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ECONOMIC AND GEOGRAPHICAL PROBLEMS OF COMPLEX DEVELOPMENT OF INDUSTRY IN AZERBAIJAN

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Being a leading sector of the economy, industry plays an important role in the development of territories, the formation of the economic structure of cities, and the provision of employment. This sector accounts for 44,2% of state's Gross Domestic Product, 67,9% of the value of primary funds and 49,3% of investments in fixed assets. The creation of industrial complexes is an essential factor to increase the importance of this area and ensure its sustainable development. The complex development of industry has a serious impact on the processing of minerals and agricultural products, based on which the development of cities. The complex improvement of this sector is organized by the creation of a network of enterprises engaged in the sequential processing of natural resources in certain areas. Taking this into account, it can be said that industrial complexes have been established or are being formed in the oil and gas industry in Absheron, in the processing of agricultural products in the regions, in the production and processing of non-ferrous metals in Ganja and surrounding areas.

In the fuel and energy, chemical, petrochemical, mechanical engineering, metallurgy, construction materials industry enterprises, education, science, transport areas for oil and gas production and processing, which have been developing in Absheron since the 70s of the XIX century and entered a new stage of development at the end of the XX century infrastructure facilities have been established. As a result of measures taken in recent years, more than 10 industrial parks and 8 agro-parks have been established in the regions. Along with the production, storage and transportation of industrial and agricultural products, processing companies are built here, and the Agrarian-Industrial Complex is organized. The centres for the creation of industrial complexes in the country, economic significance, and analyzes the development prospects have shown in the article.

Keywords: industry, petrochemical complex, metallurgy, light and food industry, agro-industrial complex.

INTRODUCTION

Industries are created and developed under the influence of many natural-geographical and socio-economic factors, the presence of these factors different areas and the impact on the formation of the industry are distinctive. Therefore, there are sharp differences in the regions in terms of industry structure and location. In most cases, as a result of natural-geographical and socio-economic factors, industries are concentrated in small areas, such as areas with favourable EGP (Economic-Geographical Position) and in this case, industrial centres are created in a short time.

In addition to being the fundamental sector of the economy, the industry has a significant impact on the enhancement of other sectors and for this reason, ensuring sustainable development of industry enables to increase production in the country and its regions, to meet the needs of the population and the economy in various products through domestic production and it plays a key role in the socio-economic development of settlements as well.

The socio-economic base created as a result of the economic policy implemented since the 1930s has given chance the development of settlements and the provision of jobs for a long time. Simultaneously, it has been created the condition for using the natural-geographical condition and the natural resources. However, the difficulties that arose

during the transition period led to the disruption of companies in most areas of the economy, some of which came to a complete standstill. At present, problems in this area are being eliminated. The measures taken under the adopted State Programmes are showing their results, hence, it is substantial to flourish a scientific-theoretical and methodological basis for economic reforms.

During 2004–2018, the value of the country's Gross Domestic Product increased 3.3 times, including 2.8 times in the non-oil sector, 2.6 times in the industry and 1.7 times in agriculture. As a result of purposeful measures taken during this period, more than 2 million new workplaces which one and half million of them are permanent and more than 100,000 enterprises were created. The purpose of this article is to show the achievements attained taken measures, the potential for future development and ways to use them. Therefore, it is important to develop a scientific-theoretical and methodological basis for economic reforms.

RESEARCH OBJECT AND METHODS

The constructing direction of interconnected industries, principles and importance of their regional organization belongs to the essential objects of research. It has also studied the industrial complexes which are created in Azerbaijan, including emerging ones, their natural-geographical and socio-economic base and main centres. Industrial hubs are being formed in Azerbaijan based on complex industrial development and they are considered the main centres of economic development in the regions. So, the measures taken in this area, their main directions and importance have been analyzed in the article.

