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EVALUATION OF COMPETITIVENESS AT COUNTY LEVEL, BY URBAN-RURAL TYPOLOGY

CHIȚEA MIHAI ALEXANDRU ¹

Abstract: *The main objective of the present paper was the evaluation of the overall performance of the territorial units, at county level, expressed through competitiveness, based on an evaluation model designed specifically for this aggregation level. The theoretical model was elaborated taking into account the specific literature regarding the territorial competitiveness, that highlighted the need for further development at local level, which in our case is represented by the county level. Furthermore, the analysis focused on the results based on the urban-rural typology, that pointed out some differences between the competitiveness level, namely a lower level in the case of predominantly rural regions, compared to the intermediate and predominantly urban ones.*

Key words: *territorial competitiveness, county level, urban-rural typology.*

JEL Classification: *O18.*

INTRODUCTION

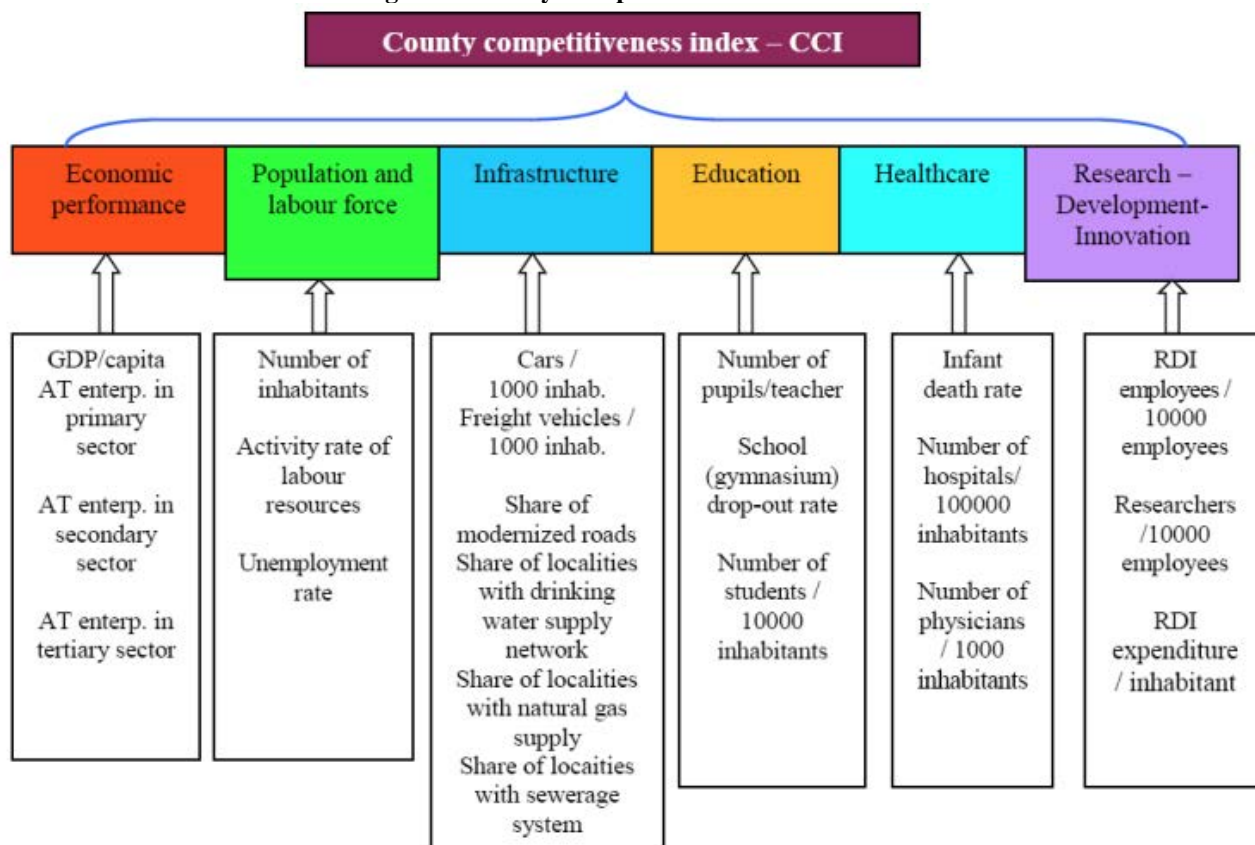
Although the debates regarding the competitiveness of territories have been around for a very long time, going back as far as the original trade theory or Adam Smith's "labor division" supporting economies of scale and productivity differences between nations [3], in the last decades we have witness an increase of the efforts at academic, economic and institutional level directed towards the development of theories and evaluation methods, aiming to identify and take into account all the facets of territorial competitiveness. Needless to say, this was not a straight, easy process, as we can recall the ideas of Krugman, pointing out that the "obsession regarding competitiveness is not only wrong, but also dangerous...thinking in terms of competitiveness can lead to bad economic policies regarding a whole series of problems" [1], and Porter and Ketels, who stated that the true competitiveness is measured through productivity [2]. Nevertheless, these different opinions have only pushed the efforts further and supported the development of evaluation models that are today used widely, at national and regional level, like the Global Competitiveness Yearbook, Global Competitiveness Index or the Regional Competitiveness Index (European Commission). Besides those, many more methods and models have been developed worldwide, aiming to surprise the overall performance of territories in the form of competitiveness, especially at national and regional level. This brings us back to our current objective, of designing an evaluation model for the competitiveness at local level, which in this case is represented by the county level. At this aggregation level, the existing models are far and few in between, being developed, in general, by universities and research centers, in order to evaluate competitiveness at local level in different areas.

