

## Territorial competition and competitiveness. Recent highlights from the perspective of technology innovation and knowledge economy

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*This paper addresses the question of territorial competitiveness – at national and regional level – from the perspective of the most important research undertaken in the international arena in order to build-up competitiveness indicators able to reveal the complexity and dynamics of this phenomenon in the contemporary society. A special emphasis is put on studies developed by prestigious organisations and research centres such as World Economic Forum, International Institute for Management Development, Cambridge Econometrics, ECORYS-NEI and so on that highlight the importance of technology innovation, ICT and knowledge promotion for getting a noteworthy position in the world competitiveness hierarchy.*

**Keywords:** *competitiveness indicators, empiric research, factors of regional competitiveness, knowledge-promoter regions.*

### Introductory remarks

In the widest meaning, the economic literature defines *territorial competition* as the actions undertaken by the economic agents in a specific geographical area in order to ensure the increase in the living standard for the inhabitants of the respective territory. One of the supporters of this definition, Jaques Poot, uses the term of *territorial competition* so as to emphasize the fact that it takes place at *different levels*: city level, region level or state (national) level (Poot, 2000).

According to the view developed by Michel Porter, at *national level* the *competitive advantages* are understood as the conditions that a country offers to firms in order to make them prosper and grow. In this way, the respective country contributes to the reinforcement of its firms' competitive capacity on both local and global markets (Porter, 1996). The competitive advantages are neither static nor immune to the governmental policies, the same idea being applicable to *regions* as well. The governing authorities, at different levels, consider the territory they administrate as competing for access to the global market, to capital, to new knowledge and technologies and, sometimes, to human resources. In this respect, their actions, undertaken for strengthening the competitive position, influence the results at both national and regional level.

This view supports the notion of *territorial competition* as a notion of wide coverage, which does not restrict the participants only to the territorial administration category, but also refers to the behaviour of firms and households in the respective territory.

The territorial competition, defined this way, is in direct correspondence with the notion of *territorial competitiveness* (at regional and/or international level): the latter represents a measure of a territory's potential to achieve high, sustainable rates of living standard growth in the respective area.

**The regional competitiveness (RC)**, as such, has been more rarely and more poorly defined. According to Cambridge Econometrics (2003) the clearest, most concrete proposal comes from the European Commission, which refers to this term as follows:

"[Competitiveness is defined as] the ability to produce goods and services which meet the test of international markets, while at the same time high and sustainable levels of income levels or, more generally, the ability (of regions) to generate, while being exposed to external competition, relatively high income and employment levels"... "In other words, for a region to be competitive is important to ensure both the quantity and the quality of jobs" - *The Sixth Periodic Report on the Regions* (1999, p.4).

The *GDP per capita* is considered to be the best representation of this definition. It may

be broken down in more factorial components, each having its own economic interpretation (Gardiner, 2003):

$$\text{GDP / Total Population} = [\text{PIB / Total number of hours worked}] * [\text{Total number of hours worked / Employment}] * [\text{Employment / Working age population}] * [\text{Working age population / Total Population}]^*$$

This formula describes the relation between GDP per capita on the one hand and the labour productivity, work – leisure ratio, employment rate and dependency rate on the other hand.

Actually, the decomposing is not done in totally independent components and some connections between the indicators can be noticed. For example, the regions with high productivity, that use highly skilled labour force, may also record high employment rates.

In general terms, the economic literature acknowledges *two perspectives in RC approach* (Camagni, 2002): RC as a combined measure of the competitiveness of *firms* in the region and RC as a competitiveness derived from the *macroeconomic* competitiveness.

However, none of these perspectives is totally acceptable: the first one because it focuses on firms' productivity and profit without taking into consideration the level of employment in the region, as an essential aspect for RC, while the second one does not consider that certain laws governing the economics of international trade do not work properly or do not exist at sub national level (for example: exchange rates variation, price – wage flexibility, etc.). Instead, other phenomena – such as the interregional mobility of production factors – capital, labour force – determine more important challenges to regions.

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\* The regional implications of considering the total number of hours worked are more eloquent in this case than at national level. Regions may present a more important specialisation from sectorial viewpoint (for example: agriculture), making the adjustment based on various characteristics of hours worked represent more accurately the real working effort involved in producing the output in comparison with the measured one.

Therefore RC seems to be a concept “stuck in the middle” (Cambridge Econometrics, 2003) and the clarification of its determinant factors is necessary in order to define and understand it. This is possible by referring to points of view with explicit or implicit implications on the RC notion expressed by major economic schools as well as to the results of empiric research works concerned with the concrete RC analysis by means of specific methodologies for which the selection of indicators and data processing have an essential role.

