THE COMPETITIVENESS AND ITS MEASUREMENT BY MEANS OF THE PYRAMID MODEL

Tünde Orsolya Nagy

Department of Accounting and Finance, Faculty of Economic Sciences, University of Debrecen, Debrecen, Hungary
nagytundeorsolya@gmail.com

Abstract: The competition itself, the fighting for the scarce resources is as old as the mankind. However, the naming 'competitiveness' has been present in the specialized literature since the 1980s. Nowadays, by crescendo of the international competition, concept of the competitiveness has become increasingly important among the decision makers at national economic and corporate levels alike. However, almost everyone means something different by competitiveness, even the researchers dealing with it have not created a uniform definition accepted by everyone. Most of them have worded their competitiveness definition with regard to corporate and national economic levels. The localization appears more pronouncedly in the economic formed and changed by effect of the globalization; economic roles of the regions, sub-regions are increasingly revaluated. This procedure is also mirrored by the competitiveness-themed theoretical and practical researches of the recent years; a significant part of them is aimed at some local levels. Topic of present treatise is the investigation of competitiveness of the regional level, among the local levels. This choice is justified by the fact the European Union decides about disbursement of the financial sources improving the competitiveness, with regard to the regional level NUTS 2. Models dealing with examination of the regional competitiveness can basically be grouped around two basic models. Members of the model family built on the benefits have largely a case study nature while the pyramid model to be presented belongs to the so called input-performance-output models. Basis of the model is the success factors which influence the region's competitiveness in a long term through metastases. And the success factors determine such basic factors as the research-development; the organizational background of the region's economy; investments from the outside; infrastructure and human capital; as well as the institutions and social capital. At next level of the model, there are such index numbers suitable for establishing the competitiveness sequence as the income, employment and labour productivity. On top of the pyramid, there is the last purpose of the competitive economy which is to increase the society's quality of life, standard of living. The final part of this essay will show the connection of the basic categories and basic factors of the pyramid model, through the example of Northern Great Plain region Hungary. According practice of the EU, GDP per capita is the basic category which determines the developmental sequence of the Hungarian regions. Presentation of the basic factors happens based on the most recent data (regarding to 2012/2013) of KSH (Központi Statisztikai Hivatal – Centrals Statistical Office) sorted by area. The treatise is of theoretical nature and partially based on an empirical research.

Keywords: competitiveness, regional competitiveness, pyramid model, Northern Great Plain region

JEL classification: R11, O18

1. Concept of the competitiveness and its different levels

It is not an easy task to define concept of the competitiveness in an exact way. A uniform definition accepted by everyone cannot be found in the specialized literature dealing with the theoretical and practical examination of the competitiveness. By wording of Ádám Török, an illustrious researcher being engaged in questions about the competitiveness since '80s, "this concept cannot be deduced from either basic paradigm of the economics i.e. in point of fact, it cannot be defined theoretically" (TÖRÖK, 1999).

Defining the concept can be performed at different levels. In a narrow sense, it can be determined in one sentence or in more detail via drawing up the factors of competitiveness. The third level already deals with different possibilities of measuring the competitiveness.

From among the persons being engaged in concept of the competitiveness, Ádám Török and Michael Eugene have worded such a definition which deals with the corporate and national/regional levels of competitiveness equally. According to Ádám Török, "concept of the competitiveness means, at micro level, the ability to gain positions in a competitive market and to hold on among the individual companies, their competitors as well as the single national economies from a macroeconomic point of view" (TÖRÖK, 1999). On the contrary, Michael Eugene defines the competitiveness as a totality of the institutions, policies and factors determining the quality of a country's productivity (PORTER – SCHWAB, 2008).

