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CURRENT FACTORS FOR LAUNCHING REGIONAL COMPETITIVENESS: AN ECONOMETRIC APPROACH

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ABSTRACT
This article examines regional competitiveness of Romania in terms of employment rate, influenced by the regional spending in research and development and innovation and by the employed population in high tech research and development. The employment rate is one of the determining indicator in the nationally and regionally competitiveness analysis. From this points of view, we formulate the hypothesis: the employment rate increases, depending on the size of expenditure in research and development and on the rate of people employed in R & D and innovation. Using an econometric model we demonstrate that there is a high correlation between them, and under these results, new fresh direction of improvement can be taken.

KEYWORDS: *regional competitiveness, employment rate, model*

JEL CLASSIFICATION: *E22, E23, E27*

1. INTRODUCTION

Following a period in which regional competitiveness (RC) has been a controversial subject, measuring its level, still remains at research level. The literature distinguishes several approaches, in this regard, two of them being generally accepted. The first approach (European Comission, 1999, 2001, 2009 IMD 2013 WEF, 2012) implies that regional competitiveness results from the sum of the many determining factors. The second approach (Porter, 1994, Blakely, 1999, Rondinelli, 2002, Cooke, 2003) sees RC through one factor of influence, specific to the region. The common element between the two approaches is that both have the same range of considering the determinants of the RC: the productivity and the use of knowledge (Nijkamp et. all, 2012; Haris, 2001; Ibert, 2007); the innovation and the development activities (Romer, 1990, Lundvall, 2002, Cooke, 2011, Andersson, 2007, Frates 2009, Gogâltan & Stelica, 2014); investment (Voiculescu, 2014); the level and the nature of education (Isvan et. all, 2016; Arriazu & Solari, 2015); human capital development (Constantin, 2007, Son & Noja, 2013), infrastructure (Komarova et all, 2014), the level and structure of employment (Constantinescu, 2007), demographic developments.
There is no consensus so far on the factor or on the set of the factors with the greatest influence on regional competitiveness. Regional disparities between countries and within countries, reveals that each territorial unit is facing certain problems and capitalize on their competitive advantages. From this point of view, the present work is part of the second type of approach, being based on the influence of one factor, in terms of the RC.
Thus, this article examines regional competitiveness of Romania in terms of employment rate, influenced by the regional spending in research and development and innovation and by the

employed population in high tech research and development. The employment rate is one of the determining indicator in the nationally and regionally competitiveness analysis.

Latest statistics (Romanian Statistical Yearbook, 2015), shows that the highest employment rate for people of working age was registered among university graduates (85.3%). In comparison, the employment rate among people with an average level of education was 42.6%. The same statistics confirm that in regions where research and development (R & D) spending were higher, competitiveness of these was higher too. From these points of view, we formulate the hypothesis: the employment rate increases, depending on the size of expenditure in research and development and on the rate of people employed in R & D and innovation.

2. TWO PRIORITARY FACTORS FOR LAUNCHING COMPETITIVENESS. THE CASE OF THE EIGHT REGIONS OF ROMANIA

From a first point of view, literature testifies early concerns about the causal link between technological progress and competitiveness. The most influential voice in this is that belonging to Schumpeter. In his Theory of Economic Development (1934), Schumpeter describes the economic development of the nation as a historical process of structural transformation, decisively led by innovation. Based on the idea that "whoever seeks profits must innovate", innovation and "creative destruction" is "the process of industrial mutation incessantly revolutionizes the economic structure that from within, incessantly destroying the old one, incessantly creating a new one".

From a second point of view, in acquiring competitiveness it must comply logical technological chain, from the purchase and use of technologies, to adaptation and to creation of technology. Thus, supporting the activities on R & D and innovation at the regional level is justified by the fact that:

- regional / local research activities increase the region's attractiveness;
- the first beneficiaries of R & D activities are, in most cases, even the inhabitants of the region in which the activities were conducted;
- limits the "export" of higher education graduates;
- the other sectors benefit from the results of research and development activities, and generate innovative products or processes, improve business environment and increase the number of well-paid jobs.

Regarding Romania's progress in achieving the target on budget allocations for R & D and innovation, in the latest results it ranks 27th of 28 in the EU. In the year 2014 budgetary allocations for RDI were only 0.38% of GDP, meaning a distance of 1.65 percentage points compared to the EU average, while the percentage of achievement of the national target is only 19%. Latest regional studies (Romanian Statistical Yearbook, 2015), warns about the rising disparities in the eight development regions of Romania and provides an image with the growing distance between the east and west of the country.The second analyzed indicator, the rate of RDI employed people (high-tech), is decisively influenced by the quality of the national education system. Spending on education can be seen both as an investment as well as consumption.

