

COMPETITIVENESS AND INNOVATION IN THE ROMANIAN REGIONS – HOW MUCH PROGRESS DURING THE POST-ACCESSION PERIOD?

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Abstract:

The paper aims to assess the latest developments in the competitiveness of the Romanian regions, with a particular focus on innovation as one of its key determinants. Different sets of indicators are used and comparisons with the EU countries and their regions are provided. The results reveal some progress towards better competitive positioning, but little advancement in the field of innovation in most of the Romanian regions (below 50% of the EU average). This exposes a systemic weakness of the innovation process in Romania, determined by both the national RDI system and the business sector, which calls for sustained efforts at multiple levels (political, economic, institutional, social, entrepreneurial, both nationally and regionally) to overcome the current stagnation and push strongly towards the most needed change in mindsets and actions in the near future.

Key words: Romanian regions, regional competitiveness, regional innovation, composite indices

JEL classification: O30, R10, R11

1. DEFINING REGIONAL COMPETITIVENESS

In a broad sense, *competitiveness* may be defined as the ability of a country, measured against the performance of other countries, to build up and ensure an economic, social and political environment able to support the accelerated value added creation. At national level, competitiveness also entails a *territorial dimension*, the territorial spread of the competitive economic agents being rather unequal, but usually concentrated in certain areas of the national territory. As regards this issue, the broad concept of competitiveness also involves defining its limits, the standard competitiveness analyses usually emphasizing three competitiveness levels – *country, industry and company* (Porter, 1990; Reiljan *et al.*, 2000), while the more recent ones expanded towards *sub-regions* and *supra-national organizations* (Reiljan *et al.*, 2000). At *regional* level, competitiveness must capture the fact that despite the presence within the region of both competitive and not competitive actors/structures, there are also certain common features in every region that impact on the competitiveness of all its companies. Such features include, among others, the social and physical infrastructure, labor skills, and public institution efficiency.

The complexity of regional competitiveness was also captured by an *analytical decomposition* by four levels (elaborated by Esser in 1995 and presented by Annoni and Kozlovskaya in 2010 in their report on the regional competitiveness index of the EU), in which different types of competitiveness drivers operate: i) the *micro* level, the competitiveness drivers focusing on the efforts of companies and on their collaboration/company networks; ii) the *medium* level, which aims at creating an enabling environment for companies, the competitiveness drivers focusing on the physical infrastructure, on the competitiveness-oriented sectoral policies (education and R&D, industrial policy, environment policy, export promotion), but also on territorially-focused policies

(regional policy, localization policy, territorial promotion), iii) the *macro* level, which includes the macroeconomic, political and legal framework which favors competition, its key drivers being the monetary, budget and fiscal policies, the trade and exchange rate policies, the competition and consumer protection policies and iv) the meta-level, which pertains to the basic societal directions, its drivers being the competitive economic system, the capability to elaborate visions and strategies, value systems that encourage learning and change, collective memory, social cohesion, social capital, social status of entrepreneurs. At regional/sub-regional/local level, the four levels are interconnected, although their degree of relevance differs; however, what is interesting is the fact that lately the significance of the meta-level seemed to have increased within the territorial units in what regards the choice of their development paths and ways, especially in the long and medium term.

Finally, we mention the most recent definition, proposed by the report on the *EU Regional Competitiveness Index 2013*, which integrates both the vision of the companies and that of the people located in/residents of a region: “regional competitiveness may be defined as the ability to provide the companies and residents with an attractive and sustainable working and living environment”, sustainability being considered the ability of a region to provide an attractive environment both on the long and on the short term (Annoni, Dijkstra, 2013).

2. ASSESSMENT OF REGIONAL COMPETITIVENESS IN THE EUROPEAN UNION AND ROMANIA

Different ways to assess the regional competitiveness may be found in the specialized literature, one of the most often used being that regarding the *aggregate/composite competitiveness indicators*. However, some specialists say (Jula et al., 1998, 1999) that it can be difficult to build an *aggregate indicator* in order to assess regional competitiveness starting from its defining elements, because it is not easy to choose what to include in such an index, due to the elusiveness and non-direct observation of the concept itself. Moreover, practically all the indicators which are relevant for competitiveness are inter-correlated, so that causality is difficult to assess. However, efforts can be done to distinguish between the drivers of competitiveness and its outputs.

