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## Selected regional competitiveness assessment models

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**Abstract:** The paper attempts to present selected regions competitiveness assessment models and measures that they use. The paper is a theoretical deliberation based on the subject literature, and consequently, data processing and logical reasoning methods were applied. The subject literature has numerous definitions of regional competitiveness, which affects exposing determinants in the regional competitiveness measurement and competitiveness.

**Keywords:** regional competitiveness, regional competitiveness assessment models, regional competitiveness determinants.

## 1. Introduction

Regional development or changes in local environment of companies are often inspired by competitiveness of adequate entities. From the regional perspective, competitiveness is variously perceived by researchers, who, trying to define it, stress various aspects. In the opinion of Filipiak et al. [5], competitiveness may be defined as the ability to adapt positive trends appearing in the environment, which create internal and external benefits (development of entrepreneurship, creation of regional growth). Regional competitiveness is defined slightly different by Stawasz [14] who perceives it more as an advantage over other regions resulting from the attractiveness of service offer addressed to present and potential users, namely inhabitants of the region, companies, investors and visitors. In addition, the aforementioned author indicates that a source of



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competitiveness may be a modern material, institutional and intellectual infrastructure of the region. Therefore, competitiveness results from strengths, namely the most important strengths of the region whose source lays, among others, in the educational system, economic structure and in the infrastructure. Competitiveness may be defined as the ability of companies, industries, regions, nations or transnational groups that enables them to equal international competition. It is reflected in ensuring a relatively high rate of return on the applied production factors and relatively high employment with fixed bases [10, 6]. In view of the above, a competitive region is a region in which the level of knowledge, defined as the ability to anticipate needs and explore a new combination and application of the existing or new tangible resources, enables structural advantage to be created and products to be commercialized [2, 8].

From the regional perspective, competitiveness is a complex and multi-aspect phenomenon, and thus measurement and assessment consider many forms of measures. Determination of competitiveness measures at the regional level enables assessment of the condition of a province and/or region, which, in turn, contributes to building an effective strategy ensuring greater competitiveness. However, in the subject literature there is no consent as to the competitiveness measures that would show this phenomenon best. The presented paper is a theoretical deliberation based on the subject literature and in consequence with that data processing and logical reasoning methods were applied. The purpose of the paper was an attempt to indicate regional competitiveness determinants in the selected models.

## 2. Regional competitiveness measures

Regional competitiveness measures and an attempt of their systematization are a relatively popular subject of deliberations. The classifications of regional competitiveness measures take account of various criteria [15], i.e.:

- time (static and dynamic measures),
- measurement method (*ex ante* and *ex post* measures),
- method of competing – in this case measures include price competitiveness measures, non-price competitiveness measures and measures that take account of cumulative effects of price and non-price competitiveness (the basis of which is capital turnover balance and technical knowledge turnover balance),
- degree and scope of data aggregation (e.g. simple measures – partial measures, and synthetic measures built on the basis of partial measures).

Due to the criterion of time, measures have also been divided into static and dynamic. This division is more and more often skipped because in the analytics it has become popular to use aggregation statistics data. This method consists in researching changes in fixed measures that occur in the analysed periods (e.g. month after month) in the past. An example of static measure applied in the aforementioned analysis may be level of income *per capita*. The measurement method criterion presents *ex ante* measures that may show forecasting of dependencies between the savings rate and the investment rate. On the other hand, in the *ex post* approach in the analysis it is possible to use the number of the employed in relation to their effective work.

The last criterion of level and scope of combining statistical information divides measures into simple and synthetic. Synthetic measures refer both to the past and the future. They are created on the basis of simple (partial) competitiveness measures. Similarly, it applies to measures used for measurement of international competitiveness *sensu stricto* where, beyond the listed criteria, an additional criterion of the type of competition is included. The measures in this approach are divided into two types. The first type distinguishes methods and measures regarding non-price and price competitiveness and measures that examine the sum of effects of their common competition. The second division divides measures connected with results of activities of the regulatory area and the real domain. Szółek [15] is of the opinion that the measures used to measure competitive position supplement measures used when measuring competitive capacity and competitiveness *sensu stricto*.