#### **Territorial competitiveness indicators. Empiric research regarding the competitiveness factors at national level and the role of technology innovation and technology transfer**

Taking into account *the influence of governmental policies* upon the economic growth, the statistical dimension of competitiveness is often used as a *scorecard* of these policies. Therefore many international organizations and research institutes are concerned with measuring *the competitiveness of national economies* by means of a large set of indicators, countries being ranked on the basis of an index that represents a weighted average of the indices corresponding to the indicators employed. Most frequently the quantifications performed by the World Economic Forum (WEF) and the International Institute for Management Development of Geneva (IMD) are considered in this respect. Until 1996 the WEF and the IMD published a common index, afterwards the two organizations have modified their methodology independently and published separate reports on competitiveness.

Although it has been noticed that the measurement of competitiveness on the basis of a too great number of indicators is not as relevant as the one based on a set of fundamental, target-indicators, the two institutes use more than one hundred indicators, collected from official statistics and surveys done with business people in over 50 countries. Both methodologies use regression functions for analysing the determinant factors of the economic development.

**World Economic Forum** publishes the index known as *Growth Competitiveness Index (GCI)* whose construction is based on three pillars considered as being fundamental for the economic development, namely the technology level of the countries analysed, the state of their public institutions, and the quality of macroeconomic environment. Each of them is taken into consideration within the GCI by means of a specific index.

In the latest GCI reports the WEF experts have emphasised that the role of new technologies in the economic growth process is different among countries, depending upon their general development level and that the technology innovation is relatively more important for the economic growth in the countries close to the so-called “technology frontier”. For example, the 2004 GCI Report mentions that the *technology innovation* is crucial for the economic growth in a country like Sweden, while the *technology transfer* (often associated with foreign direct investments) is relatively more important in countries like the Czech Republic ([www.weforum.org](http://www.weforum.org)).

For this reason, in order to establish the GCI the countries under study are separated into two groups: the first one comprises the economies for which the technologic innovation is a fundamental factor of the economic growth (*core innovators*); the second one in-

cludes the economies which rely on the transfer of technologies from abroad (*non-core innovators*).

The basic importance of technology innovation for the countries belonging to the first group is taken into consideration by allowing a greater importance (weight) coefficient (than in the case of the countries in the second group) to the innovation sub index within the technology index. For the computation of the technology index in the case of the second group of countries a specific sub index is employed, namely the technology transfer sub index.

Finally, considering that the determinants of the economic competitiveness are different for the two groups of countries, the weight placed on the three partial indices is also different. Thus, for the non-core innovators the weight is higher for public institutions index and macroeconomic environment index. This does not mean that the two aspects do not have a great importance for the core innovators as well, but in their case it is considered that they have been for a long time in a period characterised by institutional stability, the need for technology innovation being relatively more important to the economic growth process.

Details about the composition of the GCI are presented in Box 1.

#### Box 1

##### The Method of Composition of Growth Competitiveness Index

- The responses to the survey questions are ranked on a scale from 1 to 7.

- The values of the data variables collected from official statistics are converted to the same 1-to-7 scale by means of a linear interpolation formula:

$$6 * [(x_i - x_{min}) / (x_{max} - x_{min})] + 1$$

where:

$x_i$  = value of the indicator for the country analysed

$x_{max}$  = maximum value of the indicator (for the country with the best result)

$x_{min}$  = minimum value of the indicator (for the country with the worst result)

$$GCI (I) = \frac{1}{2} TI + \frac{1}{4} PII + \frac{1}{4} MEI$$

$$GCI (II) = \frac{1}{3} TI + \frac{1}{3} PII + \frac{1}{3} MEI$$

where:

GCI = Growth Competitiveness Index for countries in the first group (core innovators, I) and second group (non-core innovators, II)

TI = technology index

PII = public institutions index

MEI = macroeconomic environment index

Each of the three indexes cumulates, with different weights in the case of each group, a series of specific sub indexes.

For example, TI (I) =  $\frac{1}{2}$  innovation subindex +  $\frac{1}{2}$  ICT subindex (Information and Communication Technology), while

TI (II) =  $\frac{1}{8}$  innovation subindex +  $\frac{3}{8}$  technology transfer subindex +  $\frac{1}{2}$  ICT subindex

The same method is employed for further composing of the subindices ( see [www.weforum.org](http://www.weforum.org))

The score of competitiveness (presented in *World Competitiveness Scoreboard (WCS)*)

computed by the **International Institute for Management Development (IMD)** in Ge-

neva takes into account four determinant factors: economic performance, government efficiency, business efficiency, and infrastructure. Each of them is divided into five sub-factors which emphasise the fundamental aspects of the domain under analysis, as follows:

*Economic performance:* domestic economy, international trade, international investment, employment, prices.