One may find many studies which compute *global competitiveness indices*, but mostly at country level (for instance, those computed by the World Economic Forum and International Institute for Management Development). Beside them, there are studies dealing with regional competitiveness that use fewer indicators than in the case of the national competitiveness indices. From among them we mention the European Competitiveness Index (ECI), United Kingdom Competitiveness Index, World Knowledge Competitiveness Index (elaborated by Robert Huggins Associates), Atlas of Regional Competitiveness (Eurochambers) and, in Romania, the regional competitiveness index elaborated in 2007 by the Group for Applied Economics, the regions' competitiveness index elaborated in 2011 by IRECSON and the regional competitiveness indices elaborated on the basis of integrative model proposed by Prof. Cezar Mereuță (Mereuță et al., 2007; Chilian, 2011).

Based on the methodology employed by the World Economic Forum, which yearly publishes the Global Competitiveness Report, an *index of competitiveness of regions* was elaborated in the EU (for the NUTS-2 regions), with 11 pillars and 73 indicators [2], organized by three groups (*basic competencies*, *efficiency drivers* and *innovation drivers*), which cover a wider range of factors than purely economic aspects. The pillars of this indicator are the following [3]: i) *basic competencies*: i1) institutional quality, i2) macroeconomic stability, i3) infrastructure, i4) health, i4) primary and secondary education quality; ii) *efficiency drivers*: ii1) higher education and lifelong learning, ii2) labor market efficiency, ii3) market size; iii) *innovation drivers*: iii1) technological readiness, iii2) business sophistication, and iii3) innovation. The i1)-i5) pillars have greater significance for the less developed regions, while the iii1)-iii3) pillars for the more advanced regions (especially for those with a very high development level), but also for the regions in transition from a lower towards a higher development stage. For each pillar, a score is computed as

simple average of the standardized and/or transformed indicators (some indicators are computed only nation-wide), and the final score (total RCI) is computed as weighted average of the three basic pillars.

Because different indicators have a different impact on regions' competitiveness in accordance with their development levels, the weights attached to the three groups of drivers were correlated with the regional GDP per capita (3 weighting classes in the 2010 version and 5 classes in the 2013 version). This may also provide useful insights to the decision-makers, because competitiveness of a less developed region may be enhanced, for instance, by increasing the institutional and educational quality, as well as by increasing innovation. In fact, this was recognized by the authors of the RCI report, who *increased the weight of innovation drivers also in the case of the less developed regional economies, in order to reward the innovation policies in such regions* (Annoni, Dijkstra, 2013) (Table 1).

Table 1. RCI weighting scheme of sub-indices of main competitiveness drivers, the 2013 version

GDP per capita, in relation to the EU average	Development stage	Basic competencies pillar	Efficiency drivers pillar	Innovation drivers pillar
< 50	1	35%	50.00%	15%
50-75	2	31.25%	50.00%	18.75%
75-90	3	27.50%	50.00%	22.50%
90-110	4	23.75%	50.00%	26.25%
>110	5	20.00%	50.00%	30.00%

Source: Taken from P. Annoni, L. Dijkstra, *EU Regional Competitiveness Index 2013*, JRC Scientific and Policy Reports, European Commission, DG for Regional and Urban Policy, ISBN-978-92-79-32370-6, 2013.

In the European Union, the *regional competitiveness index* (RCI) reveals a remarkable regional dimension of competitiveness, both among the member states, and inside them. One may notice large differences between the group of the more developed states (EU-15) and the less developed ones (NMS-13) regarding also the territorial distribution of competitiveness drivers and the channels of its diffusion among the regions [4]. The first 10 top competitive regions may all be found in the EU-15 countries (more precisely, in 7 countries: the Netherlands 3 regions, the United Kingdom – 3 regions, Sweden, Germany, France and Denmark – one region each). At the opposite end, the least 10 competitive regions are equally found in EU-15 countries (Greece – 5 regions!) and in NMS-13 countries (Romania – 3 regions and Bulgaria – 2 regions). Considering the three main pillars of RCI, the situation does not change much, although the number of countries varies within larger limits (Table 2). Unfortunately, in the case of *basic competencies pillar almost all the regions of Romania are may be found among the least 10 competitive European regions*, while in the case of *innovation drivers pillars six regions of Romania are similarly unfavorable positioned*.