In the opinion of Łaźniewska et al. [11], a frequent index assessing regional development is GDP *per capita*. This index makes it possible to note disproportions between the regions. Additionally, the level of this index does not always reflect the real level of development of e.g. a province. It is caused by the fact that GDP *per capita* is designated per one inhabitant, i.e. people who work in the given area, create size of this index, and in reality do not necessarily live in a particular territory. Some of them may be commuters. As a result, greater cities can have an overrated level of this index and for rural areas, from where mainly population emigrates in the search for work, this index can be underrated. The analysis of results of larger areas like regions does not have to detect inter-regional disproportions in this respect. At the regional level, the results achieved can also be compared using value added value, which comprises GDP. However, since different regions have different prices, it should be adjusted by means of present price deflator.

The issue of regional competitiveness measurement is difficult in its assumptions. For this reason e.g. slightly different measures will be used to measure competitive capacity, while other measures will be used to determine competitive position. Therefore, the measurement of competitive capacity will be based on considering changes occurring mainly in the economic environment of the region, namely it will examine their growth. On the other hand, the determination of the competitive position requires *ex post* data to be taken into

account. A helpful hint in the interpretation of the received analysis results is information about the fact that the region that obtained high results in the competitive position ranking as compared to other regions is far more competitive, also in terms of competitive capacity. It is worth mentioning that to measure both competitive capacity and competitive position the following measures can be used: level of unemployment, level of inflation, level of income diversification, share of current turnover deficit in GDP, share of budget deficit in GDP, GDP *per capita* at purchasing power parity [16].

### 3. Regional competitiveness assessment models

In the subject literature [11] it is indicated that measurement of regional competitiveness using indexes should be organized. Therefore, it is required to:

- Select the best method which will enable factors determining regional competitiveness to be identified and put together.

- Specify indexes that will be used for measurement.
- Group factors.
- Determine impact of particular factors on each other.
- Specify the manner of acquiring data needed for measurement and calculations.
- Determine data standardization methods.
- Diagnose and ascribe weights to individual factors.
- Determine a mathematical formula of index function.

The regional competitiveness assessment may make use of decomposition of general competitiveness and construction of special and synthetic indexes and measures of competitiveness [12]. Decomposition of competitiveness makes it possible to identify factors that affect greater regional competitiveness. Czaplicka – Kolarz et al. [4] claims that presently competitiveness is measured by the effect of many economic phenomena, social processes, development policies, however, it does not arise only from smart specialization. The sources of growth in regional competitiveness may be an enormous number of socio-economic phenomena, random events, etc. As a result, it is impossible to build a simple model of interrelations like: progress in specialization – enhanced competitiveness. Moreover, conclusions regarding the possibility of presence of competitive advantages in particular areas, namely possible specialization, are drawn on the basis of comparisons of the condition/trends of a given factor with the trends in other regions, because synthetic indexes/measures themselves concerning regional competitiveness do not inform about the directions of specialization and market niches.

The assessment of regional competitiveness requires knowledge of the mechanisms of creating competitiveness as well as variables describing both competitive capacity and competitive position. The presented competitiveness models refer to the microeconomic, mezo-economic and macroeconomic scale. In addition, in all models a dependent variable is competitive position obtained by a region, and independent variables are factors of competitive capacity. As a result, competitiveness models were presented taking account of a specification of factors describing a competitive position and factors forming competitive potential. Models directly referring to the regional level include, among others, the following models: competitiveness pyramid, European Competitiveness Index (ECI), competitiveness hat. Models that use for competitiveness assessment one synthetic index, whose formula includes a set of detailed factors are, among others, the following models: competitiveness factors of the World Economic Forum (WEF), International Management Development Institute (IMD), World Bank, assessment of competitive capacity by Bieńkowski and the Irish National Competitiveness Council. A model that presents assessment of competitiveness on the microeconomic scale is, e.g. Porter's diamond [9].