Border demarcation between investment and consumption has preoccupied economists (Kiker, 1971, Mincer, 1970; Schultz, 1961), without leading to a total consensus. In general, it was found that human capital treatment and investment, human capital skills can be used virtually

anytime, depending on the social and economic environment in which individuals can place at a certain time.

Contributions in laying the foundations of economic theory and human capital, had Mincer, Schultz, Becker, and Denison. Mincer (1970), believes that citizens' personal skills are correlated with income levels that they are able to produce.

Developing this idea, Gary Becker (1997), shows that, as the level of education increases, the income generated also increases progressively.

Theodore Schultz (1961) is the one who "calls into question the notion of capital, focusing on capital as time allocation in which human capital is listed" and argues that "knowledge is an economic very particular value; In other words, science is a rational activity reserved for those sufficiently trained to understand it, and health and education expenditure are considered individual potential for revenue growth. In the vision of Mark Blaug (1976): "Education is the essence of human capital, its importance being superior health associated components". In the years 2012-2013, the competitive position of Romanian regions, (calculated by GDP / capita) is as following:

Table 1. The competitive position of Romanian regions, (calculated by GDP / capita)

Region	Year	
	2012	**2013**
North East	62.7	62.3
South East	81.9	80.9
South	82.4	83.6
South West	78.4	80.7
West	114.2	114.4
North West	83.9	83.9
Center	97.3	98.2
Bucharest-Ilfov	238.8	234.9

Source: Statistical Yearbook of Romania, 2014

As shown, the largest regional disparities are between Bucharest-Ilfov region and the other regions. A good position has the West region, which improved the competitive potential of the area, taking advantage of the geographic opening to Europe. Also, the West region has allocated financial and material resources to increase the level of technological innovation.

The North East region recorded the lowest values, although the area is not disadvantaged by a particular factor or the lack of potential. Low levels of this situation are explained better by social issues (migration, eastern influence, negative demographic rate), but also by the cultural aspect. Recent studies (Chilian et all, 2014) show that, in terms of the budgetary allocation for RDI, the innovation and the employed population in the sector, Romania's regions (except in Bucharest-Ilfov and West region), occupy the last positions, being far below the European average.

2.1 Econometric model for employment rate based competitiveness
In order to establish the competitiveness of the eight regions of Romania, we selected three relevant indicators: the employment rate, the research, innovation and development expenditure, the number of employees in RDI activities. Data were collected from the Statistical

Yearbook of Romania (2015), for the period 2010-2013. Taking into account the short period of the time series, the panel data organization has been chosen. The next step has consisted in the estimation of equation of the employment rate, based on the RDI expenditure in innovation activities, and on the number of employees in RDI activities.

$$Y_{it} = a_0 + a_1 X_{1it} + a_2 X_{2it} + \mu_{it}$$

where:

Y_{is} = occupancy rate in the eight regions (ROREG)

X_1 = expenditure in research, development and innovation (CTCD)

X_2 = employed population in high-tech (POHT)

$a_0 a_1, a_2$ = coefficients

i = cross-section for the eight regions

t = time period (2010-2013)

Then, a linear regression function has been proposed to study the correlation between the occupancy rate (dependent variable) and the values of the chosen factors, as independent variables. The econometric test has validated the function parameters, so the calculation has been possible. $Y_{it} = 55.44 + 8.26\mathrm{E}{-}7X_{1it}0.07X_{2it}$

Table 2. Correlations

		ROREG	CTCD	POHT
Pearson Correlation	ROREG	1,000	.806	.820
	CTCD	.806	1,000	.982
	POHT	.820	.982	1,000
Sig. (One-tailed)	ROREG	.	.000	.000
	CTCD	.000	.	.000
	POHT	.000	.000	.
N	ROREG	32	32	32
	CTCD	32	32	32
	POHT	32	32	32

Source: own process of econometric model with SPSS

Pearson test shows that between ROREG and CTCD there is a close positive relationship, with a Pearson coefficient = 0.806, value close to 1 at a grade of 0.000 significance ($p<0.05$). A close relationship is observed in the case of positive correlation between ROREG and POHT (0.820) at $p<0.05$. Meanwhile, between the two independent variables, there is a positive and very closely link, knowing Pearson coefficient value is very close to one (0982), the degree of significance result being 0.000 at $p<0.05$.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.820[a]	.672	.649	5.29270	.672	29.664	2	29	.000

Source: own process of econometric model with SPSS

Table 4. Descriptive Statistics

	Mean	Std. Deviation	N
ROREG	61.2562	8.93399	32
CTCD	329306.38	457222.095	32
POHT	3736.31	4691.554	32

Source: own process of econometric model with SPSS

From the Model Summary and the Descriptive Statistics tables is shows that Standard Error of the Estimate is 5.29, lower than the Standard Deviation (8.93), as it should be.

