


“Application of the methodology for determining the “growth poles” of the region’s industrial economy in the system of public administration”

AUTHORS	Nadiia Pysar
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Nadiia Pysar, Ph.D., Associate
Professor, Vasyl Stefanyk
Precarpathian National University,
Ivano-Frankivsk, Ukraine.



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Nadiia Pysar (Ukraine)

APPLICATION OF THE METHODOLOGY FOR DETERMINING THE "GROWTH POLES" OF THE REGION'S INDUSTRIAL ECONOMY IN THE SYSTEM OF PUBLIC ADMINISTRATION

Abstract

The article deals with the topical issue of applying the theory of "growth poles" to the economic development of Ukraine. A variety of theoretical definitions of the "growth pole" concept existing in the world economic and scientific thought has been studied. The ways and issues of practical application of the theory of "growth poles" for the Ukrainian economy have been identified. It has been proved that the formation of "growth poles" in industry is the determination of priority locomotive branches of the region's industrial economy. The possible mechanisms of their localization in the form of growth areas have been substantiated. The methodology for determining "growth areas" of the industrial region has been developed and applied to the industry of the Carpathian economic region. In order to identify regional economic growth areas, Ivano-Frankivsk, Lviv, Chernivtsi, and Zakarpattia regions have been analyzed, evaluated, and classified for the period 2011–2016: by the relative share of the industry in the total output produced in the region of interest; by the relative share of unprofitable businesses in the industry; by the level of profitability of industries (goods) and by the monetary value of the profit earned by industries. The procedure for classifying the branches has been put forward for the purpose of identifying economic growth areas by totality of leading businesses and by fiscal performance (size of tax payments) of industries. It has been proved that the advanced development of the region's industrial economy is possible as a result of intensifying the areas of the growth poles, with the priority innovative and investment projects for the development of the locomotive regional branches serving as the principal growth areas of the regional economy.

Keywords

"growth pole", "growth center/area", competitiveness,
innovations, locomotive branches of economy,
prioritization

JEL Classification O30, P11, R11, H19

INTRODUCTION

An increased competition is observed in the context of the enhanced deepening of globalization processes, i.e., the economic openness of countries, formation of a common financial market and information network, liberalization of trade regimes at the national and regional levels, which reflects the competition between regions, countries, global industries, and other subjects of the global space with competitive strengths in the market. Since, on the one hand, the competition at any level is intended to serve the increase in the competitiveness and performance of businesses, and, on the other hand, is a tool for suppressing the weaker participants by the stronger ones in the context of dominating global monopolies due to the incompatibility of

fundamental interests, a new approach to the development of the national economy is needed to ensure the effective economic performance. In determining the prospects and objectives of the regional development as part of the national economy, the issue of uneven production growth in the economy takes an important place due to the existing dynamic advanced industries, which serve as the locomotive of the entire economic development, i.e., represent the “growth poles” that spread the effect of production growth throughout the region or country. Therefore, the increase in the regional competitiveness both at the national and international level is increasingly gaining importance, as regions are involved in the international movement of capital, goods, and labor as the active participants of the world economic relations. The current state of the economy of Ukraine and its regions, as well as social problems yet to be solved indicate that the traditional economic growth rates based on the sector profile are no longer present. Therefore, the search, intensification, and management of “growth areas” of the national economy, which may serve as the basis for the implementation of innovative regional policies, is a pertinent solution to the regional development problems. The assessment of potential for upward movement of the region’s competitiveness on the basis of the theory of “growth poles” is innovative in terms of the economic system management and requires improvement of the methodological approach. The phenomenon of spatial polarization associated with the transition to market-based economic relations, modernization of the national economy allows to identify the competitive strengths and weaknesses of economic space entities. This is due to the initial different adaptation to the new conditions for the regional performance characterized by a historically different structure of economic performance, poorly performing economic ties, and displacement of interregional relations by foreign economic relations; significant weakening of the regulatory role of the state associated with the attempt to delegate a considerable part of authoritative powers to the regional level, and is manifested in the reduction of state investments in regional development, cancellation of a fair share of regional economic and social consideration; actual uneven regional development and progressive lag of a large group of regions. From our perspective, the aforementioned factors contribute to the development of regional polarization.

1. LITERATURE REVIEW

Ukrainian pioneers of the theory of growth poles are focused on its application to provide scientific basis for the formation of mechanisms for intensifying the development of Ukraine’s regions, especially for stimulating the development of depressed regions. Among them, Vatchenko, Fedulova, Dubnytsky et al. Specifically, Pidorycheva (2014) argues that it is not the “growth poles” concept that will allow to attain the maximum effect in the development of Ukraine’s regions, rather an intelligent combination of various present-day theories of regional economic growth and development with an innovative dominant, namely, the concepts of national and regional innovative systems and the theory of regional clusters based on the backbone innovative theoretical provisions.

