

## **ABSTRACT OF THE PH.D. THESIS**

### **Title of the Ph.D. Thesis:**

*Analysis and Forecasting of Economic and Social Development at the Regional Level*

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**Key words:** economic development, regional economy, local economy, regionalization, sustainability, decentralization, statistical methods, statistical indicators

**Abstract:**

Our conception regarding development exceeds the institutional domain, as development is needed in accordance with the specifics of each region, with the capacity of the local economy to efficiently manage resources depending on the specificity of demand, the capacity of local institutions to attract welfare-generating investments. Thus, along with markets, government and individuals, the community is an important factor in the generation of sustainable development, the community being assimilated in this sense with the local economy. The concept of local economy resides in the need for regional economic development, of a local economic community whose objective is the implementation of economic reform programs aimed at both infrastructure and increasing the level of well-being of citizens.

Local economic development is a local activity designed and implemented by operator from the public and private sectors of the community through a set of programs and projects (Profiroiu, A., Racoviceanu, S., Țarălungă, N., 1998).

The problem of regional/local economic development is perpetual, as it is shaped at the level of each stage of the development of a nation, society. As a continuous process, development is a living organism, adaptable, interchangeable depending on the prevailing conditions and the influx of resources, on the one hand, but also on the internal and international context in which the conditions that predefine the conditions for development are created.

At this moment in which humanity finds itself, with a shortage of resources, especially water, with a drought destructive to communities, regional development must be approached in the form of an integrated management system. Thus, the statistical function must prevail, followed by analysis and strategic decision in order to program development according to the reproductive capacity of the resources. Moreover, global demand must be approached comprehensively through the prism of rationality, facilitating the rational exploitation of resources throughout their life cycle, including by identifying reliable solutions for waste management. Thus, regional development must be approached unitarily, institutionally, as a measure to ensure economic sustainability.

At present, regional economics embraces a large number of approaches, theories and models for interpreting location choices and regional development trajectories. Most of these look at the impact of complex investments at the location level and the ability to generate wealth.

The increase in the interpretive capacity of theoretical approaches can be attributed - among other factors - to changes in the way space is inserted into theoretical models.

Theories regarding the approach to regional spatial development designate territorial areas assumed to be homogeneous and uniform from the inside, or conceive *space* as diversified. This change of perspective allows economic activities and production factors, demand and sectoral structure to be approached as spatially inhomogeneous in a region, focused around a growth vector, with the possibility of forming very distinct polarities in a territory. This conception of space restores one of the inspiring principles of location theories - that of economies of agglomeration as a source of local development. It is obvious that such an interpretation of space combines the economic and social relations that appear in a territorial area, the space becoming diversified-relational.

Our doctoral thesis is structured in four chapters focused on the general objective of the doctoral work, namely the identification of the sources of regional development that lead to the increase of the population's level of well-being.

The **first chapter entitled *Conceptual delimitations of regional development*** describes the concept of regional economy under the conditions of current institutional and conceptual-scientific specificity. Thus, local economies are considered to function similarly to a national economy. The types of policies that should be used to solve regional problems (including forecasting the impact of an event, the emergence of development opportunities with considerable local effects; quantifying the direct and indirect benefits of a development opportunity on the local economy; identifying significant groups of economic activity in a region and tracking the progress of a local or regional labor market or the comparative assessment of a region's competitiveness), define a region as an area that possesses certain characteristics (physical, economic, political, etc.) that give it a measure of unity and differentiates it from the surrounding areas.

At the same time, our thesis advocates for decentralization, as an argument for increasing the level of regional development, emphasizing the effects of decentralization from the perspective of equity and economic efficiency. Territorial competition therefore represents an opportunity for poorer regions to manage local economic development, as the transfer allows them to play an active role in designing their own strategies. This is in particular obvious when

compared to situations where the central government promotes traditional sectoral development policies.

Our thesis proposes, from the perspective of the analysis of development models, that, at the level of a local system, the allocations of production factors to generate regional development should be optimized through investment policies, innovation and the attraction of outlets. Thus, the paper proposes the analysis of the impact of the combination of the *variables investments, newly created enterprises, the rate of participation in continuous training courses for young people, markets for the sale of economic goods produced/market absorption on the regional/inhabitant GDP*, on the one hand, but also on the income the population. Theories that adopt this view of space are growth theories developed to explain the trend of a synthetic development indicator – such as population income.

This approach makes it possible to model the path of short-term development of output and employment and identifies the path forward - the trajectory of long-term output growth associated with higher levels of living standards (high wages and per capita income inhabitant, more favorable prices on the interregional market).

Using the concepts of leadership and entrepreneurship applied to local factors that influence the regional economy, the growth potential of the regional economy is underlined. To this end, the thesis proposes that the regional/local approach highlights the sets of data and information to be structured in local development models in which the specific approach, generated by the inputs of factors (resources), is predominant.