Non-standard approach to the discussed issue is presented by the Irish National Competitiveness Council. In this case, the concept of competitiveness is identified with success on markets which results in general growth in welfare (...); these markets cover international flow of goods, capitals and services. Companies from different countries compete with each other on the international market of goods and services. The international trade has been expanding and deepening thanks to reduction in tariff barriers. Countries compete on the capitals market to attract the greatest foreign direct investments.<sup>1</sup> This definition emphasizes both the role of countries and companies, whereas the task of the state is to create business environment fostering investments and economic development, while entrepreneurs should use competitiveness strategies that guarantee them market success [13]. According to the Irish National Competitiveness Council, regional competitive potential is determined by: activities of companies, productivity and innovations, prices and costs, supply on the labour market, environment for business, physical infrastructure and knowledge.

The competitiveness pyramid is a very popular model used to describe regional competitiveness. It was prepared by the European Commission in 1997. It is a concept that presents the factors determining the achieved level of competitiveness, classified into indirect and direct factors. Czaplicka-Kolarz et al. [4] notices

<sup>1</sup> <http://www.forfas.ie/ncc/reports/ncc/what.htm>.

that this model presents interactions between competitiveness sources (among others, social and economic sources, e.g. innovations), development factors (disclosed competitiveness) and the target results (e.g. standard of living, welfare measured by e.g. GDP per capita). This model determines competitive potential by using: employment structure, culture of innovation, regional availability, employee skills, social structure, decision centres, quality of the environment, social consistency of the region and foreign trade activity. On the other hand, the competitive position is defined by: GDP, productivity level as well as employment level. In the opinion of Jeliński [7], the meaning of each of these factors, impact and their configuration are variable in time. Additionally, once obtained competitive advantage must be developed, maintained and defended to avoid its depreciation.

A slightly different concept was prepared at the Cambridge Econometrics ECORYS-NEI and it was called a model of competitiveness hat. In this case, the procedure is as follows:

- identification of regional results (e.g. GDP per capita, gross added value),
- indication of results/efficiency of regions (e.g. regional value added, profitability, market shares, unit labour costs),
- presentation of market structure (dependent on sectors operating in the region, specialization, distribution of companies and ownership),
- identification of the regional competitiveness potential whose components are basic infrastructure, human resources and production environment (among others, unit labour costs, profitability, sectorial market structure, infrastructure, production environment, institutions, technologies, innovativeness, entrepreneurship, internationalization, social capital, knowledge, culture, demography and migrations, quality of location, environment) [9].

The subject literature also mentions the European Competitiveness Index (ECI) that permits comparison and analysis of regional competitiveness. It is worth adding that competitiveness is defined as the ability of the economy to increase the standard of living for those who participate in it, through acquisition or increase in market shares in activities. This index is used to measure various dimensions of competitiveness at the regional level. It is because regions are basic spatial units, in which entities compete in order to attract investments. Then the competitive potential is defined by, among others: investment in R&D, number of the employed in knowledge sectors, productivity, GDP per capita, length of motorways, length of railway lines, number of vehicles. The regional competitive position is determined by: results of the economy, infrastructure and availability, employment in knowledge sectors and education<sup>2</sup>.

The model of regional competitiveness by A. L. Alarcon [1] seems a different concept: it is inspired by theories of international trade, technological changes and transformations in industrial organization. In this model analysis proceeds at four levels, which, in consequence enables identification of regional competitiveness. The first level – domestic, includes ideological and political doctrines, affecting the direction of changes determining development and economic policy (on a macro– scale) of the country. It is reflected in specific projects and undertakings on a regional and local scale. The second level – regional – considers characteristics of a broadly understood regional environment affecting the level of its competitiveness. This level includes, among others: internal demand and its characteristics, population potential, population education level, and technological base. Third level – sectorial – applies to sectorial structure of the economy (in particular to production sectors) and its change. The fourth level – entrepreneurship – includes basic standards affecting behaviour of business entities, shaping and implementing development strategy in companies [8].