Other researchers determine the definitions of competitiveness referring to different levels of the competitiveness. For example, Erzsébet Czakó has worded a corporate-level definition widely accepted, according to which "the corporate competitiveness is the ability of a company which can permanently proffer the consumers such products and services, by complying with the norms of the social responsibility, that the customers are prepared to pay for, rather than for products (services) of the competitors, under conditions ensuring profit for the corporation. Condition of this competitiveness is that the company should be able to sense the changes in the environment and within the company and should be able to adjust to these changes by fulfilling the market competition criteria" (CZAKÓ, 2005). According to the national economic competitiveness definition of Attila Chikán, "the national economic competitiveness means that part of a national economy which, in accordance with the requirements of the international trade, is able to create, produce, distribute and/or provide products in such a way while the proceeds of its own producing factors are growing" (CHIKÁN, 2006).

Consequently, based on the specialized literature, the competitiveness can be divided into four levels:

- corporate;
- regional;
- national;
- supranational level.

The corporate competitiveness means the competitiveness of each concrete corporation; the regional competitiveness applies to a given country's region. Otherwise, the regional competitiveness can also be construed as a totality of competitiveness of all the companies functioning in the area. The next category embracing the regional levels is the national level (LENGYEL, 1999). We can often find the naming 'macro-level competitiveness' in the essays about competitiveness of the countries (MEYER-STAMER, 2008). The competitiveness can be examined in case of the cross-border areas as well. By means of the different mathematical models describing the spatial structure of Europe, we can easily imagine the areas meaning a so-called meta-level. For example, the "boomerang" appearing in the middle of Europe may be known for many people. Certain authors define these cross-border areas as a regional level (GORZELAK, 1996).

2. Measuring the competitiveness with the aid of the pyramid model

The approach of competitiveness, including the regional competitiveness, increasingly appears in the European Union. The importance of regional competitiveness is even more highlighted by the cohesion reports published every three years as well as the regional periodic reports dealing with the regions purposefully. The regional politics has a continuously increasing role within the EU's policy, the most important purpose of which is to moderate the developmental differences of the areas, thereby strengthening the economic and social cohesion between the member states (FORMAN, 2001).

The European Union represents the competitiveness of the individual regions by the means of value of GDP (gross domestic product) per inhabitant. However, it is to be highlighted that the application of the GDP per head as an index-number measuring the competitiveness can lead to distorted results. It does not take the community role of the social relationships and households into consideration since effects of processes taking place here cannot be measured by instruments of economics. GDP is not able to denote whether the society has moved towards the appointed goals, and if so, what the extent of displacement is (DABÓCZI, 1998).

The models measuring the regional competitiveness can basically be divided into two groups. As a starting point, one group of the models uses a basic model built on benefits and the other one applies the input-performance-output triple structured system of Huggins. The competitiveness analyses built on benefits are basically of case study nature; these ones try to present the best practice. Porter's model presenting the competitiveness benefits of the nations is a good example which describes the expected development paths of nine countries based on four countries' success stories in the industry (PORTER, 1998). Essence of the input-performance-output models is the building on each other. The inputs determine the level of economic performance, the competitiveness. Growth of the economic performance and the increasing competitiveness help to increase the wages and to reduce the unemployment. Building of the model's elements on each other is illustrated by the following figure.
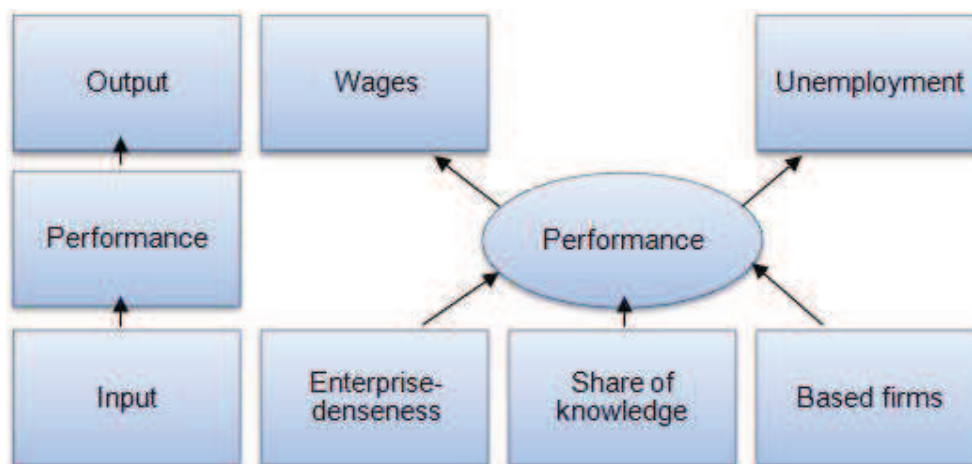
Figure 1: Logical structure of Huggins' input-performance-output model
Source: Own edition, based on (HUGGINS 2003).

