

OPPORTUNITIES FOR MEASURING REGIONAL DEVELOPMENT IN BULGARIA

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ABSTRACT

The report is devoted to the need to introduce indicators for measuring the effects of regional development in Bulgaria. A theoretical analysis is made on the necessity to deduce the spatial and spatial patterns by referring to the relevant indicative values and indicators. In this plane of socio-economic development, the necessity to derive the functional relations in the management of the regional development and the processes related to the valuation of these indicators. Models of assessing the state of municipalities and settlements are being used to derive a set of indicators that will allow us to have the necessary tool for analyzing and evaluating possible policies for effective regional policy. The report has attempted to systematize knowledge on regional development issues and its assessment.

KEYWORDS: regional, space, development, areal, geography, economics

ABSTRAKT

Der Bericht befasst sich mit der Notwendigkeit, Indikatoren zur Messung der Auswirkungen der regionalen Entwicklung in Bulgarien einzuführen. Es wird eine theoretische Analyse über die Notwendigkeit der Ableitung von räumlichen und räumlichen Mustern unter Bezugnahme auf die entsprechenden Richtwerte und Indikatoren durchgeführt. Auf dieser Ebene der sozioökonomischen Entwicklung werden die Notwendigkeit der Ableitung der funktionalen Beziehungen im Management der regionalen Entwicklung und die Prozesse im Zusammenhang mit der Bewertung dieser Indikatoren untersucht. Anhand von Modellen zur Bewertung des Zustands von Gemeinden und Siedlungen wird eine Reihe von Indikatoren abgeleitet, die es uns ermöglichen, über das notwendige Instrumentarium zur Analyse und Bewertung möglicher Maßnahmen für eine wirksame Regionalpolitik zu verfügen. Mit dem Bericht wurde versucht, das Wissen über Fragen der regionalen Entwicklung und deren Bewertung zu systematisieren.

STICHWORTE: regional, Raum, Entwicklung, Fläche, Geographie, Wirtschaft

RÉSUMÉ

Le rapport est consacré à la nécessité d'introduire des indicateurs pour mesurer les effets du développement régional en Bulgarie. Une analyse théorique est faite sur la nécessité de déduire les modèles spatiaux et spatiaux en se référant aux valeurs indicatives et aux indicateurs pertinents. Sur ce plan du développement socio-économique, la nécessité de déduire les relations fonctionnelles dans la gestion du développement régional et les processus liés à l'évaluation de ces indicateurs. Les modèles d'évaluation de l'état des municipalités et des localités sont utilisés pour dériver un ensemble d'indicateurs qui nous permettront de disposer de l'outil nécessaire à l'analyse et à l'évaluation des

politiques possibles pour une politique régionale efficace. Le rapport a tenté de systématiser les connaissances sur les questions de développement régional et leur évaluation.

MOTS-CLÉS: régional, espace, développement, aréolaire, géographie, économie

INTRODUCTION

In managing regional development, decisions have to be justified. Often these decisions are the result of borrowing indicators and benchmarks characterising socio-economic processes, but they have an indirect impact on regional development rather than supporting its effective management. This calls for the need to look for effective solutions and indicators that assess the processes taking place and set a new perspective through the management of local space. Moreover, in the modern world all processes have their local dimension and they characterise the conditions and comfort of life of the population adjacent to the territory concerned. In this direction, we must clearly acknowledge that this process is legitimate and can have the necessary evaluative framework. It develops in the respective stages of the absorption of space by man and his activity. This change is expressed in the regional development of the territory and in the functional change it undergoes. From a scientific point of view, this makes it necessary to look for a specific cognitive approach involving a combination between spatial systematization and the imposed model of socio-economic management for the rational development of the individual territorial community. Thus, knowledge of the optimal spatial organization of life requires the study of the resource, human and technological capabilities of a country or region. This also predetermines the scientific role of regional development to be a connecting level between economy and politics through the functional variations of management and administration of individual territorial communities. From what has been said so far, we can assume, albeit with many qualifications, **that regional development is a process of permanent social change that contributes to lasting and sustainable community development in a particular region. It implies a multi-sectoral and complex process linked to certain objectives: economic growth, sustainable development, social integration, satisfaction of basic needs, quality of life, regional autonomy and environmental protection.** This approach calls for the introduction of an appropriate specification or categorisation of the different territorial communities. Methodologically, regional development can be approached by drawing up an integral assessment within a specific spatial and territorial scope. This approach allows us to derive a spatial overall assessment of the situation in a given unit (municipality, locality) as a sum of individual assessments of their indicators. This makes it possible to frame the respective communities' deficits in the socio-economic development of individual territorial units by measuring regional development (Boyadzhiev, V. 2006). Hence, through regional development, a vertical disaggregation of the spatial structure of the modern nation-state can be carried out in order to reveal the degree of economic linkages between them and characterize the environment. This can be done by determining the zones of gravity and the role of large settlements and settlement structures in their functioning and the state of the regional economic system. In this direction, the correct typification and functioning of the areas based on the concept of pole development in accordance with the national and regional location and development can be important.

