DECODING THE FOUNDATIONS FOR BULGARIA'S ECONOMIC FUTURE

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ABSTRACT

The development of the Bulgarian economy in the last two decades is conditionally divided into two significant periods - before the accession (2000-2007) and after the accession (2008-2020) of the country to the integration community of the European Union. The study of the results of this development can be characterized by multiple indicators, as well as by the position of its various aspects. The current research focuses on identifying the priority (strategic) industries that become a generator of economic success in Bulgaria. The research methodology builds on the information provided by the input-output model. The obtained results highlight those priority industries that have the strongest impact on Bulgaria's economic performance.

Keywords: priority industries, input-output model, Bulgarian economy, economic future

PRELUDE TO THE ANALYSIS

Economic theory and practice can boast a rich set of models for studying the past economic development of a system (be it national, regional and/or firm). Each of these models, based on the relevant assumptions and applied in the relevant conditions, is a carrier of static information, registering events, phenomena and processes in the past period of time, and in the best case, manages to deduce the results (consequences) of these events, phenomena and processes. The results obtained in carrying out this type of research and analysis are, of course, important not only to evaluate the effectiveness of past decisions, but also in the context of the decision-making process for the future operation of these systems. This issue, considered in the context of a constantly changing global socio-economic environment, in addition to the intensively occurring transition to a digital age, complicates and changes the challenges that must be faced by the management of systems at all levels. And this change brings even more tangibly to the fore the need for an adequate strategic planning process aimed at identifying the necessary goals of future development.

Narrowing the research view, limiting it within the limits of the Bulgarian economy, an impression is made by the rich set of national strategic documents (as of August 2023, there are 169 active planning documents [1], developed to ensure the effective functioning of the socio-economic system of Bulgaria in the various aspects that this functioning and development can cover. The review of

the most important strategic document - the National Development Program of Bulgaria 2030 - was also the catalyst for the implementation of the present study. And more specifically: the stated goal of achieving an accelerated economic development and specific priorities for individual economic industries, without an in-depth analysis to identify the priority industries for the Bulgarian economy. It is the implementation of this analysis that is the main goal of the present development, which in turn identifies the economic system of Bulgaria as an object of the study, and the efficiency with which individual industries function as the subject of the study. Based on the analysis carried out, not only the priority industries for the economic system are derived, but also the impact on the economy that the process of joining the European Union has can be assessed.

MAPPING THE ACADEMIC TERRAIN

The focus of each administration is the achievement of economic growth, which will be used as a basis for the achievement of the other goals of sustainable development (in the social and environmental fields). Although a term that is used daily by both professional economists and the general public, the essence and content behind the words "economic growth" are rarely questioned. The first definitions, which we find in Smith [2], Ricardo [3], and then in Solow [4] and Kuznets [5], show economic growth as directly related to an increase in public welfare .

On a separate plane, economic growth is considered not only as a factor for achieving public welfare, but also as a generator for future development of the economic system. It is about the real production activities that promote economic growth, ensuring the continuous improvement of production methods and the discovery of new resources in order to create conditions for their efficient use. This also brings forward the study of the relationships that exist between industries in an economic system, both from their position as creators of resources and users of resources for intermediate consumption. Leontief [6] and Hirschman [7] explored these connections between economic industries, as well as their role in shaping the structure of the economy.

The strong dependence between industries in the economic system implies the need for an adequate approach to their management as a whole and individually. This approach should be a reflection of the idea of achieving efficient and competitive functioning of the economy, based on well-functioning industries whose interconnections are not disturbed. In addition, the strategic management of national economic systems today implies that it is not possible to evaluate all industries with the same level of importance for the development of the economy. In this context, the need to evaluate and highlight those industries that are a priority for the economic system comes to the fore, without underestimating the need for an adequate management approach to the other industries as well. Carrying out an analysis that leads to results that allow the priority industries for an economic system to be identified is key when it comes to developing strategic development documents. The output of the key (priority) industries for an economy not only increase the efficiency of its functioning, but also strengthen its competitiveness levels. In this way, there is not only a guarantee of the sustainable development of the system, but also an improvement of its performance, comparing it with other economic systems. This once again confirms the need for an adequate approach in prioritizing economic industries and planning specific actions for their stimulation and development.