The pyramid model, which I would like to delineate, belongs to the input-performance-output models and it is built on the competitiveness definition drafted by OECD (Organisation for Economic Co-operation and Development). It is about that "the

competitiveness is an ability of companies, industries, regions and supranational regions to create a relatively high factor income and a relatively high level of employment on a basis of sustainability, under international competitive conditions" (LENGYEL, 1999).

Figure 2: Structure of the pyramid model
Source: Own edition, based on (LENGYEL 2003).

Three basic categories meaning the competitiveness in the model are the income, the labour productivity and the employment.
In the EU's practice, the expression of the income generated in a region is performed through the regional GDP which means the primary income produced by firms having registered office, branch office in the region. However, the owners can take these incomes out of the region. For this reason, the income de facto available for the populace is more accurately determined by the regional NDI which is the total income realized for the people living in the region and having permanent residency (LENGYEL, 2003). However, the relevant regional statistics currently does not provide enough information to calculate the regional NDI.
In spite of the occasional distortions, GDP per capita is suitable for establishing the competitiveness sequence of the regions and it expresses the connection between the labour productivity and the employment in accordance with the uniform concept. There is an extraordinarily narrow connection between the regional GDP, labour productivity and employment meaning the basic categories, a change in either of them can cause a change in one of the other two categories.
At time of establishing the competitiveness sequence, the behind the values of different GDP per capita belonging to the individual areas should be investigated as well.
Five basic factors have an indirect effect on the competitiveness:
- the research and development;
- the organizational background of the region's economy;
- investments from the outside;
- infrastructure and human capital;
- institutions and social capital.

New technologies, products, innovative solutions could be suitable for obtaining a competitive advantage for a corporation, enhancing the profitability of its activity, retaining or increasing its market share. Of course, the companies performing extended

researching and developing activities can improve the competitiveness of a given region. Beyond R&D activities, from aspect of competitiveness, role of the small and medium-sized enterprises is also significant by maintaining the employment primarily. An important indicator for the development of a region is the ability to attract capital. The functional capital arriving from abroad contributes to enhancement of the region's competitiveness by means of creating new jobs. Furthermore, the competition intensifies, stimulating the other managing organizations for effectiveness. Beyond the basic factors mentioned already, the region-specific infrastructure and human capital as well as the institutional system and social capital can also influence the competitiveness. Besides the technical infrastructure (transport, telecommunication networks), quality of the institutional system responsible for developing the human capital is much higher in the more competitive regions. Areas provided with similar factors can show significant differences in the competitiveness for the different operation of institutional system, due to the communicational effectiveness. Competitiveness of the institutional system is closely connected with the region's competitiveness, namely "the features of social organization such as trust, norms and networks" (EC, 1999).

The success factors mean the basis of model which influences a region's competitiveness in longer term through metastasises. Upper level of the success factors has a close connection with the basic factors – these are mainly aspects of economic nature: economic structure of the region; whether the servicing sectors producing high added-value are present; what kind of the innovation culture is. Beyond these, the following factors are decisive: the region's accessibility, geographical location, transport connections as well as availability of the adequate skilled labour force. Beside aspects of economic nature, the competitiveness "is also influenced by number of factors which represent aspect outside economic rather. Lower level of the success factors embraces these social-environmental-local conditions affecting the regional development for a long time period" (EC, 1999).