RESULTS AND DISCUSSION

For each country, relevant types of regions can be identified: hypertrophic, highly industrialised, weakly industrialised, highly urbanised, regions dominated by small settlements and dispersed

localisation of population, transport regions, regions with peripheral economy, specific functional regions (agrarian, industrial, tourist, mountainous), etc., and the corresponding regional policy can be pursued. This leads to a further necessity that, for the assessment of spatial development, indicators should be subtracted into at least two groups (**Geshev.G.1999**). Thus, let us assume that there are core and complementary indicators in regional development. Such a division can be derived depending on the objectives of the categorization or due to their specific features to distinguish the objects (municipalities and localities). This process must undoubtedly be linked to the structuring of an information database in which primary data are accumulated. The second step is to bring the indicators into a single scale, by defining a baseline integral score for each municipality and each locality, and forming groups and categories of territorial communities. In practice, in order to proceed to the analysis of results and proposals for categorization to match the defined criteria and indicators with the necessary primary and derived values of indicators to be measured and valued¹. This necessitates the derivation of appropriate data interpretation models. Thus, regional development can have a corresponding cybernetic model expressed in the establishment of relationships (forward and backward) and regulations in a certain territorial scope of the organized and self-regulating system. In this direction, regional development can be seen as a process that obeys general patterns, regardless of the nature of the environment, whether it is governance in living nature, in non-living nature or in society. Thus, from a theoretical point of view, regional development is related to the functioning of governance in complex dynamic systems, abstracting from their substantive characteristics. Regional development proves that systems are characterized by continuous changes, complexity of structure and increasing or decreasing degree of stability of their existence depending on the amount of information in them. In this direction, regional development is called to be a necessary component of self-governing systems(Dimov, N. 2006).

In the context of very limited resources, regional development sets the necessary information as fundamental for the clarification of the management of the territory by enabling new decisions and management practices related to its adaptation to all classes of systems. This is because individual regions and territorial communities are the subject of public regional policy. Through the policies implemented, some support is sought to enable the relevant spatial policies to be implemented, leading to positive change or avoiding a crisis. Regional development has acquired a spatial aspect, but it needs measures to assess the possibility of dynamic development. On the other hand, the system of indicators makes it possible to look for opportunities to accumulate resources for redistribution also in underdeveloped and difficult areas (Dimov, N. 2007). This makes it necessary for the relevant indicators to have appropriate rankings and numerical values. In practice, this means pursuing a forward-looking regional policy, mainly by observing the principles of efficiency in the development of the investment and economic components of regional policy. Regional preferences in the promotion of regional development should have as their focus the areas with the highest development potential, and urgent measures should be taken in parallel, including regional aid for critical areas or those in decline. This means supporting and prioritising the

¹ Primary data from supporting institutions or sources of specific information are used. Where necessary, preliminary analyses and calculations shall be carried out using standard statistical calculations including the application of geospatial analyses. The Unified Classification of Territorial and Administrative Units (ECATTE) maintained by the National Statistical Institute (NSI) shall be used in the formation of the database and in subsequent calculations for municipalities and localities. If data are not available for some of the indicators for all units, this indicator is excluded from further analysis or data from previous years are taken if possible. In the absence of data for some of the units (municipalities and/or localities) for any of the indicators, average or approximate values are used. It is assumed that the base has been formed and all indicators have been valued when the data for each indicator have been completed for each municipality or locality.

development of areas that can become locomotives of progress and development, as well as the implementation of vital projects in areas with exceptional difficulties, with appropriate dosage of infrastructure, economic and social measures.

