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DOI: <https://doi.org/10.32782/2304-0920/2-92-5>**Shapurov Oleksandr
Klopov Ivan**Engineering Educational and Scientific Institute named by Yuriy Potebni
Zaporizhia National University**TRANSFORMATION OF OLD INDUSTRIAL REGIONS IN A RECESSION**

The article substantiates a systematic approach to the transformation of old industrial regions in a recession, which, in contrast to existing ones, allows to detail the conceptual and categorical apparatus on the formation of old industrial regions; to structure the main features of the old industrial regions; to form ways of transformation of old industrial regions in the conditions of recession; is based on special research methods: abstract-logical analysis, systematization and combination, terminological analysis, method of theoretical generalization, method of monitoring, statistical analysis, graphical and tabular approach. The conceptual and categorical apparatus on the formation of old industrial regions is detailed and it is determined that the old industrial region is a socio-economic system that has a retrospective historical period of formation in which it could not move from production to production of ideas, operates in a recession with degraded structure, physically depreciated fixed assets and constant lack of capital and current financing. The main features of old industrial regions are determined: branch, regional, infrastructural, investment-innovative. Monitoring of the state and trends of development of old industrial regions of Eastern Ukraine was performed: analysis of general indicators of development of old industrial regions (population dynamics, migration growth, natural increase, poverty rate, unemployment rate); the development trends of industrial enterprises were monitored on the basis of absolute and relative indicators (number of industrial enterprises, % of unprofitable enterprises, volume of output, volume of sold products, profit, loss, number of employees). The ways of transformation of old industrial regions in the conditions of recession are offered: definition of anti-crisis strategy on the basis of monitoring of retrospective periods; formation of own regional policy and investment base for its implementation; support of old industrial regions and cities based on innovative aspects of the industrial revolution 4.0, integration of regions into the system of world economic relations based on the experience of post-industrial countries.

Key words: old industrial region, gravitational region, rusty belt, post-industrial era, industrial revolution.

Problem statement. The development of each country is not possible without a clear understanding of the strategy of each industry and region. Successful regional policy and flexible management of balanced interaction of industries forms an effective national economy and ensures the improvement of socio-economic norms of society. Unfortunately, for more than 50 years, the country has a number of problems that need to be addressed in the near future, most of them related to the functioning and development of old industrial regions (urban poverty, high living costs, rising inequality and crime, migration, eco-destructive processes). Therefore, the study of trends in the development of old industrial regions and ways of their transformation is a topical issue today.

Analysis of recent research and publications. Problems and trends of old industrial regions have been studied for a long time by well-known domestic and foreign scientists. The following scientists made a significant theoretical and practical contribution: O. Amosha, M. Baranovsky, O. Baranovska, I. Bakarych, V. Boychenko, K. Bachych, E. Boyko, E. Glaser, J. Zisman, S. Cohen, S. Litovchenko, O. Lyakh, J. Meyer, S. Sliepchevich, V. Smal, M. Soldak, A. Timartsev, S. Fedulova, D. Cherevatsky. Scientists have considered the preconditions for the emergence of old industrial regions; the historical and economic factors of consolidation of regional specialization of productive forces of the regions of the East of Ukraine and transformation of these regions into old industry are determined; the imbalances of development of old industrial regions, which consist in socio-economic, infrastructural problems and problems of investment provision, are singled out.

Selection of previously unsolved parts of the overall problem. However, the methodological aspect of the study needs further achievements and

development, including the formation of a systematic approach to the transformation of old industrial regions in a recession, which, unlike existing ones, allows to detail the conceptual and categorical apparatus on the formation of old industrial regions; to structure the main features of the old industrial regions; to form ways of transformation of old industrial regions in the conditions of recession; based on special research methods

The purpose of the article. The main purpose of this work is a systematic approach to the transformation of old industrial regions in a recession. To ensure the implementation of the main goal of the study, the following tasks were solved: detailed conceptual and categorical apparatus on the formation of old industrial regions; identified the main features of the old industrial regions; monitoring of the state and development trends of the old industrial regions of Eastern Ukraine was performed; the ways of transformation of old industrial regions in the conditions of recession are offered.

Presenting main matter. In the modern world of the 21st century, there are many problems that need to be addressed in the near future, most of them related to urbanization processes (urban poverty, high housing costs, rising inequality and crime, migration, eco-destructive processes) arising from high the share of heavy industry in the structure of production [1, p. 127]. In 1950, the percentage of the population living in cities was 30% worldwide and 53% in Europe. At this time, this percentage increased to 55.3% (worldwide), 74.5% (Europe). By 2050, these figures are expected to increase to 66% (worldwide) and 83.7% (Europe). The urban population consumes 80% of all energy and 75% of the world's natural resources and is responsible for 75% of carbon emissions. However, cities offer numerous technological and socio-economic benefits

and have already become centers of research and education [2].

