Mihai Alexandru CHIȚEA

Institute of Agricultural Economics, Romanian Academy, Bucharest
mihai_chitea@yahoo.com

THEORETICAL MODEL OF TERRITORIAL COMPETITIVENESS, BY URBAN – RURAL TYPOLOGY

ABSTRACT

The paper presents the evaluation of overall territorial competitiveness, at county level, following the development of an evaluation model based on a series of theoretical elements elaborated throughout the time, at international and national level. The starting point was a previous analysis of the theoretical framework of territorial competitiveness, from which the following idea emerged: as we access the upper aggregation levels (regional, macro regional, national), the local performance fades into an aggregated result. The elaboration of the model turned to classical econometric methods, for standardizing the selected indicators, as well as to factor analysis for highlighting the determinant factors of competitiveness at county level. The analysis of the results took into consideration the urban-rural typology and highlighted significant differences between the three types of counties (predominantly rural, intermediate, predominantly urban), as well as the determinant character of some groups of indicators from the model structure, like economic performance and population and labour force.

Key words: competitiveness, territory, urban-rural typology.

JEL Classification: A13, P47.

1. INTRODUCTION

Performance assessment by different territorial aggregation levels was a concern of the economic and academic environment even since the emergence of the main economic theories referring to the mechanisms and determinants of welfare. While at the beginning the approach focused on the comparison between various nations, having at its core a low number of factors included in the analysis, such as the endowment in production factors, capital and labour, as the society developed and new theories emerged in this field, the comparative economic performance evaluation process was extended to the level of lower territorial aggregation levels, namely at regional and local level. At the same time, the factors taken into consideration were multiplied and diversified, bringing together information referring to the economic results and new information on the demographic structure, infrastructure, education, health and research-development-

innovation. Developed over time, some of these competitiveness assessment methods have become benchmarks in this field, being elaborated by prestigious international bodies on the basis of numerous criteria and having behind them dozens or hundreds of statistical indicators considered relevant for such an endeavour. Most of these are addressed to the national and regional territorial aggregation levels, providing a solid scientific basis for comparisons between states/nations from different continents, as well as between different regions. Two representative examples are the Global Competitiveness Index, elaborated by the World Economic Forum and the Regional Competitiveness Index, elaborated under the coordination of the European Commission,

However, in the last decade, with the growing importance attached to the lower territorial aggregation levels (zonal, local), as important elements for preserving local specificities, the number of competitiveness assessment methods/models at these levels increased. Generally developed by the academic environment (research institutes and centers, universities), these have in view a comparative assessment of performance (competitiveness) of certain specific areas (zones, counties, localities) of interest; these models also contain common elements with those from the upper aggregation levels, but also elements specific to the investigated areas and aggregation level.

The current approach is based on the consultation of the rich literature elaborated over time, on the analysis of the main theories, methods and models for the assessment of territorial performance, expressed in terms of competitiveness; it has in view the development of a competitiveness assessment model at county level, as well as the analysis of results by urban-rural typology, in order to develop customized development proposals.

2. STATE OF KNOWLEDGE

The concerns for competitive performance evaluation at territorial level date back to several hundred years, with the emergence of the first important economic theories, these being interconnected. The multiplication of contributions in this field over time was followed by the emergence of numerous methods, models and techniques for competitiveness assessment, elements that were described in a previous article. In this context, we shall next briefly present the main theoretical and practical elements in the field of territorial competitiveness assessment, which represented the basis for the development of research in this field:

A. Conceptual theories and elements in the field of competitiveness:
- the theory of mercantilism – 15th–17th centuries, putting in the foreground, as essential element for the creation of the wealth of a nation, the trade balance, the difference between exports and imports respectively;