Pidgrushny (2013) views the poles of socio-economic development as elements of the spatial social organization. The scholar made a direct con-

nection between the formation of the poles of socio-economic development (PSED) and urbogenesis processes, and outlined the time frame for four Kondratieff-Schumpeter cycles in the economy of Ukraine, where four waves of urbogenesis are clearly distinguished. The scholar found on the basis of the analysis of Ukraine’s network of urban settlements that 88% of country’s urban settlements are classified as waning and stagnant. The ways to optimize the spatial social organization have been put forward, which consists in increasing at least 4 to 4.5 times the number of progressively growing urban settlements, i.e., PSED, which would correspond to the number of country’s regional and district centers.

Kalashnikova (2015) argues that the experience of France, which relied on Perry’s dirigism and indicative planning in the post-war economic reconstruction, should spark the interest of the Ukrainian academia and government. The tool governing the regional policy developed in France is one of the most efficient in Europe.

A large number of scientists consider the e-governance the main factor in improving the state services delivery system in the developing countries. However, the government is concerned about its adoption and use by the citizens. The result of this study is the analysis of the factors having a moderate impact on the decisions of the citizens concerning the adoption of e-governance services and its use in the region (Willard Munyoka & Manoj Maharaj, 2017).

The findings in the paper focus on the information structure, change of working processes and the sector of the global competency, orientation towards new way of organization.

Based on the research, it can be concluded that during the clusterization, the use of cluster analysis should enable the logical iterations and be accompanied by the combination of several different methods.

The theory of growth poles served as the basis for many government-sponsored regional development programs. Notwithstanding the accumulated best practices, the application of the theory requires the improvement and discovery of new dimensions of theoretical and methodological background of the theory.

2. METHODOLOGY AND RESEARCH METHODS

A synergistic paradigm served as the general methodology of the research.

The research used the following general scientific and special methods: the theory of logic and hypothetico-deductive – to substantiate the concept of forming and implementing the region's industrial policy; formalizing and modeling – to develop a system for assessing the region's level and industrial performance and modeling their impact on socio-economic development; classifications, comparisons, and descriptions – to determine the state and trends of the region's industrial development; content analysis – to clarify the essence of the "growth pole" concept; analysis and synthesis – to identify priority branches of the region's industrial

development, which are subject to priority development and government support; classification – to determine the model types for the region's industrial policy.

3. ADVANTAGES OF POLARIZED ECONOMIC SPACE

The theory of growth poles gained acceptance as the main theory of initiating and spreading the development, and found practical application in the development of numerous national economic growth strategies. The creation of "growth poles" contributes to addressing such issues as promoting the development of lagging regions, shaping the industry and spatial economic structure, increasing the country's investment attractiveness, developing knowledge-intensive industries, intensifying the innovation process, minimizing transportation and other costs. The concept of "pole" or "polarized" development is flexible, therefore, assumes that there is a wide choice of industries on the basis of which some spatial production entity or other will be developed as a "growth center" and a form of future growth poles. Nowadays, this concept is actively encouraged by Western specialists for the post-Soviet countries in the form of various investment projects. In addition, there is an urgent need in today's economic realities to shape a clear strategy for Ukraine's economic development, identify promising locomotive branches of the national economy, and overcome disproportions in the socio-economic and regional development, which are getting worse. It is for addressing of these issues that the theory of growth poles should be applied (Harus, 2015). Therefore, it is necessary to clarify the performance of the list of priority regional functions and make it possible to attain the set goals of the region's socio-economic development in the strategic perspective as part of the necessary research in the context of expanding and deepening the processes of economic globalization and transformation. In view of the foregoing, the development of procedures for finding the region's economic growth poles is a topical issue to study and put into practice in order to encourage the region's economic development.

All theories of “growth poles” are based on the idea of the leading role of the industry as an economic category and primarily of the leading industries that create new goods and services and are most dynamically developing. Centers and areas of economic space, which accommodate businesses of the leading industries, are becoming the poles attracting the production factors, since they provide the most effective their use (Pidgrushny, 2013).

As one of the most prominent present-day growth pole theorists, John Parr states that one of the most fundamental contradictions of the theory of interest is the lack of a clear distinction between the growth pole as a characteristic feature of the spatial economy featuring dynamic growth and the growth pole as a key concept of national long-term economic development strategies, i.e., between the concepts of “natural” (“spontaneous”) and “designed” (“induced”) growth pole. He notes that in many national strategies, the phenomena describing spontaneous development as part of the regional spatial economy are erroneously presented as arguments for creating the designed growth poles (Parr, 1999).

Such an important feature of the growth pole as the development diffusion is directly proportional to its initial competitive strengths. The creation of artificial (directive) growth poles based on opportunistic considerations is indeed very cumbersome. It is necessary to create and constantly maintain competitive strengths of the artificially induced growth center so that it comes up with the natural growth center in terms of capacity and dynamics. The mission assigned to the socio-economic growth poles should be commensurate with their inner essence and opportunities to implement the functions of the dynamic elements of the spatial social organization, its peculiar “locomotives”. The analysis of performance of socio-economic development of economic centers of the countries worldwide, their place in the regional and national economic systems shows that they are natural development centers in these countries and are not prone to stop generating positive ripple effects due to favorable geoeconomical and geopolitical factors. Examples are California in the United States, Guangdong Province in China, and Bavaria in Germany (Harys, 2015).