*Government efficiency:* public finance, fiscal policy, institutional framework, business legislation, societal framework.

*Business efficiency:* productivity, labour market, finance, management practices, attitudes and values.

*Infrastructure:* basic infrastructure, technological infrastructure, scientific infrastructure, health and environment, education.

In total, the 20 sub-factors consider over 300 criteria; however, these are not equally distributed by sub-factor. For example, in order to evaluate education more criteria are used in comparison with prices. Regardless the number of criteria employed, each sub-factor has the same weight, of 5% (a total of  $20 * 5\% = 100\%$ ).

On the whole, the criteria for which WCS elaboration is based on official statistics represent approximately two thirds whereas one third counts for the information obtained by means of surveys.

Starting with the year 2004 the IMD Report comprises two absolutely new elements, as follows ([www02.imd.ch/wcc/ranking](http://www02.imd.ch/wcc/ranking)):

- in addition to one global ranking (referring to all 60 countries examined), there are several customized rankings split by population size, by wealth or by region (Europe – Middle East – Africa, Asia – Pacific, and the Americas);

- regional economies have been also included since 2004 for they play a particular role in the economic development at global level and show “pockets” of competitiveness with different profiles in comparison with the countries they belong to (for example Bavaria – Germany, Catalonia – Spain, Ile de France – France, Lombardia – Italy, Maharashtra – India, Rhône-Alps – France,

Scotland – United Kingdom, state of Sao Paulo – Brasil, Zhejiang – China).

At the same time other reports on the competitiveness of national economies are elaborated, i.a., by the Organization for Economic Cooperation and Development (OECD)\* and by the UK’s Department for Trade and Industry\*\*.

A synthesis of the competitiveness factors at national level analysed by the most important reports developed in the international arena is presented in *A Study on the Factors of Regional Competitiveness. A final report for The European Commission Directorate-General Regional Policy* (2003), elaborated by Cambridge Econometrics, the University of Cambridge and ECORYS-NEI – Rotterdam. The respective synthesis presents the factors of competitiveness as being divided into three large categories, namely (page 2-23):

#### **Infrastructure and Accessibility**

- *Basic infrastructure*

- road
- rail
- air

- *Technologic infrastructure*

- ICT
- telecommunications
- Internet

#### **Human resources**

- *Labour force characteristics*

- productivity
- flexibility

- *Management skills*

- internationalised
- level of professionalism
- efficiency level

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\* *OECD’s New Economy Report* (2001) takes into account 5 groups of factors considered as having a strong causality relation with the economic competitiveness and which give a major importance to the new economy: ICT usage, innovation and technology diffusion, human capital, entrepreneurship and quality of macroeconomic environment.

\*\* Published since 1999, the *Competitiveness Indicators Report* uses the benchmarking in order to evaluate the UK’s performance against the world’s leading economies as compared to its main competitors from the perspective of five drivers of productivity: investments, innovation, skills, enterprise and competitive markets.

- *Highly skilled work force*
- scientists and engineers
- symbolic analysts
- High participation rates in post school education
- tertiary education
- vocational education
- *Educational infrastructure*

#### **Productive environment**

- *Entrepreneurial culture*
- low barriers to entry
- risk taking culture
- *Internationalisation*
- exports/ global sales
- investment
- business culture
- *Technology*
- application
- management
- *Innovation*
- patents
- R&D levels
- research institutes and universities
- linkages between companies and research
- *Capital availability*
- *Nature of competition*
- *Sectoral balance*

#### **Determinant factors of regional competitiveness. The emergence of knowledge-promoter regions**

As concerns the **regional competitiveness (RC)** analysis, two categories of studies can be distinguished: the first category approaches RC as a cumulative result of more determinant factors, while the second one focuses on a particular driver of competitiveness (Cambridge Econometrics, 2003).