- Adam Smith's absolute advantage theory (1776) – the absolute advantage (resulting from the world trade) is represented by the national production cost (higher) and the import price (lower). In this context, each country should focus on specialization – producing goods for which it has absolute advantage and importing those goods that are more costly to generate at national level;
- The theory of comparative advantage, by David Ricardo (1817), states that, beyond the absolute advantage concept, the trade advantages may appear when two countries specialise in producing goods in which they have comparative advantage. In his model, the technological differences in production between industries and countries generate labour productivity differences;
- The Heckscher-Ohlin Model – H-O Model (1933) builds on Ricardo's model, incorporating two production factors, namely labour and capital. Unlike the latter model, the H-O Model assumes that technologies are identical across nations and the comparative advantages are determined by the differences at the level of relative abundance of production factors. In other words, the countries will specialise in the production of those goods that utilise more intensively the production factors that are abundant at their level;
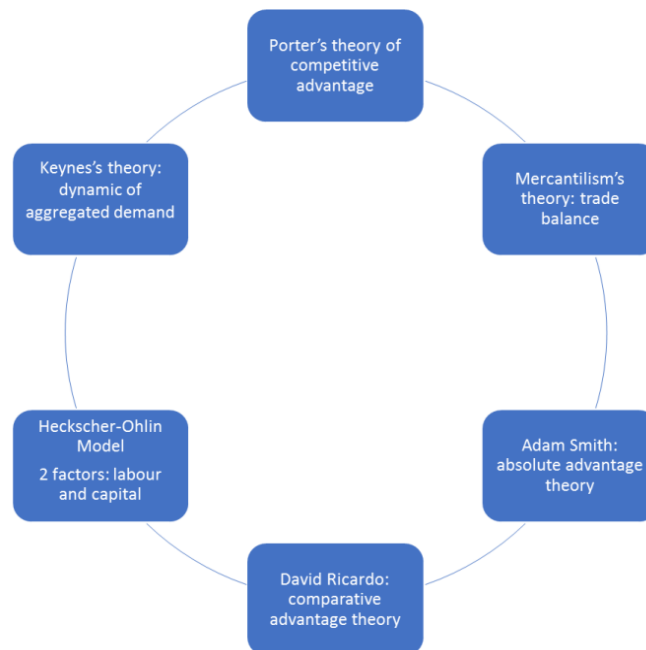
Source: own processing

Figure 1. Theoretical elements of competitiveness

- Keynes' theory (1936) – represents the theory of short-term dynamics of aggregate demand and employment in the economy, based on expectations, because they influence investments and consumer behaviour. The aggregate result is considered to be the sum of consumption, investments, government expenditure, plus exports minus imports.
- The theory of competitive advantage – Michael Porter (1990) considers that the determining factor of a nation's competitiveness is the technological upgrading and innovation capacity of its industry – "companies gain an advantage over the best global competitors due to pressure and competition".

B. Competitiveness assessment methods/models:
- Global Competitiveness Yearbook – elaborated by the Management Development Institute, which has been published since 1989. It analyses the performance of 61 countries on the basis of more than 340 criteria measuring various facets of competitiveness. In this case, the focus is laid on the Gross Domestic Product per capita as indicator of general competitiveness, but the key indicator role of the living standard is also recognized.
- Global Competitiveness Index – developed by the World Economic Forum, GCI combines 114 indicators that capture the important concepts for competitiveness, indicators grouped into 12 pillars: institutions, infrastructure, macro-economic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation.
- Regional Competitiveness Index – European Commission, RCI includes 11 pillars that describe the different aspects of competitiveness, classified into three groups:
- Basic: 1. Institutions, 2. Macroeconomic Stability, 3. Infrastructure, 4. Health, 5. Basic Education;
- Efficiency: 6. Higher Education, Training and Lifelong Learning, 7. Labour Market Efficiency and 8. Market Size;
- Innovation: 9. Technological Readiness, 10. Business Sophistication and 11. Innovation.
- UK Regional Competitiveness Index, developed by the Department of Trade and Industry of UK. It includes 14 indicators selected by DTI in the analysis, many of these indicators measuring the regional competitiveness effects.
- Model for local competitiveness assessment – Croatia – O. Mikuš, R. Franić and I. Grgić (2012). The model was developed for the assessment of rural area competitiveness in the county Zagreb, located in the proximity of the capital city; the county Zagreb was next compared to the national average on the basis of rural competitiveness index. The

selection of indicators for measuring rural competitiveness was based on the sustainable rural development concept and grouped the indicators into four categories: human resources, state of the non-agricultural economic sector, state of agricultural economic sector and of other income gaining activities on agricultural households.