Due to the nature of the present study, it is based on the use of the inputoutput model developed by Vasiliy Leontief [6] and specifically the forward and reverse relationships between economic industries that can be studied and evaluated through it. Symmetric input-output tables represent economic industries in rows and columns, showing how they (industries) interact. The vector columns of the table characterize the inputs of the various resources required for production in each of the respective industries j (j = 1, 2, ..., n). The sum of the column vector values represents the material costs of industry j to create its total output. The vector rows in the table characterize the resources created in industry i (i = 1, 2, ..., n) made available for use by all other industries in the economy. The vectorrow sum represents the volume of inputs supplied by each economy i.

In this model, the relationships between industries in an economy are forward and backward linkages. Straight connections characterize the strength of sensitivity, i.e. the extent to which an industry contributes to the development and functioning of other industries, including itself. In this way, the degree of sensitivity of an industry as a result of the demand for its intermediate output from other industries in the economy is estimated. Higher values in the assessment of direct links are indicative of the industry's ability to provide a resource for the functioning of other industries.

Feedbacks, in turn, characterize the so-called distribution of power, which characterizes the interrelationship of an industry with the others that provide it with output, so that it can function smoothly in the future. In other words, the strength of feedback loops is a measure of the level of demand for output from economic industries, thus becoming generators for the production processes in those industries. Higher values of the indicator also characterize higher levels of dependence between the studied industries.

Based on these two types of linkages, priority industries for an economy could be derived. Essentially, for the first time, priority industries were the subject of interest by Hirschman [7], who focused on the analysis of the high linkages of industries that are a source of growth for the economic system. The perception of the role of high-value relationships is similar to that of Jones [8], according to whom the relevant industry creates added value not only in itself, but also distributes it to other industries.

The advantages of the input-output model are indisputable, not only for studying past development, but above all for designing future development. The use of this model, when talking about deriving priority industries for an economic system, is also related to taking into account the main limitations presented in the scientific research carried out to date. They derive from the technological coefficients of the matrix of direct costs, which are the basis of the constructed research methodology. Bullard and Sebald point out as the main problem with the use of the technological coefficients aij and the coefficients of the total costs derived on their basis $\frac{A_{ij}}{\Delta}$ in the inverse matrix $(E - A)^{-1}$, the lack of constancy over time, and in conditions of constant technological change, they may not reflect fully faithfully and comprehensively the real material and technological conditions under which economic industries function [9], [10]. Similar considerations are also presented in the works of Quandt [11], Simonovitz [12] and Lahiri [13]. However, these considerations do not have such a strong impact today, as economic industries manage to adapt to changes much faster than in the past.

ANALYTICAL FRAMEWORK

To apply the capabilities of the input-output model, the information provided by the symmetrical input-output tables for Bulgaria in the period 2000-2009 and the FIGARO tables for the period 2010-2020 is used. The data used up to 2009 present information on 64 branches of the Bulgarian economy, which gives rise to the need for their aggregation to 19 industries in order to be comparable with the data from the FIGARO tables. The technical aspect of the aggregation process, in which the transition from 64 to 19 industrial structure in the Bulgarian economy takes place, is presented by Kalinkova [14]. Worldwide, similar but much larger aggregations of up to 27 industries were made by Chenery-Watanabe [15] with input-output data for the industries of Japan (1951, 182 x 182), Norway (1950, 117 x 117) and USA (1947, 200 x 200).

For the purposes of the study, the open input-output model constructed by n industries (in the present study 19) is applied, where the equations are valid:

$$(E - A).X = Y$$
 (1)
 $(E - A)^{-1}.Y = X$ (2)

where:

X is a vector with dimension $n \ge 1$ and characterizes the output for the different industries *j* in the economy (j = i = 1, 2, ..., n). In essence, it is the vector of the total output created in the economy and, in this sense, it is also the vector by which its structure is characterized.

Y is a vector with dimension $n \times l$ and characterizes the final demand for output created in the industries of the national economy.

(E - A) is the matrix of technological coefficients with dimension $n \ge n$.

 $(E - A)^{1}$ is the inverse matrix of technological coefficients with dimension *n* x *n*.

Each equation represents a different approach to the management of the economic system, respectively helps to generate a different type of information for the future development of this system. At the same time, the two management logics provide an opportunity to study the consequences for the economic system of the priority development of its specific industries. They make it possible to evaluate the consequences for the economic system, from changes in its structure (X) and from changes in the vector characterizing the consumption of final products (Y).

