SUSTAINABLE DEVELOPMENT IN ROMANIA: GENERAL AND REGIONAL PERSPECTIVE

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Abstract
The doctrine of ‘sustainable development’ derives from a discipline in economics that has been evolving for almost two humanity’s burgeoning population began with the work of the English political economist Thomas Malthus in the early 1800’s. As development policy has evolved, different approaches have been emphasized at different times. The original emphasis was on promoting more productive agriculture and industrialization. Education, Nutrition, health, sanitation and employment for the poor were the central components of this approach-reflecting on acknowledgment that the benefits of development did not necessarily “trickle down” to those who needed them most. This perspective inspired the creation of the United Nations Development Program’s Human Development Index, which uses health and education measures together with Gross Domestic Product (GDP) to calculate an overall index of development success. This study aims to analyze the sustainable and regional development of Romania, using development indicators. In the literature, there are lots of studies evaluating the sustainable and regional development using alternative empirical approaches. Regional sustainable development is so important for policy makers because if there is a differences in terms of regions, this can be affect the economy. We use spatial econometric techniques to determine the similarities and dissimilarities among the regions of Romania.

Key Words: Sustainable Development, Regional Development, Spatial Statistics, Spatial Econometric Techniques,

Clasificare JEL: C21, C31

1. Introduction

Although complexity and subtlety are fundamentals to the detailed analysis of a given topic, basic concepts that inspire influential paradigms of thought are moderately clear and easy to comprehend in comparison. Ideas that influence masses and lead national policies should not only be available to the privileged, but also be accessible for everyone in social sciences. Consequently, institutions could become intrinsic to the human landscape and fabric of our lives through facilitating the capability to infuse from the local to the global level (Harris, 2000).

“Sustainable development” principle, which remains in evolution for almost two decades, originates from an approach in economics. The work of Thomas Malthus, an English political economist, in the early 1800’s instigated the discussion on whether the limited natural resources of the Earth would continue to provide sustenance for the escalating human population. Malthus emphasized the ultimate principle of environmentalism in An Essay on the Principle of Population (1798), since sustenance could increase only in arithmetic progression where the human population was inclined to increase in a geometric progression, and thus, diminution of natural resources and inevitable demands and desolation of humanity would eventually become a result of the population growth. (Basiago, 1999).

Diverse approaches during different periods were accentuated along with the evolution of the development policies. Stimulating productivity growth in agriculture and industrialization was the unique prominence that was highlighted. Accepting the fact that the welfare of development did not certainly drip for those who needed them most, this approach situated employment, sanitation, health, nutrition and education of the poor as the crucial constituents. The United Nations Development Program’s Human Development Index, which calculates an overall index of development achievement via utilizing health and education measures in common with the Gross Domestic Product (GDP), was motivated by this approach (Harris, 2000).

Although the commonly cited definition of sustainability is ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (World Commission on Environment and Development, 1987), sustainable development implies distinctive meanings for different people. Nevertheless, sustainable development is a multifaceted concept, which involves numerous shareholders and focuses on diverse temporal and spatial scales. In cases where the development target is not explicitly epitomized and could be conditional on alterations during the process, sustainable development indicates a communal process of alterations (Zeijl-Rozema, 2011). Instead of recognizing
sustainable development as a scientific concept, it could as well be considered as a political or normative act. In present time and in the future, the quality of life anticipated by humans is actually related to sustainable development. In addition, a significant equity constituent exists with respect to recognizing the fact that in another temporal or spatial setting, other humans would also have the right to quality of life. Deciding on options and trade-offs that are discernable for our anticipated future is what sustainable development is about. The anticipated future would change for diverse locations and different people (Zeijl-Rozema, 2011). As a result, it is possible to state that there exist various interpretations of sustainable development. The strength of the concept lies in its capability to reveal the diversities in conceptions of the world and the contradictions in present day behavior and in its potential to provide a ground for discussions (Lafferty, 2004).