4. STUDY OF REGION'S INDUSTRIAL “GROWTH POLES”

Perroux interpretes “growth poles” as compactly positioned and dynamic industries and individual enterprises in which the “momentum of development” is concentrated, which spreads its influence to nearby areas and territories. This is due to the concentration of innovations clustered around the leading industry. Should the industry be propulsive, i.e., it is capable of having a positive ripple effect, it will form a growth pole. Perroux defines the growth pole as a structure capable of promoting the growth in other structures. It follows that:

- 1) the growth area is the concentration of production elements;
- 2) the growth is derived from a local area, i.e., it has its rise in the growth effect and the effect of overflow from one pole to the setting;
- 3) due to the fact that major businesses act like magnets, they are in need of investment in order to attain their role as a growth pole and ensure regional growth;
- 4) in a developing country or region, a multinational business (acting as a growth pole) can act as a local business with same favorable economic effects (Perroux, 1970).

Perroux worked out the classification of industries by development trends, and divided them into three groups:

- industries featuring slow development, degradation, being prone to constant reduction in terms of their share in the structure of country's (region's) economy;
- industries featuring high growth rates with no significant bearing on the development of other branches of economy;
- industries featuring not only rapid growth, but also generating a chain reaction resulting in the emergence and growth of industrial centers and a general industrial development of the country (Perroux, 1970).

The “growth pole” emerges where these industries evolve. The primary industries are closely interrelated and form a “complex of industries”, as defined by Perroux. The induced (polarization effect) is attained, i.e., the effect of the measures taken as a result of the impulses generated by the interaction of driving forces. The theory of Perroux is termed as the theory of polarized development. In this case, the polarization effect is attained due to intensity of interfirm and intersectoral transactions. Perroux also emphasized that “growth does not occur everywhere and at once, rather has its rise in growth areas or poles and spreads through different channels, causing different results” (Karmyshev, 2005).

In spite of the diversity of takes on the definition of the concept of growth areas, the idea that priority industries are regional growth areas is still supported by many present-day authors. Thus Lashcheva suggests defining an “economic growth area” as an economic (business) entity, industry or business activity capable of providing diversification and rationalization of the region’s economic structure, promoting the emergence and development of its new elements, as well as contributing to improving the population quality of life as a result of intensification (Lashcheva, 2008). Nowadays, the “growth area” or “growth pole” concept is used increasingly frequently when developing the methodological principles of regional policy. Therefore, it is suggested to define the growth pole as the type of activity, on the basis of which a certain regional competitiveness is provided by intensifying its propulsive growth areas.

5. METHODOLOGY OF DETERMINING THE “GROWTH AREAS” FOR THE REGIONAL INDUSTRY

A variety of conditions and factors of existence and development of sectoral and regional economies makes it difficult to work out theoretical and practical approaches to defining this phenomenon and the mechanism for identifying growth areas. However, the idea that priority industries for the region are its growth areas is supported by many authors. According to (Babenko,

Pasmor, Pankova, Sidorov, 2017) very interesting to rate the socio-economic status of Ukraine in terms of international integration and create scenarios for the development of integration processes. To assess the state of industries and identify growth areas, the following methods are suggested. Let us consider the mechanism of identifying growth areas existing in economic practice, which is based on identifying the region’s leading industry (Voitovich, 2013), and then review the industrial structure of the Carpathian economic region in order to identify the growth areas. An information base for analysis is available (The Main Department of Statistics in the Zakarpattia Region, 2017; The Main Department of Statistics in the Ivano-Frankivsk Region, 2017; The Main Department of Statistics in Lviv Region, 2017; The Main Department of Statistics in Chernivtsi Region, 2017; Ukraine today, 2017).

5.1. By the relative share of the industry in the total output produced in the region of interest for a given period

To that effect, let us calculate the total output produced in the region for a given period in monetary terms and determine the share of each operating industry (and subindustries as part of more detailed analysis) in the indicator obtained. The most promising in terms of development are the industries with the largest relative share in the total output. The disadvantage of this method is that it is not possible to take into account the costs of each industry.

The first method for determining growth areas by the relative share of the industry’s output allows to distinguish three groups of growth areas.

5.1.1. Industries with the highest growth rates

To determine them, let us analyze the indices of industrial production of the Carpathian economic region for 2011–2016 (Main Department of Statistics in Zakarpattia Region, 2017; Main Department of Statistics in Ivano-Frankivsk Region, 2017; Main Department of Statistics in Lviv Region, 2017; Main Department of Statistics

Table 1. Growth areas of the Carpathian economic region are identified as having the highest industrial growth rates in 2013–2016