Alongside with these conceptual elements developed worldwide, we must also mention a few national concerns regarding the assessment of territorial competitiveness:

- Studies based on a set of specific indicators that highlight a few aspects under investigation (Altar *et al*., 2006, Iancu – coordinator, 2005, E. Pelinescu – coordinator, 2006); integrative model for the economy (Mereuţă, Horniaschi, Chilian *et al*., 2005, Mereuţă *et al*., 2004, 2010, 2012) – (Iordan, Pelinescu, 2014);

- Formulation of operational concepts of the cohesion and competitiveness policy (2009) – study elaborated by a team of authors consisting of Valentin Cojanu, Elena Botezatu and Ion Peleanu. The material capitalizes on previous concerns of professor Valentin Cojanu in the field of competitive development in the territory, and aims at the formulation and graphical representation of operational forms of territorial development on the basis of a theoretical construction, by four coexisting levels: urban field, groups of related industries, development area and areas with deficiency of location (or specific problems). According to authors, the "great challenge of European policies dedicated to territorial development and the opportunity of this study reside in the attempt to highlight the connection or lack thereof between the concepts of polycentrism and regional competitiveness and at the same time between cohesion and competitiveness, in order to support territorial development". The study brings to reader's attention the main theories and concepts linked to competitiveness in general and to regional competitiveness in particular, with reference to the regional competitiveness assessment matrix developed by the Applied Economy Group in the year 2007.

- Handbook of Regional Competitiveness Assessment (2007) – elaborated by the Applied Economy Group – uses a methodology similar to that of the Lisbon Monitoring Platform (LMP) – an econometric system classifying the regions into 11 groups, based on Eurostat statistical indicators, referring to the regional landscape (for instance GDP, long-term unemployment, high tech services, university education, research-development expenditure, added value in industry and agriculture, population density, share of young people, etc). The authors propose an assessment matrix consisting of two independent parts, that contributes to complementing an overall picture of competitiveness, expressed at regional level: one part of "hard" type, based on official statistical data, and one part of "soft" type – data obtained following the application of a questionnaire at regional and local level. The "hard" part of the matrix

starts from the complete list of 125 structural indicators from the Eurostat database, grouped into the following categories: general economic background, employment, innovation and research, economic reform, social cohesion, environment. Following the selection of indicators, in terms of relevance for competitiveness and availability, the authors retain 13 structural indicators for the purpose of the analysis, grouped into three great categories: economic, social and technological. The "soft" component of the matrix comprises a set of community indicators, at locality level, considered relevant for regional competitiveness. The authors support this approach through the heterogenous nature of regions, which include relevant sub-units that must be taken into account in designing the regional development policies.

- Regional competitiveness in Romania – Maria Vincze (2003) – highlights population's incomes expressed by GDP/capita as "*a measure of national economic and social competitiveness, of regional competitiveness respectively*". The formulation of this indicator is based on a mix of different inter-related factors, among which the most important are represented by labour productivity and employed population.

- Model for the assessment of county competitiveness compared to the regional level – Chițea, Dona (2016) – competitiveness assessment model constructed on 4 dimensions considered important for competitiveness at county level (human resources, agricultural sector economy, non-agricultural sector economy, specialization and innovation) and 16 relevant indicators.
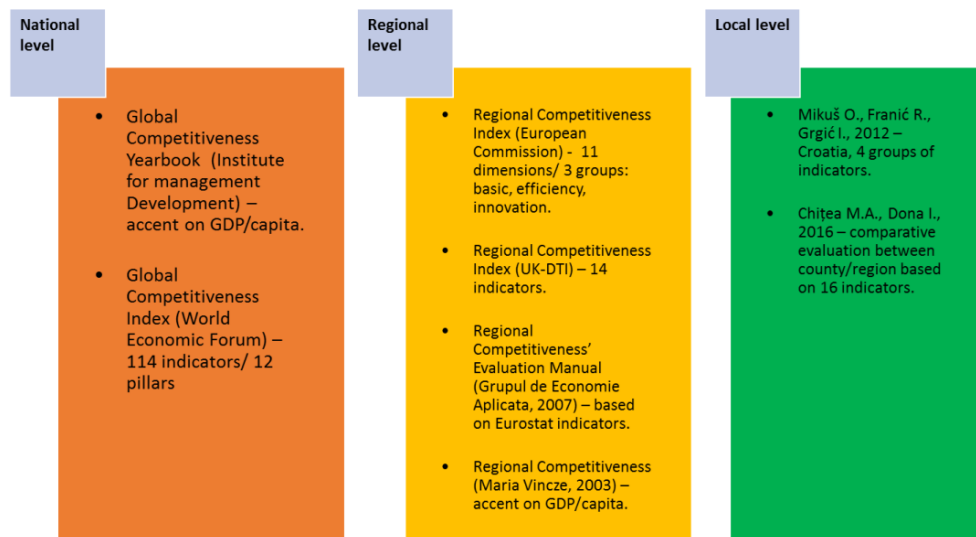
Source: own processing