The scientific research on the impact of natural-geographical and socio-demographic base on the development of industry, the principles of territorial organization, the creation of industrial complexes, the features of regional distribution was used in the scrutiny process [1]. There is rich information in this field in the scientific works of scientists from neighbouring countries and Azerbaijan. Statistical materials, provisions of state laws, programmes and orders, the information in periodicals played a basic role in the research. In recent times, there has been an increase in regional research in Azerbaijan, which allows for more in-depth analysis and is used as a source for future research [5, 7, 8].

The analyzes in the article were completed using statistical, mathematical analysis, the historical-geographical study of areas and comparison methods.

Scientific innovations and the author's recommendation. For the first time, the article studies the factors determining the complex development of industry, its main directions and principles, the territorial distribution of industrial complexes which have been formed in Azerbaijan. It was determined that in addition to the use of natural resources, which play a key role in the integrated development of industry, it is important to organize infrastructure, the creation of ancillary and service facilities. During the independence years, along with the technical and technological reconstruction of existing facilities, the establishments that they are necessary for the formation of industrial complexes were built. The implemented analyses show that there is still considerable potential for the establishment of AIC (Agro-Industrial Complex) in cities of regions based on the processing of agricultural products and their use is one of the important factors for the development of the regions.

STUDY OF THE SUBJECT

The industry as an important sector of the economy is widely studied in economic and socio-geographical research. In this case, the factors influencing the territorial organization of industry, its main centres, the importance of the use of natural resources, the principles of territorial organization of the economy and other issues are given priority. In the survey process, scientists from Azerbaijan and foreign countries A. T. Khrushov, E. B. Alayev, A. A. Nadirov, S. K. Huseynov, A. M. Hajizade, R. H. Mammadov, Z. N. Eminov, N. H. Ayyubov, N. A. Pashayev and theoretical-methodological statutes of others' treatises are taken as a basis.

At the same time, the overextended of the sectoral and territorial structure of the industry in Azerbaijan, the determination of ways to use the industrial potential of the regions is an outstanding theoretical and methodological task and this is important in the context of the low-level industrial potential of the regions.

RESULTS AND THEIR DISCUSSION

The characterisation of its complex enhancement ways play a pivotal role during the investigation of the industry. The complex development of the industry is achieved in the process of creating industrial complexes. On this occasion, the cooperations are not only united by their transport-geographical position and general use of the infrastructure network, but also have close production and technological ties, as a result of these relations, primary raw materials are processed sequentially, industrial wastes are processed, finished products are produced jointly based on cooperation, enterprises serve each other, and connections and dependencies are established in other areas [3].

Achieving integrated development of industry in all areas are forming in long historical periods and this requires the creation of interconnected production areas. The coexistence of different industrial enterprises in many cases is a key factor in the formation of industrial hubs [4].

When talking about the complex development of industry, it is probable to analyze its main directions in different areas and its principal principles in the regions. The creation of complexes in different areas of the industry have economic, economic-geographical, logistical and technological, and in many cases ecological advantages. In most cases, affirmative conditions are created for the formation of industrial complexes in the regions where large mineral resources are extracted and other areas are organized on the basis of the use of products obtained in large and medium-sized cities, created based on the activities of their production and processing companies.

The activity of establishments that complement each other by achieving integrated development of the economy enables the formation of specialization areas which such situation allows the creation of diversified areas of the economy. At the same time, the specialization areas lead to the establishment of close ties between economies, the formation of novel areas of production and services based on their use. These measures, in turn, mean the creation of new workplaces and increase the incomes of the population and the regions. The creation of multifarious economies and their regional organization provides socio-economic development in the regions with maintaining the demographic

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potential, along with, the influx of population from the surrounding areas is experienced. Hence, the taken measures are the essential factors in terms of increasing the population in cities and improving the economic structure [5].

The establishment of industrial complexes necessitates the organization of ancillary and service areas that are constantly ensuring their development and in most cases, they have produced and technological ties with key industries and they operate based on the use of raw materials and waste obtained from them. Rapidly swelling technical progress creates favourable conditions for the expansion of areas that are interconnected in the leading areas of production in the economic regions, as well as those arising from other requirements of the complex development of the economy [6].