Source: developed by author on the basis of review of the information base

	AGRIP* Ivano-Frankivsk region	AGRIP* Lviv region	AGRIP* Chernivtsi region	AGRIP* Zakarpattia region
Industry	0.95	0.99	0.98	0.97
Mining and quarrying	0.93	1.00	0.99	1.03
Processing industry	0.94	0.98	0.95	0.96
Production of foods, drinks, and tobacco products	0.84	1.00	0.92	0.91
Textile manufacture, production of clothing, leather, leather goods, and other materials	0.53	1.04	1.00	0.95
Manufacture of wood articles, paper production and printing activities	1.00	1.00	1.01	1.00
Production of coke and refined products	0.00	0.00	0.00	0.00
Production of chemicals and chemical products	0.58	0.89	0.66	0.99
Production of basic pharmaceuticals and pharmaceutical drugs	0.00	1.11	0.00	0.78
Production of rubber and plastic products, other non-metallic mineral products	1.04	0.99	0.96	0.98
Metallurgical production, production of ready-made metal products, except for production of machinery and equipment	0.95	1.02	0.95	1.20
Mechanical engineering, except for repair and installation of machinery and equipment	0.99	0.99	0.90	0.96
Supply of electricity, gas, steam and air conditioning	0.96	0.58	1.06	1.00

Note: AGRIP* is the average growth rate of industrial products by core activities.

in Chernivtsi Region, 2017; Ukraine Today, 2017) and determine the average industrial output growth rate. To that effect, let us calculate the chain growth rates for each reporting period available and calculate the geometric mean by formula:

$$K_{pcp} = \sqrt[n]{K_{p_1} \cdot K_{p_2} \cdot K_{p_3} \cdot K_{p_n}}, \quad (1)$$

where E_{pcp} is the average chain growth rate, n is the number of reporting periods, E_{p_i} is the value of the growth rate for the i -th period, $i =$ from 1 to n .

Thus, the growth rate is determined as follows:

$$E_{p_i} = \frac{I_{p_i}}{100}, \quad (2)$$

where I_{p_i} is the growth index (%) for the i -th period.

It is found as a result of calculating the average growth rate for each industry that the following industries are characterized by the highest growth rates in the Carpathian economic region: mining and quarrying with an overall average growth rate of 0.99; production of foods, drinks, and tobacco products with an overall average growth rate of

0.92; manufacture of wood articles, paper production and printing activities with an overall average growth rate of 1.00; production of rubber and plastic products, other non-metallic mineral products with an overall average growth rate of 0.99; metallurgical production, production of ready-made metal products, except for production of machinery and equipment with an overall average growth rate of 1.03; mechanical engineering, except for repair and installation of machinery and equipment with an overall average growth rate of 0.96 (see Table 1).

5.1.2. Industries with the largest relative share in the structure of production.

The following industries should be distinguished as potential growth areas in the Carpathian economic region as part of investigating the performance of the structure of production, namely, the relative share of subindustries on the basis of data on the industrial sales volumes by business profile for Ivano-Frankivsk, Lviv, Zakarpattia, and Chernivtsi regions for 2016: extraction of minerals industry; food industry; wood products manufacturing industry; production of rubber and plastic products, other non-metallic mineral products; metallurgical industry (see Figure 1).

Source: developed by author on the basis of review of the information base.

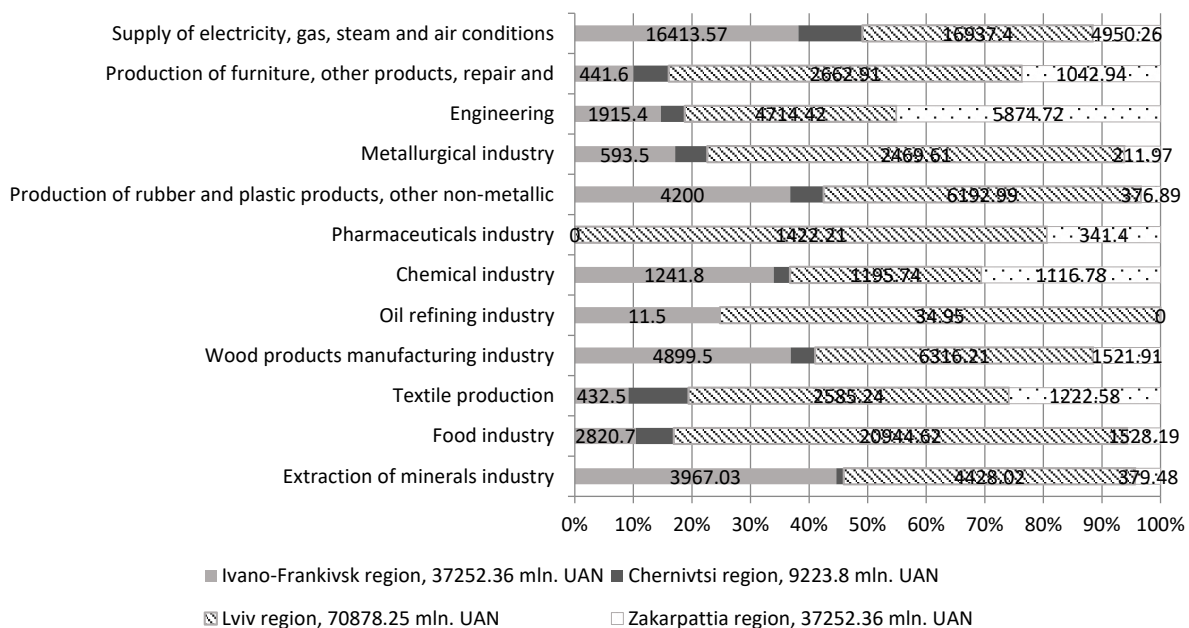


Figure 1. Growth areas of the Carpathian economic region determined by the highest performance of the industrial sales volumes by business profile for 2016