Overall, the pyramid model is a well-structured model depicting the coherences in a logical way. However, it is to be highlighted that measurement distortions can come into being at application of the model since the total group of the basic categories and basic factors cannot be measured accurately by means of the information available in the territorial databases.

3. Presenting the relation between basic categories and basic factors the pyramid model through the example of Northern Great Plain region

In Hungary, the different level territorial units were already established at the end of the '90s, in accordance with the EU'S five-degree NUTS (Nomenclature of Territorial Statistical Units) system allowing a uniform territorial ranking. The developed seven **NUTS 2-level planning-statistical regions have an outstanding importance because this level is linked to the whole supporting regulation and submitting conditions of the tenders for demanding support (KOVÁCS, 2000).**

GDP per capita means the basic category on basis of which the competitiveness sequence of Hungary is established. The available GDP per capita data show that each area of Hungary has been developing with varying degrees since the change of regime. The Central Hungarian region is developing above the national average, Central and Western Transdanubia are the most advanced among the rural regions while the Northern Great Plain and Northern Hungarian regions are at the end of the developmental sequence. This trend did not change in 2012 either as you can see on Sheet 1 below. Disadvantage of the regions lagging behind, therefore of the Northern Great Plain region is steadily growing, the GDP per capita was only 63.9% of the national average in 2012.

Sheet 1: Value and distribution of GDP by regions in 2012

Regions	GDP, million HUF	Distribution, %	GDP per capita, thousand HUF
Közép-Magyarország	13 795 721	48,32	4 681
Nyugat-Dunántúl	2 872 966	10,06	2 917
Közép-Dunántúl	2 740 682	9,60	2 543
Dél-Dunántúl	1 809 695	6,34	1 951
Dél-Alföld	2 521 801	8,83	1 951
Észak-Alföld	2 752 839	9,64	1 841
Észak-Magyarország	2 055 096	7,20	1 720
Country in total	28 548 800	100,00	2 878

Source: Own edition, based on (KSH 2015)

Area of the Northern Great Plain region, which includes Hajdú-Bihar, Jász-Nagykun-Szolnok and Szabolcs-Szatmár-Bereg counties, is 17 729 square kilometres, its population is around 15% of the total national population thus this is the second biggest and simultaneously the most populous rural region of the country (BARANYI 2008). Intensive agricultural activities can performed on 60% of its area. Despite its advantageous abilities, it is in the next-to-last place of the regions' competitiveness sequence.

Presentation of the features causing the Northern Great Plain region's competitiveness disadvantage happen based on (KSH 2015, pages 9-24). The source contains the most recent (regarding 2012/2013) time-serial annual statistical data of KSH, sorted by area.

According to the available data, 4 basic factors affecting the development will be presented henceforth:

- organizational background;

In Hungary, a powerful concentration characterizes the distribution of numbers of enterprises. Of course, the largest number of enterprises was and is present in the central areas. 34.17% of the more than 1 million 666 thousand profit-oriented enterprises had registered offices in the central region in 2013. The concentration is more powerful with regard to the joint enterprises; dominance of Central Hungary and the Transdanubian areas is even more evident. This degree of the joint enterprises' presence results in a high level specific economic performance. If number of the joint enterprises is extrapolated onto thousand capita then situation of the Transdanubian regions appears more favourable in comparison with Central Hungary.

Considering the main activity of the enterprises, the services sector is the most representative in each region; its measure is more than 80% in the Central Hungarian area. Most of the enterprises performing an industrial activity operate, in addition to the Central Hungarian region, in the Southern Great Plan regions and in the middle part of Transdanubia. 40% of the enterprises performing an agricultural main activity have their registered offices in the two mentioned Great Plain regions.