Figure 2. Territorial competitiveness assessment methods/models

3. MATERIAL AND METHOD

Taking into consideration the theoretical background described above, for the purpose of our approach, competitiveness at county level can be described on the basis of six categories of factors (Criteria) referring to the economic, human and physical characteristics of the territorial units that determine the performance level: Economic performance, Population and labour force, Infrastructure, Education, Healthcare and Research-Development-Innovation. On the basis of these criteria, which put together the main identified indicators and the interconnections between these, we shall construct a composite indicator of competitiveness at county level. The statistical data were subjected to a standardization (normalization) operation, having in view that the indicators are expressed by different units of measure. For the design of graphical elements of map type, we used the GiS GeoDa software.
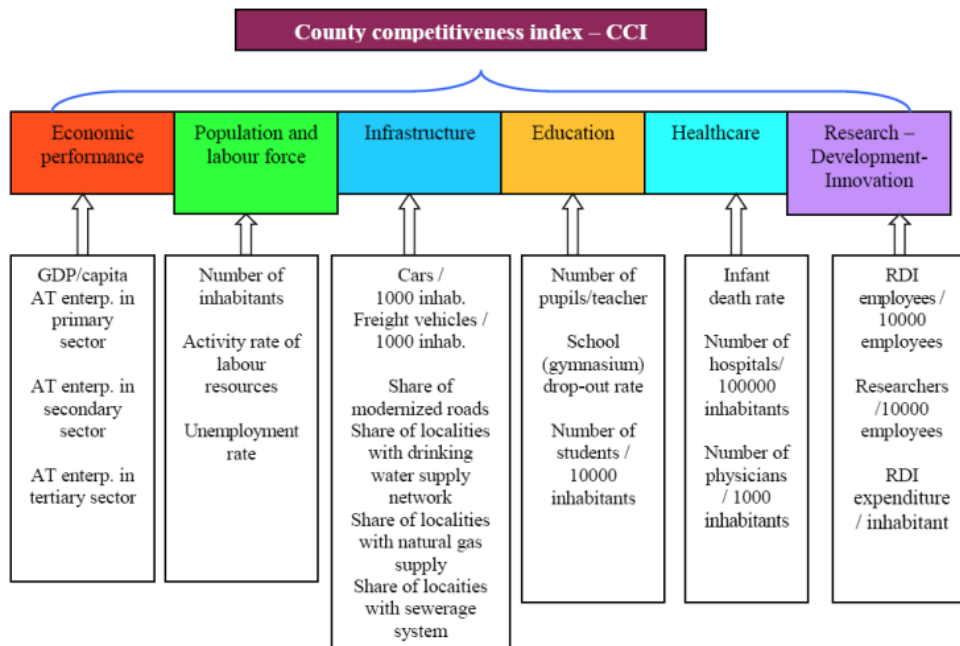

Source: own processing

Figure 3. Integration of theoretical elements in the model architecture

4. RESULTS AND DISCUSSIONS

The present paper is the first part of a multi-annual approach by which we intended to develop a model for competitiveness assessment at county level. In this first part, we shall present the defining elements that led us to the construction of the overall scheme of the model, the modality of data processing and their integration into the proposed assessment model. The second part will present the results obtained by populating the model with statistical data, the hierarchy of counties in terms of competitiveness, as well as their analysis by urban-rural typology.

For designing the theoretical model for the assessment of the competitiveness level of the 42 counties, 22 indicators have been selected, grouped under 6 criteria, considered as defining criteria for the evaluation of overall performance, expressed by competitiveness. The statistical data were obtained from the official databases elaborated by the National Institute of Statistics, i.e. Tempo-online and e-Demos.

