491,2	6772,2	624,6	463	42,6%	25,10%	81,40%	6,30%	187,5	62,60%	29,80%
Zaliztsi	10,402	248,6	4553,4	9349,9	1781,8	556,5	18,6%	39,10%	84,20%	5,60%	273,5	47,20%	40,80%
Naraiv	6,656	218,2	4544	8993,2	2114,4	169	23,9%	46,50%	81,00%	1,80%	496,3	51,60%	36,20%
Ivane-Puste	4,754	80,7	3250,6	7931,9	1350	177	34,5%	41,50%	79,50%	2,10%	187,2	56,30%	40,40%

Continuation of table 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Koropets	5,872	85,9	2459,2	6598,2	1151,1	108,5	40,5%	46,80%	83,80%	1,30%	164,1	49,10%	34,40%
Lopushne	5,11	144	3770,3	11053,8	1981,5	336,7	30,1%	52,60%	86,10%	2,90%	240,4	64,30%	33,10%
Borsuky	6,235	152,8	4559,2	9638,6	1724,3	428,2	19,4%	37,80%	78,60%	4,20%	233,4	51,80%	25,60%
Kolyndyany	6,488	156,7	3633,7	8927,7	1454,8	159	23,5%	40,00%	76,00%	1,70%	239,7	50,30%	31,60%
Zolotyi Potik	15,076	160,2	2931,7	9069,8	865,3	115,6	31,8%	29,50%	84,40%	1,20%	180,6	66,20%	22,40%
Saranchuky	6,308	223	3978,9	9024,7	1837,6	174,8	25,5%	46,20%	84,00%	1,80%	362,5	52,60%	32,70%
max	227,619	637,9	17662,2	20026,1	3583,4	2442,8	42,60%	52,60%	86,10%	17,20%	1189,4	66,20%	42,20%
min	3,759	65,8	2459,2	6598,2	624,6	108,5	0,00%	8,40%	35,10%	1,20%	152,6	13,40%	7,70%

Table 2

Indicators for determining the financial capacity of communities after normalization

Name of the territorial community	General fund revenues per capita	General fund expenditures per capita	Expenditures on administrative apparatus maintenance per capita	Capital expenditures per capita	Level of budget subsidies	Share of administrative expenditures	Share of budget expenditures on labor costs	Share of capital expenditures in the budget	Expenditures on culture, physical education, and sports per capita	Share of transfers in budget revenues	Share of local taxes and fees in the revenue part of the general fund budget without transfers
1	2	3	4	5	6	7	8	9	10	11	12
Velyki Hai	0,6359	0,4760	0,4701	1,0000	0,0000	0,1855	0,5843	0,9063	0,7316	0,1193	0,4348
Velyka Berezovytsia	0,4840	0,3197	0,2750	0,6498	0,0000	0,1403	0,5647	0,7313	0,7093	0,1439	0,8609
Ternopil	0,6883	0,5519	0,1541	0,9430	0,0000	0,0000	0,3510	0,7813	0,4097	0,0549	0,5913
Baikivtsi	0,9216	0,7395	1,0000	0,4485	0,0000	0,3032	0,4431	0,3313	1,0000	0,0000	0,8232
Velyki Birky	0,6027	0,4745	0,7468	0,7217	0,0000	0,3620	0,5059	0,6813	0,3242	0,0947	0,8986
Trybukhivtsi	1,0000	1,0000	0,3117	0,7726	0,0000	0,0090	0,0000	0,4625	0,3257	0,0852	0,0000
Bila	0,4159	0,3067	0,4109	0,6458	0,0657	0,2851	0,6333	0,7313	0,5479	0,2064	0,9971
Husiatyn	0,2940	0,2394	0,2220	0,5482	0,0634	0,2285	0,6137	0,6813	0,5304	0,1875	0,7478
Pidhorodne	0,5416	0,2447	0,6612	0,6053	0,0798	0,3552	0,7137	0,7563	0,1294	0,1364	0,7362
Zboriv	0,2824	0,2244	0,1522	0,4038	0,1737	0,1697	0,7824	0,5313	0,4758	0,3864	0,7507
Skoriky	0,3612	0,2744	0,5274	0,9004	0,0000	0,4321	0,7627	1,0000	0,2164	0,2614	0,4870
Kozova	0,2888	0,2199	0,3241	0,2770	0,0000	0,3326	0,6902	0,3750	0,2876	0,2462	0,6493
Khorostkiv	0,3095	0,2457	0,2918	0,1442	0,0305	0,2805	0,6392	0,1875	0,4591	0,2519	0,7942
Zbarazh	0,2864	0,2721	0,2913	0,2190	0,1714	0,3032	0,7392	0,2750	0,5423	0,3485	0,7652
Pidvolochysk	0,2887	0,2337	0,3335	0,3406	0,0962	0,3416	0,7706	0,4375	0,4744	0,2633	0,7246
Zavodske	0,2799	0,1285	0,3258	0,2180	0,0704	0,3462	0,5627	0,3500	0,0000	0,2292	0,7739
Chortkiv	0,2417	0,1753	0,1308	0,2074	0,1549	0,1833	0,6078	0,3000	0,2722	0,3580	0,5623
Borshchiv	0,1976	0,1987	0,0867	0,1640	0,4014	0,1742	0,5569	0,2375	0,3464	0,4848	0,7971
Pidhaitsi	0,3346	0,3185	0,3196	0,0648	0,0000	0,2805	0,8098	0,0688	0,4962	0,3011	0,4841
Lanivtsi	0,2346	0,2530	0,2871	0,5409	0,1408	0,3643	0,7882	0,6563	0,0688	0,4697	0,6928
Buchach	0,1803	0,2309	0,1950	0,3055	0,4178	0,3326	0,7725	0,4063	0,3997	0,5530	0,7681
Kremenets	0,2335	0,2793	0,1395	0,2106	0,2582	0,2014	0,8275	0,2563	0,3912	0,4943	0,6783
Shumsk	0,1783	0,2128	0,2274	0,4142	0,2183	0,3778	0,8353	0,5375	0,3044	0,4735	0,6261