However, the thesis proposes a critical approach to newly emerging issues in structurally disadvantaged rural areas, such as the idealization and accountability of local leadership. Local response strategies have certain limits, and practitioners and researchers need to reflect on the complexity of regional and local development and regional polarization.

The second chapter **entitled *Evaluation of regional trends and perspectives based on the results of bibliometric analysis and text mining analysis*** aims to analyze and forecast the trends and models of economic and social development at regional level based on the use of bibliometric analysis, text mining analysis, but also of cluster analysis to extract valuable insights from a large volume of data and literature to better understand current and future regional dynamics. This will facilitate the development of more effective and personalized regional strategies, adapted to the needs and specificities of each region.

The bibliometric study is essential for a deep understanding of the factors that influence regional economic and social development and for the formulation of effective regional development strategies. Thus, the analysis shows that terms such as *social, cultural, policies, education, and economic* are closely interconnected, which suggests that these areas should be prioritized in future research. These central nodes show key themes that require further attention to fully understand a topic. The close correlation between terms from various disciplines (for example, between *cultural and economic*), could indicate the need for an interdisciplinary approach in research and policy-making, considering how different social and cultural aspects influence the economy and vice versa.

The **third chapter, entitled *Analysis of the evolution of the main indicators for measuring economic and social development in a regional profile***, considers the opportunity to propose a set of development indicators integrated through a composite indicator, called the *vector of the region*.

The degree of economic and social cohesion at the level of Romanian regions differs greatly depending on climatic elements, geographical positioning, relief, human density, on the one hand, but also depending on the level of investments attracted to ensure employment, the capitalization local resources, the exploitation of the elements of public and private property of the state manifested through the institutional factor.

The indicator *vector of the region* measures the competitiveness of a region through the economic value created by resident enterprises, distributes the value through sustainable goods and services to the population, provides a dynamic, creative and sustainable environment to the population through fair access to the elements of development recognizable at the level of the region.

The indicator *vector of region* refers to the region's ability to provide an attractive environment, both in the short term and in the long term, by including numerous indicators on human capital and the quality of institutions, entrepreneurship, technology. The vector of the region measures five dimensions of development, integrating 73 indicators (Annex 4) and highlighting relevant concepts for the *competitiveness-productivity-sustainable development-well-being relationship* at the level of a region.

Thus, the *vector of the region* provides a comparable and multidimensional picture of the level of development for all macro-regions of Romania and allows the evaluation of inequalities

and the monitoring of performance over time at a disaggregated spatial level which, in most cases, is much more appropriate than the national one.

The region's vector tool - IVR -, through its five dimensions, contains several economic-social-development-research sub-indicators, organized into three sub-indicators: basic factors - subsystem of infrastructure indicators; efficiency - subsystem of economic and social indicators; innovation - the subsystem of research-development and entrepreneurial indicators of development. Being a multidimensional and interconnected concept, IVR contributes to improving the competitiveness of the region through the coordinated effort of many different actors (the employed population that ensures the valorization of economic resources, investments that support entrepreneurship, technology and infrastructure that support the well-being of the population). The IVR analysis contributes to highlighting the strengths and weaknesses of the region, allows the comparison of regions, with an effect on the level of economic growth at the national level, which is a tool for decision-makers at the national and local level.

The **fourth chapter entitled *Analysis and forecast of economic and social development in regional profile. Empirical evidence at the level of Romania*** aims, through the composite index of economic-social development, to analyze the evaluation and promotion of sustainable and equitable regional development in Romania.

The study aims to evaluate and analyze the different aspects of economic and social development at the level of the regions in Romania, for the period 2008-2022 based on the construction of a synthetic measure that incorporates the action of local economic and social determinants, using five classes of indicators: *Social indicators, Economic indicators, Research and development indicators, Infrastructure indicators, Entrepreneurial indicators*.

The statistical indicators were collected for the period 2008-2022. The choice of the period 2008-2022 for the collection of statistical indicators is justified by the temporal relevance, the inclusion of major economic events, the availability of high-quality data, the impact of structural reforms and the specific socio-economic and demographic context.

The period 2008-2022 includes various phases of economic cycles, including recessions and periods of economic expansion. This allows a more accurate assessment of the impact of these cycles on economic and social development. The beginning of the study period in 2008 allows the analysis of the effects of the global financial crisis on the regional economies in Romania.



During this period, many reforms and improvements were implemented in the reporting and statistical data collection systems, both nationally and regionally.

The research methodology for building the composite index of economic-social development is based on statistical and econometric methods. The process starts with imputing missing data using the multiple imputation technique, followed by data standardization to ensure comparability between indicators with different units of measurement. The identification of the determining factors of the counties' performances is carried out through multivariate analysis, using Multiway Principal Components Analysis (MPCA), a generalization of principal components analysis (PCA) applied to panel data. The internal consistency of the indicators is verified by the Cronbach Alpha coefficient, and the construction of the composite index is based on the weighted aggregation of the variance of the principal components, later transforming into percentiles for interpretability. The quality of the results is evaluated by KMO tests and Bartlett's Test of Sphericity. Highlighting the poles of economic and social development is done by analyzing the hierarchical classification, using the Ward method and the squared Euclidean distance, and the evolution of the counties' performances is monitored by trend diagrams.