MATERIAL AND METHOD

The present endeavor started from an extensive literature review regarding the theories, models and methods of evaluating the overall territorial performance, at different aggregation level, expressed through competitiveness. Based on this, for the current research objective, competitiveness at county level can be described by six categories of factors, regarding the economic, human and physical characteristics of territorial units that determine the performance level: economic performance, population and labor force, infrastructure, education, health and research-development-innovation. 22 indicators were selected from the official databases elaborated by the National Institute for Statistics, i.e Tempo-online and E-Demos, based on their relevance in describing the competitiveness at county level and availability (the data was extracted for the year 2016), taking into consideration the replicability criteria.

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Figure 1. County Competitiveness Index scheme



Source: author's own scheme

The first step in the processing of statistical data was represented by standardization/normalization of data, having in view the fact that the indicators were expressed in different units of measure. This process took into account all the variables (indicators) and all the county level territorial units (42 in case of Romania).

Figure 2. 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

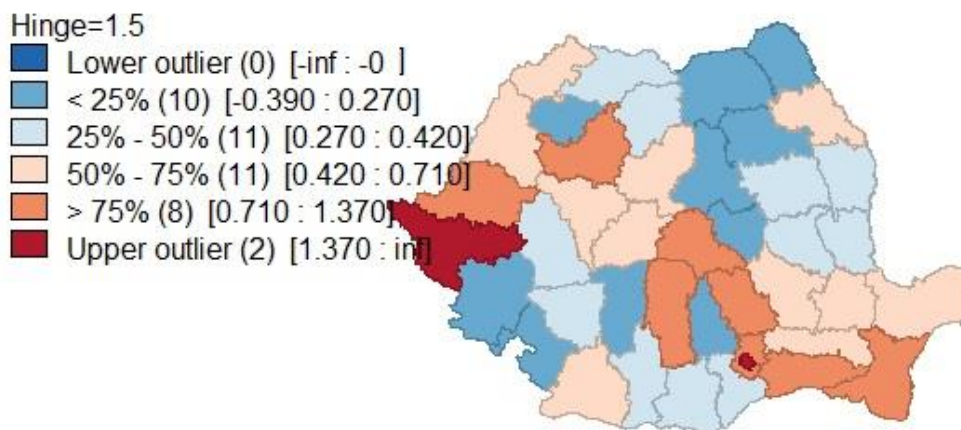
By summing up the normalized values of indicators, a value has been obtained for each of the six criteria of the model, and finally, by summing these results, the final value of the County Competitiveness Index (CCI) was obtained. The processing of data included in the model was achieved with the specialist software SPSS (descriptive analysis, Pearson coefficient), detaching the determining causality relations and identifying the trends (factor analysis).