5.1.3. The third group contains industries, whose relative share in the total industrial output is above the average

Determined by the ratio of total production (100%) to the number of industries operating in the region (11) (see Table 2). Thus, it contains industries, the relative share of which in the production of industrial products is above 9%. The performance analysis of the industrial sales volumes (goods, services) by business profile for the Carpathian economic region for 2012–2016 shows that the leading industry of the region of interest is the production of foods, drinks and tobacco products. The high relative share of industrial products sold in Ivano-Frankivsk region accounts for the mining and quarrying – 11.01%; manufacture of wood articles, paper production and printing activities – 13.33%; and the production of rubber and plastic products, other non-metallic mineral products – 9.37%, and 9.15% in Chernivtsi region. The leading branch in Zakarpattia region is mechanical engineering, which accounts for 37.86% in the structure of industrial sales volumes.

However, given the today's tendency for the increase in the relative share in the industrial structure of the Carpathian economic region, it is suggested to

distinguish the mining industry with its inherent resources, since it is the increase in the commercial production of natural gas and oil in the Western region of Ukraine that is the strategic goal of its development. The set goal is achieved by dynamically increasing the production and sales volumes of equity production hydrocarbons, as well as by developing new gas and oil fields. The long-term development strategy is aimed at increasing the manufacturing capabilities of the fields and rational utilization of the region's natural resources. At this stage of the national development, the issues related to the production and consumption of hydrocarbons are not only economic in nature, rather have an important social and political significance. The Carpathian economic region is one of the largest in terms of security of mineral and fuel and energy resources. A critical task of the integrated development of the Carpathian economic region is to increase the performance of the fuel and energy and mineral resources sectors through recurrent geological prospecting and expand the mineral resource potential. This is precisely why we suggest focusing on the application of the theory of growth poles to prioritize the fuel and energy sector of the Carpathian economic region in the current context, as well as the development of mechanisms for their localization in the form of growth areas.

Table 2. Growth areas of the Carpathian economic region are identified as having the highest performance in terms of relative share of the industrial sales volumes (goods, services) by business profile, percent

Source: developed by author on the basis of review of the information base.

	RSISV* Ivano-Frankivsk region	RSISV* Lviv region	RSISV* Chernivtsi region	RSISV* Zakarpattia region
Industry	100	100	100	100
Mining and quarrying	11.01	5.29	1.07	1.58
Processing industry	48.86	72.61	52.58	77.66
Production of foods, drinks and tobacco products	13.33	31.90	18.72	9.85
Textile manufacture, production of clothing, leather, leather goods, and other materials	1.37	3.29	5.56	5.76
Manufacture of wood articles, paper production and printing activities	11.72	8.58	5.09	6.72
Production of coke and refined products	0.31	0.81	0.00	0.00
Production of chemicals and chemical products	6.44	2.24	1.37	7.42
Production of basic pharmaceuticals and pharmaceutical drugs	0.02	1.77	0.00	1.04
Production of rubber and plastic products, other non-metallic mineral products	9.37	8.59	9.15	1.96
Metallurgical production, production of ready-made metal products, except for production of machinery and equipment	1.11	4.04	2.38	1.02
Mechanical engineering, except for repair and installation of machinery and equipment	4.09	7.19	7.26	37.86
Production of furniture, other products, repair and installation of machinery and equipment	1.10	4.20	3.05	6.04
Supply of electricity, gas, steam and air conditioning	40.14	22.10	46.35	20.76

Note: RSISV* is the relative share of the industrial sales volumes (goods, services) by business profile.

Summarizing the findings of the analysis, reference was most often made to the following industries as growth areas of the Carpathian economic region: production of foods, drinks, and tobacco products (4 times), metallurgical industry (3 times), production of chemicals and chemical products (2 times), mining, light, and pulp and paper industries (1 time). It can be stated that from economic perspective the Western region is agro-industrial. The sectoral structure of the economy is dominated by material-intensive and energy-intensive industries: mining chemical, wood chemical and woodworking, pharmaceutical, meat, dairy, cheese, flour milling, and cereal. Labor-intensive engineering industries are also presented.

This method is suitable for the initial assessment and identification of a promising “strategic set” or “complex of industries”, however, leaves out of

account the profitability and profitability of businesses in each industry, and can significantly affect the strategic choice in planning. Therefore, it is necessary to further analyze the financial performance of the region’s industries and businesses. In order to identify growth areas, the following methods are suggested given said performance.

5.2. By the relative share of unprofitable businesses in the industry

This method is based on comparing the total number of businesses operating in each regional industry with the number of unprofitable businesses in said industry. This analysis mainly considers only businesses with an increased industrial significance (usually large and medium). It is assumed that the higher the relative share of unprofitable

Table 3. Growth areas of the Carpathian economic region determined from the number of profitable industries for 2016

Source: developed by author on the basis of review of the information base.