Table 2. The top and the least competitive 10 regions of the EU countries, as according to the RCI 2013 pillars

Basic competencies pillar		Efficiency drivers pillars		Innovation drivers pillar	
Top 10 regions	Last 10 regions	Top 10 regions	Last 10 regions	Top 10 regions	Last 10 regions
Netherlands – 6 regions!	Romania – 7 regions!	Netherlands – 6 regions!	Greece – 5 regions!	Germany – 3 regions!	Romania – 6 regions!
Finland – 4 regions	Bulgaria – 2 regions	United Kingdom – 3 regions	Spain – 2 regions	Sweden, United Kingdom,	Bulgaria – 3 regions
	Greece – 1 region	France – 1 region	France – 2 region	Denmark, Belgium,	Greece – 1 regions
			Bulgaria – 1 region	Finland, Netherlands, Luxembourg (NUTS-1) – 1 region each	

Source: Computations based on data from P. Annoni, L. Dijkstra, *EU Regional Competitiveness Index 2013*, JRC Scientific and Policy Reports, European Commission, DG for Regional and Urban Policy, ISBN-978-92-79-32370-6, 2013.

The inter-regional overall competitiveness gaps [5] in the EU countries are of a higher magnitude in the case of the EU-15 countries than in the case of the NMS-13 countries, but considering the three pillars the situation differs (Tables 3 and 4). Thus, while in the case of *basic competencies pillar* the inter-regional gaps are similar in the two groups of countries, in that of *efficiency drivers pillar* the inter-regional gaps are somewhat higher in the EU-15 countries, and in that of *innovation drivers pillar* the highest inter-regional gaps are accounted for by the NMS-13 countries (*namely by Romania*).

Table 3. Inter-regional competitiveness gaps in the EU-15 countries

	Basic competencies pillar	Efficiency drivers pillar	Innovation drivers pillar	RCI 2013
Belgium	1.32	1.42	1.70	1.45
Denmark	1.05	1.32	1.63	1.32
Germany	1.23	1.47	1.67	1.46
Ireland	1.03	1.23	1.24	1.20
Greece	1.80	3.39	3.80	2.80
Spain	1.22	5.23	2.47	2.75
France	1.64	35.02	2.57	3.64
Continental France	1.42	2.61	2.19	2.15
Italy	1.37	2.93	1.92	1.94
Netherlands	1.13	1.43	1.59	1.35
Austria	1.12	1.20	1.52	1.17
Portugal	1.21	2.04	2.17	1.77
Finland	1.06	1.34	1.61	1.22
Sweden	1.13	1.54	1.98	1.52
United Kingdom	1.33	1.83	3.04	1.66

Source: Authors' computations based on data from P. Annoni, L. Dijkstra, *EU Regional Competitiveness Index 2013*, JRC Scientific and Policy Reports, European Commission, DG for Regional and Urban Policy, ISBN-978-92-79-32370-6, 2013.

Table 4. Inter-regional competitiveness gaps in the NMS-13 countries

	Basic competencies pillar	Efficiency drivers pillar	Innovation drivers pillar	RCI 2013
Bulgaria	1.80	1.94	3.83	2.15
Czech Republic	1.13	1.45	1.94	1.42
Croatia	1.03	1.14	1.03	1.08
Hungary	1.27	1.62	2.01	1.65
Poland	1.42	2.08	2.64	1.61
Romania	1.60	3.15	7.03	3.25
Slovenia	1.02	1.19	1.42	1.19
Slovakia	1.29	2.57	2.35	2.11

Source: Authors' computations based on data from P. Annoni, L. Dijkstra, *EU Regional Competitiveness Index 2013*, JRC Scientific and Policy Reports, European Commission, DG for Regional and Urban Policy, ISBN-978-92-79-32370-6, 2013.

