UTILISATION OF BENCHMARKING TECHNIQUES FOR FUNDAMENTING DEVELOPMENT STRATEGIES IN THE MANUFACTURING INDUSTRY IN ROMANIA

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Abstract: Benchmarking is a method used to measure the products, services and processes in comparison to an entity recognized as a leader in terms of performance of its operations. Used in the years 1970-1980 in the strategic management of the company currently has proven to be increasingly useful in many areas, including in international analysis models. In the European Union benchmarking indicators are used especially in the digital economy and as perspective indicators for 2011-2015 (Eurostat, Database).

In the introduction we present and define forms of benchmarking, as well as a number of specific terms, which contribute to a better understanding of the content of this scientific work. Time series are used to highlight advances in labor productivity in EU countries, and the analysis is particularized for two countries: Romania and Germany. Quantitative data were collected from the source Eurostat website.

A comprehensive indicator at macroeconomic level is resource productivity, representing GDP in relation with domestic consumption of material (DCM). DCM measures the amount of materials used directly by an economy. It is presented in tabular form for all European Union countries and Switzerland, as evolving over a period of eight years.

Benchmarking method is used to highlight some differences (gaps) between EU countries regarding productivity and particularly the one between Germany and Romania is highlighted, concerning the performance of manufacturing industries. It is expected that this gap will diminish. The gap was highlighted by relevant graphics and interpretations. The second part of the paper focuses on comparative analysis of factors productivity using the production function. We analyze labor and capital productivity and other factors that determine the level of production. For highlighting the contribution of the labour factor we used the number of hours worked, considering that it reflects the analyzed phenomenon more realistically. For highlighting the contribution of capital factor we used as an indicator the capital stock in euros, available for Germany in the Eurostat database, and for Romania in the Statistical Yearbook 2009, expressed in RON, as comparable prices and then converted into euros at the average rate calculated by the NBR . The results for the entire manufacturing industry represent the basis for further expansion of benchmarking to the main components of this industry, especially automobile building, transportation vechicules, furniture, clothing, leather chemical, etc.., providing a scientific basis to fundament the economic policies including commercial ones.

Keywords: benchmarking, labor productivity, resource productivity, capital productivity, sustainable development strategy

JEL Codes: F15 - Economic Integration, F31 - Foreign Exchange, L6 - Industry Studies: Manufacturing

1. Introduction: Characteristics of benchmarking

Benchmarking - a process that aims at seeking solutions to enhance the performance of the organization, based on the best methods and procedures of the industry. Setting business goals based on optimal methods and procedures existing in the industry are an important factor in the success of business strategy.

Benchmarking techniques were originally developed in strategic management in order

to identify aspects through which one can compare an organization with similar organizations, even though they may function in a different industry or have a different target group of customers. In addition, benchmarking can be a valuable tool to identify areas, systems or processes that need improvement, which can take the form of a continuous development or of a dramatic change as business process reengineering.

There are several types of benchmarking, the most common being: - Technical benchmarking - involves identifying products and services capability, especially in comparison with similar products and services of leading competitors, market leaders, using a scale of 1-4 (4 being the best score) to quantify properties of products and services from your organization. If input data about products and services are difficult to obtain, they may be regarded as inappropriate to be competitive.

- Competitive benchmarking - involves a quantification of the main attributes, functions or values associated with products or services, so you can make a comparison between them and those of market leader (Sherman and Zhu, 2006)

- Functional benchmarking – represents using benchmarking methods to compare a particular business function in two or more companies (Lerna and Price, 1995). Camp (1989) defines it as a particular function comparison with best practices in that area.

Our aim is to conduct a study on industries in different countries using benchmarking. The research methodology consists of preparing the statistical series for a period long enough to show realistically the phenomena investigated, on productivity in EU member states and highlighting indicators of efficiency in manufacturing production in Romania and Germany. The indicators were estimated using the Cobb-Douglas function of production for the manufacturing industry in the two countries,

using data according to CAEN Rev.1.1 (including 2008).

2. Literature review

The International Association Global Benchmarking Network (GBN) is joining private and public institutions, non-profit or research organizations which have expertise in benchmarking. The role of this association is to share knowledge and capabilities in the field of benchmarking through exchange of experience between its members and promoting the best practices identified. Through the association's members, who are from different parts of the globe, the association keeps in touch with the current stage of development in the field of benchmarking and enhances the development of this branch of study.

In order to use benchmarking techniques it is essential to have a common understanding of specific terminology, which enable experts to express their ideas in a concise manner. In this respect GBN association has developed a glossary of terms. For a better understanding of this research paper, we considered necessary to present a selection of some relevant terms from the glossary of benchmarking terms, as it follows:

- Benchmarking Gap - represents the difference in performance between an activity conducted at a company and the same activity at other competitors on the market.