For the graphical representations of partial and final results, we have turn to a GIS software, GeoDa, having in view the large number of territorial units. The results for each criterion were introduced in a table, based on the SIRUTA code for the county units. The final step was the creation of maps, representing the values for each of the 42 investigated territorial units.

RESULTS AND DISCUSSIONS

For each of the six criteria included in the evaluation model, a map was created based on the normalized values of the indicators, for each county.

Figure 3. Clustering of counties, by the Economic performance criterion

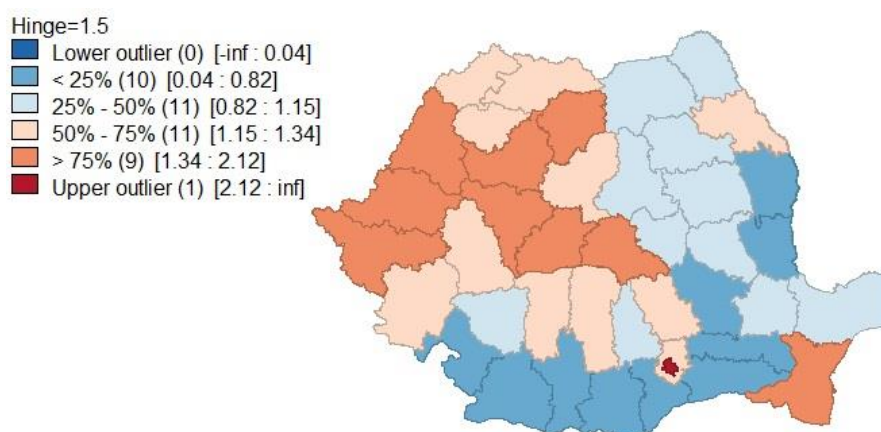


Source: own processing based on Tempo-Online and E-Demos, NIS

The București municipality and Timiș county stand out, compared to the rest of territorial units, being in the upper outlier, based on the value of the *Economic performance* criterion. There is an evident concentration of units, with low values, in the north-east, center and south-west, like Mehedinți, Botoșani, Covasna, Vâlcea, Harghita, Caraș-Severin și Neamț, most of them being predominantly rural counties.

The second part of classification is dominated by counties from south, south-east, center, west and north-west areas. By urban rural typology, all types of counties are present here. However, those that stand out, based on the values for *Economic performance* are Argeș, Cluj, Prahova, Brașov (intermediate units), Călărași (predominantly rural), Ilfov (predominantly urban) and Constanța (intermediate unit).

Figure 4. Clustering of counties, by the Population and labor force criterion



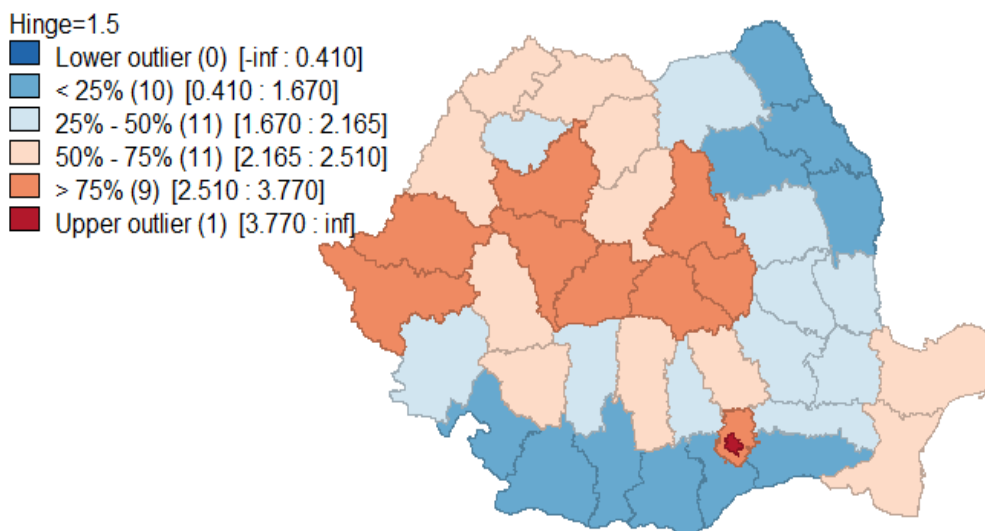
Source: own processing based on Tempo-Online and E-Demos, NIS