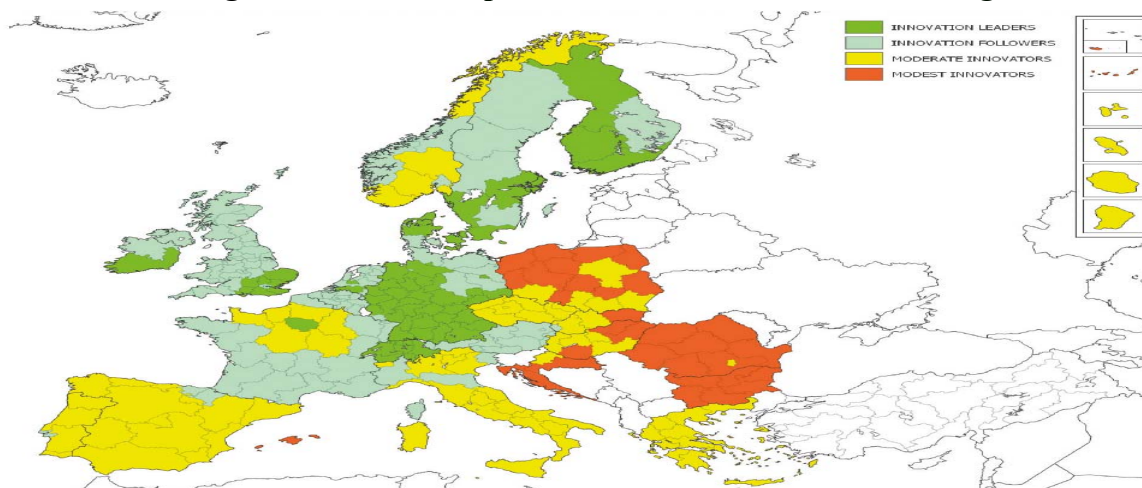
When assessing the regional competitiveness gaps, we also consider as interesting and useful the assessment of the *possible theoretical influence of the maximum, and the minimum ranks of regions*, respectively [6], for the RCI and its three pillars. The gaps among the EU countries are

very large in such a case. The highest (theoretical) competitive influence of the maximum ranks of regions may be noticed, both for the RCI and for its pillars, exactly in the countries with regions in Top 10 competitive positions (United Kingdom, Sweden, Germany, Netherlands, Denmark, France and Belgium), and the lowest in countries with regions in weaker or medium competitive positions (Greece, Italy), or in countries with small gaps between the maximum and the minimum ranks (Austria, Ireland), and vice versa in the case of the competitive influence of the regions' minimum ranks. In the NMS-13 countries, the influences of competitive positions of both the minimum and the maximum ranks are of smaller magnitude and almost similar (except for Slovakia, which comes closer to some EU-15 countries). Also in this case, the most striking gaps may be found for the *innovation drivers pillar*, which appears to be the *key factor for sustainability of the competitive positions of the regions of the EU countries*.

As regards Romania, except for the *Bucuresti-Ilfov* region, all the regions were positioned among the least competitive in the European Union (ranks higher than 240, from among 262 positions), and the *Sud-Est* region was ranked the penultimate among the EU regions (the lowest overall competitiveness score from among the regions of the new member states, beside the Severozapaden region of Bulgaria also in 2010). Also, in the case of certain sub-indices of competitiveness drivers pillars, at least one Romanian region may be found as ranked last in the NMS regions or even in the entire UE: all Romanian regions in the case of *basic education*, the Bucuresti-Ilfov region in the case of *institutional quality*, the Sud-Vest Oltenia region in the case of *infrastructure*, the Vest region in the case of *basic competencies pillar*, the Sud-Est region in the case of *health, higher education and lifelong learning, labor market efficiency and efficiency drivers and innovation drivers pillars*, the Nord-Est region in the case of *market size, technological readiness and innovation drivers pillar*, the Sud Muntenia region in the case of *business sophistication*. One may also notice that the Bucuresti-Ilfov region (the most developed in Romania, with the highest competitive position – except for the basic competencies pillar) is surrounded by regions with much worse competitive positions (Sud Muntenia, Sud-Est and Sud-Vest Oltenia), which reveals the concentration of competitiveness drivers on its territory and the limited nature of “competitiveness diffusion”, due both to the poor quality of transport infrastructure, and, mostly, to the significant gaps regarding the sectoral structure and dynamics, business development and propensity to innovate. In fact, the Bucuresti-Ilfov region is already included among the regions in the 4th development stage (namely, transition towards an innovation-driven economy), unlike the rest of the regions, which are included among the regions in the 2nd stage of development (namely, transition towards an efficiency-driven economy – the Vest region) or even in the 1st stage of development (basic competencies-driven economy – the other regions of Romania).