The first objective of the research considered the identification of the determining factors in the performance evaluation of Romania's regions by using multivariate principal component analysis specific to panel data and the evaluation of the regions' performance by building a composite index based on panel data covering the eight regions of the country for the period 2008-2022 and which incorporates a total number of 65 specific indicators in the field of economic and social development. The value of the Cronbach Alpha coefficient ( $c\text{-alpha}=0.624$ ), which measures the internal consistency of the items in a model, highlights a moderate internal consistency, indicating adequacy in the construction of a composite indicator.

The second objective of the research aimed at identifying the important synthetic indicators of economic and social development at the level of the regions of the country, using the technique of analysis in main components and highlighting the main poles of the economic and social development performance, using comparative analyzes of the years 2022 and 2008, but also data aggregated at the level of 2008.

If we analyze the performances in the economic-social field of the country's regions, the trend diagram is delimited by the horizontal axis that marks the average value of the composite index, and by the vertical axis that shows the trend. The two axes divide the area into four

quadrants. Regions in the upper quadrant are "moving forward" because both their value and trend are above the period average, while counties in the lower left quadrant are "still lagging" because they are below average for both variables. This analysis highlights the regional disparities in Romania and the need for differentiated economic policies to stimulate uniform development in all regions.

Our thesis, by applying the hierarchical grouping method for the 11 main components obtained from the MPCA for the years 2008 and 2022 respectively, identified the main poles of economic-social development. The clusters were based on the individual indicators of the composite index using the hierarchical clustering method based on the Ward method and the squared Euclidean distance. Thus, the results show that in the period 2008-2022, a redistribution of clusters took place. The empirical results of the 12 estimated panel models, one for each of the 11 socio-economic determinants and the composite index, revealed the persistence of GDP per capita, with all models showing strong persistence of GDP per capita, indicating that Previous year's GDP is a strong predictor of current GDP. A high coefficient of real GDP per capita (t-1) indicates that the regional economies tend to maintain a constant economic performance every year, that they tend to turn the investments into poles of growth and well-being for the population and the region as a whole.

The analysis of the performance poles found the following:

- Bucharest-Ilfov: It is in the "Catching up" quadrant and close to the "Moving ahead" quadrant. It has the highest socio-economic development index in the year 2022 and has seen significant growth, indicating a very dynamic and prosperous region.
- North-West and Center: In the "Stagnation" quadrant are presented the developed regions, with limited momentum in recent years.
- West: In the "Moving ahead" quadrant, which suggests a region of steady and solid growth.
- South-West Oltenia and North-East: In the "Falling further behind" quadrant, suggesting the need for support measures and investments to stimulate development.

The analysis of the impact of the determining factors of economic and social development on the gross domestic product per capita at the level of the regions of Romania highlighted the influence of seven determinants on the variation of real GDP per capita, namely: economic development and road infrastructure, unemployment and economic instability,

infrastructure of gas, access to family medicine, drinking water infrastructure, access to education, quality of governance and ecological infrastructure, spending on social protection of the unemployed.

Access to family medicine and the development of drinking water infrastructure had the greatest impact on GDP per capital in a regional profile. Medicine, like education, contributes to increasing the level of well-being of the population. Investments in these areas increase the level of involvement in the social and professional life of an individual, in terms of productivity, motivation, creating added value, following good health and based on the premises of well-being, the effect of production, by valuing the skills of the labor factor.

Based on the results obtained from the regression analysis, alternative scenarios of the evolution of the real GDP per inhabitant were presented at the level of all development regions in Romania, for the period 2023-2025, in the perspective of maintaining the same factors of influence and degree of urbanization, at the level of 2022, or in the perspective of improving the performances determined on the basis of the average variations in the period 2019-2022.

Comparatively analyzing the results offered by both forecast scenarios for each region, on each of the seven determining factors of economic-social development, it was found that in four of the eight regions examined (North-East, South Muntenia, South-West Oltenia, North-West and South-East), the quality of education and ecological infrastructure is the most important factor for most regions. In second place, in order of importance, it is the improvement of the gas infrastructure and the reduction of expenses for the social protection of the unemployed, each being relevant for different regions.

Economic development and infrastructure (DEI) is strongly correlated with the density of enterprises, the ratio of railway infrastructure to road infrastructure, foreign direct investment, the population's access to a doctor - exclusively a dentist, and expenditure on professional training. A high density of enterprises indicates intense economic activity and a high capacity to create jobs. This increases the population's income and consumption, which increases the regional GDP, and therefore it is desired to support entrepreneurship and small businesses by providing tax facilities and financing.