Sustainable development, which emerged due to decades of vigorous global scientific discussions, is a concept that obtained diverse political connotations within the framework of globalization. The Romanian language pronounces the concept through two corresponding terms “dezvoltare durabila” and “dezvoltare sustenabila”. These terms, which were alternatively used throughout the Romanian version of the document (Government of Romania, 2008), emerged as synonymous excerpts from different linguistic sources.

Sustainable development’s multifaceted problems acquired a worldwide political feature subsequent to being elaborated at the United Nations Conference on Environment and Development (UNCED) summit in Rio de Janeria (1992), at the Special Session of the United Nations General Assembly that accepted the Millennium Goals (2000) and at the Earth Summit in Johannesburg (2002). The principle “think globally, act locally” aided the establishment of tangible action agendas at international level (Government of Romania; 2008: 10).

2. Regional And Sustainable Development

Sustainable development could be described as a continuous progression in evolution of humans within balanced social, economic, and ecological development. Nevertheless, the foremost feature of progress for sustainable development is the economic constituent, since processes of value creation is intrinsic to economy. Sustainable development indices founded by the European Commission are commonly used in the EU countries in order to evaluate the sustainable development trends. Through the objectives, such as socio-economic development, sustainable consumption and production, social inclusion, demographic changes, public health, climate change and energy, sustainable transport, natural resources, global partnership and good governance, defined by the EU Sustainable Development Strategy, a depiction of the phases for realizing the objectives is obtained (Burja and Burja, 2013).

Our Common Future, 1987 report of the World Commission on Environment and Development, pursued to tackle the setback of disagreements between the environment and development objectives through articulating a description of sustainable development (Harris, 2000). The description articulated as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” yet postulates an all-encompassing foundation for present-day thinking and practice, which focus on the protection and enrichment of natural resources and ecosystems while corresponding people’s economic and social needs.

Balanced incorporation of economic, social and environmental scopes is what sustainable development demands. A critical alteration in policy approach emerges due to the incorporation of these three dimensions, due the broadening income and various gaps in society and the increasingly hazardous infringement of the boundaries of the planet (ESCAP, 2015).

To put it differently, sustainability problem could be defined via the prevailing instrument of the three pillars of sustainability. Economic, social and environmental pillars constitute the minimum of this prevailing instrument. Figure 1 presents the two common means to envisage these three pillars:

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1 Source: http://www.fdsd.org/the-challenge/what-is-sustainable-development/
Majority of the nationwide and worldwide efforts to create a solution for the problem concentrates merely on one pillar at a time. For instance, environmental pillar is the main subject of concentration for the United Nations Environmental Programme (UNEP), the Environmental Protection Agencies (EPA) in many countries and Environmental NGOs. Economic growth is the primary focus of the World Trade Organization (WTO) and the Organization for Economic Cooperation and Development (OECD), where the latter as well considers brief interest in social sustainability, such as justice and lessening wars. Although it has a minor impact due to its consensual decision making procedure and small budget, the United Nations concentrates on consolidating all three of the pillars. As economic growth is the main demand from its members, particularly the developing nations, and the United Nations concentrates commonly on the economic pillar.

- **Economic**: In the past, conventional scientific development was guided by the increase of development and productivity. Production of commodities and services on a steady basis, keeping government and external debt at controllable levels, and eluding severe imbalances that have the potential to impair agricultural or industrial production are the abilities required for an economically sustainable system.

- **Environmental**: Providing a stable resource base, diminishing non-renewable resources only if suitable surrogates are capitalized in, and eluding overuse of renewable resources or environmental sink functions are the core approaches that an environmentally sustainable system should focus on. Concepts that are not customarily classified as economic resources, such as preservation of biodiversity, atmospheric stability and other ecosystem functions are intrinsic to environmental pillar.

- **Social**: Gender equity, political accountability, participation, achieving equity in distribution, adequacy of social services such as health and education are the main features of a socially sustainable system (Harris, 2000).

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1. Interaction between environment and economy: economic cost of the environmental
2. Interaction between economy and environment: forces acting on environmental resources and investments
3. Interaction between environment and social: provision of a clean environment to support human welfare and health care
4. Interaction between social and environment: awareness of consumption behavior and environmental responsibilities
5. Interaction between economy and social: provision of occupation and income that facilitates a good life standard
6. Interaction between social and economy: labor in terms of quantity and quality (Teodorescu, 2012).