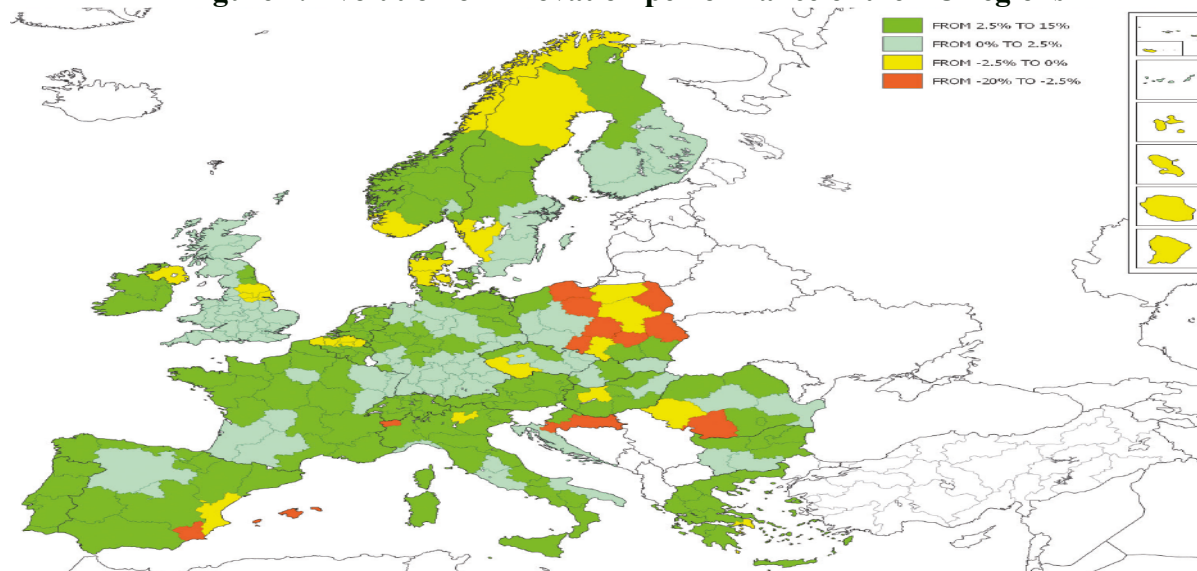
3. INNOVATION PERFORMANCE IN THE ROMANIAN REGIONS

Since innovation is a key driver of competitiveness, both at national and regional level, we present in the following some issues in this respect. Thus, the regional performance in innovation in the EU regions [7] was determined by the **Regional Innovation Scoreboard (RIS)**, according to which the regions of the EU member countries were classified by four performance groups, as follows: *innovation leaders* (34 regions), *innovation followers* (57 regions), *average innovators* (68 regions) and *modest innovators* (31 regions – Figure 1). As one may see, although the regional innovation performance may largely vary within a country, generally in the EU the regional performance groups are correlated with the national ones. One may notice a clear innovation divide between the countries (and regions) of the Northern and Western Europe, and the Southern and Eastern Europe. Romania has a single region that exceeds the modest innovators level - the *Bucuresti-Ilfov* region, included in the average innovators group – results in line with those regarding the competitiveness performance of the Romanian regions.

Figure 1. Innovation performance of the EU countries' regions

Source: *Regional Innovation Scoreboard 2014*, Directorate-General for Enterprise and Industry, European Commission.

The regions that are *innovation leaders* registered the best performance regarding all the indicators considered for the analysis, by about 30% above the EU averages, while the regions that are *modest innovators* registered the lowest performance, especially regarding the business innovation performance. Despite the presence in such regions of highly skilled and educated labor force, they experience both major weaknesses concerning the other fields of the regional innovation systems, and negative impacts due to the hindrances from the part of the national RD&I systems of the countries of which they are components. In the case of the Romanian regions, the evolution of the *overall innovation performance gaps* over the interval 2004-2010 was positive for six of the eight development regions, except for the Sud-Vest Oltenia and Vest regions, which registered negative average annual growth rates of RIS ranging between -2.5% and 0% (Figure 2). The best evolutions of the innovation performance were registered by the Bucuresti-Ilfov, Sud Muntenia, Nord-Vest and Nord-Est regions.

Figure 2. Evolution of innovation performance of the EU regions

Source: *Regional Innovation Scoreboard 2014*, Directorate-General for Enterprise and Industry, European Commission.