Continuation of table 2

1	2	3	4	5	6	7	8	9	10	11	12
Terebovlia	0,2163	0,1850	0,1890	0,1877	0,2676	0,2760	0,8353	0,2750	0,6188	0,3977	0,6000
Berezhany	0,1821	0,1724	0,1723	0,1617	0,3732	0,3009	0,6471	0,2438	0,5039	0,4356	0,6319
Kupchynets	0,2770	0,3227	0,5953	0,4264	0,0000	0,6199	0,7431	0,4875	0,2541	0,3295	0,7913
Ozerna	0,1750	0,2221	0,2590	0,3478	0,4343	0,4253	0,8078	0,4688	0,2041	0,6117	0,8609
Hrymailiv	0,2447	0,2685	0,6790	0,2195	0,1150	0,7738	0,8294	0,2813	0,2191	0,3920	0,8580
Zolotnyky	0,2487	0,2306	0,4261	0,2077	0,0000	0,4932	0,8000	0,2688	0,2455	0,3996	0,6899
Ivaniv	0,2531	0,1307	0,3763	0,0505	0,0000	0,4344	0,8059	0,0875	0,1952	0,2841	0,6638
Skalat	0,2498	0,2709	0,3441	0,1784	0,2512	0,4050	0,8176	0,2250	0,4190	0,4318	0,8638
Zalishchyky	0,1768	0,1898	0,2772	0,2134	0,3286	0,4457	0,7863	0,3063	0,4968	0,5208	0,6580
Bilobozhnytsia	0,1813	0,1640	0,2747	0,0359	0,2606	0,4344	0,7686	0,0563	0,3259	0,5095	0,7768
Monastyryska	0,1522	0,1346	0,1995	0,3108	0,3286	0,3869	0,8588	0,4750	0,2622	0,5227	0,6580
Mykulyn	0,1760	0,1886	0,1936	0,1276	0,4131	0,3371	0,8137	0,1875	0,2656	0,5341	0,7391
Velyki Dederkaly	0,1446	0,2802	0,2811	0,0540	0,0000	0,5181	0,9176	0,0563	0,1835	0,6420	0,8203
Kozliv	0,1731	0,2191	0,6066	0,1815	0,2347	0,8846	0,5784	0,2563	0,1632	0,5284	1,0000
Vasylkivtsi	0,1678	0,2403	0,3773	0,1087	0,3638	0,5950	0,9549	0,1438	0,1999	0,6042	0,8551
Kopychnitsia	0,1458	0,2060	0,2327	0,1582	0,5282	0,4457	0,8176	0,2188	0,3034	0,6307	0,8000
Vyshnivets	0,0846	0,1620	0,2283	0,3883	0,7066	0,5950	0,8216	0,5563	0,1026	0,6989	0,7565
Pochayiv	0,1083	0,2324	0,1638	0,2655	0,6972	0,4208	0,8745	0,3563	0,3069	0,7708	0,7333
Bilche-Zolote	0,1960	0,1728	0,4984	0,0708	0,0352	0,6833	0,7941	0,1063	0,1700	0,4299	0,6899
Nahiryanka	0,1652	0,1088	0,2783	0,0123	0,4225	0,4683	0,7667	0,0313	0,0944	0,5758	0,7768
Skala-Podilska	0,1470	0,1579	0,2196	0,1319	0,4390	0,4231	0,7549	0,2063	0,2079	0,5625	0,5623
Tovste	0,1193	0,1800	0,2906	0,3127	0,5681	0,5950	0,8647	0,4438	0,1069	0,6496	0,7855
Mlynets-Podilska	0,0021	0,0130	0,0000	0,1519	1,0000	0,3778	0,9078	0,3188	0,0337	0,9318	0,6406
Zaliztsi	0,1377	0,2049	0,3911	0,1919	0,4366	0,6946	0,9627	0,2750	0,1166	0,6402	0,9594
Naraiv	0,1371	0,1784	0,5035	0,0259	0,5610	0,8620	0,9000	0,0375	0,3315	0,7235	0,8261
Ivane-Puste	0,0521	0,0993	0,2452	0,0293	0,8099	0,7489	0,8706	0,0563	0,0334	0,8125	0,9478
Koropets	0,0000	0,0000	0,1779	0,0000	0,9507	0,8688	0,9549	0,0063	0,0111	0,6761	0,7739
Lopushne	0,0862	0,3318	0,4586	0,0978	0,7066	1,0000	1,0000	0,1063	0,0847	0,9640	0,7362
Borsuky	0,1381	0,2264	0,3717	0,1370	0,4554	0,6652	0,8529	0,1875	0,0779	0,7273	0,5188
Kolyndyany	0,0773	0,1735	0,2806	0,0216	0,5516	0,7149	0,8020	0,0313	0,0840	0,6989	0,6928
Zolotyi Potik	0,0311	0,1841	0,0814	0,0030	0,7465	0,4774	0,9667	0,0000	0,0270	1,0000	0,4261
Saranchuky	0,1000	0,1807	0,4100	0,0284	0,5986	0,8552	0,9588	0,0375	0,2024	0,7424	0,7246