The industry is one of the main sectors of the economy in Azerbaijan. In 2018, the industrial companies were produced 47 677.0 mln manat worth of products. This is equivalent to 44.2% of GDP (Table 1). The industry plays a pivotal role in other sectors as well.

Table 1.

The position of industry in economic structure of Azerbaijan, 2018

Indicators	Total	Industry	The share of Industry, %
GDP, mln. manat	79 797,3	47 677,0	44,2
The average annual number of workers, thsd. person	4 879,3	210,7	13,6
Cost of fixed assets, mln. manat	124 112,2	130 150,1	67,9
The investments in primary capital, mln. manat	193 491,0	8 497,2	49,3
At the current exchange rate, 1 US dollar = 1.7 Azn			

Source: Statistical yearbook of Azerbaijan — 2018. Statistical yearbook. Baku, 2019.

Natural resources that facilitate the creation of industrial complexes in Azerbaijan include oil, natural gas, iron ore and alunite. Of them, incomplete industrial complexes were created based on the use of oil and gas resources located in Absheron and the shelf zone of The Caspian Sea.

Absheron is the principal centre of the country's industrial potential where along with Baku and Sumgayit cities, the formation and development of dozens of settlements were based on the activities of the plethora of cooperations related to the conduct and processing of oil and gas production and other sectors of the economy that serve them. The producing of oil in Absheron has primarily resulted in the establishment of many machine-building and metallurgical establishments that serve this purpose. From the 1930s onwards, the increment in oil production required the production of new technological equipment and tools, however, the main obstacle was the lack of steel, which was used as a raw material. Nevertheless, in a short time, diversified machine-building plants used in oil production were built at the expense of steel imported from other republics. The oil engineering plants established at the initial stage served for onshore oil production.

Despite the start of oil production in the Caspian Sea in the second half of the twentieth century, the Deep Sea Foundation Factory, which produces offshore platforms,

was commissioned between 1985 and 1986. The Sumgayit Pipe-Rolling plant was established in the middle of the 20th century for the production of steel pipes, the main component of oil and gas production, and the essential raw material for the machine-building industry.

Among the facilities belonging to the basic ancillary and service areas of the oil industry are the Institute of Petroleum Engineering, which is the main design and construction centre for the training of qualified personnel (Azerbaijan State Oil and Industry University, Baku Higher Oil School), production of oilfield equipment. The Cement Plant, whose products are widely used in the drilling of oil wells, and facilities for the production of barite, other raw materials and products also serve oil production.

It can be said that the oil and gas and petrochemical industry complexes are being formed in Absheron, however, not all areas of the petrochemical complex have been created. From the middle of the 20th century onwards, foundations producing chemical products based on oil refining was established, nonetheless, the number of facilities producing the final product was fewer among them [7].

Owing to the poor application of the state-of-the-art technology and colonial policy, although the companies operated in Absheron where the plastics and synthetic rubber has manufactured the production of final products was not permitted.

Some products were produced at different stages. There are no facilities for producing rubber and chemical fibre.

The foundations operating in other areas in Absheron existed independently and there are a small number of machine-building enterprises, light and food industries in the region. Therefore, there are serious problems in the creation of industrial complexes in other areas here.

The complex development of industry gives a chance for the full processing of exploited natural resources, the extraction of all useful elements, and the reduction of throwing away waste to nature. At the same time, it is possible to process waste and by-products obtained during the production process. Therefore, the amount of waste released into the environment is reduced, and opportunities to protect the environment are expanded. This factor is one of the main requirements for sustainable development. So, it can be considered that the creation of industrial complexes is also important for the transition to sustainable development [8].

The development of industry and agriculture, which are the primary sectors of the economy, the construction of a network of transport and communication facilities and service facilities at the level of modern requirements can ensure the integrated development of areas. The esemplastic development of the territories is probable through the transition to the efficient use of land and water resources, the cultivation of agricultural products by the agro-climatic conditions and indicators of the territories. In this case, suitable conditions for living and recreation are created in the populated areas, cities and villages are united in the settlement system.