- capital investment from abroad;

Value of the foreign capital per capita shows significant divergences in respect of the individual regions. Far fewer foreign capital arrives in the less developed regions than in case of the Central Hungarian, Western and Central Transdanubian areas since the abilities of the less developed areas are far worse in respect of infrastructure, economy as

well as available labour force. In 2012, the capital stock arrived in the areas exceeded 18 trillion HUF, more than 60% of it operated in the enterprises having their registered offices in Central Hungary and 18.6% in the ones having their registered offices in the Western Transdanubian region. Share of the Northern Hungarian enterprises was 3.7% (KSH 2013a).

- transport infrastructure, human capital;

In our country, the most common mode of transport is the road transport in point of both passenger and freight transports. At the end of 2013, the length of the national road network was 31 760 km, its main part (23 160 km) was side-network. Road density of the main network is different by regions. With regard to network of the main roads, Western Transdanubia possesses the most favourable value, the motorway network is the most extensive in Central Hungary, fifth of the total network is concentrated there. Northern Great Plain has the shortest motorway section. Expressway can be reached within 10 minutes only from 14% of the Hungarian townships, more than fourth of these townships can be found in Southern Transdanubia. Based on data of 2012, less than 5% of the Great Plain townships lie in such a close distance from one of the expressways.

Beside the transport infrastructure, quality of a given region's human resources is extremely important as well. Within the population, rate of the people completed only the eighth class of the primary school or finished a vocational training school show significant territorial roughness. In the economically disadvantaged regions, their rate within the employees is well above the average, for example it exceeded the 45% in the Northern Great Plain region in 2012. We need to highlight that the rate of the people completed only the eighth class of the primary school (14.2%) is the highest in this region. In 2012, number of the people with higher education increased within the total population of Hungary, it was and 1.7 in case of those who have a high school graduation and 4.3% in case of those who have college or university degree (KSH 2013b). The growing was the biggest (8.1%) in Central Transdanubia and the lowest in Northern Great Plain (4.0%).

- research-development;

Measure of the sources on the research-development is another important indicator for development and competitiveness of a given area. Value of the researching expenditures calculated on current prices has been continuously increasing since the millennium, the amount sorted by regions was 414 741.1 million HUF in 2013. More than 60% of this amount has been spent on R&D activities in the Central Hungarian region. This is not surprising because the following things has a key role in forming the territorial differences of research and development: a given region's number of the enterprises performing innovative activities, development as well as researching activity of the institutional system for the higher education. In 2013, more than 50% of the research-development places with the most headcounts functioned in the Central Hungarian region. 9.58% of the research-development places operated in the Northern Great Plain region and number of the employees was 2624.

4. Summary, proposals
The persons dealing with theoretical and practical researching of the competitiveness defined the concept of competitiveness generally at corporate as well as natural levels. In the extending global competition, there is a bigger and bigger importance of conception definition and examination of the regional competitiveness.
During the past few years, models suitable for examining the regional competitiveness have been published in the specialized literature in large number. According to the pyramid model presented in this essay, in Hungary, sequence of the competitiveness was determined based on GDP per capita. The most recent available data regarding

2012/2013 show that the economic performance of the Northern Great Plain region is greatly lagging behind the more developed regions of Hungary. The Northern Great Plain region is one of the most disadvantaged regions of our country; it gets to grips with challenges for creating all conditions of the economic recovery so its capital attracting ability is extremely low. The lower wages and the main subventions are not enough attractive for the companies.

Significant part of the foreign enterprises arriving in the disadvantaged regions of Hungary are present as a so-called industrial transplant, they do not want to build up any connections with the Hungarian economy (IVITZ et al., 2014).

This temporality is symbolized by the fact that these enterprises mainly rent the area of activity, the production hall and even the labour force so they are able to move to another country in a short time in case of more favourable conditions.

The investment in innovation, the intensified support for developing the human resource and other non-material productive factors are required in order to increase the region's competitiveness. Such conditions need to be established in the Northern Great Plain region that are attractive for those large companies which wish to operate not just as an assembly plant but they want to build diversified connections with the companies thus they can become motors of the Hungarian economy.