**Economy-environment**: Population increase causes an increasing pressure of economic activities on the environment and in return the natural environment was damaged over time. The relationship between light pine economy and environment in terms of sustainable development is not quantitative, yet is qualitative via its efforts to enforce environmental standards such as reducing particulate matter and greenhouse gas emissions, attaining productivity, removing waste, managing waste,

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2 Source: [http://www.thwink.org/sustain/glossary/ThreePillarsOfSustainability.htm](http://www.thwink.org/sustain/glossary/ThreePillarsOfSustainability.htm)
limiting undesirable impact of human actions on environment, endorsing reforestation, and transition to sustainable agriculture.

**Environment-economy:** “The polluter pays”, the basic principle of environmental policies, is employed via the relationship between environment and economy.

**Environment-social:** Water, soil, air are the factors provided by the environment, and their good quality is due to the degree of stress environment receives from human and natural actions. The environmental conditions are strictly related to the stress bestowed upon the environment, and the measures that aim to reduce the potential harmful effects are comprised in environmental policies. Maintaining a clean environment and biodiversity would contribute to the conditioning or labor and economic growth utilized for concerns such as human health, food security. Safe and sufficient energy is the main demand for all industries of the economy. Energy consumption intensely affects the industrial productivity, availability for employment, urban and rural development and various other major economic activities.

**Social-Environment:** Keynes noted that consumer demands are altered due to higher wages. An unmaintainable nature in consumption growth would cause harmful environmental impacts that could therefore be experienced through the adverse effects on life quality and health.

**Economy-social:** Provision of employment is simply one of the goals of sustainable development. Economy and living standards in a country could be traced from the labor employment rate of that country.

**Social-economy:** Health status, job satisfaction and human resources approach starting at the period of school enrolment are the main human factors that enhance productivity and respectively contributes to growth. Social quality stems from aspects such as considering health, housing, education, and income for the population (Teodorescu, 2012).

The Sustainable Development Strategy of the European Union asserts the following guiding principles to ensure the integration and a balanced correlation of the economic, environmental and social components (Government of Romania, 2008):

- Basic human rights should be endorsed and protected;
- Generations should within and between strengthen solidarity;
- A society that is open and democratic should be achieved;
- Citizens should be informed and be actively involved in decision making;
- Businesses and their social partners should be in full involvement;
- Coherence of policies and the quality of governance should be ensured at local, regional, national and international levels;
- Evaluation of impacts and consultation of stakeholders should be considered for incorporation of economic, social and environmental policies;
- Economically comprehensive and cost-effective policies should be achieved through the use of best available knowledge;
- The condition of scientific uncertainty should be approached via application of precautionary principles;
- “Make polluters pay” should be applied as principle.

Integration of sustainable development principles into regional development applications is included in the regional sustainable development concept. Thus, regional sustainable development includes all activities and tools and initiatives related to the same application. The justification of the abovementioned approach derives from the significance of the role the regions play as intermediaries between national and local spheres and the importance of sustainability as a common belief that it would play a significant role in the future regional development. Similar trends could be observed in EU and national level that aim in more integrated forms of operation, furthermore, regional sustainable development facilitates an awareness among regional development experts. It further emphasizes that the focus should not be only on economic growth, but the new broader approach includes a wide range of activities from establishing new forms of partnership to exploring innovative planning and integration methodologies (Clement et al., 2003).

EU Thematic Evaluation on the Contribution of the Structural Funds to Sustainable Development recently improved the key documents in an attempt to rationalize regional sustainable development (Clement et al., 2003). The abovementioned approach had three main goals:

- Developing methods, indicators and approaches to assess regional sustainable development,
- Generation of better sustainable development projects through a more efficient Structural Fund delivery system.
Identification of explicit or implicit trade-offs included in regional development policies.