According to the «elbow» method (Fig. 2), the graph of the sums of intracluster distances WSS (calculated in STATISTICA) sharply changes the slope at the point k=3, which indicates the optimal number of clusters.

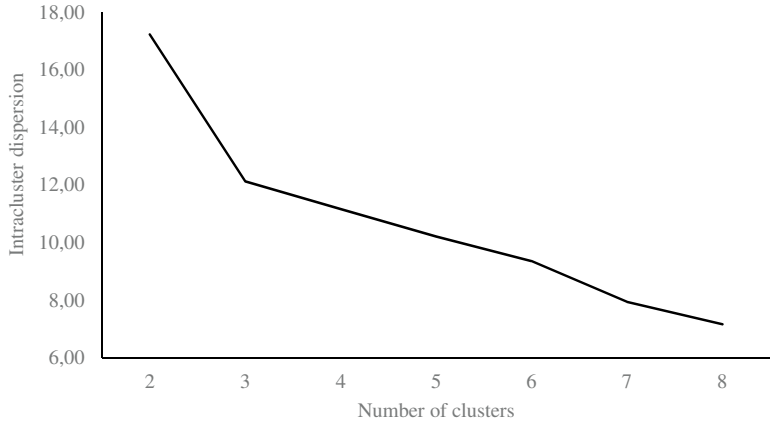

Fig. 2. Searching for the optimal number of clusters using the «elbow» method

Therefore, three clusters were selected for further analysis.

Clustering was performed in the STATISTICA software environment. Table 3 shows the distribution of 55 communities in the region by clusters. Each community is assigned to one of three clusters according to the similarity of budget indicators.

Figure 2 shows the calculations of distances to the cluster centre for each cluster.