References

Baranyi, B. (2008) *Regionalizmus Magyarországon*. In. Baranyi Béla (szerk.): Észak-Alföld. Dialóg Campus Kiadó, Pécs-Budapest, pp. 517.

Chikán, A. (2006) A vállalati versenyképesség mérése. *Pénzügyi Szemle*, vol. 51, no. 1, pp. 42-54.

Czakó, E. (2005) *Versenyképességi programok néhány tanulsága a kormányzati szféra számára – az Ír Versenyképességi Tanács és a Lisszaboni Stratégia, Versenyben a Világgal 2004 – 2006. 11. sz. műhelytanulmány.* Versenyképesség Kutató Központ, Budapest, p. 34.

Dabóczi, K. (1998) A mérhető balgaság, avagy miért nincs olaj a közgazdaságtan lámpásában? *Kovász*, vol. 2, no. 2, pp. 32-57.

EC (1999) Sixth Periodic Report on the Social and Economic Situation and Development of Regions in the European Union European Commission, Luxembourg, p. 242.

Forman, B. (2001) *Az Európai Unió strukturális és előcsatlakozási alapjai*. Európai Bizottság Magyarországi Deklarációja, Budapest, p. 397.

Gorzelak G. (1996) *The Regional Dimension of Transformation in Central-Europe.* Jessica Kingsley, London, p. 152.

Huggins R. (2003) Creating a UK Competitiveness Index: Regional and Local Benchmarking. *Regional Studies*, vol. 37, no. 1, pp. 89-96.

Ivitz, M., Katona, K. and Schlett, A. (2004) Vonzó-e Magyarország külföldi működőtőke számara? In. Botos Katalin (szerk.): Pénzügyek a globalizációban. JATEPress, Szeged, pp. 62-73.

Kovács Tibor (2000) Magyarország régiói. Statisztikai Szemle, vol. 78, no. 12, szám, pp. 945-962.

KSH (2013a) *A gazdasági folyamatok regionális különbségei, 2012*, [Online], Available:http://www.ksh.hu/docs/hun/xftp/idoszaki/regiok/debrecengazdfejl/debrecengazdf ejl12.pdf [16 March 2015].

KSH (2013b) *A foglalkoztatottság és a munkanélküliség regionális különbségei, 2012, [Online], Available:* http://www.ksh.hu/docs/hun/xftp/idoszaki/regiok/debrecenfoglmunk12.pdf [16 March 2015]

KSH (2015) *A gazdasági folyamatok regionális különbségei, 2013*, [Online], Available: http://www.ksh.hu/docs/hun/xftp/idoszaki/regiok/debrecengazdfejl/debrecengazdfejl13.pdf [16 March 2015]

Lengyel, I. (1999) *Régiók versenyképessége (A térségek gazdaságfejlesztésének főbb közgazdasági fogalmai, alapgondolatai, tényezői az EU-ban)*; Kézirat, JATE Gazdaságtudományi Kar, Szeged, p. 66.

Lengyel I. (2003) *Verseny és területi fejlődés: térségek versenyképessége Magyarországon*. JatePress, Szeged, p. 454.

Meyer-Stamer J. (2008) *Systematic Competitiveness and Local Economic Development,* [Online], Available: http://www.meyer-stamer.de/2008/Systemic+LED_SouthAfrica.pdf [16 March 2015].

Porter M. E. (1998) *The competitive advantage of nations.* MacMillan Press Ltd., London, p. 855.

Porter, M. E. and Schwab, K. (2008) The global competitiveness report 2008-2009, *World Economic Forum Geneva*, Switzerland, p. 500.

Török, Á. (1999) *Verseny a versenyképességért? Bevezetés a mikroszféra-kezelés gazdaságpolitikájába az Európai Unióban és Magyarországon.* Miniszterelnöki Hivatal Integrációs Stratégiai Munkacsoport, Budapest, p. 247.