The first quantile of counties (low values), based on the values of the *Population and labor force* criterion is dominated by predominantly rural units, located especially in south, south-west, south-east and north-east areas, creating visually a corridor along the Danube river: Mehedinți, Dolj, Olt, Teleorman, Giurgiu, Călărași and Ialomița. Another corridor is emerging, on the south-

east north-east direction, of counties from the second quantile of values, also mostly predominant rural units, like Botoșani, Tulcea, Suceava and Vrancea.

In the case of the next 2 quantiles, there is an evident concentration of units in the center, north-west and west areas, all types of counties by the urban rural typology being present here. Timiș county, together with another 8 counties – 5 intermediate (Cluj, Bihor, Sibiu, Brașov, Constanța) and 3 predominantly rural (Bistrița-Năsăud, Alba și Arad) make up the last quantile, by the value of the criterion – the results were supported mainly by the high values registered in the case the activity rate of labor resources and a lower level of unemployment. Again, the București municipality ranked first, being in the upper outlier, with 2.95 points out of a maximum of 3.

Figure 5. Clustering of counties, by the Infrastructure criterion



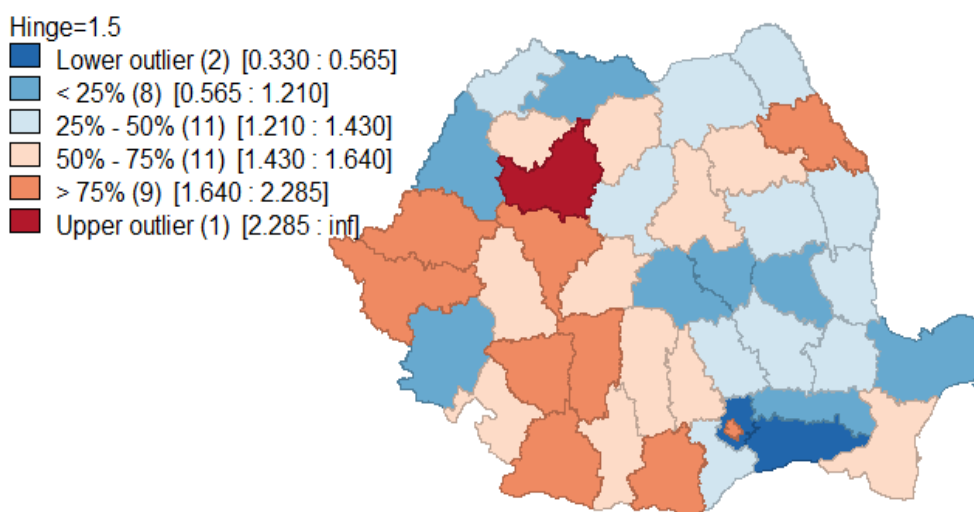
Source: own processing based on Tempo-Online and E-Demos, NIS

Based on the value for the *Infrastructure* criterion the first two counties are both predominantly urban, namely București municipality and Ilfov county. They are followed by counties from the center and west areas, like Cluj, Brașov, Arad, Sibiu and Timiș. The results obtained by these counties were based on the development level of the water supply network, population’s mobility and freight road transport capacity. Still, the quality of the road infrastructure remains weak in many cases, the share of the modernized roads having, in general, the smallest contribution to the total value of the criterion.

As for the other end of the hierarchy, where the lowest values are registered for this criterion, it is dominated by counties from the north-east, south, south-east and south-west, both intermediate and predominantly rural ones: Botoșani, Teleorman, Vaslui, Olt, Neamț, Giurgiu, Dolj, Iași, Mehedinți and Călărași. The territorial distribution reveals two areas that concentrate the lowest values for this criterion, one towards north-east and a corridor along the Danube river. The modest results were determined by low normalized values of the indicators specific to population’s mobility and freight road transport capacity, but also by the development level of the utilities networks, especially in the case of natural gases and sewerage. This corridor extends to the north with counties from the second quantile of values, like Ialomița, Buzău, Brăila, Galați, Bacău and Suceava. Those that come closest to the upper quantile are Ilfov, Cluj, Brașov, Alba, Sibiu, Arad, Timiș, Harghita and Covasna counties. The only county that meets the criteria for the upper quantile is București municipality with a total value of 6 points (maximum).