Table 3

Distribution of communities in the region by clusters

Cluster	Number of communities	Names of communities
1 (highest capacity)	10	Velyki Hai, Velyka Berezovytsia, Ternopil, Baikivtsi, Velyki Birky, Trybukhivsi, Bila, Husiatyn, Pidhorodnie, Skoryky
2 (average capacity)	29	Zboriv, Kozova, Khorostkiv, Zbarazh, Pidvolochysk, Zavodske, Chortkiv, Borshchiv, Pidhaitsi, Lanivtsi, Buchach, Kremenets, Shumsk, Terebovlia, Berezhany, Kupchyntsi, Ozerna, Hrymailiv, Zolotnyky, Ivaniv, Skalat, Zalishchyky, Bilobozhnytsia, Monastyryska, Mykulyntsi, Velyki Dederkaly, Bilche-Zolote, Skala-Podilska, Kozliv
3 (low capacity)	16	Vasylkivtsi, Kopychyntsi, Vyshnivets, Pochaiv, Nahiryanka, Tovste, Melnytsia-Podilska, Zaliztsi, Naraiv, Ivane-Puste, Koropets, Lopushne, Borsuky, Kolyndyany, Zolotyi Potik, Saranchuky

Table 4 shows the average indicators in each cluster.

Table 4

Average indicators in each cluster

Cluster	General fund revenues per capita (UAH)	General fund expenditures per capita (UAH)	Administrative expenditures per capita (UAH)	Capital expenditures per capita (UAH)	Budget subsidy level (%)	Share of administrative expenditures (% of general fund revenues)	Share of budget expenditures on labour compensation (% of general fund expenditures)	Share of capital expenditures in the budget (%)	Expenditures on culture, physical education, and sports per capita (UAH)	Share of transfers in the revenue part of the budget (%)	Share of local taxes and fees in the revenue part of the general fund budget without transfers, (%)
1	11497,74	12811,14	2038,65	1797,42	0,9	19	61	12	663,19	20	30
2	5882,53	9516,44	1511,89	624,89	8	26	74	6	483,41	36	32
3	3934,54	8882,26	1455,07	390,45	27	37	81	4	289,75	52	34

Characteristics of clusters. Cluster 1 brings together the most financially capable communities in the region, with high levels of per capita income and significant overall budget resources. This group includes, in particular, the Baikivtsi community and the regional centre (Ternopil TC), which have the highest per capita income. Cluster 1 is characterised by high capital expenditures (investments in infrastructure) and minimal dependence on state subsidies. Most communities in this cluster do not receive basic subsidies (some are even donors – reverse subsidy payers). The share of transfers in revenues is the lowest here (budgets are mainly formed from own revenues, in particular local taxes). Cluster 1 communities also have a low share of administrative expenses (economies of scale – a large revenue base allows them to maintain the administrative apparatus, spending an average of 19% of revenues) and a relatively low share of salary expenses (about 61%). This means that after covering protected items, these communities have sufficient funds left for development – the share of capital expenditures here is the highest (12% on average). In general, cluster 1 communities can be characterised as financially self-sufficient and capable of investing in their own development.

Cluster 2 includes communities with average financial capacity. Their budget indicators are close to the regional average. Own revenues per capita and expenditures in these communities are at an average level, which allows them to meet basic needs. Cluster 2 is characterised by moderate dependence on state transfers (about half of the revenues come from educational subsidies and other subsidies) and a moderate level of subsidisation (the basic subsidy averages 8% of the budget). The share of local taxes in general fund revenues is average (≈32%), which indicates some development of

entrepreneurship, and communities have their own tax base, albeit not a very strong one. Expenditures on administrative costs and wages in cluster 2 account for a significant but not excessive share of the budget (25% on average). Capital expenditures in the communities of this group per capita are moderate, sufficient to maintain infrastructure, but less than in cluster 1 (on average, 6% of budget expenditures). Therefore, cluster 2 can be described as a group of relatively balanced communities with satisfactory or optimal capacity, but without significant resources for large-scale investments.

Cluster 3 brings together the financially weakest communities. These are usually rural areas with a low-income base. Per capita income here is the lowest, and expenditures barely cover protected budget items. Cluster 3 is characterised by high dependence on transfers: most of the revenues come from educational subsidies and basic grants (the share of transfers often exceeds 52%). Accordingly, the level of budget subsidisation is the highest – state support covers a significant part of their expenditures. A significant share of these communities' funds is directed toward maintaining institutions and paying salaries (on average, 80% of general fund expenditures go toward salaries for public sector employees). The share of administrative expenses is also higher than average (about 38% of revenues) because even a small administrative apparatus is financially burdensome for low-budget communities. In such conditions, resources for development are minimal: capital expenditures per capita are insignificant (4% of the budget, and in some cases, non-existent). For example, it is in communities with the lowest capacity that critically low levels of capital investment and high specific expenditures on the administrative apparatus are recorded. Cluster 3 communities can be characterised as those that require increased financial support and the search for additional sources of revenue to ensure an adequate level of services.