Different natural and geographical conditions in Azerbaijan makes possible the formation of a variety of agricultural structures [9]. However, production complexes are formed based on the processing of products obtained based on the cultivation of strategically important products. Phased and sequential processing enterprises can be

organized based on cultivation and processing of cotton, grapes, tobacco, tea, fruits and vegetables and livestock products, and two principal forms of production organization are created. Establishment of production plants with the aim of processing of agricultural products is considered to be the substantial stage in the formation of industrial complexes. These types of production facilities are organized for the manufacturing of the food industry's product.

Combines were established in Khachmaz, Gabala, Lankaran, Bilasuvar and Agsu on the processing of fruits, vegetables, grapes and fish products in Azerbaijan [10]. Their distinguishing feature is the variety of products, even in some companies process and preserve all agricultural products are fulfilled. These establishments play an important role in the economic structure of cities, in other words, they have a positive impact on income generation, employment of the population, providing by food products and attaining food security.

Hierarchical technological processes are carried out in processing enterprises producing light industrial products. Complex processing processes are organized in the plants that process cotton, linen, silk, wool, leather, they comprise the initial processing, yarn acquisition, weaving, dyeing, sewing stages. At present, the development of the chemical industry facilitates the production of synthetic and man-made fibres, their use in combination with natural raw materials allows the production of textiles and knitwear to grow, expand the raw material base, create a network of new production facilities [11].

In Azerbaijan, it is important to take steps in this area, increase the production of agricultural products, organize the production of chemical fibre or regulate a phased structure of the light industry production based on imports. Considering the water-intensive of the chemical fibre production, these type of establishments can be built in cities such as Mingachevir, Shirvan, Yevlakh or Salyan which are located near to the Kura River.

The recent growth in oil and gas production in Azerbaijan makes it necessary to establish new petrochemical and gas-chemical companies. Although Sumgayit has been built as the country's petrochemical centre for many years, it cannot be said that there is an industrial complex here now. This is because there are almost no oil refineries that produce the final rubber, plastic or rubber products [12].

Based on natural gas processing, the products that meet the needs of the economy may be produced. Cutting-edge technology allows us to get the most diverse products in this area, especially, the fabricating of nitrogen fertilizers, various chemicals, and the production of nitrogen fertilizers is especially important. A urea factory was built in Absheron to obtain these products. Moreover, it is necessary to establish enterprises based on chemical processing of natural gas.

At the present moment, the extractive industry plays a leading role in the economic structure of the country and accounts for 43.3% of industrial output (Table 2 and Figure 1). The primary reason of this trend is the high development of oil and gas production. For this reason, it is necessary to take measures for the processing of raw materials in this area.

Table 2.

The share change in the separated areas of industry, %

Indicators	Years			
	2000	2005	2012	2018
Industry	100,0	100,0	100,0	100,0
Extraction	53,5	67,6	74,1	73,3
Production	31,3	26,0	20,3	22,0
Electric energy, gas və steam supply	15,2	6,4	5,0	4,1
Water supply			0,5	0,6

Source: The table is compiled on the basis of statistical data on the industry of Azerbaijan for the years of 2000, 2005, 2012 and 2018.

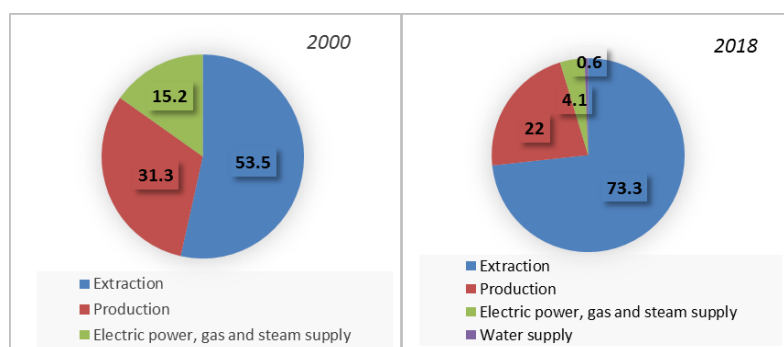


Fig. 1. The share of primary areas of industry, %

Source: compiled on the basis of statistical data on the industry of Azerbaijan.