The indicators were selected according to their relevance in describing the competitiveness of counties, as well as to their availability from official statistics, having in view that a series of indicators are not available at this territorial disaggregation level.

County competitiveness index – CCI

Economic performance	Population and labour force	Infrastructure	Education	Healthcare	Research – Development- Innovation
GDP/capita AT enterp. in primary sector AT enterp. in secondary sector AT enterp. in tertiary sector	Number of inhabitants Activity rate of labour resources Unemployment rate	Cars / 1000 inhab. Freight vehicles / 1000 inhab. Share of modernized roads Share of localities with drinking water supply network Share of localities with natural gas supply Share of locaities with sewerage system	Number of pupils/teacher School (gymnasium) drop-out rate Number of students / 10000 inhabitants	Infant death rate Number of hospitals/ 100000 inhabitants Number of physicians / 1000 inhabitants	RDI employees / 10000 employees Researchers /10000 employees RDI expenditure / inhabitant

Source: author's own scheme

Figure 4. County Competitiveness Index scheme

The first criterion of the analysis – ***Economic performance*** – is the overall performance of investigated territorial units, on the basis of the results of their economic activity, over one year, and represents a very important indicator of the economic potential. This criterion consisted of the following indicators:

– *Gross domestic product/inhabitant* is a primary indicator measuring the economic performance of a territory, representing the total value of final goods and services produced throughout the year, divided by the number of inhabitants. GDP/inhabitant is an important indicator of the living standard of the population;

– *Turnover of active enterprises in the primary/secondary/tertiary sector* represents the economic results, under the form of turnover, of the active enterprises in the 3 sectors, being an important indicator for revealing the economic activity structure at the level of territorial units. A local economy mainly based on only one activity sector is more vulnerable to changes of economic and social nature than those in which there is a balanced development of all the three sectors.

The second criterion – ***Population and labour force*** – represents both an important resource of territorial units, with a strong influence on the development level, and an indicator of labour market performance. The following indicators were included under this criterion:

– *Number of inhabitants* – represents the human potential available in each county, having a dual nature, i.e. both production factor (labour force) and beneficiary of economic results obtained in this territory; in order to make a comparison at national level, it is possible to use the population by domicile, this being necessary, according to national legislation, to establish certain financial measures, as well as the categories of counties, municipalities and towns.

– *Activity rate of labour resources* – represents an important indicator of labour market development, expressed in percent ratio, between the civilian employed population and the labour resources (representing that category of the population that has the necessary physical and intellectual abilities to get involved in an economic activity);

– *Unemployment rate* – is an important indicator of the development level of labour market and of the economy, expressed as a ratio of the number of registered unemployed to the number of civilian active population.

The third criterion – ***Infrastructure*** – represents one of the most important defining elements of the overall development level, being very important both for the assessment of the quality of life of people from a certain area and for their economic development possibility, in terms of attracting new investments and development of current activities. The following indicators were included under this criterion:

– *Number of cars/1000 inhabitants* – expressing the population's mobility, both for professional and personal purpose, independently of the public and private transport systems;

– *Number of freight vehicles/1000 inhabitants* – represents a transport capacity indicator of goods and products (both those manufactured in the respective area and those resulting from trade relations) and of the volume of economic activities implicitly;

– *Share of modernized roads* – represents a qualitative indicator of road infrastructure, extremely important for facilitating the trade relations, mobility of commodities and people, as well as for attracting new investments in the investigated territorial units;

– *Share of localities with drinking water/natural gas supply networks/ sewerage system* representing 3 important technical infrastructure indicators for the people's quality of life, as well as support elements for the development of various economic activities, being also an advantage for potential investments.

The fourth criterion – ***Education*** – represents an essential element for supporting the social development and professional training of the population, ensuring the necessary premises for getting integrated into the social life, while at

the same time providing multiple opportunities of integration in the labour market. A high educational level of the population supports economic development and contributes to the increase of the quality of life, by ensuring a high income level. The following indicators were included under this criterion:

– *Number of pupils/teacher* – represents a qualitative indicator of the educational process; its higher values mean a higher load on the teaching staff and less individual time allocated to pupils;

– *School (gymnasium) drop-out rate* represents a qualitative indicator of the capacity of educational/administrative system to ensure the continuation of the educational process for certain pupils coming from families that are facing problems of various nature (poverty, disorganization, broken families);

– *Number of bachelor students / 10000 inhabitants* represents the school population from higher education – bachelor degrees in 10000 inhabitants.