In practice, regional development is meant to characterize the pattern or pattern of development of the country as a whole. This implies a significant level of decentralisation and linkage of the governance system to the available resources for the implementation of the relevant measures and policies. To a large extent, regional development management requires the setting of priorities for each individual territorial community - the respective autonomous space - in the search for realising the potential and comparative advantages for better participation in national and international markets within the global framework of the national development strategy. Thus, we can assume that as a systems paradigm regional development can be embedded in general systems theory as a management and structural science (Jiljov, A., V. Marinov 1998).

In practice, in the conceptual apparatus of systems analysis, the central place belongs to the concept of system itself. There are a number of definitions, both qualitative, verbal and formalised. For the purposes of regional development, we can assume that a system is a complex of elements in interaction and add that it is a set of objects together with the relationships between the objects and between their attributes. This largely allows us to assume that **the regional system is a combination of objects with consistent interrelations, which gives new qualities: integrity, autonomy, sustainability and, above all, the functional. The objects or the set of objects performing a function in the system are defined as elements of the system.** This gives us a reason to assume in regional development that the system is defined as a set of elements with relations and connections between them, forming a certain integrity and thus define the need to bring out regional development as a new scientific field with a systemic character (Dokova, S. K. Petrov 2015),.

In this direction, regional development is called upon to derive an overall integral assessment of municipalities and localities. Since indicators are generally measured in different units and on different scales, in order to have comparability between them they must be aligned on the same scale, while maintaining the ratios between them. The step involves removing outliers and normalising the values. Normalisation is done in two different ways for municipalities and localities. The use of different normalisation methods takes into account the specificity and effect sought for the further application of the assessment and the category of municipalities and localities. For each indicator, values lying outside the range are identified for the whole group of sites. Values lying outside the range are replaced by the value of the nearest limit. In the field of regional development territorial systems are the objects of material production, non-productive sphere and demographic resources. In this case, the population and the objects of the service sphere are referred to the social, and the objects of the extractive and processing sphere - to the economic elements of the systems (Kolev, B. 2008). This, in turn, makes it necessary to relate the results to *unit vectors*. In this method, all natural indicators transform each other into values between 0 and 1, taking the lowest value for criteria with positive impact and the highest value for criteria with negative impact as 0.

$$d_{ij} = \frac{c_{ij} - c_{j\min}}{c_{j\max} - c_{j\min}} \text{ - for a criterion with a positive (incentive) impact}$$

$$d_{ij} = \frac{c_{j\max} - c_{ij}}{c_{j\max} - c_{j\min}} \text{ - for a criterion with a negative (retention) impact}$$

d_{ij} - result value of a natural indicator

c_{ij} - natural values

$c_{j\max/\min}$ - maximum and minimum of criterion j in municipalities

As a result of using the method, a result matrix is obtained in which each row represents values of indicators for one municipality. After normalization, each of them has a value between 0 and 1.

$$D = \begin{bmatrix} d_{11} & d_{12} & \dots & d_{1n} \\ \dots & \dots & \dots & \dots \\ & & d_{ij} & \\ d_{m1} & & & d_{mn} \end{bmatrix}$$

In this direction, in the field of regional development, we assume the spatial system and its structures to be considered as a whole and as parts of this whole within limits that appear as functions of the development process of this whole. Boundaries play your role in the formation of the system and its structures. A change in boundaries occurs when the state of the system changes. In regional development for territorial systems, analysis of distances, directions, spatial concentration is mandatory.