- Benchmarking of sectors - compares performance of two sectors, the purposes of comparison being to take best practices from one sector, and applies them to the weakest sector on that particular criterion.

- The productivity of capital - is an economic indicator of productivity, which measures the level of output (in euro or dollar) made for each euro/dollar invested in fixed assets. - Core competence - a company's strategic capability, which gives them a market advantage. - Productivity Benchmarking - provides companies with a systematic method to compile indicators of

economic growth in order to create a table of economic productivity used to identify activities and processes which do not add value, but represent an additional cost. Another important concept that will be used in the proposed research is that of labor productivity. The generally accepted definition of labor productivity is quantity of production obtained per unit of labor, which can be represented by the number of hours worked, number of employed persons (employees and other categories) or number of employees. The version which takes into account the number of hours worked is the most used, reflecting more realistic the phenomenon analyzed. The labor productivity determined using the number of employees, it is easier to calculate, but the quality of results is more modest. (Bolstorff and Rosenbaum, 2003)

Labor productivity can be determined for different representations of economic performance: total production or gross value added. We opted for the last presented expression of performance. Statistical data show significant differences between countries on this indicator.

3. Research Methodology

The research objective is to realize a comparative study between the performance of industries in different countries, and we chose Romania and Germany in particular. The research methodology consists in taking the benchmarking method, and apply it in research of industry performance, comparing different countries of the European Union (to complete the picture of the studied phenomenon, we introduced the comparisons also Switzerland). We sought to highlight indicators of manufacturing production efficiency in Romania, taking specific indicators in Germany as point of reference.

It should be noted from the very beginning that, during 2000 - 2007 (2008), for which we had available statistics provided by Eurostat, Romania has a notable gap compared with Germany.

4. Comparative analysis of labor productivity

Regardless of the calculation method (see Literature review), labor productivity is only a partial measure of productivity, showing the cumulative effect of several factors: mainly capital and intermediate consumption, and technological and organizational efficiency, economies of scale or potential growth in utilization of production capacity. A comprehensive indicator at macroeconomic level is resource productivity, representing GDP in relation with domestic consumption of material (DCM). DCM measures the amount of materials used directly by an economy. In table 1, this indicator is presented for the EU members and Switzerland for the year 2007 compared with 2000.

Table 1: Resource productivity in the years 2000 and 2007 in EU countries and Switzerland (EUR per kg)

	2000	2007		2000	2007
UE 27	1,21	1,3	Lithuania	0,44	0,43
UE 15	1,4	1,57	Luxemburg	2,78	4,32
Belgium	1,32	1,47	Hungary	0,45	0,6
Bulgaria	0,13	0,14	Malta	3	2,14
Czech Republic	0,33	0,42	Holland	2,16	2,6
Denmark	1,28	1,24	Austria	1,41	1,4
Germany	1,41	1,71	Poland	0,32	0,38
Estonia	0,32	0,27	Portugal	0,66	0,62
Ireland	0,63	0,66	Romania	0,18	0,14
Greece	0,88	0,98	Slovenia	0,48	0,46
Spain	0,93	0,9	Slovakia	0,4	0,49
France	1,64	1,8	Finland	0,76	0,79
Italy	1,25	1,6	Sweden	1,71	1,79
Cyprus	0,66	0,64	United Kingdom	2,11	2,54
Letonia	0,24	0,31	Switzerland	3,05	3,36

Data source: Eurostat, Statistics, Sustainable Consumption and Production

We observe that the pursued indicator values are dispersed (from 0.13 Bulgaria, 4.32 Luxemburg), for 18 out of 28 countries (including Switzerland) the value of indicators has increased, most important being in Luxembourg, United Kingdom, Switzerland, Germany and Italy; for other 10 countries the value of the indicator has decreased, highlighting a diminish of efficiency in resources utilization.