Internationally, the most relevant studies for the cumulative approach have been undertaken by the European Commission (*Second (2001) and Third (2003) Report on Economic and Social Cohesion*), the Welsh Development Agency in partnership with Barclays Bank PLC (*Competing with the World*, 2002), UK's Department of Trade and Industry (*Regional Competitiveness Indicators (2002)*), UK Government Offices in the East and West Midlands (commissioned to Ernst and Young Ltd) (*East and West Midlands Benchmark, 1997*)), Silicon Valley Network

(*Silicon Valley Comparative Analysis, www.stanford.edu*), and, the most comprehensive, Cambridge Econometrics in collaboration with Cambridge University and ECORYS-NEI Rotterdam (*A Study on the Factors of Regional Competitiveness, 2003*). In this paper the most relevant aspects for the topic envisaged have been selected and presented below, in accordance with Cambridge Econometrics conclusions.

In the context of the Second and Third Report on Economic and Social Cohesion, even though the European Commission does not weight the factors of RC, it contributes to highlighting the factors which have the greatest influence in this respect. Starting from the idea that regions are at different stages of development and display differing economic-social structures, the reports point out the relevance of RC factors to various groups of regions. Accordingly, the factors of the greatest influence on RC are:

- employment and productivity level;
- sectoral structure of employment;
- demographic trends\* ;
- investments;
- investment in knowledge economy assets;
- infrastructure endowment;
- level and nature of education;
- innovation and R&D.

The *Third Report* reveals that interregional disparities with regard to competitiveness factors diminished at its elaboration date, but also draws the attention to the challenges generated by EU enlargement, especially after Romania and Bulgaria will join the EU.

Of a special interest is the study elaborated by Ernst and Young Ltd for the UK Government Offices in East and West Midlands, which had requested the application of benchmarking in order to determine the level of competitiveness of East and West Midlands, as compared with other 12 EU regions. The purpose has been to identify measures for increasing the level of competitiveness for the region analysed. The study combines the statistical benchmarking with an assess-

\* The negative effect of outward migration and ageing of population is emphasised.

ment of best practices development in order to explain the differences in performance.

In the end, fifty five RC indicators resulted and were scored in accordance with their relative importance. The report concludes that for the regions included in the study competitiveness mostly depends on:

- knowledge-intensive skills;
- innovation capacity;
- investment level;
- the degree of employment concentration in high value added industrial activities;
- quality of financial and business services\* ;
- the level of foreign direct investment.

Within the studies which are concentrated on one single RC aspect, the following factors are the ones that have been paid the greatest attention:

- clusters (Porter, 1990, 1998, 2001);
- demography, migrations (Glaeser and Sheifer, 1995);
- hard / soft factors of localization (Kowalski and Rottengatter, 1998);
- entrepreneurial environment and inter-firm networks (Ritsila, 1999);
- institutional capacity and government quality (Bradshaw and Blakely, 1999, Rondinelli, 2002);
- industrial structure (EC's Sixth Periodic Report, 1999);
- innovation / regional systems of innovation (Guerrero and Seró, 1997), Cooke, 2003);
- property, models in the field of foreign direct investments (Cantwell and Iammarino, 2000).

The synthesis regarding RC realised in the study drawn up by Cambridge Econometrics - mentioned before – is based on many of the elements presented in the synthesis of competitiveness factors at national level, but also introduces a series of characteristic features that mainly consist in:

- adding the quality of the territory under analysis in terms of housing, natural sur-

roundings, cultural amenities and safety to the “Infrastructure and accessibility” chapter;

- including the demographic trends besides the high skilled workforce in “Human Resources” chapter;

- in the “Productive Environment” chapter the newly introduced elements refer to sectoral concentrations (balance / dependency, employment concentration, share of high value-added activities), specialisation and governance and institutional capacity.

Also, this study has elaborated a typology of regions based on the key-factors of competitiveness. Considering the position occupied in a rectangular coordinate system, where the population density is configured on the horizontal axis and GDP per capita on the vertical one, three major groups of regions have been identified, as follows: *Regions attractive for production activities (production sites)* appear as regions with a lower to medium level of incomes. In these regions the economic efficiency derives, first of all, from the inexpensive inputs. Herein, the endowment with production factors stresses the availability of work force, land and capital. Their attractiveness does not consist very much in the localisation or urbanization economies as it resides in the absence of losses and negative effects of urbanization.

The determinants of competitiveness are concentrated in the area of the basic infrastructure and accessibility (low-price land, absence of demographic congestion, affordable housing and available human resources also at moderate costs). Such an endowment with factors attracts foreign direct investments based on vertical integration relations. However, the development strategies specific to regions in this group, which are not characterized by demographic congestion, were also adopted by regions with a higher population density, but, as a result of a low economic dynamism they are not facing disadvantages of urbanisation.