	Chernivtsi region	Profit earned, %	Loss made, %	Ivano- Frankivsk region	Profit earned, %	Loss made, %	Lviv region	Profit earned, %	Loss made, %	Zakarpattia region	Profit earned, %	Loss made, %
Overall	3,500	69.3	30.7	6,883	78.8	21.2	15,586	73.7	26.3	5,058	78.0	22.0
including												
Agriculture, forestry, and fishery	709	78.4	21.6	770	83.0	17.0	1,153	80.5	19.5	906	91.8	8.2
Industry	481	71.4	28.6	1,159	77.6	22.4	2,330	72.7	27.7	757	73.0	27.0
Construction	269	60.5	39.5	901	75.7	24.3	1,407	71.4	28.6	339	73.1	26.9
Wholesale and retail industry; repair of motor vehicles and motorcycles	770	71.9	28.1	1,793	82.6	17.4	4,172	79.5	20.5	1,150	79.4	20.6
Transport, warehousing, postal and courier activities	158	63.2	36.8	241	77.8	22.2	663	77.8	22.2	267	81.9	18.1
Accommodation and catering	94	64.5	35.5	205	81.1	18.9	640	74.4	25.6	186	79.3	20.7
Information and telecommunications	135	69.0	31.0	195	74.2	25.8	627	71.3	28.7	169	76.8	23.2
Financial and insurance activities	20	35.3	64.7	68	81.8	18.2	123	67.2	32.8	27	59.3	40.7
Real estate	391	58.8	41.2	626	74.8	25.2	1,888	63.5	36.5	594	68.4	31.6
Professional, scientific, and technical activities	204	73.2	26.8	401	77.6	22.4	1,152	68.6	31.4	294	71.8	28.2
Administrative and auxiliary services	134	63.2	36.8	281	76.3	23.7	742	76.5	23.5	188	73.5	26.5
Education	22	68.2	31.8	40	59.0	41.0	115	69.1	30.9	20	0.0	0.0
Health and social care	56	64.3	35.7	91	69.7	30.3	259	69.6	30.4	87	69.0	31.0
Art, sports, entertainment, and recreation	14	50.0	50.0	26	80.8	19.2	76	56.2	43.8	32	71.9	28.1
Other services	43	69.0	31.0	86	82.4	17.6	239	74.6	25.4	42	76.2	23.8

businesses, the less promising is the industry to invest in its development. Those industries are considered promising whose indicator of unprofitable businesses is lower than the overall indicator for all regional businesses. Thus, under this method, it is apparent from Table 3 that agriculture, forestry, and fishery are the promising industries of the Carpathian economic region. The today's performance of industrial businesses (see Table 3) is more than critical, which is indicative of the stagnation of economy and almost complete destruction of industrial potential due to underdevelopment of the economy.

5.3. By the level of profitability of industries (goods)

Using this method, let us determine the profitability performance for each operating industry of the Carpathian economic region. The profitability ratio of production is typically calculated by the ratio of the profit earned over a period to the total expenditure incurred over the same period. The disadvantage of this method is that profitability is taken into account for all activities, whereas the core activity can be even unprofitable, and the success of the business can be based on the prof-

itability of other activities. To eliminate said disadvantage, it is necessary to calculate the indicator characterizing the core activity and compare industries or businesses based on the calculated data. The level of profitability of goods can serve as said indicator. The analysis of the data from Table 4 shows the following growth areas of the Carpathian economic region in terms of profitability of industries (goods): consumer goods industry; manufacture of vehicles, trailers, and semi-trailers, and other vehicles; production of furniture, other articles; repair and installation of machinery and equipment; manufacture of computers, electronic and optical articles; mechanical engineering and mining.

5.4. By the monetary value of the profit earned by industries

This method is similar to the aforementioned one, with an absolute measure used here as an assessment criterion instead of the relative one. The application of this method is based on the fact that the industry with a large total of output and low profitability can yield a greater profit in real monetary terms to the region than the industry with a small total of output and large profitability. Accordingly, the industries with a higher profit in monetary terms are more promising than those with a lower profit in monetary terms. This method for determining the economic growth areas is characterized by the same disadvantage as the aforementioned one. This disadvantage can be avoided by taking into account only the part of the total profit earned by businesses from the core activity (see table 4).

5.5. by Totality of Leading Businesses

This method is based on identifying some predetermined number of businesses operating in the given area and having the best complex of economic performance. It may include the accounting liquidity, solvency, volume of output and sales, level of production profitability, partnerships, number of jobs, size of tax payments, etc. Industries featuring the identified businesses are considered the most promising in terms of development, especially if multiple businesses of the given industry

are listed. However, it may occur that the waning industry features a sustainable business. This being the case, the funds can be invested directly in said business.

5.6. By fiscal performance (size of tax payments) of industries

This method is based on directly identifying the effect of each industry on the region's budget by determining the size of tax and other statutory payments. The higher the fiscal performance of the industry, the more promising it is in terms of development, since it is more of a support for the regional economy.