The *Education criterion* groups three indicators considered relevant, as for the current objective, for evaluating the performance of the educational system at county level: number of pupils/teacher, school (gymnasium) drop-out rate and number of students/10000 inhabitants.

Figure 6. Clustering of counties, by the Education criterion



Source: own processing based on Tempo-Online and E-Demos, NIS

Based on the value for the *Education* criterion, the first place is occupied by Cluj county, with a score of 2.48 points, followed by Vâlcea with 1.97 points, Arad – 1.90 points, Timiș – 1,89 points, Gorj -1,81 points and București municipality – 1.78 points. The result obtained by București municipality, on the 6th place based on the value for this criterion was determined, în principal, by a higher level of pupils/teacher, compared to other counties, that translates into a shorter time allocated to pupils by the teaching staff. Also, the significant reduction of the student population during this period contributed to the decrease of the number of students/10000 inhabitants.

The graphical representation of the values registered at county level for the *Education* criterion, highlights the existence of a lower outlier represented by Călărași and Ilfov counties. The low values in this case were determined by the level of indicators included in this criterion. Thus, Călărași county registered the highest value of the school drop-out rate and a reduced number of students/10000 inhabitants. In the case of Ilfov county, the number of pupils/teacher (the highest value of all counties) and number of students/10000 inhabitants were the determining factors of the final result.

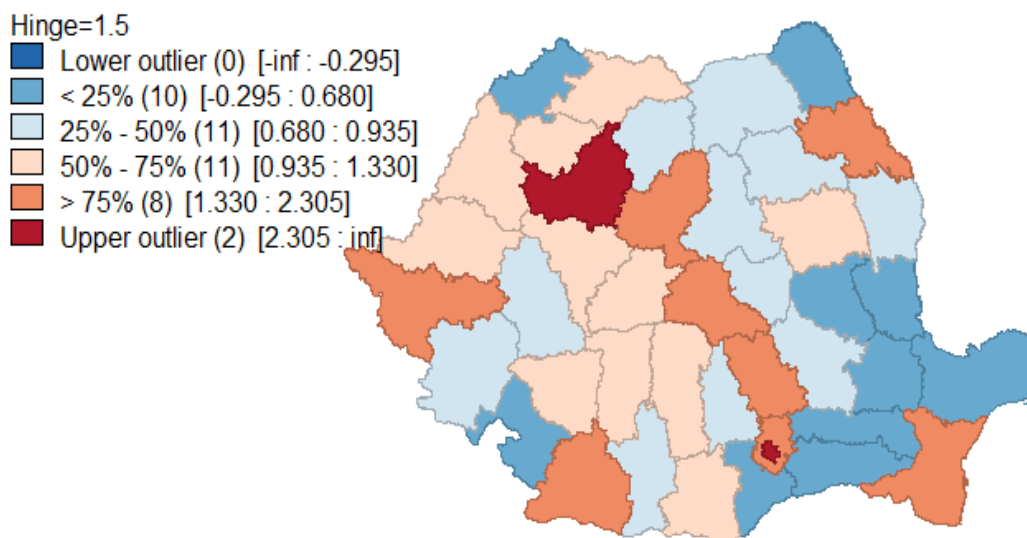
Modest values are also found in the first quantile, most of the counties present here being predominantly rural ones, like Ialomița, Caraș-Severin, Vrancea, Tulcea and Covasna. Still, it comes as a surprise the situation of Brașov county, also present in the first quantile of low values. În this case, the high level of school drop-out rate was the determining factor.

The last two quantiles, base on the values for the *Education* criterion, where counties having a higher value are present, highlight a concentration of units in the south-west, south, center and west areas, all types of territorial units by urban rural typology being present here. As for the upper quantile, only one county meets the criteria for being placed here, namely Cluj county, with a value of 2.48 points (out of a maximum of 3 points). In this case, the performance was determined firstly by the highest value for the number of students/10000 inhabitants, but also by the levels registered in the case of *de minimum* indicators - number of pupils/teacher and school drop-out rate.