The subject literature contains the terms of competitive capacity (which is identified with factor competitiveness) and competitive position (known as result competitiveness). In the opinion of Bieńkowski [3], the term of competitive capacity is a broader notion than competitive capacity, which may be presented using, among others: GDP, work efficiency, participation in the world trade, balance of payments and its structure. On the other hand, regional competitive potential is illustrated by: size, structure and effectiveness of use of production resources, socio-economic system, government's economic policy, international economic environment.

The World Bank's model, when describing competitiveness, indicates categories that will prove the presence of this phenomenon, i.e. general economic situation (assessment of GNP per capita and its distribution), economic dynamics (investments and growth in productivity, trade, competitiveness and structure of export, trade policy, government's role in the economy), financial dynamics (assessment of the public debt level, level of private indebtedness, market capital, inflation), infrastructure and investment climate (information and communication networks, physical infrastructure, socio-political stability), human resources (human capital, intellectual capital). However, it is indicated that regional competitive potential is reflected by: financial dynamics, infrastructure, investment climate, and human resources. On the other hand, competitive position is characterized by general economic situation and economic dynamics [4, 9, 13].

Some approaches to regional competitiveness have been taken from reports of the International Institute for Management Development (IMD) and the World Economic Forum (WEF). These reports present strengths and weaknesses of a few dozen economies worldwide, which were then aggregated to obtain composite indexes

<sup>2</sup> <http://www.cforic.org/pages/european-competitiveness.php>

and, on this basis, international competitiveness rankings were prepared. In the model of the International Institute of Management Development, competitive potential of a region is expressed in: government efficiency, management effectiveness, infrastructure, finance, science and research, and human resources. On the other hand, a competitive position is determined with the use of: situation and internationalization of the economy. According to the Model of the World Economic Forum, the potential includes: institutions, infrastructure, macroeconomic stability, health and primary education, education at a higher level and training, effectiveness of goods market and labour market, maturity of financial markets, technological readiness, market size, innovations, maturity of companies and their networks leading to a higher production effectiveness. The competitive position is determined by the openness of the economy.

In addition, quite often analyses of regional competitiveness use the Porter analysis model (Porter's rhombus or diamond). It consists of four groups of interrelated factors determining competitive advantages of a region at the microeconomic level, i.e.:

- production factors (among others, human resources, capital or natural resources, infrastructure: technical, administrative, scientific and technological-IT,
- role of the government,
- random events,
- character of domestic demand (shopping habits, etc.) or regional demand,
- presence of competitive industries in the region,
- strategy and ways of managing and competing of entities.

Assessment of the competitiveness development stage considers resources-investments-innovativeness-wealth [4, 9].

In the opinion of Czaplicka-Kolarz et al. [4], the objective of most presented models is to analyse growth potential affecting future possibilities, rather than result. It is compliant with intentions of the aforementioned authors, as, in their opinion, the model should examine regional potential development trends and forecast the impact of changes on a regional economic growth. The analysis of competitiveness in that perspective considers the impact of various factors on the creation of national income and thus constitute in this case a particular approach to the analysis of economic growth [4, 9].

#### 4. Summary

Currently, competition is a natural phenomenon, and competitiveness is a requirement of co-existence on the market. Therefore, discussions concerning competitive potential, sources of competitiveness or instruments of competing become a compulsory element in the market game of entities or regions. In addition, both entities at macro-, meta- or micro-level should take account changes occurring in the environment, in connection with the above must rapidly undertake adaptation actions. Flexibility and efficient searching for a gap on the market and knowledge of methods and tools ensuring identification of factors is necessary to ensure competitiveness. On the other hand, selection and use of regional competitiveness assessment model is supported by the decision-making process of an entrepreneur in the case of investment planning and development of their business.

#### Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.14254/2223-3822.2016.14-1.1>

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