In this sequence, in a theoretical sense, regional development provides an opportunity to study the changes in the regional economy through the analysis of price dynamics, unemployment, etc., and at the same time, from a functional point of view, to devise solutions and strategies for the implementation of policies of influence by the government on the national space in its entirety and specificity of its regional variations and peculiarities. This makes it necessary to look for solutions to derive regional indicators for localities. Thus, we assume that it is possible to analyse data for individual localities by the *Z-transformation method (alignment with averages and their deviation)*. Briefly, the method uses the following transformation from primary (natural) data to normalized data:

$$D = \frac{C - \mu}{\sigma} \quad d_{ij} = \frac{c_{ij} - \mu}{\sigma}$$

C - matrix of natural (primary) data

D - matrix with normalized values

c_{ij} - initial values (natural)

μ - average

d_{ij} - normalized (transformed) values

σ - standard (quadratic) deviation

As a result of using the method, a result matrix D is obtained, in which each row represents values of indicators for one locality. After applying this normalization method, positive values of d_{ij} are obtained for natural values above the population mean, and negative values for those below the mean.

$$D = \begin{bmatrix} d_{11} & d_{12} & \dots & d_{1n} \\ \dots & \dots & \dots & \dots \\ & & d_{ij} & \\ d_{m1} & & & d_{mn} \end{bmatrix}$$

Through this approach, we can see to what extent the outlined measures have the same "territorial projection" and therefore coordination of sectoral policies and actions², in the third - as a component of the overall national development policy, in the fourth - as a separate stand-alone policy. In practice, the determination of the assessment goes through the determination of scores for each of the criteria or the formation of an overall integral score. However, the question of the delimitation of this system is still open. In geographical systematisation, the term 'hiatus' is used, meaning a break, a jump in the series of comparable indicators and attributes. It is the presence of a hiatus that makes it possible to precisely define the boundary of the objects in the taxonomy - class, type, taxon. For this purpose we will use the integral coefficient of structural differences. When comparing more than two systems simultaneously, the relative shares are given for each of them. In this case we will compare the differences /or similarities/ between the sectoral structure /primary, secondary and tertiary/ at the level of districts and municipalities. The coefficients of differences /or similarities/ are found empirically. The relative shares of the three sectors of the economy are computed sequentially, the differences between the relative shares are found. The squares of the differences between the relative shares are then related to the sum of the squares of the relative shares, rooting everything.

Taking into account that the coefficient of structural disparities is in the theoretical range from 0 to 1 /or from 0 to 100%/ it is possible to estimate the extent of disparities between the sectoral structure of the 10 districts or municipalities. Looking at it dynamically, it is possible to see to what extent the compared structures are converging or diverging. Comparing the divergence rates over a period of years will characterise, in concrete numerical terms, the processes of narrowing or widening divergence in regional structures. Those municipalities having similar indicators or small differences and approaching the centre of the system will be included in the study object and will delineate its boundaries and its territorial extent. In practice, this creates the conditions regional development to be presented as a manageable set of measures by local and regional authorities to improve the quality of life of the population and to create conditions for business development.

In this direction, we should also pay attention to the derivation of an assessment in which the strengths and weaknesses and the specificity of each object are manifested. It is also particularly important for the balanced and controlled participation of each criterion in the final evaluation. The weight of each indicator is determined according to whether it is primary or complementary. Core indicators are given twice the weight of complementary indicators. Each community has specific local conditions that enhance or detract from the potential for local economic development, and it is these conditions that determine a community's relative advantages in terms of its ability to attract, create and retain investment(. The economic, social and physical characteristics of the municipality guide the development and implementation approaches of the local economic development strategy. Good practice demonstrates that to build a strong local economy, each community must clarify the nature and structure of the local economy in a collaborative process and undertake an analysis of local strengths, weaknesses, opportunities and threats. This highlights the most important issues and opportunities for the local

² Similar differences can be observed in other countries and are reflected, for example, in the following definitions: 'Regional development policy refers to the local manifestation of regional policy - the institutions, laws and actions that promote local participation and economic innovation at the sub-national level. Regional policy refers to the legal and institutional framework itself and to the interaction of sectoral policies and regional institutions at the national level (Hudak, 1999). A noteworthy comment on this issue is one of the comments of the NIRP (1999): "... part of regional policy is implemented through the coordination of sectoral policies ... and another part through a separate budget ..."