The territorial distribution of the values for the *Education* criterion, by urban rural typology, highlights again, a concentration of predominantly rural counties in the first quantiles (with low values) along a corridor with the starting point in the south area towards south-east, north-east, and of those with higher values towards the west part of the country (south-west, west, north-west). This process is also evident in the case of other criteria and signals the existence of a development gap, based on the overall performance of territorial units, between the east and west part of the national territory.

The next evaluation criterion, within the model for evaluating the competitiveness at county level, is the *Health* criterion. This groups 3 indicators considered relevant for evaluating the population's access level to medical services, overall performance of the health system and specific infrastructure's: infant mortality rate, number of hospitals/100000 inhabitants and number of doctors/1000 inhabitants.

Figure 7. Clustering of counties, by the Health criterion



Source: own processing based on Tempo-Online and E-Demos, NIS

Based on the value for the *Health* criterion, the first place is occupied by București municipality, with 2.96 points, followed by 6 intermediate counties, namely Cluj, Timiș, Iași, Dolj, Brașov and Constanța. A common element in all these counties is the presence of university centers and university medical units, that provide a solid base of qualified human capital needed for this sector.

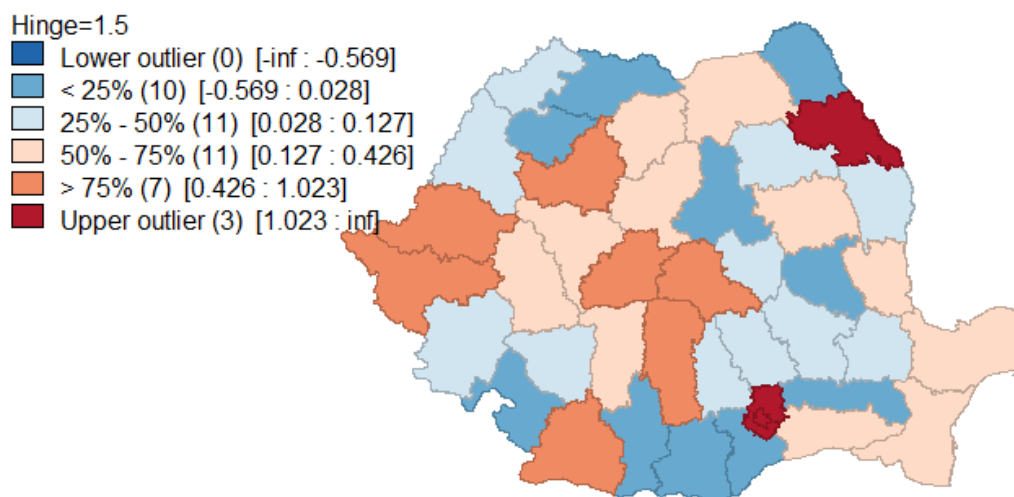
The graphical representation of the values at county level for this criterion highlights a concentration of units from the first quantile (lowest values) at the level of south and south-east areas, most of them being predominantly rural ones, like Ș Călărași, Giurgiu, Tulcea, Brăila, Ialomița, Vrancea and Galați. Călărași county registers the lowest value, of 0.17 points – the results being determined by the highest value of the infant mortality rate and the lowest value in the case of the number of doctors/1000 inhabitants.

The same geographical areal is also represented by counties from the second quantile (low values), the majority of them, again predominantly rural units, that are joined by some counties from the center, south-west and west areas. There is an evident gap, based on the urban rural typology, the vast majority of predominantly rural units being present in the first 2 quantiles, compared to the other types, intermediate and predominantly urban, that fall within the last 2 quantiles, with higher values for this criterion.

The only 2 counties that meet the criteria for the upper quantile are Cluj county and București municipality, this result being determined by the values of all 3 indicators from this criterion, both units benefiting from the presence of specialized higher education institutions/university medical units, but also of a strongly developed private medical sector.