The fifth criterion – **Healthcare** – represents an important element for the assessment of the quality, including indicators that refer to population's access to healthcare services. The following indicators were included under this criterion:

– *Infant death rate* – a basic indicator of the economic and social situation of a community and of population's health condition;

– *Number of hospitals/100000 inhabitants* – expresses population's access to the emergency healthcare services and specialised procedures provided by healthcare units of hospital type;

– *Number of physicians/1000 inhabitants* – expresses the population's access to qualified healthcare services in a given territory, closely relating to population's health condition.

The sixth criterion – **Research-development-innovation** – indicates the development potential based on high tech and innovative products/processes. The following indicators were included under this criterion:

– *RDI employees in 10000 employees* indicates the number of employees in the research-development-innovation sector in the territorial units in total employed population;

– *Number of researchers in 10000 employees* represents the qualified human capital in research-development-innovation in total employed population;

– *RDI expenditure/inhabitant* represents the total expenditure in Research& Development, including the current costs (labour) and the capital (investment) costs in relation to the number of inhabitants.

The first stage in the processing of statistical data included in the model of competitiveness assessment at county level (County Competitiveness Index – CCI) is data standardization/normalization, having in view that the indicators are expressed by different units of measure, as well as their nature, *de maximum* or *de minimum* respectively. Most indicators included in CCI are *de maximum* indicators, only 4 indicators being *de minimum* indicators (unemployment rate, number of pupils/teacher, school drop-out rate and infant death rate). In the case of *de maximum* indicators, their higher values reveal a better performance of investigated

territorial units; at the same time, in the case of *de minimum* indicators, the higher values point to a series of deficiencies existing at county level, to a lower performance respectively. For data normalization, the indicators available for each county were taken into account (V1, 2...22) and the 42 territorial units – counties (administrative county units-ACU 1, 2...42), namely:

Table 1

Normalization of variables

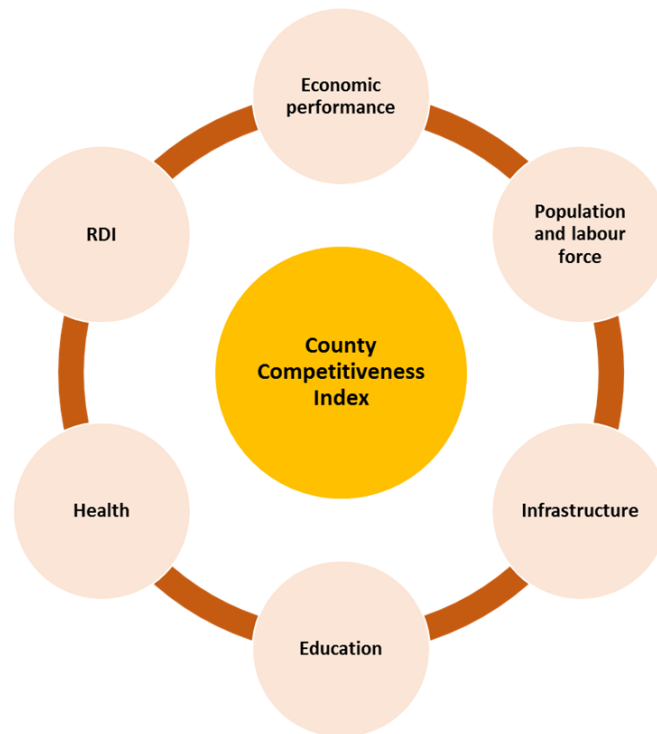| County/indicator	V1	V2	...	V22	V1 normalized	V2 normalized	...	V22 normalized
ACU1								
...								
ACU42								
Maximum								
Minimum								
Absolute amplitude								

Source: author's own scheme

Figure 5. Integrating the values of criteria in CCI

In order to avoid negative values, out of the usual standardization methods we opted for that which takes into consideration the maximum and minimum value of indicators, on the basis of which their absolute amplitude was calculated. For the minimum indicators, the minimum and the maximum values were reversed, as the lower values of these describe a better performance of territorial units.   After   the data have been introduced in the template described above, the next operation is the normalization of indicators, according to the following formula: $V_{in} = (v_i - v_i min)/aa_i$, where V_{in} represents the normalized value of indicator i, v_i represents the value of indicator i, $v_i min$ represents the minimum value of indicator i, and aa_i is the absolute amplitude of indicator i.