In modern conditions, the issues of solving the problems of sustainable development of old industrial cities and regions deserve special attention. During the fourth industrial revolution there is a transformation of industrial processes, as a result the role of old industrial regions changes. Technological systems change each other and transform the general structure of industrial production, directing it to innovative development. Some old industrial cities remain in the clash of technological systems, becoming depressed and recessionary. Most often, these are cities, the lion's share of gross regional product which is formed by the textile industry, metallurgy, coal basins, coke and other heavy industries.

S. Litovchenko proposes to understand the old industrial region as a holistic territorial entity, socio-economic development of which is determined by the concentration of industrial branches of 3–4 historical technological structures, which, despite the economic downturn caused by the transition to post-industrial economy, have significant potential innovative development [3, p. 142].

Boychenko V.S. gives a similar definition: the old industrial region is a historically formed area, which mainly operates industrial enterprises with outdated technologies, which compared to other regions are characterized by higher output, higher wages, more investment, greater potential for high-tech innovation, and a greater role in replenishing the state treasury, but at the same time have a high level of depreciation of fixed assets and heavily pollute the environment. The author identifies four factors of problems of old industrial regions: general problems of sectoral nature (structural imbalances, depletion of technological and raw material base; dominance of large enterprises; low mobility of capital, narrow specialization of staff); problems of innovation and investment nature (significant material and energy consumption; low rates of innovation; low investment attractiveness of regions); infrastructure problems (shifting the emphasis of regional policy on the development of basic dominant old industries on the basis of increasing the diversification of the economy of the regions by optimizing the structure of industries); socio-economic problems (employment problems, declining incomes; problems of small and medium business development) [4, p. 168].

Group of authors O. Amosha, O. Lyakh, M. Soldak, D. Cherevatsky, considering the application of the concept of smart specialization to ensure the future sustainable development of old industrial coal mining regions, provides a comprehensive description of this category and argues that typical old industrial coal mining regions are a symbiosis of monoindustrial clusters of enterprises and surrounding settlements. The authors identify the following features of the old industrial region: unfavorable for coal mining and geological conditions, high production costs and consistently low prices for the final product [5, p. 315].

E. Boyko notes that more than 40% of Ukraine's regions can be classified as old-industrial, most of which are concentrated in the east of our country. The author identifies the main features of development: territories that developed on the "collision" of technological systems during the first industrial revolution; regions that have gone through periods of economic decline in their development, accompanied

by manifestations of social tension; economic decline and depression of the old industrial regions due to the difficulties of transformation of old industries; imperfect development of the system of support for the introduction of innovations in the old industrial regions; the depressed situation of the old industrial regions is an incentive to take measures to effectively replace the dominant old industries with new modern industries; in the transformation of old industrial regions a decisive role is played by the investment system, which can lead to inertial development [6, p. 110].

M. O. Baranovsky, V. V. Smal, O. V. Baranovska claim that the main old industrial regions of the country are Donetsk and Luhansk regions. Focusing on these regions, the authors suggest the following features: high concentration of population and production, dominance of primary and primary enterprises in the secondary sector, the predominance of the corporate sector, including large enterprises with outdated means of production, the important role of these regions in industrial production. countries, low entrepreneurial activity of residents and difficult environmental situation; formation of regions on the basis of extraction of certain types of resources (coal, ore) [7, p. 38].

According to the convincing opinion of Fedulova S. O. "old industrial region" is a holistic socio-economic system, part of the territorial structure of the country, which is characterized by the existence of ancient basic industry with a predominance of mono-industrial economy and the share of such regions in mining and processing industries is over 7%. The scientist includes Zaporizhia, Dnipropetrovsk, Luhansk, Donetsk regions and Kyiv among the old industrial regions [8, p. 15].

A. Yu. Timartsev has an identical point of view and refers to the old industrial cities of Mariupol, Makeyevka, Gorlovka, Artemivsk, Severodonetsk, Rubizhne, Alchevsk, Kamenskoye, Kryvyi Rih, Nikopol, Pavlograd [9, p. 85].