economy and the sphere of influence of the major centres and their adjacent areas. Active analysis of the economic base helps municipalities to clarify opportunities and barriers to growth and investment (Karastoyanov, St. 2010). Through regional development, municipalities have the opportunity to take steps to expand the economic and employment base by developing and implementing strategic programs and projects that will remove barriers and facilitate investment. In our case, a weighted average formula (integral scores method) of the individual scores d_{ij} of the values of the selected indicators for it is used.

$$F_{ki} = \sum_{j=1}^n w_j d_{ij}$$

Where:

F_{ki} -value of the integral score for municipality i on selected criteria k

k - criterion number (internal)

i - municipality number (internal)

j - indicator number (internal to the criterion)

n - number of indicators (for the respective criterion)

d_{ij} - converted value of a natural indicator

w_j - weighting factor for indicator j

Thus, at the end of this step for each municipality or locality, as many scores as criteria are obtained. The values of the scores for each criterion depend on the number of indicators used. In order to eliminate the influence of different numbers of indicators included in the criteria, these scores are scaled by weighting factors. This provides us with a basis to look for opportunities to define approaches to manage regional development, as well as to implement the functional linkages through which the territorial economic system functions. To a large extent, in spatial terms, it is necessary to look for a real definition of approaches to the individual components in the territorial community. In our case, we will approach the *definition of integral (complex) valuations* using two different methods for municipalities and localities. In the first case, we will focus on balanced development in each of the criteria. Using a geometric mean in terms of the integral scores F_{ki} for the five criteria allows municipalities with balanced scores on the five criteria to score higher than others with similar characteristics but with unbalanced scores on the criteria used. The overall integral score is calculated as the **geometric mean** of the individual F_{ki} scores of the criteria ($k=1 \div 5$)

$$O_i = \sqrt[5]{F_{1i} \cdot F_{2i} \cdot F_{3i} \cdot F_{4i} \cdot F_{5i}}$$

Where:

O_i -value of the integrated assessment for municipality i

F_{ki} -value of the integral score for municipality i on criterion k , $k=1 \div 5$

i - municipality number

k - number of criteria

5 - number of criteria (five for municipalities)

At the end of this step, an integral score is obtained for each municipality. It is used in the next steps in forming groups (clusters) and determining the category of the municipality. Assuming that integral problems determine the nature of the process behaviour of territorial systems, this means that the first

starting point is to determine the signs of the problems at the relevant territorial levels - regional, subregional and local.

On the basis of the typological classification covering all territorial systems at the same time, types of systems by similar features and qualities emerge. On the other hand, however, municipalities are composed of several localities. This predetermines the derivation of the corresponding patterns in them in order to analyze the settlements themselves, which in recent years has not been the subject of analysis for the state of regional development. Thus, in our approach, the settlements come to the fore as a second element. In these, the accumulation of qualities is more important, and the absence (weaker scores on some of them) cannot be taken as a decisive factor. Under these assumptions, the use of an average of the F_{ki} integral scores for the criteria to obtain the final score is more appropriate to account for accumulated qualities rather than missing ones. This is also the major deficit of regional development in Bulgaria, because the advantages between comparable territorial communities are highlighted instead of looking for their deficits. This is surmountable once it is calculated as an average of the individual scores F_{ki} of the criteria

$$O_i = (\sum_{k=1}^4 F_{ki}) / 4$$

Where:

F_{ki} -value of the integral score for municipality i on criterion k ($k=1 \div 4$)

i - municipality number

further analyse the integral score obtained at the end of this step for each settlement. This implies forming groups of settlements of different ranks and determining the settlement category. This step is particularly important and specific in terms of the effect of the results of using the apparatus for categorising municipalities and localities. By outlining the prevailing type of processes, the characteristic common problems can also be identified. The regional approach is directly linked to the process of globalisation in all spheres of societal development. New spatial economic and urbanisation structures are emerging and increasingly becoming manageable territorial systems. This implies the necessity of a methodology that includes two ways of forming groups according to the way of its concrete application - as a first determination of categories or monitoring (observation), or updating the categorization. The first way involves a purely analytical solution without taking into account the fact that there are existing statutory categories for municipalities and localities. The second approach aligns the proposed solutions with existing categories³. We assume that an analytical definition of groups and categories can be used when defining groups and categories without considering existing regulations regarding categorization. For the formation of categories (groups) a two-stage cluster analysis applied on the resulting integral score is used. This necessitates the application of two steps, firstly by pre-grouping the objects into a large number of small groups and then by aggregating the 're-groupings' into the given number of groups. In the first step, when assigning objects to a group, the maximum proximity of the objects is sought. A minimum standard deviation is sought for each object from the group mean. In the second step (grouping), in addition to the closeness of the scores, a proportional characteristic is sought between the

³ The only starting point in this method is the requirement that the municipalities be categorized into 5+1 categories (0 for Sofia Municipality and 1 to 5 for all others), the settlements into 8+1 categories (0 for Sofia and 1 to 8 for the rest of the settlements) based on the calculated integral score (O_i) according to the set of criteria and indicators postulated by Council of Ministers Decision No. 921 of 2011.

number of objects falling into the groups. Thus, regional development has an economic component and this is mainly determined by economic zoning. Under the new conditions, this approach means that specific regional programmes can and should be 'tied' to well-defined areas that are relevant in terms of economic and social development. This, in turn, requires a vertical disaggregation of the regions in order to reveal the degree of economic linkages between them, to identify the areas of gravity and the role of large settlements and individual settlement structures in their functioning, and to carry out a typology depending on the objectives of regional policy (Patarchanov, P. 2005).

Of particular importance in this aspect is the proper typification and functioning of regions based on the concept of pole development in accordance with national and regional specificities. The formation of groups and the definition of categories in line with existing categories approach takes into account the fact that there are already statutory categories for municipalities and localities. In this case, there are certain limiting conditions in terms of the distribution (in terms of relative share) of the sites in the respective categories on the one hand and, on the other hand, the already defined categories of municipalities and localities. These constraints imply a modified approach in determining the membership of each site in the relevant category. These prerequisites mainly have the following influence on the method of dividing and grouping sites. In practice, this means pursuing a forward-looking regional policy, mainly by observing the principles of efficiency in the development of the investment and economic components of regional policy. In the vertical section, the global, national and local levels are used, while the distinction between territorial systems in the horizontal section is made by searching for the territorial boundaries of the thresholds defining the characteristics of one or another section of the earth's surface and territorial communities. This gives us the basis to define the possible practical-applicational field of our research and analyses (Tsonkov N, 2021). The essence of the feedback principle consists in the fact that any deviation in the control system from the set state becomes a source for a new movement aimed at creating equilibrium. The feedback principle is a fundamental principle of control, a necessary condition for the information interaction between its subsystems.

CONCLUSION

In conclusion, regional preferences and practical indicators for assessment and analysis and regional development should help us to highlight the specificities and focus of the areas with the highest development potential as well as those in need of specific policies. By deriving passported data and indicators for monitoring and evaluation, it enables us to implement measures including regional aid for critical areas and the implementation of specific policies. This means supporting and prioritising the development of areas that can become locomotives of progress and development, as well as vital projects in areas with exceptional difficulties, with the appropriate dosage of infrastructure, economic and social measures. At the same time, creating the conditions for the revival of others or the preservation of others that may fall into decline. In this sense, regional development characterises the pattern or pattern of development of the country as a whole, but highlighting the respective needs of local specific policies within the national space. This implies a significant level of decentralisation and actual management of regional development, so that - for each individual territorial community - the appropriate autonomous space can be identified to realise the potential and comparative advantages for better participation in national and international markets within the global framework of the national development strategy. The combination of vertical and horizontal hierarchy of the territorial systems studied by regional

development enables it to participate creatively in governance and planning at different levels and territorial configurations. This implies that regional development can be perceived as a system in which there are marked sectoral linkages that create the condition for its functionality.

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