Table 5. Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1661.931	2	830.965	29.664	.000[b]
	Residual	812.368	29	28.013		
	Total	2474.299	31			

Source: own process of econometric model with SPSS

The Anova test validates the regression model, the value of Sig. being 0.000.
The model's results confirm the hypothesis: the employment rate increases as the size and rate of the expenditure in RDI and of the occupied population in the sector, grow. Calculations generated interregional disparities which demonstrates the same situation as before, with some exceptions: the North West region occupies the fourth position after Bucharest-Ilfov region, West, Centre. South Region is outweighed by the South West region, while the North East keeps its last position, and otherwise recording the highest poverty rate.

3. CONCLUSIONS

The analysis of regional competitiveness was debated taking into account the social finality. Poverty level can't be changed in a short term. Finding the most opportune solutions for each region requires innovation. Spending on innovation, research and development will attract investors, will diminish the massive departures of higher education graduates and increase the number of jobs.
The developed model reveals the fact that regional competitiveness can be launched by numerous factors, and that a way to verify this fact is to combine them in multiple ways. However, the theory has its limitation: the small number of years taken into consideration and

the isolated analysis. One possible way to improve the forward research, is to multiply the number of factors, or to concentrate on, to only on region.

We consider relevant the development of a best practice manual from the most competitive regions. Bucharest-Ilfov region, even though if it has a special status, can offer some measures that can be adapted in the other regions. Also, based on the example of Central and West regions, we can say that large projects are born from small activities, conducted at the individual level, the institutional level and at the local level.

 The two regions mentioned above are distinguished by the high degree of initiative among students, entrepreneurs and society itself. Encouraging young people in research and recognition of their merits, nationwide, will diminish the migration and increase the local consolidation. Another inexpensive option is the coverage of the non profit organizations that support excellence in research and innovation. They have the openness, both to attract the necessary funds, and for attracting investors.

Finally, we believe that the measures to increase competitiveness provided in the National Operational Programmes are not close enough much of the most important resource, namely, human capital. In these conditions, focusing attention on individual and community efforts can be a way to launch innovation-based competitiveness in Romania.

REFERENCES:

Arriazu, R., Solari, M. (2015). The role of education in times of crisis: A critical analysis of the Europe 2020 Strategy,129-149, retrieved in august 2016, http://eng.kedi.re.kr

Becker, G., S. (1997). *Capitalul uman. O analiza teoretica si empirica cu referire speciala la educatie*, All, Bucuresti.

Capello R. (2007). Regional economic, Routledge, London.

Constantin, D., L., Dimian, G.C. (2007). The regional competitivity of Romania under European integration, retrieved august 2016 from http://www.rejournal.eu/sites/rejournal.versatech.ro/files/issues/2007-06-01/575/je202420constantin20dimian.pdf

Istvan, L., Eva, D., Orsolya, N. (2016). Competitiveness-higher Education, Sues, 11-25, DOI: 10.1515/sues-2016-0002

Lundvall, Bengt-Ake et al. (2002). National systems of production, innovation and competence building. *Research Policy*, *31*(2), 213-231.

Mincer, J. (1970). The Distribution of labor incomes: a survey with special reference to the human capital approach. *Journal of Economic Literature*, *8*(1), 1-26.

Nijkamp, P., Painho, M., Caetano, M. (2012). A multi-scenario forecast of urban change: A study on urban growth in the Algarve. *Landscape and Urban Planning*, 104(2), 201-211.

Porter P. (1994). The role of relocation in competition, J. Econ Bus.

Romer P. (1990). Endogenous tehnological chance. *Journal of Political Economy,* 98(5), 71-102.

Schultz, T. (1961). Investment in Human Capital. *The American Economic Review*, 51(1), 1-17.

Son, L., Noja, G.G. (2013). The role of the human capital and investment in human capital within the sustainable socio-economic development. How labour force migration affects competitiveness? *Theoretical and Applied Economics*, XX(10(587)), 111-126.

Statistical Yearbook of Romania – 2013, 2014, 2015, national Institute of Statistics, Bucharest