A key element in bringing out the industries with the so-called high connections, is the use of the technological coefficients aij presented above. They characterize the direct cost of a resource of type i required to produce a unit of output of type j.

$$a_{ij} = \frac{\sum_{i}^{J} x_{ij}}{x_j} \qquad (i = j = 1, 2, ..., n) \tag{3}$$

These coefficients, as well as the coefficients of total costs calculated on their basis (the coefficients of the inverse matrix) are used to calculate the direct and inverse relationships that give an answer to the questions "Where does the output created by the industries in the economy go?" and "From where does the output necessary for the functioning of the industries in the economy come in?". The study of these connections in order to identify the priority industries for the economic system can be carried out in different ways.

The most commonly used method for calculating forward and backward linkages is that of Chenery-Watanabe, who first used the interdependencies between industries as a starting point to study the structure of the economy [15].

Direct links are calculated as the vector-order sum of the coefficients of direct costs of output of industry *i* for the production of the output of this same industry *i*, as well as of all other industries j (j = 1, 2, ..., n). The formula for their calculation has the following form:

$$FLcw_{i} = \sum_{j=1}^{n} \frac{X_{ij}}{X_{i}} = \sum_{j=1}^{n} a_{ij}$$
(4)

The feedbacks are calculated as a column-vector sum of the coefficients of the matrix A, which characterize what resources of industry i are needed to produce the output of industry j (i = j = 1, 2, ..., n). The formula for their calculation is as follows.

$$BLcw_{j} = \sum_{i=1}^{n} \frac{X_{ij}}{X_{i}} = \sum_{i=1}^{n} a_{ij}$$
(5)

The interpretation of the obtained results is made under the assumption that the industries in the economy do not have specific weights, i.e. are of equal importance for the development of the economy. Based on this assumption, priority industries in the economy are considered to be those characterized by values of the studied connections greater than 1 [16].

A step in improving the applied method is done by placing "weights" (degrees of importance) of individual industries. In this way, more precise coefficients are obtained by which to assess the degree of importance of the industry for the economy. For this purpose, the predetermined weights are used, so the mathematical form of equations (4) and (5) is modified respectively equations (6) and (7)), converting the links from unweighted into weighted. And the industries for which the sum of the values of the two coefficients is greater than 1 are considered priority.

$$wFLcw_{i} = \frac{FLcw_{i}}{\left(\frac{1}{n}\right)\sum_{i=1}^{n}FLcw_{i}} * w \qquad (6)$$
$$wBLcw_{j} = \frac{BLcw_{j}}{\left(\frac{1}{n}\right)\sum_{j=1}^{n}BLcw_{j}} * w \qquad (7)$$

where:

 $wFLcw_i$ – weighted forward linkages calculated using the Chenery-Watanabe method;

 $wBLcw_j$ – weighted backward linkages calculated using the Chenery-Watanabe method;

Using the Chenery-Watanabe method makes it possible to assess strategic (priority) industries for an economy based on the direct relationships that exist between industries. A disadvantage of the method is its inability to cover the indirect relationships that exist between the industries that fall within the scope of the coefficients of the full costs presented in the inverse matrix (E-A)-1.

For this reason, the next stage of the research methodology is related to the use of Rasmussen's method, in which the forward and reverse connections between industries in the economic system are evaluated based on the information provided by the inverse matrix of Leontiev.

$$FL_{i}^{R} = \sum_{j=1}^{n} \frac{A_{ij}}{\Delta}$$
(8)
$$BL_{j}^{R} = \sum_{i=1}^{n} \frac{A_{ij}}{\Delta}$$
(9)

Bringing the priority industries through their full operating conditions (full costs) makes it possible to estimate much more precisely the impact that an increase in output in one priority industry will have on other industries (change in demand for resources) and the economic system as a whole (changes in added value, in total output and output intended for final consumption).

$$wFL_{i}^{R} = \frac{FL_{i}^{R}}{\left(\frac{1}{n}\right)\sum_{i=1}^{n}FL_{i}^{R}} \cdot w \qquad (10)$$
$$wBL_{j}^{R} = \frac{BL_{j}^{R}}{\left(\frac{1}{n}\right)\sum_{j=1}^{n}BL_{j}^{R}} \cdot w \qquad (11)$$

where:

$$IP = \frac{FL_i^R}{\left(\frac{1}{n}\right)\sum_{i=1}^n FL_i^R} \cdot w + \frac{BL_j^R}{\left(\frac{1}{n}\right)\sum_{j=1}^n BL_j^R} \cdot w$$
(12)

The derived methodology makes it possible to carry out four assessments of the importance of the branches of the Bulgarian economy for its future development. The results of the research are presented in the following statement.