E. Glaser in his scientific work "Triumph of the City" highlights the concept of a rusty belt – the old industrial cities, which could not move from the production of goods to the production of ideas and are gradually degrading. The author includes such industrial cities as Buffalo, Cleveland, Detroit, New Orleans, Pittsburgh and St. Louis. Using the example of Detroit, the author explains the recession of the industrial city, which occurred in 58 years: 42% of the city's population was lost; the median income of the city's population decreased to 33 thousand dollars, and was less than half the average income of the United States; the unemployment rate rose to 25%, which is 9% higher than in other similar cities. Old industrial cities such as Birmingham and New York City specialized in professionalism, small businesses, and close ties to the outside world. All these qualities, which determine the competitive advantages of the city today, allowed them to succeed long before the first roll of fabric came out of a textile factory in Manchester, and the first machine from the assembly line in Detroit [10, p. 72].

The study of industrial cities of Southern and Eastern Europe by the group of authors Bakarych I., Bachych K., Slipechevich S. deserves attention [11, p. 8].

Thus, to form ideas about the development or recession of old industrial regions of Ukraine we will form two groups of indicators: general indicators of development and industrial development trends

and analytically substantiate the "rusty zone" of the country, which will include four regions of eastern Ukraine: Zaporizhia, Dnipropetrovsk, Donetsk, Luhansk.

During the period 2019–2021, every year the population of the old industrial regions of the country decreases due to migration by 0.1–0.2% and natural increase of 0.5–1.5%. If this trend continues, in 50 years they will lose more than 50% of their population. The average unemployment rate in the old industrial regions for the period 2019–2021 is 12.6%, which is 3.6% more in the country, which in turn may give impetus to the precarization of society. The catastrophic situation with poverty in the old industrial regions, almost a third of the population with incomes below the subsistence level, is actually 2.5–3 dollars per day.

Despite the increase in industrial entities in the Zaporizhia and Dnipropetrovsk old industrial

regions, there are recessionary processes and crises of industrial and financial nature in all the considered old industrial regions of the country:

– 22–30% of industrial entities are unprofitable and this loss in some regions (Zaporizhia, Donetsk, Luhansk) exceeds the profits by 1.5–3 times, and in the Luhansk old-fashioned region at the time of 2020 by 8 times;

– comparing 2020 from 2018 for all old industrial regions there is a pattern of decline in the volume of produced and sold products: Zaporozhye old industrial region by 12–14%; Donetsk – 17–26%; Dnipropetrovsk – 9%; Luhansk – 10%;

– during the retrospective period, the number of employees in all old industrial regions decreased by an average of 9%. Under such conditions, such trends may significantly increase unemployment and poverty in the near future.

According to the English scientist R. Hudson, some of the old industrial cities and regions,

Table 1

General indicators of development of old industrial regions of Ukraine

Period	Population of the region, persons	Migration growth, persons	Natural increase, persons	Poverty rate, %	Unemployment rate, %
Zaporizhia old industrial region					
2019	1705836	-2200	-16280	32,8	9,9
2020	1687401	-2000	-18865	38,7	11,1
2021	1666515	-1907	-26146	31,1	11,4
Donetsk old industrial region					
2019	4165901	-7700	-26413	19,3	14
2020	4131808	-5400	-26095	30,9	15,4
2021	4100280	-5288	-35620	18,8	15,9
Dnipropetrovsk old industrial region					
2019	3206477	-1400	-28403	17,8	7,9
2020	3176648	-600	-33981	23,6	8,8
2021	3142035	-283	-45267	20,4	9,1
Luhansk old industrial region					
2019	2151833	-4900	-10980	25,1	14,4
2020	2135913	-3500	-11100	28,3	16,1
2021	2121322	-3104	-13687	24,5	16,7

Source: [12–15]

Table 2

Trends in the development of industrial enterprises old industrial regions of Ukraine

	Industrial enterprises, thousand units	% unprofitable	Volume of output, UAH million	Sales volume, UAH million	Profit *, UAH million	Loss *, UAH million	Number of employees, persons
Zaporizhia old industrial region							
2018	2097	22,7	199909	207064	18048	3733	144083
2019	2237	22,2	185193	190179	11640	9995	139271
2020	2281	26,9	173721	182861	10573	15000	132781
Donetsk old industrial region							
2018	1366	26,3	299575	338666	17265	14654	168346
2019	1510	27,7	292901	297232	13235	23661	163028
2020	1327	29,6	251348	251956	8898	25687	153907
Dnipropetrovsk old industrial region							
2018	3857	26,1	493900	534150	65138	36906	302268
2019	4155	24,6	497295	51611	59519	27811	297264
2020	4204	27,7	451480	490521	46979	22130	288147
Luhansk old industrial region							
2018	471	32,7	18227	17986	3218	2817	32681
2019	571	30,1	20014	19409	8460	1802	29624
2020	467	29	16532	18861	1164	9102	28443

Source: [12–15]

* - profit (loss) before tax

the so-called workshops of the world, lost their significance and became areas of "housing and consumption", the main source of which was public funding and subsidies [16, p. 588].