The last of the six evaluation criteria is the *Research -Development-Innovation* criterion, that includes three indicators referring to the human capital from this activity sector and to public expenses per capita.

Figure 8. Clustering of counties, by the RDI criterion



Source: own processing based on Tempo-Online and E-Demos, NIS

Based on the value for the *Research -Development-Innovation* criterion, the first place is occupied by Ilfov county, with the maximum score of 3 points, followed by București municipality – 1.54 points and 7 intermediate counties: Iași, Argeș, Cluj, Timiș, Dolj, Sibiu and Brașov the values ranging between 1.12 and 0.56 points. The only predominantly rural county that comes close to this echelon is Arad, with 0.43 points. The result obtained by Ilfov county, was determined by the performance registered at the level of the 3 indicators – number of employees/10000 occupied persons, number of researchers/10000 occupied persons and public RDI expenses/capita. Although it is hard to believe, București municipality comes second, at a considerable difference from Ilfov county.

The graphical representation of the values at county level for *RDI* criterion highlights, again, a significant gap between the territorial units, based on the urban rural typology. The first two quantiles are clearly dominated by predominantly rural units, the first one being exclusive represented by these. As for the territorial distribution, the units from the first two quantiles are mainly localized in the south, south-east, north-east and north-west areas, like: Ialomița, Mehedinți, Olt, Maramureș, Vrancea, Giurgiu and Teleorman.

As for the upper quantile, that of counties that registered the highest values for this criterion, it includes 3 counties: Ilfov, București municipality and Iași. All three indicators from this criterion have contributed to this result, but in the case of București municipality and Iași county, the main contribution came from the highly qualified human capital, expressed through the number of researchers/10000 occupied persons.

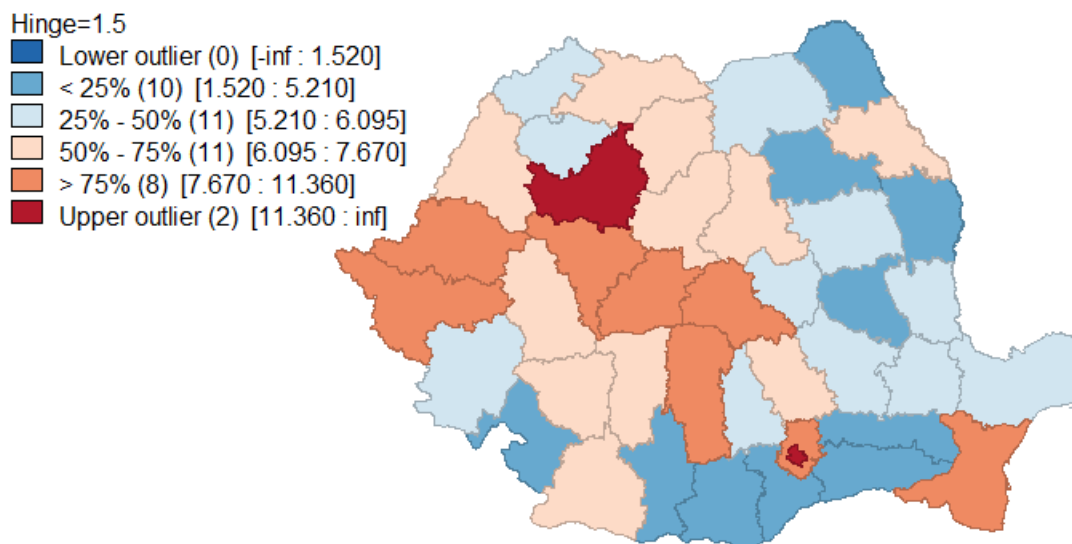
The last step of the methodological process is the summing of the values for the six criteria (*Economic Performance, Population and labor force, Infrastructure, Education, Health and Research-Development-Innovation*) for each of the 42 county level territorial units, leading to the County Competitiveness Index (CCI).

The final hierarchy, by the value of the *CCI* comes as no surprise, confirming, overall, the individual performance of the territorial units for all the criteria included in the evaluation model.