FINDINGS AND INTERPRETATION

The following presentation presents the results of the analysis on the importance of industries in the Bulgarian economy in the two studied periods by applying Chenery-Watanabe method and Rasmussen method.

Priority industries assessed using the weighted Chenery-Watanabe method

During the first studied period (2000-2007), as can be seen from the data presented in Table 1, seven main priority industries functioned in the Bulgarian economy. In 2000, the industry with the highest value of the Chenery-Watanabe coefficient is "Manufacturing" [4,21], and with the lowest priority is "Wholesale and retail trade; repair of motor vehicles and motorcycles" [1,08]. The priority nature of the "Manufacturing" industry is preserved in all years of the researched

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period, with only a decrease in the value characterizing this priority [3.29 in 2007] being reported. Industry "Wholesale and retail trade; repair of motor vehicles and motorcycles" is characterized by a fluctuating performance according to the studied indicator with years of decline below the reference value 1 (2002, 2004, 2005 and 2007). Since 2001, the "Information and communication" industry has been shown as a priority, and this trend is maintained until the end of the period, when a value of 1.07 is noted.

The remaining priority industries for the Bulgarian economy during this period are: "Agriculture, forestry and fishing" [1.17-2000 and 1.27-2007]; "Electricity, gas, steam and air conditioning supply" [1.40-2000 and 1.09-2007]; "Construction" [1.30-2000 and 1.72-2007]; "Transporting and storage" [1.71-2000 and 2.31-2007], and "Real estate activities" [1.26-2000 and 1.78-2007].

Table 1. Priority industries in Bulgarian economy for the period 2000-2007 measured by Chenery-Watanabe method

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|------|------|------|
| Agriculture, forestry and fishing | 1,17 | 1,45 | 1,38 | 1,5 | 1,14 | 1,48 | 2,41 | 1,27 |
| Mining and quarrying | 0,68 | 0,62 | 0,68 | 0,66 | 0,68 | 0,54 | 0,71 | 0,53 |
| Manufacturing | 4,21 | 2,6 | 2,93 | 2,75 | 3,11 | 3,68 | 4,01 | 3,29 |
| Electricity, gas, steam and air conditioning supply | 1,4 | 1,72 | 1,46 | 1,45 | 1,38 | 1,15 | 0,82 | 1,09 |
| Water supply; sewerage; waste management and remediation activities | 0,77 | 0,82 | 0,87 | 0,81 | 0,83 | 0,77 | 0,59 | 0,8 |
| Construction | 1,3 | 1,54 | 1,44 | 1,43 | 1,56 | 1,52 | 1,59 | 1,72 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 1,08 | 1,24 | 0,94 | 1,17 | 0,49 | 0,87 | 2,29 | 0,21 |
| Transporting and storage | 1,71 | 1,73 | 1,72 | 1,94 | 1,74 | 1,59 | 2,05 | 2,31 |
| Accommodation and food service activities | 0,54 | 0,56 | 0,56 | 0,51 | 0,55 | 0,6 | 0,27 | 0,67 |
| Information and communication | 0,93 | 1,19 | 1,09 | 1,07 | 1,22 | 1,03 | 0,8 | 1,07 |
| Financial and insurance activities | 0,42 | 0,9 | 0,74 | 0,72 | 0,89 | 0,62 | 0,39 | 0,68 |
| Real estate activities | 1,26 | 1,13 | 1,55 | 1,32 | 1,54 | 1,77 | 1,07 | 1,78 |
| Professional, scientific and technical activities | 0,49 | 0,46 | 0,56 | 0,53 | 0,67 | 0,52 | 0,15 | 0,57 |
| Administrative and support service activities | 0,79 | 0,92 | 0,89 | 0,8 | 0,78 | 0,69 | 0,61 | 0,68 |
| Public administration and defense; compulsory social security | 0,29 | 0,3 | 0,3 | 0,3 | 0,33 | 0,27 | 0,15 | 0,27 |
| Education | 0,61 | 0,58 | 0,56 | 0,52 | 0,56 | 0,52 | 0,29 | 0,51 |
| Human health and social work activities | 0,81 | 0,71 | 0,79 | 0,87 | 0,9 | 0,82 | 0,66 | 0,91 |
| Arts, entertainment and recreation | 0,54 | 0,53 | 0,54 | 0,65 | 0,64 | 0,56 | 0,17 | 0,63 |
| Other services activities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Source: Author's calculations