Summing the normalized values of indicators, a value will be obtained for each criterion in the composition of the model, and by summing these resulting values the final value of the **County Competitiveness Index (CCI)** will result. The processing of the statistical data included in the theoretical model of competitiveness assessment was achieved with the specialised SPSS software (descriptive analyses, correlations, Pearson coefficient), detaching the determining causality relations and identifying the trends (through the factor analysis module).

For each criterion a summary picture has been achieved, which contains the initial data, maximum and minimum values, amplitude, as well as the final values after their normalization, as well as the final score for this criterion, at county level

For the graphical representation of the partial and final results, we have opted to design maps based on the GIS GeoDa software, having in view the large number of territorial units. For this purpose, the data corresponding to the criteria must be introduced in the table format of the program, for each county in part; these, in their turn, have been assigned a unique SIRUTA code, on the basis of which the graphical representations are created. For illustration purpose, such a map is presented below, for the Economic Performance criterion. Having in view that the statistical data for each criterion were first standardised, the negative value being thus avoided by this operation, and the total represents a positive value, we chose the Equal Intervals (4) option for grouping the counties, according to their hierarchy (for each criterion). In the case above, the lighter colours highlight a better positioning of counties in the ranking achieved for the Economic Performance criterion, while the darker colours indicate poorer results from this point of view.

Besides the hierarchization of territorial units (counties) by the 6 criteria, as well as by the final value of the *County Competitiveness Index* (CCI), the second part of our approach will include an analysis in dynamics of the component indicators, over 10 years, structured by urban-rural typology. This will make it possible to highlight the evolution of the three types of counties – predominantly rural, intermediate and predominantly urban, in the investigated period, as well as to formulate customized sustainable development directions, based on local characteristics, potential and priorities.

Equal Intervals
☐ [1 : 11.250] (11)
☐ [11.250 : 21.500] (10)
☐ [21.500 : 31.750] (10)
☐ [31.750 : 42] (11)
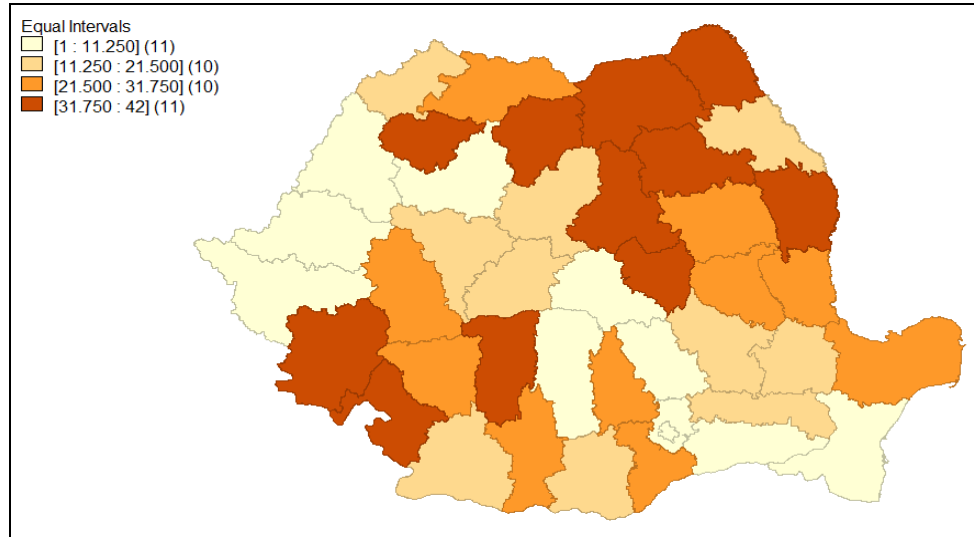
Source: Author's own GeoDa processing, National Institute of Statistics data