3. Regional Sustainable Development in Romania

Romania was the first European country that committed to support sustainable development and to limit the climatic changes by ratifying the Kyoto Protocol in 2001. First Romanian National Sustainable Development Strategy was written between 1997 and 1999, assisted by the United Nations Development Programme (UNDP). Documents signed by Romania during the pre-accession period to the EU and the Romania-EU Treaty of Accession (2005) reflect Romania’s solid commitment to implement the EU acquis and the principles of sustainable development. National Sustainable Development Strategy with goals for 2013-2020-2030 was adopted by the Romanian government in accordance with its obligations as a new EU member, setting a goal to implement a sustainable development model which would generate high levels of added value, based on knowledge and innovation within a reasonable and viable timeframe to maintain a continuous improvement of the quality of life in harmony with the environment (Burja and Burja, 2009).

Before the accession to the EU, Romania was divided into 8 regions of development starting from 1998. Each division included 4 to 7 districts, while the 8th region, namely Bucharest-Ilfov only included the Bucharest municipality and Ilfov County. These regions were created to represent the voluntary association groups of counties reflecting the general Romanian space (Dumitru and Sandru, 2015).

Regional weak implementation points were confirmed by the discussions on the regional development strategy drafts and the findings of the Regional Operational Programme 2007-2013 with a focus on the eighth district. The program was adopted in April 2007 and the following points were included in the program (Government of Romania, 2008):

- The concentration of economic growth in and the perimeter of Bucharest due to increasing foreign investments and increasing differences between Bucharest-Ilfov district and other 7 regions and the problems of congestion in Bucharest;
- Socio-economic decline observed in several large cities and the decrease observed in the impact of these cities on development of surrounding regions;
- The increase in demographic inequalities between the regions due to changes in age structure and ageing population, which is at alarming levels especially in the southern part of the country;
- Due to restructuring and worsening of social problems, the loss of urban functions in several small and medium settlements, especially in mono-industrial localities;
- Discrepancies in historical development between the eastern and western Romania and disintegration of eastern and northern traditionally under-developed areas as well as in the areas along Danube;
- Unavailability of access to certain areas, creating an obstacle towards local development;
- Lack of adequate labor force in large areas as a result of a decline in population, massive transitory migration and ageing, which also adds the pressure on social and health services;
- The potential of an economic stagnation in mountain areas;
- Low competitiveness in many industries, mainly in tourism, low levels of capital investments, labor productivity, managerial skills and modern technology use;
- Lack of a quality public infrastructure, urban utilities under poor condition and inability to preserve historical and cultural assets;
- Poor skills and experience of local authorities to manage economic, social and environmental components of intricate sustainable development programs.
There are several indicators of sustainable development. For the purposes of the present study, indicators identified by the EU would be used, since Romania is an EU member country. EU determined indicators as depicted in EU Sustainable Development Strategy could be summarized with the following themes:

- Socioeconomic development
- Sustainable production and consumption
- Social inclusion
- Demographic changes
- Public health
- Climate change and energy
- Sustainable transport
- Natural resources
- Global partnership

Map 2 below displays the Romanian situation among other EU countries.

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3 Data is obtained from: [www.cursdeguvernare.ro](http://www.cursdeguvernare.ro)

4 Data is obtained from: [www.cursdeguvernare.ro](http://www.cursdeguvernare.ro)
Real GDP per capita is calculated as the ratio of real GDP to the average population of a specific year. This map is about 2015. As can be seen above, Romania is dark green, lots of EU countries are yellow. This means Romania GDP per capita rate is under EU average.

Resource productivity reflects the GDP divided by domestic material consumption (DMC). DMC measures the total amount of materials directly used by an economy. It is defined as the annual quantity of raw materials extracted from the domestic territory of the focal economy, plus all physical imports minus all physical exports. It is important to note that the term consumption as used in DMC, denotes apparent consumption and not final consumption. As can be seen above, Romania is dark green, Romanian value is approximately 0.9 points under EU average.

The Europe 2020 strategy promotes social inclusion, in particular through the reduction of poverty, by aiming to lift at least 20 million people out of the risk of poverty and social exclusion. This indicator corresponds to the sum of individuals, who are at risk of poverty or severely materially deprived or living in households with a very low intensity. As can be seen above, Romania is light green, meaning that the risk of poverty is higher than the other EU countries.