During the second period considered in the present study, an increase in the number of priority industries for the Bulgarian economy is reported (see Table 2). In the first year of Bulgaria's accession to the EU integration community (2008), the number of priority industries in the country's economy remained identical to that of the previous period - seven. The highest values in the studied indicator are again reported for the "Manufacturing" industry [3.79] and this trend is

maintained until the end of the studied period (2020). In addition to the already established priority industries, "Wholesale and retail trade; repair of motor vehicles and motorcycles'; "Financial and insurance activities", "Professional, scientific and technical activities" and "Arts, entertainment and recreation", and the "Real estate activities" industry lost its priority character in 2010.

| | | L Ž | | | | л | | | | l I | 1 | 1 | |
|-------------------------------------|-------|-------|------|------|------|-------|------|----------|-------|------|------|------|-------|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Agriculture, forestry | 1,48 | 0,9 | 1,1 | 1,06 | 1,04 | 1,06 | 1,04 | 1 | 1,01 | 1 | 1,01 | 0,99 | 1,06 |
| and fishing | 1,40 | 0,7 | 1,1 | 1,00 | 1,04 | 1,00 | 1,04 | 1 | 1,01 | 1 | 1,01 | 0,77 | 1,00 |
| Mining and | 0,81 | 0,92 | 0,73 | 0,7 | 0,7 | 0,7 | 0,66 | 0,65 | 0,65 | 0,65 | 0,62 | 0,58 | 0,59 |
| quarrying | | - | - | | | - | · · | · | | · | · | · · | |
| Manufacturing | 3,79 | 1,94 | 2,2 | 2,19 | 2,25 | 2,25 | 2,15 | 2,09 | 2,12 | 2,11 | 2,07 | 2,06 | 2 |
| Electricity, gas, | | | | | | | | | | | | | |
| steam and air | 1,35 | 1,53 | 1,06 | 1,09 | 1,09 | 1,11 | 0,94 | 0,92 | 0,96 | 0,92 | 0,82 | 0,77 | 0,77 |
| conditioning supply | | | | | | | | | | | | | |
| Water supply; | | | | | | | | | | | | | |
| sewerage; waste | 0.57 | 0.00 | 0.00 | 0.00 | 0.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.67 | 0.00 | 0.67 | 0.00 |
| management and | 0,57 | 0,89 | 0,69 | 0,69 | 0,7 | 0,69 | 0,69 | 0,69 | 0,68 | 0,67 | 0,66 | 0,67 | 0,68 |
| remediation | | | | | | | | | | | | | |
| activities Construction | 1,73 | 1,37 | 1,57 | 1,56 | 1,58 | 1,42 | 1,58 | 1,72 | 1,41 | 1,48 | 1,51 | 1,53 | 1,8 |
| | | 1,57 | 1,37 | 1,50 | 1,38 | 1,42 | 1,30 | 1,72 | 1,41 | 1,40 | 1,31 | 1,55 | 1,0 |
| Wholesale and retail | | | | | | | | | | | | | |
| trade; repair of motor vehicles and | 0,1 | 0,21 | 1,34 | 1,34 | 1,31 | 1,31 | 1,38 | 1,37 | 1,4 | 1,41 | 1,43 | 1,44 | 1,45 |
| motorcycles | | | | | | | | | | | | | |
| Transporting and | | | | | | | | | | | | | |
| storage | 1,44 | 1,73 | 1,31 | 1,35 | 1,36 | 1,37 | 1,39 | 1,34 | 1,38 | 1,35 | 1,36 | 1,36 | 1,3 |
| Accommodation | | | | | | | | | | | | | |
| and food service | 0,61 | 1,1 | 0,67 | 0,69 | 0,69 | 0,69 | 0,7 | 0,7 | 0,7 | 0,7 | 0,71 | 0,7 | 0,65 |
| activities | -, | -,- | | -,-, | .,., | .,., | -,, | • , , | | •,, | | •,, | *,*** |
| Information and | 1.0.4 | 1.1.7 | 1.00 | 1.07 | 1.07 | | 1.00 | 1.1 | 1.1.5 | 1.10 | 1.10 | 1.05 | 1.00 |
| communication | 1,04 | 1,15 | 1,06 | 1,07 | 1,07 | 1,1 | 1,08 | 1,1 | 1,15 | 1,13 | 1,18 | 1,25 | 1,33 |
| Financial and | 0.6 | 0.00 | 1.20 | 1.20 | 1.20 | 1.4 | 1.25 | 1.2.4 | 1.40 | 1.45 | 1 47 | 1.45 | 1.4 |
| insurance activities | 0,6 | 0,86 | 1,39 | 1,39 | 1,38 | 1,4 | 1,35 | 1,34 | 1,49 | 1,45 | 1,47 | 1,45 | 1,4 |
| Real estate activities | 1,4 | 1,42 | 0,7 | 0,72 | 0,7 | 0,72 | 0,71 | 0,7 | 0,69 | 0,73 | 0,75 | 0,7 | 0,69 |
| Professional, | | | | | | | | | | | | | |
| scientific and | 1,26 | 1,02 | 1,4 | 1,36 | 1,34 | 1,32 | 1,31 | 1,39 | 1,44 | 1,41 | 1,41 | 1,46 | 1,45 |
| technical activities | | | | | | | | | | | | | |
| Administrative and | | | | | | | | | | | | | |
| support service | 0,59 | 0,8 | 0,91 | 0,92 | 0,92 | 0,92 | 0,94 | 0,94 | 0,96 | 0,96 | 0,98 | 0,99 | 0,95 |
| activities | | | | | | | | | | | | | |
| Public | | | | | | | | | | | | | |
| administration and | 0,39 | 0,29 | 0,41 | 0,43 | 0,46 | 0,46 | 0,47 | 0,45 | 0,42 | 0,43 | 0,44 | 0,43 | 0,44 |
| defense; compulsory | | , | | | | | Í | <i>,</i> | | Í | Í | , | Í |
| social security | | | | | | | | | | | | | |
| Education | 0,62 | 0,76 | 0,46 | 0,47 | 0,48 | 0,48 | 0,5 | 0,47 | 0,42 | 0,44 | 0,44 | 0,44 | 0,44 |
| Human health and | | | | | | | | | | | | | |
| social work | 0,83 | 1,35 | 0,68 | 0,7 | 0,69 | 0,71 | 0,72 | 0,71 | 0,69 | 0,69 | 0,7 | 0,68 | 0,73 |
| activities | | | | | | | | | | | | | |
| Arts, entertainment | 0.20 | 0.74 | 1.2 | 1.27 | 1.22 | 1.20 | 1 20 | 1.42 | 1 4 4 | 1.40 | 1.45 | 1.51 | 1.22 |
| and recreation | 0,38 | 0,74 | 1,3 | 1,27 | 1,23 | 1,29 | 1,39 | 1,42 | 1,44 | 1,46 | 1,45 | 1,51 | 1,23 |
| Other services | | | | | | | | | | | | | |
| activities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | 1 | I | I | 1 | I | 1 | 1 | ı | I | 1 | 1 | |