Examples of regions in this group are: regions in Ireland, Central Scotland, South Wales, Northern England, North – Pas-de-Calais and, recently, some regions in West of Poland, Czech Republic, Hungary.

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\* It is considered that this sector has a special importance, not only because at present is one of the domains of activity with the highest growth rate but also owing to its contribution to raising the competitiveness of other sectors.

*Regions as sources of increasing returns* are the ones with high rates of economic growth, with average population density and a robust economic structure. That is why they are also called dynamic or vital regions. In these regions the activities are concentrated in a selected number of industries, characterised by an increased level of agglomeration economies, representing important wealth sources. The localisation economies, industry-specific in nature, favour the process of getting high, sustainable incomes. Determinant factors of competitiveness are labour skills, division of labour between firms, the effects derived from the market dimensions, the existence of specialised suppliers.

Within the European Union well-known examples are the following regions: Baden – Württemberg, Emilia – Romagna, Zuid- Oost – Brabant, Oost – Vlaanderen (Gent), Rhône – Alpes (Grenoble) and Toulouse.

*The regions – promoters of knowledge* - are those which display a higher population density and high and sustained GDP growth rates. Often they consist of large urban areas, getting closer to the archetype of cosmopolitan regions and specialised urban zones. At the same time, these areas benefit from the agglomeration economies, specific not only to certain industries but also cross-sectoral. Based on a diversified, vibrant city atmosphere and an elaborate offer of consumption goods and services, even though difficult to be quantified, the urbanisation economies have a great importance. As centres promoting knowledge and ICT, these city regions are open to international activities, offer the best career opportunities, attract skilled and talented workers, determine naturally a good correlation between labour demand and supply, are characterised by high quality of R&D, of entrepreneurial relations, new firm formation, registration of a great number of patents. This kind of regions – as one may very well notice the case of London and Paris – present also considerable disadvantages of urbanisation, such as the high level of wages, demographic congestion, high housing costs and high rates of crime. However, these drawbacks are counterbalanced by the special

quality of human resources, by the excellent access to international markets and information, to venture capital, to business services and by the cultural amenities.

Such a typology represents a useful tool for a better understanding of the mechanisms of regional competition and competitiveness.

Moreover, by means of a large data base, built-up for the NUTS2 level and of extremely elaborated statistical and econometric instruments, the research done by Cambridge Econometrics has succeeded to place at the disposal of the General Directorate for Regional Policy of the European Commission a highly valuable material for assessing RC and interregional disparities. It has contributed to the objective underlying of the economic and social cohesion policy, which has set convergence – competitiveness – cooperation as basic priorities of the 2007 – 2013 financial exercise.

### **Brief conclusions**

In its widest acceptance the territorial competition refers to the actions undertaken by the economic agents in a certain territory so as to ensure the raise of the living standard of inhabitants in the respective area. It takes place at different levels: city, region or state level. The territorial competition, defined this way, is in direct correspondence with the notion of territorial competitiveness (at regional and/or international level): the latter represents a measure of a territory's potential to achieve high, sustainable rates of living standard growth in the respective area.

Usually, the competitiveness of national economies is measured by means of a wide set of indicators, the countries being ranked on a complex index basis. The respective index represents a weighted average of the partial indices employed. The calculations performed by the World Economic Forum (WEF) and by the International Institute for Management Development (IMD) and resulted hierarchies are most frequently taken into consideration. Although it has been emphasized that the measurement of competitiveness on the basis of a too great number of indicators is not as relevant as the one based

on a set of fundamental, target-indicators, the two institutes use more than one hundred indicators, collected from official statistics and surveys done with business people in over 50 countries. One the main sources of differences in the hierarchies provided by the two organisations is the stronger emphasis that the former places on the aspects relating to technology innovation and technology transfer as important factors for countries' differentiation in the global competitiveness arena. As regards the analysis of regional competitiveness, two different categories of studies have been identified: the first one considers the RC as the cumulative result of more determinant factors, while the second category is focused on single driver of RC.

The typology of regions based on the key-factors of competitiveness has revealed three essential types: regions as production sites, regions – sources of increasing returns and regions – promoters of knowledge. Such a typology represents a useful tool for a better understanding of regional competition and competitiveness mechanisms and for stimulating the decision-makers to concentrate to a greater extent on the need to support ICT and knowledge-based activities within territorial networks.

On the whole, the research performed in the international arena aiming to quantify the territorial competitiveness has proven its usefulness in underlying the economic and social policy at national and regional level. A suggestive example in this respect is the European Union's economic and social cohesion policy, which will concentrate on convergence – competitiveness – cooperation in its next programming period.

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