Data is obtained from: [www.cursdeguvernare.ro](http://www.cursdeguvernare.ro)

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5 Data is obtained from: [www.cursdeguvernare.ro](http://www.cursdeguvernare.ro)

6 Data is obtained from: [www.cursdeguvernare.ro](http://www.cursdeguvernare.ro)
The employment rate of older workers is calculated by dividing the number of employed individuals between the ages of 55 - 64 by the total population in the same age group. This indicator is based on the EU Labor Force Survey. The survey covers the entire population living in private households and excludes those in collective households such as boarding houses, halls of residence and hospitals. Employed population consists of those individuals, who during the reference week did participate in any work for pay or profit for at least one hour, or were not actually working but had jobs from which they were temporarily absent. As can be seen above, Romania is light green, this means Romania’s employment rate of older workers is lower than EU countries.

This indicator is defined as the mean number of years still to be lived by a person at birth-if subjected throughout the rest of his or her life to current mortality conditions. As can be seen above, Romania is light green, this means Romania is under EU countries in terms of this indicator.

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7 Data is obtained from: www.cursdeguvernare.ro
8 Data is obtained from: www.cursdeguvernare.ro
Map No. 7: Greenhouse Gas Emissions

This indicator reflects the trends in total man-made emissions for greenhouse gases included in the ‘Kyoto basket.’ It is a mean of emissions with respect to 1990 base year emissions and the emissions in the Kyoto base year. The ‘Kyoto basket’ includes the following greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and the F-gases (hydrofluorocarbons, perfluorocarbons and Sulphur hexafluoride (SF6)). These gases were collected into a single gas unit using gas-specific global warming potential factors. Since Romania is light green in the map above while 27 EU countries are in yellow, Romanian emission levels are under the EU average.

Map No. 8: Energy Consumption of Transport Relative to GDP

This indicator is defined as the ratio between the energy consumption of transport and GDP. The energy consumed by all types of transport (road, rail, inland navigation and aviation) is covered, including commercial, individual and public transport, with the exception of maritime and pipeline transport. As can be seen in the map, Romania energy consumption level is above EU countries.

9 Data is obtained from: www.cursdeguvernare.ro
10 Data is obtained from: www.cursdeguvernare.ro
Official Development Assistance (ODA) includes grants or loans that are provided by the public sector to promote economic development and welfare in recipient countries. Payments reflect actual international monetary transfers or goods or services at the cost in the origin. For the purposes of the present study, ODA is presented as a share in Gross National Income (GNI). GNI at market price is equal to GDP minus external primary income payable by resident units.

5. Spatial Analysis

Spatial analysis is based on the concept that “space matters,” in other words, the events of a specific region is interrelated with the events of the neighboring regions. Tobler (1979) put it more precisely in the First Law of Geography: “Everything is related to everything else, but closer things more so”. This phenomenon could be approached with the concept of spatial autocorrelation. Anselin and Bera (1998) loosely defined spatial autocorrelation as the coincidence of similarity in value with the similarity in location. To put it in different words, high or low values for a random variable have the tendency to cluster in space (positive spatial autocorrelation) or locations have the tendency to be surrounded by neighbors with very dissimilar values (negative spatial autocorrelation). It was determined that among these two types of spatial autocorrelation, the positive one is the most innate autocorrelation. Negative spatial autocorrelation reflects a dispersed set of values and could not always be interpreted meaningfully (Viton; 2010:3).

Haining (1989) complained about the lack of specialized software for spatial data analysis and judged this fact as the primary reason for the researchers not being able to utilize spatial statistics, but since the 1980’s, there is a rapid development of such tools. Statisticians and econometricians usually limit their interest in exploratory analysis, induction and description of the data to develop generalizations about a predetermined population based on a sample of the same population. Researchers that study maps and conduct data description and induction had the tendency to review the literature to extract as much information as they can from geo-referenced findings (Getis; 1997:239). In geography, several smart cartographic devices were developed to review spatial data efficiently. However, with the knowledge that spatial aspect is a significant perspective to approach knowledge, scientists have always attempted to find better methods of reflecting the data on maps and testing hypotheses based on predicted data structures on these maps.