Table 2. Priority industries in Bulgarian economy for the period 2008-2020 measured by Chenery-Watanabe method

Source: Author's calculations

Priority industries assessed using the weighted Rasmussen method

Research on priority industries in the Bulgarian economy using the Chenery-Watanabe method provides the most basic insight into their impact on the development of the economic system. A deep insight is provided by the results obtained by applying Rasmussen's method.

The data presented in Table No. 3 clearly show that, evaluated through the matrix of full costs (E-A)-1, the number of priority industries in the Bulgarian economy is decreasing. Changes are also reported in the ranking of industries. In the years between 2000 and 2004, the industry with the highest value of the coefficient, measured by the Rasmussen method, is "Wholesale and retail trade; repair of motor vehicles and motorcycles" with a value of 4.96 in 2000 and 4.64 in 2004. Subsequently, the value decreased and as the highest priority in 2005 according to this indicator the industry "Manufacturing" was reported [2.66] and until the end of the researched period (2007) remains the industry with the highest value of the indicator [2.62].

It is noteworthy that at the beginning of the studied period, which characterizes the development of Bulgaria before its accession to the European Union, the number of priority industries for the country was four: "Agriculture, forestry and fishing"; "Manufacturing"; "Wholesale and retail trade; repair of motor vehicles and motorcycles" and "Transporting and storage". At the end of the research period (2007), the number of priority industries in the Bulgarian economy reached six, with "Construction" and "Real estate activities" added to the already mentioned ones.