The first place, is occupied by București municipality, followed by Cluj, Timiș, Arad, Brașov, Constanța, Sibiu and Argeș counties. In the case of București municipality, the main contributors to this result were *Economic Performance, Population and labor force, Infrastructure and Health*

criteria, sectors were this developed urban area clearly dominates over the other counties. Each of the counties present at this level has some strong and weak points, represented by the values of the criteria, that have all, however, contributed to the final result.

Figure 9. Clustering of counties, by the County Competitiveness Index (CCI)



Source: own processing based on Tempo-Online and E-Demos, NIS

The graphical representation of the CCI values at county level, highlights the distribution of the investigated territorial units in 4 quantiles and one upper outlier, of those that detached from the rest of the units. The first two quantiles are clearly dominated by predominantly rural units, like: Botoșani, Călărași, Giurgiu, Vaslui, Mehedinți, Ialomița, Olt, Teleorman and Vrancea. Botoșani county registers the lowest CCI value, determined by modest results, mainly at the level of *Economic performance*, *RDI* and *Health* criteria.

The third quantile groups 11 counties, both predominantly rural and intermediate, concentrated mainly in the south-west, center and west areas, like: Gorj, Hunedoara, Bistrița-Năsăud, Dolj and Prahova. The fourth quantile is represented by 8 counties from the south, center, west and south-east areas, were all types of counties, by urban rural typology, are present: Timiș, Ilfov, Arad, Brașov, Constanța, Sibiu, Argeș and Alba, the CCI values ranging from 8.17 points (in case of Alba county) to 11.11 points (in case of Timiș county).

The upper outlier is represented by two counties, namely București Municipality and Cluj county.

If we were to group these 42 county level units based on the CCI value in 3 categories, associating them an overall performance expressed through competitiveness, then:

- ◆ The first 2 quantiles would represent the group of counties with a low level of territorial competitiveness: Botoșani, Călărași, Giurgiu, Vaslui, Mehedinți, Ialomița, Olt, Teleorman, Vrancea, Neamț, Brăila, Tulcea, Galați, Caraș-Severin, Buzău, Suceava, Dâmbovița, Covasna, Bacău, Satu Mare and Sălaj;
- ◆ The third quantile would represent the group of counties with an average level of territorial competitiveness: Gorj, Hunedoara, Harghita, Maramureș, Bistrița-Năsăud, Bihor, Dolj, Mureș, Vâlcea, Prahova and Iași;
- ◆ The fourth quantile and the upper outlier would represent the group of counties with a high level of territorial competitiveness: Alba, Argeș, Sibiu, Constanța, Brașov, Arad, Ilfov, Timiș, Cluj and București municipality.

CONCLUSIONS

Based on the 22 indicators included in the six evaluation criteria we have calculated the County Competitiveness Index, allowing the creation of a hierarchy of territorial units, based on the value of *CCI*.

The predominantly rural counties place themselves, by the *CCI* value, mainly at the level of quantiles with low values, highlighting a gap based on urban rural typology, at the level of overall performance expressed through competitiveness. Some of these counties are: Botoșani, Călărași, Giurgiu, Vaslui, Mehedinți, Ialomița, Olt, Teleorman and Vrancea. In this context, an important aspect has to be mentioned: there are also predominantly rural counties that registered higher values of *CCI*, allowing them to reach the third and fourth quantiles, most of them located at the level of the regions within the inner Carpathians arc, process that highlights a cleavage in this category of units, based on the spatial distribution, namely a gap between the counties from the perimeter delimited by the south, south-east, north-east areas and the center, west and north-west areas.

This process is even more evident at the level of the fourth quantile, the only two predominantly rural counties present here being Alba and Arad, localized in the center and west areas of the national territory.

The intermediate counties, with only a few exceptions (Neamț, Bacău, Galați and Brăila) cluster in the third and fourth quantiles, based on the *CCI* values. Here also there is an evident gap based on the territorial distribution, the south-east and north-east areas being represented, in general, by counties that have registered lower values of *CCI*. Iași and Constanța counties represent the exception in this case, being placed in the third and fourth quantiles. At this level, the intermediate counties Argeș, Sibiu, Brașov and Timiș, as well as Ilfov county (predominantly urban) complement the general overview of competitiveness, the *CCI* values being close to the upper outlier represented here by București municipality and Cluj county.

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