To emphasize the important differences between countries on the resource productivity and its changes over time, we presented in chart 1 a upwards ranking of countries by indicator values in 2007, based on data in Table 1.
It appears that both the EU 27 and EU 15 increased in resource productivity, and former socialist countries, now EU members, without exception, are at levels below the EU 27 average.
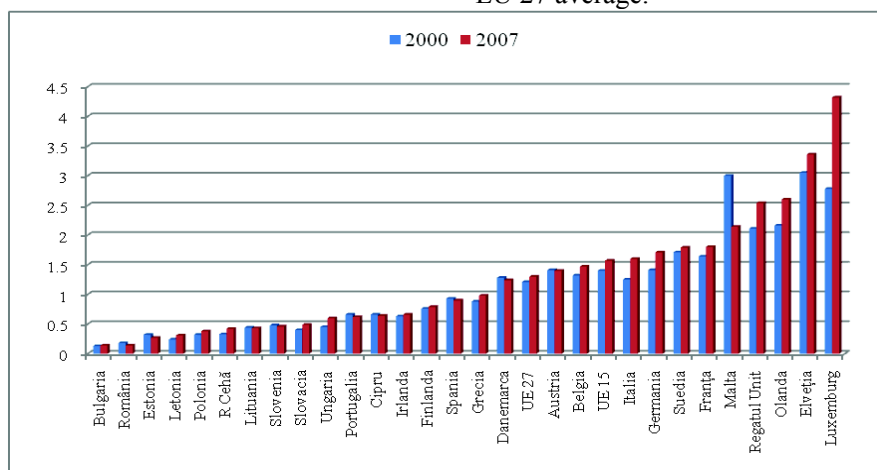

Figure 1: Comparison between the productivity of resources in 27 EU countries (and Switzerland) and Romania in 2000-2007
Source: Based on data from Eurostat Statistics, Sustainable Consumption and Production

Romania, as well as Bulgaria, is experiencing an amazingly low level of this indicator and, unlike Bulgaria, has recorded a decrease in time. Figure 1 shows a comparison between the evolution in time of the indicator in Romania and the European Union average.
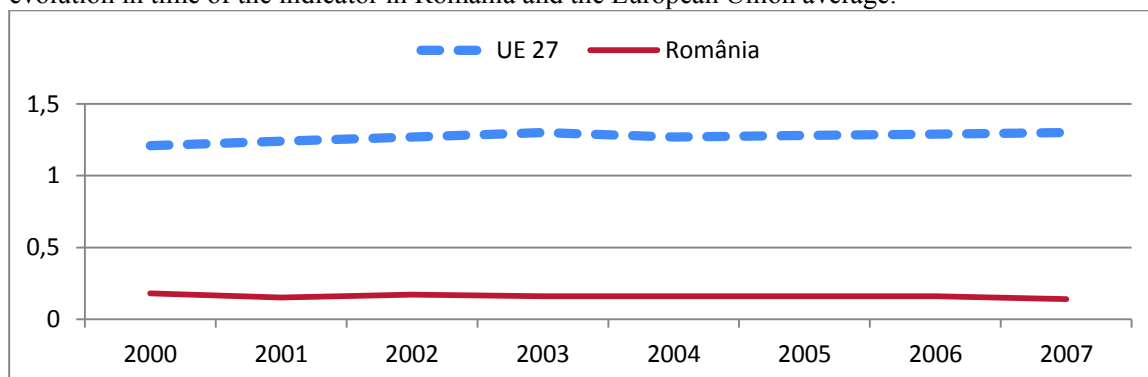

Figure 2: Comparison between the average productivity of resources in EU 27 countries and Romania during 2000-2007

Source: Based on the data from Eurostat, Statistics, Sustainable Consumption and Production

5. Capital productivity and capital stock
Capital productivity index shows the economic result (gross value added) produced by a certain amount of immobile productive capital.

To measure the capital stock involved in a production process, literature and empirical analysis recommends several methods:
- The flow of productive services provided by an asset in the production process;
- Gross stock of capital obtained by cumulating the investment flow, adjusted by the rate of removal from service of capital goods.
- The net stock of capital obtained by correcting the gross stock capital with the loss of productive capacity.

Given the availability of statistical data, we used the gross stock of capital to estimate the coefficients for the production function. In the process of estimating the production function coefficients, we have highlighted the contribution of other factors, besides labor and capital.

Multifactor productivity (MPF) allows the identification of distinct contributions of labor, capital, intermediate consumption and technology/efficiency to the final production. This contribution is shown by indicator PMF

- KLEMS (capital-labor-energy-materials-services), considered to be the most comprehensive measure of efficiency at industry level, calculated only for 25 countries from the EU, Romania and Bulgaria being excepted.

6. Results of the research and conclusions
For econometric estimation of production function coefficients for the manufacturing industry in the two countries, we used statistical data about gross value added (VA), the number of hours worked (HEMP) and gross capital stock (KGFCF) from the Eurostat database for Germany and the corresponding data of the same variables in the Statistical Yearbook of Romania 2009. Variables were converted from RON to euro for Romania, using the average annual exchange rate, published by the BNR. Before 2000, the exchange rate seemed to distort the value sizes studied, so we decided to limit the time series data to the period 2000-2007, although statistics provide data since 1995. The production function has the following expression:
$Y = A * L^{\alpha} * K^{\beta}$, where Y, L and k are respectively VA, HEMP and KGFCF and the exponents are elasticities of output