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|------|------|------|
| Agriculture, forestry and fishing | 1,4 | 1,4 | 1,33 | 1,2 | 1,23 | 1,09 | 1,1 | 1,03 |
| Mining and quarrying | 0,73 | 0,93 | 0,7 | 0,73 | 0,7 | 0,81 | 0,98 | 0,81 |
| Manufacturing | 2,84 | 2,65 | 2,67 | 2,76 | 2,78 | 2,66 | 1,19 | 2,62 |
| Electricity, gas, steam and air conditioning supply | 0,77 | 0,73 | 0,76 | 0,82 | 0,72 | 0,86 | 0,99 | 0,86 |
| Water supply; sewerage; waste management and remediation activities | 0,54 | 0,49 | 0,58 | 0,6 | 0,55 | 0,75 | 0,97 | 0,8 |
| Construction | 0,7 | 0,65 | 0,74 | 0,8 | 0,79 | 1,05 | 1,04 | 1,22 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 4,96 | 5,43 | 4,74 | 4,29 | 4,64 | 2,57 | 1,08 | 1,92 |
| Transporting and storage | 1,48 | 1,56 | 1,6 | 1,53 | 1,6 | 1,47 | 1,06 | 1,47 |
| Accommodation and food service activities | 0,42 | 0,38 | 0,45 | 0,48 | 0,44 | 0,67 | 0,95 | 0,73 |
| Information and communication | 0,65 | 0,6 | 0,68 | 0,72 | 0,72 | 0,87 | 0,99 | 0,92 |
| Financial and insurance activities | 0,59 | 0,47 | 0,52 | 0,55 | 0,55 | 0,67 | 0,96 | 0,74 |
| Real estate activities | 0,88 | 0,96 | 1,03 | 1,04 | 1,03 | 1,15 | 1 | 1,22 |
| Professional, scientific and technical activities | 0,55 | 0,55 | 0,56 | 0,59 | 0,61 | 0,69 | 0,95 | 0,72 |
| Administrative and support service activities | 0,54 | 0,47 | 0,55 | 0,57 | 0,51 | 0,69 | 0,97 | 0,72 |
| Public administration and defense; compulsory social security | 0,36 | 0,32 | 0,38 | 0,42 | 0,38 | 0,54 | 0,95 | 0,57 |
| Education | 0,42 | 0,37 | 0,44 | 0,47 | 0,43 | 0,62 | 0,95 | 0,65 |
| Human health and social work activities | 0,47 | 0,4 | 0,5 | 0,58 | 0,53 | 0,74 | 0,98 | 0,82 |
| Arts, entertainment and recreation | 0,42 | 0,37 | 0,44 | 0,52 | 0,46 | 0,65 | 0,95 | 0,72 |
| Other services activities | 0,29 | 0,26 | 0,31 | 0,34 | 0,31 | 0,45 | 0,94 | 0,47 |

Table 3. Priority industries in Bulgarian economy for the period 2000-2007 measured by Rasmussen method

Source: Author's calculations

The Rasmussen method applied to the second analyzed period (2008-2020) characterizes the development and effectiveness of the functioning of the Bulgarian economy based on the information provided from the full cost matrix. The data presented in Table No. 4 confirm the established trend of increasing the number of priority industries in the Bulgarian economy. In the first year after Bulgaria joined the integration community of the European Union (2008), the number of priority industries decreased by one. The "Real estate activities" industry loses its priority character and this state is maintained until the end of the researched period (2020).