The second industrial complex in the country formed based on mineral processing, is located in the Ganja-Gazakh economic region. Iron ore and alunite have been mined here since the second half of the 20th century. However, the enterprises established for their processing differ in the sequence of technological processes and the coverage of processing stages. Initially processed in Ganja, the alunite raw material was later turned into the final product at the Sumgayit Aluminum Plant [13].

During the years of independence, Ganja and Sumgayit Aluminum manufactories were reconstructed. Besides, a second aluminium plant was built in Ganja. The annual production capacity of each plant is 100,000 tons. So, an industrial complex covering the stages of aluminium processing has been created in the country. However, the difficulty and cost of electricity supply, as well as the use of sulfuric acid obtained in the processing process, prevent them from operating at full capacity based on local raw materials. To solve the problems in this area, it is necessary to build new TECs (Thermal Electric Centres) and reduce the cost of products based on modern technology.

In ferrous metallurgy, raw materials were only extracted in the Ganja-Gazakh economic region [14]. However, there is an opportunity to create an industrial complex for the ferrous metallurgy industry. Completion of the construction of a metallurgical plant and a train-building plant in Ganja could serve to complete this complex. Ganja Machine-Building company is also one of the main users of ferrous metal. For the time being, the

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establishment of industrial complexes for ferrous and non-ferrous metallurgy in the Ganja-Gazakh economic region is incomplete and has not been completed for many years.

The economic region also has the potential to create an industrial complex for grape processing, and these opportunities are widely used. Starting from the 1970s, the economic region has become one of the largest viticulture and winemaking regions of the country. Wine plants with primary processing facilities close to raw material sources have been established in almost all administrative districts for the processing of products in this area. Wine and cognac factories operated in Ganja, Goygol, Shamkir and Tovuz [15]. Recently, viticulture has been restored in the country, wineries are being rebuilt, and much of it is already operational. However, in the majority of companies, it is not possible to restore the previous capacity, and the area under vines is much lower than in the 1980s.

The economic region also has a technical-economic, economic-geographical base and demographic potential for the creation of industrial complexes for the fruit and vegetable canning industry. Significant results can be achieved in this area by expanding crops in agriculture, increasing crop production and establishing processing foundations (Figure 2).



Fig. 2. A large number of industrial facilities have recently been built in the regions of Azerbaijan

“Agribusiness” created in the region are the main steps in the creation of industrial complexes. These enterprises, based on the cultivation, transportation and processing of fruits and vegetables in the Shamkir region include all stages. The creation of their new networks is an important step in the development of agriculture and food production.

There are opportunities to create industrial complexes for processing agricultural products in other economic regions of the country. In Aran, Shaki-Zagatala, Nakhchivan AR there is a raw material base, the socio-demographic and economic base for the creation of industrial complexes in the production of both food and light industrial products and based on their use, a new network of processing plants is necessitated.

In addition to cotton and silk, raw materials of sheep raising, cattle dealing and other livestock can be used for developing light industry in the country and increasing production in these areas. To create areas for the production of the carpet business, weaving, leather products, first of all, the organization of supply points requires the collection of raw materials.

The Aran economic region is one of the regions with convenient conditions for the organization and operation of mentioned areas. As well as being the largest cotton-growing region in the country, sericulture and sheep breeding is also developing in this

region. For many years, along with cotton growing, there were up to 17 ginneries in here as well as a textile manufacturing plant carried on business in Mingachevir; however, no cotton fabric was produced here. At present, most of them shut down, so, the forethoughts are planned to restore them [16].

In recent years, the precautions have been taken to develop cotton growing in the country, and primary processing enterprises have been restored. With the establishment of the Industrial Park in Mingachevir, there are favourable conditions for the organization of industrial complexes covering all stages of processing in the cotton sector. In this regard, there are great opportunities for the establishment of industrial complexes in the Yevlakh, Shirvan, Salyan, Hajigabul cities. It is necessary to establish a full range of carpet processing companies in these cities.