To visualise the clusters and depict the communities in two-dimensional space, we will first use the principal component analysis (PCA) method.

This method transforms multidimensional data into two principal components that retain maximum variance (information).

Figure 3 shows the factor loading matrix (PCA component matrix). Its values show how strongly each variable is related to the two components.

Factor Loadings (Unrotated) (Spreadsheet1)
Extraction: Principal components
(Marked loadings are >,700000)

Variable	**Factor 1**	Factor 2
Доходи загального фонду на мешканця, (грн)	-0,947736	0,099161
Видатки загального фонду на мешканця, (грн)	-0,803380	0,065851
Видатки на утримання апарату управління на мешканця, (грн)	-0,360657	0,869485
Капітальні видатки на мешканця, (грн)	-0,832299	-0,052373
Рівень дотаційності бюджетів, (%)	0,784237	-0,223113
Частка управлінських видатків, (% від доходів загального фонду)	0,712510	0,560474
Частка бюджетних видатків на оплату праці, (% від видатків загального фонду)	0,843100	0,126079
Частка капітальних видатків бюджету, (%)	-0,702213	-0,054647
Видатки на культуру, фізкультуру і спорт на мешканця, (грн)	-0,657742	0,044465
Частка трансфертів у дохідній частині бюджету, (%)	0,910656	-0,141802
Частка місцевих податків і зборів у дохідній частині загального фонду бюджету без трансфертів, (%)	0,318675	0,647108
Expl.Var	6,056508	1,596543
Prp.Totl	0,550592	0,145140

Fig. 3. The factor loading matrix

As a result of PCA, we obtained two components

PC1 = –0.948X1 – 0.803X2 – 0.361X3 – 0.832X4+0.784X5+0.713X6+0.843X7 – – 0.702X8 – 0.658X9 + 0.911X10 + 0.319X11,

PC2 = 0.099X1 + 0.066X2 + 0.869X3 – 0.052X4 – 0.223X5+0.560X6+0.126X7 – – 0.055X8 + 0.044X9 – 0.142X10 + 0.647X11,

where X1, …, X11 are the designations of the indicators, respectively, that we used to determine the financial capacity of communities.

Cluster diagram (2D visualisation). In Fig. 4, communities are represented in the space of two principal components after applying the PCA method to reduce the dimensionality to 2. The points representing communities are coloured according to clusters (orange – cluster 1, grey – cluster 2, red – cluster 3). The coordinates of the points are the values of the two principal components. The names of the communities are added as captions to the points. It can be seen that the groups are quite clearly separated in space: the communities of cluster 1 are located compactly and are distant from the others, while the communities of cluster 3 form another group with some overlap with cluster 2. The intermediate group (cluster 2) occupies a position between the better and the weaker communities. This visualisation confirms the results of the analysis—financially capable communities differ significantly from less capable ones, and communities in the middle group occupy an intermediate position.

Conclusions. The financial capacity of local communities is a key condition for the effective functioning of the local self-government system and the proper provision of public services, particularly during times of martial law. It is an integral characteristic that encompasses not only the volume of financial resources that local communities can allocate for the delivery of public services but also the quality of their formation, the structure of their utilisation, and the community's ability to independently meet its own financial needs.

There are numerous approaches in scientific literature that explain the concept of the financial capacity of a territorial community. This suggests that the economic phenomenon is complex. Through a comparison of various scientific approaches, it has been demonstrated that the most suitable understanding of the financial capacity of a territorial community is as a quantitative and qualitative characteristic of the formation and utilisation of its financial resources. This approach enables a more comprehensive consideration of the economic, institutional, and social specifics involved in the functioning of territorial communities.

An analysis of existing methods for assessing the financial capacity of communities has shown that they are heterogeneous and fragmented. Although individual research and expert groups (such as the working group of the U-LEAD with Europe programme) have made some progress in developing a methodology for assessing the financial capacity of communities, a unified and comprehensive methodology has not yet been established. This makes it more difficult to conduct a comparative analysis of the financial capacity of territorial communities and to use their results to develop priorities for state regional policy and to promote local self-government.