It is possible to identify multiple industries and businesses with the greatest development potential as potential growth areas by applying each method in analyzing the structure of each region's industrial economy.

6. CHARACTERISTICS OF GROWTH AREAS OF THE CARPATHIAN ECONOMIC REGION

Summarizing the findings of the industry analysis of the Carpathian economic region using the above methodology, the following conclusion can be drawn and regularities formulated. The following industries are most often referred to as growth areas: production of foods, drinks, and tobacco products (5 times), metallurgical industry (4 times), production of chemicals and chemical products (3 times), mining and pulp and paper industries (2 times); textile manufacture, production of clothing, leather, leather goods, and other materials (1 time).

Production of foods, drinks, and tobacco products is a promising activity or "growth pole" in the Carpathian economic region. The industry is the leader in terms of all indicators of interest. This is evidenced by industry's rapid growth, sustainable share within the processing industry, and industry's upward trend towards an increase in bulk of the national industrial produc-

Table 4. Growth areas of the Carpathian economic region determined from the performance of the total industrial output (goods and services) by level of industry profitability for 2016

Source: developed by author on the basis of review of the information base

	Ivano-Frankivsk region			Chernivtsi region			Lviv region			Zakarpattia region		
	thous. UAH	%	ALP	thous. UAH	%	ALP	thous. UAH	%	ALP	thous. UAH	%	ALP
Industry	37,252.36	100	-0.78	9,223.80	100	1.52	70,878.25	100	1.60	18,476.05	100	2.26
Mining and quarrying	3,967.025	10.6	15.70	112.40	1.2	-5.16	4,428.02	6.2	4.76	379.48	2.0	-13.56
Processing industry	16,556.52	44.5	-0.84	4,228.30	45.9	2.64	48,538.88	68.5	1.44	12,896.32	69.8	4.16
Production of foods, drinks, and tobacco products	2,820.67	7.6	0.80	1,447.70	15.7	-0.66	20,944.62	29.6	0.38	1,528.19	8.3	5.00
Textile manufacture, production of clothing, leather, leather goods, and other materials	432.54	1.2	2.42	484.40	5.2	10.76	2,585.24	3.6	3.06	1,222.59	6.6	5.16
Manufacture of wood articles, paper production and printing activities	4,899.53	13.2	5.96	555.10	6.0	2.22	6,316.21	8.9	0.56	1,521.91	8.2	6.34
Production of coke and refined products	...3	...3	0.00	...3	...3	-31.52	34.94	0.0	0.00	0.00	0.0	-1.10
Production of chemicals and chemical products	1,241.81	3.3	-22.78	101.30	1.1	5.94	1,195.74	1.7	4.76	1,116.79	6.0	-0.04
Production of basic pharmaceuticals and pharmaceutical drugs	...3	...3	-20.70	...3	...3	-0.24	1,422.21	2.0	0.00	0.34	0.1	19.94
Production of rubber and plastic products, other non-metallic mineral products	4,199.98	11.3	13.64	652.50	7.1	3.18	6,192.99	8.7	-0.60	376.89	2.0	3.30
Metallurgical production, production of ready-made metal products, except for production of machinery and equipment	593.49	1.6	0.94	189.90	2.1	-2.94	2,469.62	3.5	-3.48	211.98	1.1	-0.18
Mechanical engineering	1,915.42	5.1	2.74	530.60	5.8	7.20	4,714.43	6.7	-0.26	5,874.72	31.9	3.77
Production of computers, electronic and optical products	33.08	0.1	3.72	197.40	2.1	10.52	254.93	0.4	-3.30	664.31	3.6	8.18
Manufacture of electrical equipment	1,176.62	3.2	4.14	23.70	0.3	26.08	817.77	1.1	-6.70	918.16	5.0	-1.90
Manufacture of machinery and equipment not otherwise classified	166.39	0.4	-6.74	302.00	3.3	5.76	678.04	1.0	9.96	124.68	0.7	-7.02
Manufacture of vehicles, trailers, and semi-trailers, and other vehicles	539.32	1.4	6.62	7.50	0.1	6.26	2,963.69	4.2	7.46	4,167.58	22.6	7.96
Production of furniture, other articles; repair and installation of machinery and equipment	441.56	1.2	5.74	265.30	2.9	2.68	2,662.91	3.8	8.16	1,042.94	5.6	1.20
Supply of electricity, gas, steam, and air conditioning	16,413.55	44.1	-0.16	4,687.70	50.8	0.90	16,937.5	23.9	3.34	4,950.27	26.8	0.08
Water supply: sewage, waste management	315.23	0.8	-14.82	195.40	2.1	-5.88	973.91	1.4	-8.20	249.98	1.4	-1.38

Note: ALP is the average level of profitability.

tion, as well as the level of profitability of operating activities.

Metallurgical production, production of ready-made metal products, except for production of machinery and equipment, has an industry share above the average and is traditionally the region's primary industry. However, the analysis findings for 2011–2016 show that the growth slows down in this industry, which is indicative of a decrease in its competitiveness and lack of stimuli for further development.

Given the priority of the innovation-based development, this area can become promising only in case of modernization of individual businesses and output of new globally competitive types of products.