5.1. LISA and BILISA Map

LISA cluster maps reflect regions that contain important local Moran statistics. These are grouped in four clusters of spatial correlation (high-high, low-low, high-low and low-high) (Annoni & Kozovska; 2010:23). In LISA maps, spatial clusters are shown by bright colors. High-high regions are depicted with the color red, reflecting the fact that positive associations arise due to the high values of the feature variable in both own and surrounding regions. Low-low regions are colored in blue where positive spatial autocorrelation is due to low values of the attribute variable in own and neighboring regions. LISA meets the two requirements stated below:

a. The extent of significant spatial clustering of similar values around the observation is provided by each LISA observation;

Data is obtained from: www.cursdeguvernare.ro
b. The sum of LISAs for all observations is proportional to a global indicator of spatial association (Anselin; 1995: 2).

6. Aim, Data And Methodology

The present study aims to analyze Romania’s regional development using regional development indicators. These indicators are determined and defined by Eurostat and World Bank. Especially in this study, we take into account regional sustainable development indicators and use these indicators for the spatial econometric analysis. The indicators we used can be listed as presented below:

- Number of accidents at work
- Average monthly nominal gross earnings
- GDP per inhabitant
- Number of agricultural holdings
- Forest annual fillings
- Number of hospital beds per 1000 inhabitants

These indicators are defined by the Romania sustainable development agency for 2015. Also, Romania development agency provides maps for these and other development indicators. These maps gave us an a priori information for our spatial analysis. These maps were as follows:

Map No. 10: Number of accidents at work and Average monthly Nominal gross earnings

Map No. 11: GDP per inhabitant and Number of Agricultural Holdings

12 Source: Romania Development Agency
13 Source: Romania Development Agency
As can be seen in Maps 10, 11 and 12; at regions of Iaşi, Alba, Sibiu, Braşov, Argeş, Timiş, Caraş-Severin, Ilfov, Bucharest, Călăraşi, Giurgiu and Tulcea, average monthly earnings are more than the other regions. Timiş, Ilfov and Bucharest have the most GDP per inhabitant. The most agricultural areas in; Suceava, Neamţ, Iaşi, Bacău, Buzău, Prahova, Dambovita, Argeş, Olt and Dolj. Number of hospital beds are the most in; Cluj, Timiş, Hunedora, Covasna, Iaşi regions.

As can be seen in Map 13, Moran’s I value is 0,12 and since it has a positive value, there is a positive spatial autocorrelation among regions, so we could argue the presence of spatial interaction between regions, but this spatial effect is not so strong (because of small Moran’s I value). From the map, we could classify the regions as:

<table>
<thead>
<tr>
<th>CLASSIFICATION OF REGIONS</th>
<th>Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-high area (dark red)</td>
<td>Mureş, Sibiu</td>
</tr>
<tr>
<td>Low-low area (dark blue)</td>
<td>Iaşi Omita, Constanta</td>
</tr>
<tr>
<td>Low-high area (light blue)</td>
<td>Cluj, Hunedoara</td>
</tr>
<tr>
<td>High-low area (Light red)</td>
<td>Bacău, Galaţi, Buzau, Giurgiu, Salaj</td>
</tr>
</tbody>
</table>

Mureş and Sibiu regions are in the high-high area. This means that the number of accidents in these regions are higher than Romania’s mean value and have positive spatial homogeneity. This homogeneity means that Mureş and Sibiu have homogeneity in terms of high number of accidents. Iaşi Omita and Constanta are in the low-low area and in these regions number of accidents are lower than mean value and these regions have negative spatial homogeneity. This homogeneity means that Iaşi and Constanta have homogeneity in terms of low number of accidents. Cluj and Hunedoara are in the low-high area and these regions have higher number of accidents when compared to other regions but spatial
interaction is low. Bacău, Galati, Buzau, Giurgiu and Salaj are in the high-low area, which means that these regions have lower number of accident than the other regions and these regions have high spatial interaction and homogeneity.