The Aran economic region has convenient conditions and potential for the establishment of fishing and fruit and vegetable canning plants, as well. Reservoirs, rivers, streams of the economic region, areas along the shores of the Caspian Sea can be used as centres for the organization of fisheries and fish farming. It is necessary to take serious measures to build processing plants based on purchased products.

Even though there are numerous fruit and vegetable canneries in the economic region, it is much lower than the capacity to grow agricultural products, and the domestic demand and export potential of the population is quite high. Favourable natural-climatic conditions, high thermal regime allow to grow quality vegetables and fruits. This demand can be met through the processing of their products.

Complexes for the production of light industry products have been established in Shaki-Zagatala and Nakhchivan AR. These economic regions were once important silk centres of the republic. The regions also have sufficient potential for wool production. Along with, a carpet production enterprise operated in Nakhchivan.

During the period of economic reforms, the manoeuvres are implemented to restore the silk complex in Shaki-Zagatala, albeit the measures are taken so far are not enough to make it a full-fledged one. For this, it is necessary to develop cocoons in both economic regions, increase production and bring the Shaki Silk Plant to full capacity. Along with the Silk Spinning Mill in Ordubad, it is necessary to establish weaving areas.

RESULTS

The development of industrial complexes is one of the fundamental factors in the transition to the sustainable development of the country and its different regions. A majority of industrial complexes formed over many years, especially manufactories in the light and food industries, have been destroyed. At present, there is a certain stage of the industrial complex for oil production and refining in Absheron, fruit and vegetable processing complexes based on the processing of agricultural products, nevertheless the number of which is quite small.

Absheron economic region accounts for 28.7% of the country's total population, including 53.2% of the urban population, 90.6% of industrial output and 52.0% of those working in this field and 70.9% of investments are invested in this region. Therefore, it is

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important to ensure the development of other regions and increase the role of industry in this area.

In the current situation, the economic base of the existing cities in the regions of the country, especially small and medium-sized cities, is deficient, due to the small number of enterprises, there are serious problems with employment and their incomes which are low. Therefore, financial resources for the sustainable operation of other sectors of the economy are limited. Taking this into account, it is necessary to create new products and service facilities for light and food industries in small and medium cities.

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ЭКОНОМИКО-ГЕОГРАФИЧЕСКИЕ ПРОБЛЕМЫ КОМПЛЕКСНОГО РАЗВИТИЯ ПРОМЫШЛЕННОСТИ В АЗЕРБАЙДЖАНЕ

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Промышленность, являясь ведущей отраслью хозяйства, играет важную роль в развитии территорий, формировании хозяйственной структуры городов, обеспечении занятости населения. Создание промышленных комплексов является важным фактором для повышения значимости этой сферы и обеспечения ее

устойчивого развития. Комплексное развитие промышленности серьезно влияет на переработку полезных ископаемых и сельскохозяйственной продукции, на их основе развитие городов. Эта сфера обуславливается созданием сети предприятий, осуществляющих последовательную переработку природных ресурсов на определенных территориях. В Абшероне сформированы промышленные комплексы в нефтегазовой промышленности, в регионах переработки сельскохозяйственной продукции, добычи и переработки цветных металлов в городе Гянджа и прилегающих районах.

Для развития нефтегазодобывающей промышленности на Абшероне и переработки продукции этой отрасли, начиная с 70-х годов XIX века и входящие в новый этап в конце XX века, построены предприятия топливно-энергетической, химической, нефтехимической, машиностроительной, металлургической, стройматериальной промышленности, сети инфраструктурных объектов по образованию, науки, транспорта. Здесь наряду с выращиванием, хранением, транспортировкой продукции создаются перерабатывающие предприятия, организуется аграрно-промышленный комплекс. В статье показаны центры создания промышленных комплексов в стране, их экономическое значение, проводится анализ по их перспективному развитию.

Ключевые слова: промышленность, нефтехимический комплекс, металлургия, легкая и пищевая промышленность, аграрно-промышленный комплекс.

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