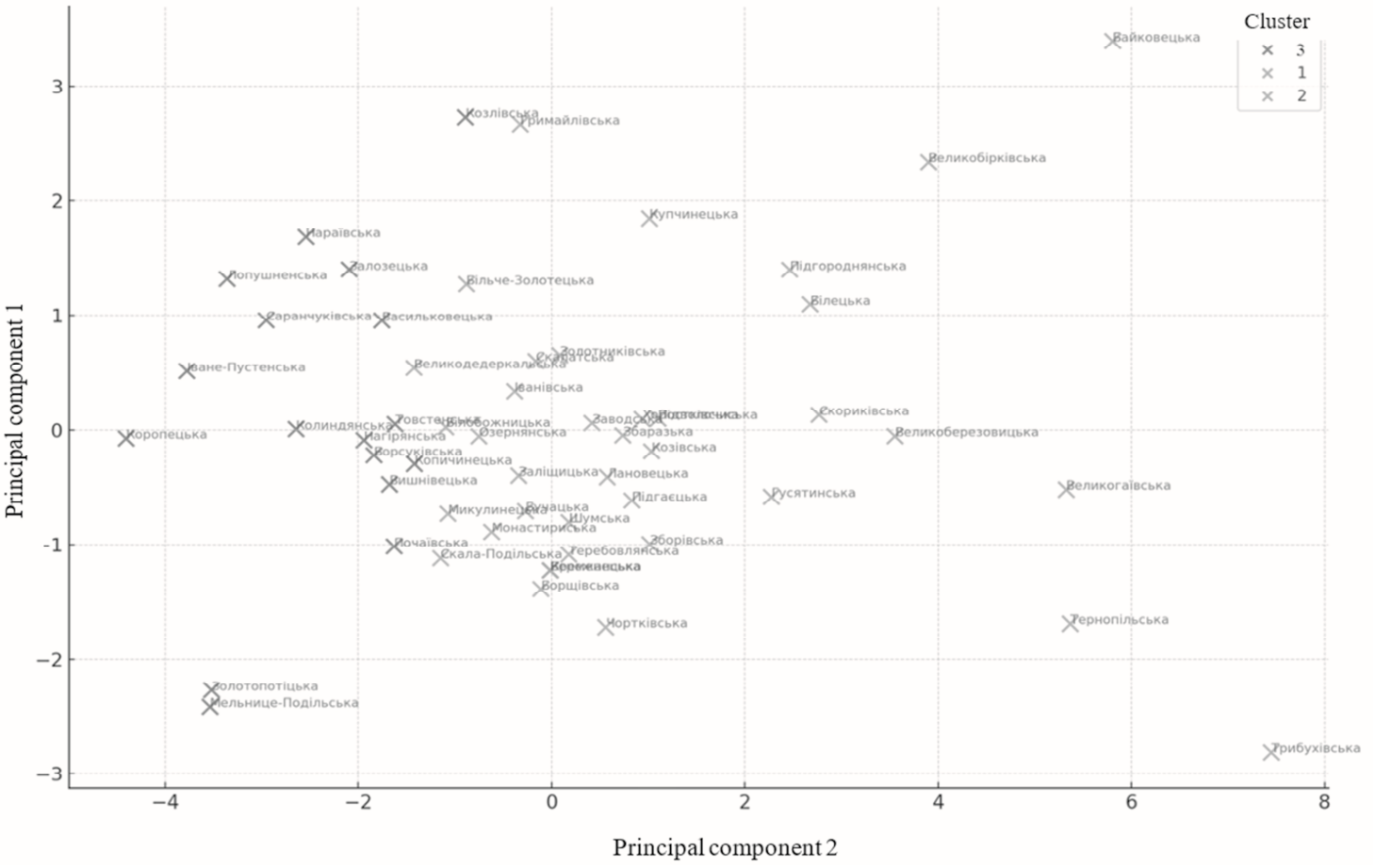

Fig. 4. Visualization of the results of cluster distribution of territorial communities using the principal component method

Cluster analysis enabled the identification of three homogeneous groups of territorial communities based on their financial indicators. The first cluster grouped together leading communities with sufficient resources of their own and minimal dependence on the state; the second cluster comprised communities with balanced indicators close to the average; and the third cluster included communities exhibiting critically low financial capacity that rely on subsidies. The stratification of territorial communities, based on the results of the cluster analysis, revealed significant differences in financial capacity, serving as a foundation for management decisions: communities in cluster 3 require priority support and income growth, while the successful experiences of communities in cluster 1 can act as a benchmark for others. The "elbow" method ensured an objective selection of the number of clusters, and graphical interpretation confirmed the reliability of the clusters obtained. Thus, the analysis permits a comparative assessment of the financial capacity of communities and the identification of risk and success groups for strategic planning of territorial development.

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