When analyzing the performance of the Romanian regions regarding the RIS indicators (Table 5), we may notice that most of them have registered performance below the level of 50% of the EU average for all indicators. Paradoxically, some of the regions with lower development levels

(Nord-Est, Sud-Vest Oltenia) have registered slightly better performance for certain indicators correlated to a higher extend with the innovation capability and the capability of trading the results of innovation, and regions with a higher development levels (Vest, but also Bucuresti-Ilfov) have registered poorer performance. However, on the whole, the weaknesses of the innovation process in Romania, due both to the national RD&I system, and to the business structures and their inner relationships, are also true at the regional level, which call for action at multiple levels (political, economic, institutional, social, entrepreneurial) in order to overcome the current unfavorable situation and build up the premises for a mindset shift and operational action in the very near future.

Table 5. Features of the innovation performance in the Romanian regions

Indicators	Performance level > 120% of the EU average	Performance level between 90% and 120% of the EU average	Performance level between 50% and 90% of the EU average	Performance level <50% of the EU average
Share of population aged 25-64 years with higher educational level	Bucuresti-Ilfov			Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Vest, Nord- Vest, Centru
Research on R&D in the public sector as % of the GDP		Bucuresti-Ilfov		Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Vest, Nord- Vest, Centru
Research on R&D in the business sector as % of the GDP				Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Vest, Nord- Vest, Centru, Bucuresti- Ilfov
Non-R&D innovation expenditures as % of turnover		Sud-Est	Nord-Est, Centru, Vest, Sud Muntenia	Bucuresti-Ilfov, Nord- Vest, Sud-Vest Oltenia
Single innovating SMEs, as of total SMEs				Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Nord-Vest, Centru, Bucuresti-Ilfov. Regiunea Vest – lipsă date
Collaborations between the innovative SMEs, as % of SMEs				Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Vest, Nord- Vest, Centru, Bucuresti- Ilfov
EPO patent applications per bill. regional GDP (PPS)				Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Vest, Nord- Vest, Centru, Bucuresti- Ilfov
Product or process innovators as % of SMEs				Nord-Est, Sud-Est, Sud Muntenia, Sud-Vest Oltenia, Nord-Vest, Centru, Bucuresti-Ilfov. Regiunea Vest – unavailable data
Marketing or organizational innovators % of SMEs		Nord-Est	Bucuresti-Ilfov, Sud-Vest Oltenia	Sud-Est, Sud Muntenia, Vest, Nord-Vest, Centru
Employment in medium and high-	Vest	Bucuresti-Ilfov	Centru, Sud Muntenia	Nord-Est, Sud-Est, Sud- Vest Oltenia, Nord-Vest

tech manufacturing and in knowledge-intensive services, as % of total employment				
Sales due to new-to-market or new-to-firm innovations, as % of turnover		Sud Muntenia, Centru	Nord-Est, Sud-Est, Sud-Vest Oltenia, Nord-Vest, Bucuresti-Ilfov	Vest

Source: Adaptation based on information from *Regional Innovation Scoreboard 2014*, Directorate-General for Enterprise and Industry, European Commission.

[1] The paper presents some partial research results of the research themes *Stimularea clusterelor locale - factor determinant al competitivității regionale – coordinator Carmen Beatrice Păuna, Institute for Economic Forecasting, Bucharest, 2013, mimeo* and *Identificarea rețelelor inovative în dinamica economică a spațiului European – cazul României. Capitalul uman. Dezvoltarea economică bazată pe cunoaștere, inovare și inteligență, coordinator Carmen Beatrice Păuna, Institute for Economic Forecasting, Bucharest, 2014, mimeo.*

[2] The 2013 version; the 2010 version has included 69 indicators.

[3] *Investing in Europe's future, Fifth report on economic, social and territorial cohesion, European Union, 2010* and P. Annoni, L. Dijkstra, *EU Regional Competitiveness Index 2013, JRC Scientific and Policy Reports, European Commission, DG for Regional and Urban Policy, ISBN-978-92-79-32370-6, 2013.*

[4] Data available upon request.

[5] Computed by the ratio of normalized (score+2) maximum to minimum scores for each EU country with at least two NUTS-2 regions.

[6] Computed as according to the formulas: $(R_{max}-R_{min}) \cdot R_{min} / (R_{max}-R_{min}) \cdot R_{max}$, and $(R_{max}-R_{min}) \cdot R_{max} / (R_{max}-R_{min}) \cdot R_{min}$, respectively. Data available upon request.