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Agriculture, forestry and fishing | 1,48 | 0,9 | 1,1 | 1,06 | 1,04 | 1,06 | 1,04 | 1 | 1,01 | 1 | 1,01 | 0,99 | 1,06 |
| Mining and quarrying | 0,81 | 0,92 | 0,73 | 0,7 | 0,7 | 0,7 | 0,66 | 0,65 | 0,65 | 0,65 | 0,62 | 0,58 | 0,59 |
| Manufacturing | 3,79 | 1,94 | 2,2 | 2,19 | 2,25 | 2,25 | 2,15 | 2,09 | 2,12 | 2,11 | 2,07 | 2,06 | 2 |
| Electricity, gas, steam and air conditioning supply | 1,35 | 1,53 | 1,06 | 1,09 | 1,09 | 1,11 | 0,94 | 0,92 | 0,96 | 0,92 | 0,82 | 0,77 | 0,77 |
| Water supply; sewerage; waste management and remediation activities | 0,57 | 0,89 | 0,69 | 0,69 | 0,7 | 0,69 | 0,69 | 0,69 | 0,68 | 0,67 | 0,66 | 0,67 | 0,68 |
| Construction | 1,73 | 1,37 | 1,57 | 1,56 | 1,58 | 1,42 | 1,58 | 1,72 | 1,41 | 1,48 | 1,51 | 1,53 | 1,8 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 0,1 | 0,21 | 1,34 | 1,34 | 1,31 | 1,31 | 1,38 | 1,37 | 1,4 | 1,41 | 1,43 | 1,44 | 1,45 |
| Transporting and storage | 1,44 | 1,73 | 1,31 | 1,35 | 1,36 | 1,37 | 1,39 | 1,34 | 1,38 | 1,35 | 1,36 | 1,36 | 1,3 |
| Accommodation and food service activities | 0,61 | 1,1 | 0,67 | 0,69 | 0,69 | 0,69 | 0,7 | 0,7 | 0,7 | 0,7 | 0,71 | 0,7 | 0,65 |
| Information and communication | 1,04 | 1,15 | 1,06 | 1,07 | 1,07 | 1,1 | 1,08 | 1,1 | 1,15 | 1,13 | 1,18 | 1,25 | 1,33 |
| Financial and insurance activities | 0,6 | 0,86 | 1,39 | 1,39 | 1,38 | 1,4 | 1,35 | 1,34 | 1,49 | 1,45 | 1,47 | 1,45 | 1,4 |
| Real estate activities | 1,4 | 1,42 | 0,7 | 0,72 | 0,7 | 0,72 | 0,71 | 0,7 | 0,69 | 0,73 | 0,75 | 0,7 | 0,69 |
| Professional, scientific and technical activities | 1,26 | 1,02 | 1,4 | 1,36 | 1,34 | 1,32 | 1,31 | 1,39 | 1,44 | 1,41 | 1,41 | 1,46 | 1,45 |
| Administrative and support service activities | 0,59 | 0,8 | 0,91 | 0,92 | 0,92 | 0,92 | 0,94 | 0,94 | 0,96 | 0,96 | 0,98 | 0,99 | 0,95 |
| Public administration and defense; compulsory social security | 0,39 | 0,29 | 0,41 | 0,43 | 0,46 | 0,46 | 0,47 | 0,45 | 0,42 | 0,43 | 0,44 | 0,43 | 0,44 |
| Education | 0,62 | 0,76 | 0,46 | 0,47 | 0,48 | 0,48 | 0,5 | 0,47 | 0,42 | 0,44 | 0,44 | 0,44 | 0,44 |
| Human health and social work activities | 0,83 | 1,35 | 0,68 | 0,7 | 0,69 | 0,71 | 0,72 | 0,71 | 0,69 | 0,69 | 0,7 | 0,68 | 0,73 |
| Arts, entertainment and recreation | 0,38 | 0,74 | 1,3 | 1,27 | 1,23 | 1,29 | 1,39 | 1,42 | 1,44 | 1,46 | 1,45 | 1,51 | 1,23 |
| Other services activities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 4. Priority industries in Bulgarian economy for the period 2008-2020 measured by Rasmussen method

Source: Author's calculations

The "Agriculture, forestry and fishing" industry is also characterized by fluctuations, where in certain years the value of the indicator falls below the limit value of 1, which leads to the classification of the industry as a low priority for the country's economy. At the end of the studied period, there were nine active priority industries for the Bulgarian economy, presented in Table No. 4.

In addition to the already outlined industry the results show that as a strategic (priority) economic industries can be defined as well: "Information and communication"; "Financial and insurance activities"; "Professional, scientific and technical activities" and "Art, entertainment and recreation". With highest priority the method characterized "Manufacturing" industry.

CONCLUSION

The presented analysis of the importance of industries in the economic system of Bulgaria should be considered as the first step in the process of deriving the necessary and desired future development of the economic system. It is not by chance that the results presented here are set as the basis for further work. The highlighted priority industries for the Bulgarian economy show the transition from a focus on creating products of a material nature to the provision of services. At the same time, the constant presence of industries such as "Agriculture, forestry and fishing" and "Manufacturing" categorically show that it is not possible to achieve successful development in the future if management decisions are made partially, without considering the systemic nature of the economic system.

For this reason, the author also marks the necessary future research that must be carried out in order to obtain sufficiently wide-ranging and in-depth information, on the basis of which the priorities of the economic development of Bulgaria can be derived. First, it is necessary to continue the research in the line of determining the priority industries for the Bulgarian economy by applying the possibilities of the matrix of full costs, which are not presented in the present study. Secondly, it is necessary to carry out a sensitivity analysis, which would provide detailed information on how targeted changes in a given industry of the economy would affect the overall development of Bulgaria's economic system.

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