Map No. 14: Average Monthly Nominal Gross Earnings

Moran’s I value is 0.08 and because of a positive value, there is a positive spatial autocorrelation among the regions, so we could argue that there can be spatial interaction between regions, but this spatial effect is not so strong (because of small Moran’s I value). We can classify the regions as:

Table No. 2: Spatial LISA Map Results - Average Monthly Nominal Gross Earnings

<table>
<thead>
<tr>
<th>CLASSIFICATION OF REGIONS</th>
<th>Gorj, Constanta</th>
<th>Botoșani, Vaslui</th>
<th>Teleorman</th>
<th>Iași, Tulcea</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-high area (dark red)</td>
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<tr>
<td>Low-low area (dark blue)</td>
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<tr>
<td>Low-high area (light blue)</td>
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<tr>
<td>High-low area (Light red)</td>
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</tbody>
</table>

Gorj and Constanta regions are in the high-high area. This means that the average monthly nominal gross earnings in these regions are higher than Romania’s mean value and have positive spatial homogeneity. This homogeneity means that Gorj and Constanta have homogeneity in terms of high nominal gross earnings. Botoșani and Vaslui regions are in the low-low area and in these regions nominal earnings are lower than the mean value and these regions have negative spatial homogeneity. This homogeneity means that Botoșani and Vaslui are homogenous in terms of this indicator. Teleorman is in the low-high area and in this region nominal gross earning is higher than other regions. Iași and Tulcea are in high-low area, means that, in these regions people have lower earnings than the other regions and these regions have high spatial interaction and homogeneity.

Map No. 15: GDP per Inhabitant

Moran’s I value is 0.11 and there is a positive spatial autocorrelation among regions. There is spatial interaction between regions, but this spatial effect is not so strong (because of small Moran’s I value). We can classify the regions as:

16 Author’s calculation.
17 Author’s calculation.
Table No. 3: Spatial LISA Map Results- GDP per Inhabitant

<table>
<thead>
<tr>
<th>CLASSIFICATION OF REGIONS</th>
<th>( \text{High-high area (dark red)} )</th>
<th>( \text{Low-low area (dark blue)} )</th>
<th>( \text{Low-high area (light blue)} )</th>
<th>( \text{High-low area (Light red)} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regions</td>
<td>Prahova</td>
<td>Botoşani, Iaşi, Galati</td>
<td>Călăraşi, Giurgiu, Argeş</td>
<td></td>
</tr>
</tbody>
</table>

Prahova is in the high-high area. This means that GDP is in these regions are higher than Romania’s mean value. Botoşani, Iaşi and Galati are in the low-low area and in these regions nominal earnings are lower than the mean value and these regions have negative spatial homogeneity. This homogeneity means Botoşani, Iaşi and Galati have homogeneity in terms of this indicator. Călăraşi, Giurgiu and Argeş are in the low-high area and in these regions, GDP value is spatially higher than other regions.

Map No. 16: Number of Agricultural Holdings

Moran’s I value is 0.16 and there is a positive spatial autocorrelation among regions. There is spatial interaction between regions, spatial interaction in terms of number of agricultural holdings is stronger than the other indicators given above. We can classify the regions as:

Table No. 4: Spatial LISA Map Results- Number of Agricultural Holdings

<table>
<thead>
<tr>
<th>CLASSIFICATION OF REGIONS</th>
<th>( \text{High-high area (dark red)} )</th>
<th>( \text{Low-low area (dark blue)} )</th>
<th>( \text{Low-high area (light blue)} )</th>
<th>( \text{High-low area (Light red)} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regions</td>
<td>Botoşani, Iaşi, Neamt, Olt</td>
<td>Constanta</td>
<td>Sibiu</td>
<td>Mureş</td>
</tr>
</tbody>
</table>

Botoşani, Iaşi, Neamt and Olt are in the high-high area. This means that the number of agriculture holdings in these regions are higher than Romania’s mean value and have positive spatial homogeneity. This homogeneity means that these regions have homogeneity in terms of high number of agricultural holdings. Constanta is in the low-low area and in this region number of agricultural holdings is lower than the mean value. Sibiu is in the low-high area and in this region number of agricultural holdings is higher than other regions. Mureş is in the high-low area, which means that in this region number of agricultural holdings is higher than the other regions.
Moran’s I value is 0.41 and this is the highest value for this indicator among the indicators used in this study. There is spatial interaction between the regions. We can classify the regions as:

<table>
<thead>
<tr>
<th>CLASSIFICATION OF REGIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-high area (dark red)</td>
</tr>
<tr>
<td>Suceava, Neamt, Harghita, Covasna</td>
</tr>
<tr>
<td>Low-low area (dark blue)</td>
</tr>
<tr>
<td>Giurgiu, Ialomita, Constanta, Tulcea</td>
</tr>
<tr>
<td>Low-high area (light blue)</td>
</tr>
<tr>
<td>Botoșani</td>
</tr>
<tr>
<td>High-low area (Light red)</td>
</tr>
</tbody>
</table>

Suceava, Neamt, Harghita and Covasna are in the high-high area. This means that forest annual fillings in these regions are higher than Romania’s mean value and have positive spatial homogeneity. This homogeneity means that these regions have homogeneity in terms of high forest fillings. Giurgiu, Ialomita, Constanta and Tulcea are in the low-low area and in these regions forest annual fillings rate is lower than the mean value. Botoșani is in the low-high area and in this region forest annual fillings is higher than other regions.

Moran’s I value is 0.16. This value is not high enough, but similar to the other results. This value indicates a positive spatial autocorrelation between Romanian regions. There is spatial interaction between regions. We can classify the regions as:

19 Author’s calculation.
20 Author’s calculation.
Table No. 6: Spatial LISA Map Results- Number of Hospital Beds per 1000 Inhabitants

<table>
<thead>
<tr>
<th>CLASSIFICATION OF REGIONS</th>
<th>Alba</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-high area (dark red)</td>
<td>Călărași, Giurgiu, Teleorman, București, Prahova, Dâmbovita</td>
</tr>
<tr>
<td>Low-low area (light blue)</td>
<td>Constanta</td>
</tr>
</tbody>
</table>

Alba is in the high-high area. This means that the number of hospital beds per 1000 inhabitants in this region is higher than Romania’s mean value. Călărași, Giurgiu and Teleorman are in the low-low area and in these regions number of hospital beds per 1000 inhabitants is lower than the mean value. Constanta is in the high-low area and in this region, number of hospital beds per 1000 inhabitants is lower than other regions.

7. Conclusions

Regional and sustainable development is really important for countries around the world. This study aims to analyze Romania’s regional development and sustainability of development. Actually, regional development is serious problem for most of the countries. At this point, policy makers have essential role. In Romania, based on current organization of Romania, there are eight development regions were established: South Muntenia, South-East Dobrogea, North East, North West, West, Soth-West-Oltenia, Centre and Bucharest-Ilfov. As a result of this study, we can say that, regional and sustainable development is really important because of the heterogeneity among the regions. We use six basic regional development indicators, these are: number of accidents, average monthly nominal gross earnings, GDP per inhabitant, number of agricultural holdings, forest annual fillings and number of hospital beds per 1000 inhabitants. For empirical evaluation, we use spatial statistical techniques, cartograms. Cartogram maps give essential information about spatial interaction and homogeneity among regions, countries, etc. There are four colors in these maps, these are: dark red, dark blue, light red and light blue. If you need, after analyzing cartogram maps, you can use spatial econometric techniques for determining the each indicator gives us different result. But generally, we can say that there is heterogeneity in Romania’s regions in terms of regional development for these indicators. In addition, this heterogeneity affects negatively Romania’s economy, economic growth and especially GDP level. For all indicators used, West and North Romania are different in terms of regional sustainable development. This situation is not only for Romania, difference of regional development is a serious problem. Especially, difference among regions needs to be handled for efficient sustainable development. In the literature, there are lots of study about regional development and sustainability of regional development, but in most of these studies, generally basic statistical and econometric techniques were used. But in this study, we use spatial analysis and apart from statistical and classical econometric techniques. Finally we can say that, difference of regional development level in Romania, affects the economic growth negatively, in the short term, this difference cannot be solved, but in the long term, government can cope with this difference with taking into account regional development indicators.

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