Mining and quarrying is a potential growth area (according to Perroux's criteria). This area can be considered as a strategic pole, which needs to be included in the socio-economic development program and requires extra efforts from the government to trigger it. Provision should also be made for the resource potential and the available scientific, technical, and human resources in this area. It is also necessary to activate this growth pole in order to promote the area globally, increase the competitive production, which implies further attracting foreign investment and highly-qualified personnel, and, as a consequence, enhancing the region's scientific and performance potential. Therefore, it is advisable to conduct an industry analysis according to the same criteria in order to identify potential growth opportunities within the industry. The development of this area can have not only an economic, but also a social effect. This will be done in our subsequent research.

Textile manufacture, production of clothing, leather, leather goods; pulp and paper, publishing are the so-called growth areas of the second order, i.e., potential growth areas, which do not yet have a significant share in the sales pattern of finished products, however, do have a potential and resource base for their development, as well as positive performance of growth rates, i.e., are able to react faster to changes in the market, and are thus more competitive. These

areas should become priority areas and call for measures to improve their state.

Mechanical engineering is strategically important given the high added value of products, as well as industry's high export potential.

For a more detailed analysis, it is expedient to study the aforementioned promising industries and identify the most promising subindustries and businesses using the same criteria.

Given the current industrial state of the Carpathian economic region, the issues of development and immediate implementation of a set of measures aimed at systemic restructuring of the domestic economy are becoming increasingly topical today. It should be noted that the key drivers of updating the region's industrial potential should be its competitive strengths:

- 1) sustainable resource base. Ukraine has established itself globally as a leading choice in terms of reserves of iron and manganese ore (about 15-17% of world reserves), coal (including coking);
- 2) favorable geographic location. EU and CIS markets in the immediate vicinity;
- 3) relatively low proportion of labor costs within the prime cost of industrial products;
- 4) vast untapped potential of domestic demand for industrial products.

In addition, the following issues of domestic industry should necessarily be addressed and solved as soon as possible:

- 1) obsolescence and physical deterioration of fixed assets;
- 2) high dependence on external environment and excessive influence of external demand, underdevelopment of domestic demand;
- 3) high energy intensity of production;
- 4) scarcity of own energy resources;
- 5) out of products with low added value;

- 6) lack of an effective system of enrichment of low-quality domestic raw materials (Khodyakova, 2014).

Other countries' experience in surmounting the crisis shows that the development of innovative and investment activities is indeed the economic growth area. Therefore, the existence of an approach to determining growth areas as priority investment and innovation projects and financial investments in the economy has been justified. The principal growth areas of the regional economy should be the following:

- priority investment and innovation area development projects;
- investment projects that gained support of the areas by generating their own "area development strategy" and their inclusion in the pri-

ority projects of the given area;

- investment projects of spatial budget-forming resident businesses, which create more than 50% GRP;
- investment projects of non-resident businesses, which guarantee creation of a certain regional investment portfolio (Lazhentsev, 2013).

In their work, the authors Kinias, Tsakalos, Konstantopoulos (2017) when analyzing the time factors for investment and electricity's price level in wind energy, consider the real options theory. The aim of the study is to find the optimal investment strategy in a liberalized global electricity market, on which the price of electricity is undefined, while the other parameters are adjusted separately in every country.

CONCLUSION

Given the natural, economic, scientific, and technical potential existing in the Carpathian region, its historical and geographical features, the strategic goal of the region's prospective development is to create an efficient market-type economic system based on the rational utilization of natural, material and technical, labor, intellectual resources in order to ensure the material well-being of the region's population and environmental security. The set goal appears to be achieved through the phased implementation of the overriding priorities. The creation of the necessary conditions for development of said industries and spheres of human activity will ensure the rise of the country's overall socio-economic level.

Since the deterioration of fixed assets and technological inferiority of Ukraine's potentially promising industries makes it necessary to identify the so-called growth areas within said industries (businesses or certain types of activities) with a view to developing innovative manufacturing methods and attracting investments on their basis, it is necessary to use the analysis method referred to in the article. However, given that the study using the industry-specific criterion gives an idea of merely the scope of activity within which development may occur, one cannot neglect an opportunity of emergence of the so-called spontaneous areas (growth poles), which are innovative in nature. In this study, the mining industry with its energy potential for regional development and resource reserves is suggested as the growth pole.

Should the region's growth areas be intensified, this will enable the emergence of new types of activities capable of:

- 1) diversifying and rationalizing the region's economic structure in the long run;
- 2) improving the quality of life and economic activity of the population;
- 3) promoting the strengthening and development of region's interregional and foreign economic relations;
- 4) encouraging the emergence and broadening of the spectrum of sources of financing of investment processes by increasing the region's investment attractiveness;
- 5) improving the quality of life and economic activity of the population;
- 6) providing the budget revenue sufficient to finance the region's social sphere (Lyashenko, 2015).

Further development is required to determine a clear mechanism for searching, identifying, and further classifying growth areas based on a number of criteria and features of the same milestones in structural and spatio-temporal terms, and, most importantly, of a mechanism for intensification of growth areas.

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