[7] 190 analyzed regions, from 22 EU countries, Norway and Switzerland, in 2004, 2006, 2008 and 2010 – *Regional Innovation Scoreboard 2014, Directorate-General for Enterprise and Industry, European Commission.*

BIBLIOGRAPHY

1. P. Annoni, K. Kozovska (2010), *EU Regional Competitiveness Index 2010*, Joint Research Centre and DG Regional Policy.
2. P. Annoni, L. Dijkstra (2013), *EU Regional Competitiveness Index 2013*, JRC Scientific and Policy Reports, European Commission, DG for Regional and Urban Policy, ISBN-978-92-79-32370-6, 2013.
3. R. Camagni (2002), *On the concept of territorial competitiveness: Sound or misleading?* Paper presented at the ERSA Conference, Dortmund, August.
4. M.N. Chilian (2013), *Coeziunea economico-socială la nivel regional – Elemente de fundamentare a unei strategii regionale*, Editura Expert, Bucuresti.
5. M.N. Chilian (2011), *Competitivitatea economiei românești și integrarea în Uniunea Europeană*, Editura Universitară, Bucuresti.
6. European Commission (2010) - *Investing in Europe's future, Fifth report on economic, social and territorial cohesion.*
7. European Commission (2014) - *Regional Innovation Scoreboard 2014*, Directorate-General for Enterprise and Industry.
8. Gardiner, A., R. Martin, P. Tyler (2004), *Competitiveness, Productivity and Economic Growth across the European Regions*, University of Cambridge, UK, May.
9. ***, „Inovarea și creșterea competitivității – Vectori fundamentali ai progresului economico-social al României”, Program PNCD II, Contract nr. 91-071/2007, Etapa P2/II – „Analiza comparativă a diverselor categorii de indicatori de competitivitate și relevanța acestora. Modele pentru studiul mecanismelor de difuzie a noilor cunoștințe și de propagare a undelor inovative”, Contractor: Institutul de Prognoză Economică, Subcontractor: Universitatea Româno-Americană, București, Noiembrie 2008, mimeo.

10. Jula D., Ailenei D., Jula N., Gârboveanu A. (1999), *Economia dezvoltării*, Ed. Viitorul Românesc, București,
11. Jula D., Jula N., “Dinamica dezechilibrelor în dezvoltarea regională” (1998), *Oeconomica*, nr. 3-4, Societatea Română de Economie, IRLI, București.
12. R. L. Martin (coord.), (2003), *A Study on the Factors of Regional Competitiveness. A draft final report for the European Commission*, Directorate General Regional Policy, Cambridge Econometrics, University of Cambridge, UK.
13. C. Mereuță, L.L. Albu, M. Iordan, M.N. Chilian (2007), “A Model to Evaluate the Regional Competitiveness of the EU Regions”, *Romanian Journal of Economic Forecasting*, No. 3, pp. 81-102.
14. C.B. Păuna (coord.) (2013), *Stimularea clusterelor locale - factor determinant al competitivității regionale*, Institutul de Prognoză Economică, București, mimeo.
15. C.B. Păuna (coord.) (2014), *Identificarea rețelelor inovative în dinamica economică a spațiului European – cazul României. Capitalul uman. Dezvoltarea economică bazată pe cunoaștere, inovare și inteligență*, Institutul de Prognoză Economică, București, mimeo.
16. Porter, M.. (1990), *The Competitive Advantage of Nations*, The Free Press New York.
17. Janno Reiljan, Maria Hinrikus, Anneli Ivanov (2000), *Key Issues in Defining and Analyzing the Competitiveness of a Country*, University of Tartu, Finland, Faculty of Economics and Business Administration, Working Paper Series, No. 1/2000.
18. ***“Sinteza Documentară privind clusterii și competitivitatea”, din cadrul studiului documentar privind literatura de specialitate și tendințele domeniului creșterii economice pe plan mondial în contextul noii economii, Programul CEEX_CERES, Proiectul Cex-05-D8-32/5.10.2005, “Creșterea economică, ocuparea și competitivitatea în economia bazată pe cunoaștere”, Autoritatea Contractantă IFA, Contractor IPE, 2005-2008, Etapa I, Decembrie 2005.