Figure 6. Graphical representation model, Economic Performance criterion

5. CONCLUSIONS

This endeavour to develop a model for overall performance assessment of territorial units at county level is based on a series of previous concerns in the field of assessing the territorial competitiveness at higher aggregation levels, i.e. regional, macroregional. The starting point was represented, following the consultation of the world and national literature, by focusing on a less approached level, the local level respectively, which in the present approach covers the category of counties in Romania. Furthermore, having in view the fact that the higher aggregation levels, i.e. regional, macroregional, represent simple statistical units, without own status and self- administration, created out of the need of equivalence with similar units at EU level, as well as of the need to manage the EU regional development funds, the opportunity of assessing competitiveness at county level appeared naturally, as a continuation of previous endeavours. Another reason was the fact that, as we go forward to higher aggregation levels, the local information is merged in a result that no longer allows to highlight the specific characteristics at county level, the one that has administrative status as well as specific institutions for territory administration. In this context, the aim of our endeavour was to develop a county competitiveness assessment model to enable deeper analyses of the socio-economic elements that lie at the basis of activities at this level, as well as to integrate them into a final score that supports the

comparative assessment of overall performance of territorial units. In this context, the analysis is complemented by the assessment of territorial units by urban-rural typology, developed at EU level, as support element for the elaboration of proposals for action for the sustainable and balanced development of counties.

In order not to remain a punctual approach, the main rationale of model construction was to make it replicable; on the basis of theoretical elements considered significant for the assessment of competitiveness, the architecture of the model was outlined, and the selection of indicators aimed at reaching this objective, the statistical data coming from the official databases of the National Institute of Statistics, Tempo-Online and E-Demos respectively, under permanent updating process. Thus, by their simple updating, at a given moment, partial and final results can be generated, and in the latter case we speak about the *County Competitiveness Index.* This will make it possible to assess competitiveness at county level over a longer period of time, representing a support tool for the socio-economic development policies.

REFERENCES

1. Chițea, M.A., Dona I., (2016), *Evaluation of territorial competitiveness, Case Study: South-East Region and Tulcea County*, in Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 16, Issue 1.
2. Cojanu V., Botezatu Elena, Peleanu I., (2009), *Formularea conceptelor operaționale ale unei politici de coeziune și competitivitate*, Colecția de Studii nr 22 a Institutului European din România.
3. Iordan Marioara, Pelinescu Elena, (2014), *Competitivitate, Performanță, Sustenabilitate*, Lucrarea realizată în cadrul Proiectului POSDRU/159/1.5/S/137926, București.
4. Keynes, J. M., (1936), *The General Theory of Employment, Interest and Money*, London. UK
5. Mikuš O., Franić R., Grgić I., (2012), *The evaluation of rural competitiveness in creating a policy of rural development in Croatia*, Journal of Food, Agriculture & Environment, Vol.10 (2): pp. 962–969.
6. Porter M.E., (1990), *The competitive advantage of nations*, Free Press, New York.
7. Smith, A., (2011), *Avuția Națiunilor*, Editura Publica, București.
8. Vincze Maria, (2003), *Regional Competitiveness in Romania*, Universitatea Babeș-Bolyai, Facultatea de Științe Economice, Cluj Napoca, România.
9. Voinea L., (coordonator), Cojanu V., Lungu L., Sandu D., Iulia Șerb, (2007), *Manual de evaluare a competitivității regionale*, Grupul de Economie Aplicată, București, România.
10. European Commission, (2017), Annoni P., Dijkstra L., Gargano N., *The EU Regional Competitiveness*, Index , http:// ec.europa.eu/regional_policy/sources/docgener/work/201701_ regional_competitiveness2016.pdf
11. *** IMD, World Competitiveness Center – Global Competitiveness Yearbook, www.imd.org
12. *** World Economic Forum (Schwab K.), (2016), *The Global Competitiveness Report 2015–2016*, http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf
13. ***Institutul Național de Statistică, baza de date Tempo-online, http://statistici.insse.ro/shop/
14. ***Institutul Național de Statistică, baza de date e-Demos, www.insse.ro