S. Cohen and J. Zisman argue that the post-industrial era is a myth, in fact we have a different kind of industrial economy [17]. M. Castells is less categorical, he argues that there is a rapid displacement of industry, development of the financial sector, expansion of the social services sector and the soon dominance of services will lead to the disappearance of industry, or flexible approaches to modernized innovative industrial sector [18].

J. Meyer, on the contrary, argues that the old industrial region should generate the effect of economic development and growth on the entire local economy, including socio-economic development and the surrounding area, thus being a kind of pole of economic development [19, p. 22].

The need to solve the problem of increasing competitiveness, based on the principles of the industrial model, arose in the world economy in the 50s of the twentieth century. At that time, the industrial economy in developed countries began to lose its dominant position, which was accompanied by an accumulation of fixed and human capital, especially – in the basic industries. In our country, which is heading to the European Union, the problem of regional structural deformations of the East of Ukraine is still not solved. In fact, the current State Strategy for Regional Development of Ukraine for the period up to 2020, which is formally developed taking into account European priorities for regional policy, in practice does not define clear requirements for structural adjustment of the economy of old industrial regions. Uncertain strategic position on the model of further development of old industrial regions poses a high risk of further exploitation of outdated economic structures of these regions [20, p. 172].

Timartsev A. Yu. notes that world practice shows that only direct or indirect regulation of territorial development, in the process of market transformation of the economic complex of the old industrial region, by the state can effectively carry out territorial "alignment", so direct public investment is mandatory state regional policy [9, p. 86].

Baranovsky M. O., Smal V. V., Baranovskaya O. V. believe that the revival of old industrial regions should be based on real reindustrialization and post-industrialization, include the implementation of measures aimed at human capital development (change of mentality, overcoming paternalistic sentiments, activation of entrepreneurs activity) and the formation of a favorable business climate. The authors argue that for the Luhansk region it is necessary to develop a separate program for the development of northern regions, which will overcome the backwardness and logistical alienation of these areas, to combine different parts of Luhansk region on a new economic basis [7, p. 39].

According to Boychenko V. S. old industrial regions need appropriate governance, which is possible by changing the outdated mission, values and traditions, principles and culture of governance, which in modern conditions need to be reformed [4, p. 169].

In our opinion, the main ways to transform old industrial regions in a recession are as follows:

1) crisis and stagnation processes of old industrial regions have been formed for a considerable amount

of time, they are similar to each other and will have regressive tendencies in the further historical aspect, if appropriate anti-crisis measures are not applied;

2) to overcome the recession, old industrial regions and cities must have their own regional policy and investment base for its implementation, and this requires a balanced state program for the development of strategically important industries, in our case it is primarily metallurgy;

3) support for old industrial regions and cities should be based on innovative aspects of the Industrial Revolution 4.0: blockchain, IoT, virtual and augmented reality, artificial intelligence;

4) for the successful integration of regions into the system of world economic relations, it is necessary to study the experience of countries that have achieved significant success in solving the challenges facing the old industrial regions and cities. In this case, you can quote E. Glaser: "When you walk the streets of Leipzig with their dilapidated houses, it is easy to imagine that you are in Detroit. Empty houses create the same depressing impression wherever they are – in England or Ohio. But no one confuses Bangalore with Boston or Tokyo with Chicago. Successful cities are always full of human energy, which expresses itself in different ways, forming its own unique space" [8, p. 76].

Conclusions and suggestions. Thus, the study of old industrial regions made it possible to determine the following:

1) industrial potential, which historically developed at the turn of the nineteenth and twentieth centuries. formed the vector of development of future industrial enterprises of the East of Ukraine and determined their specialization and concentration, which is preserved in our time. The deformation of the structure of industry, the transition to a different system of economic production and distribution, the critical low share of innovative industries of new technological systems have determined the transformation of industrialized regions into old industries. As a result, we can say that the old industrial region is a socio-economic system that has a retrospective historical period of formation in the process of which could not move from production to production of ideas, operates in a recession with degraded structure, physically worn out fixed assets and constant shortages of capital and current financing;

2) the main features of the old industrial regions are identified: sectoral (structural imbalances, depletion of technological and raw material base; dominance of large enterprises; low mobility of capital, narrow specialization of staff); regional (high poverty and unemployment rates; negative migration and natural growth rates, population decline and household income); infrastructure (shifting the emphasis of regional policy on the development of basic dominant old industries on the basis of increasing the diversification of the economy of the regions by optimizing the structure of industries); investment and innovation (difficulties in the transformation of old industries; imperfect development of the system of support for innovation in the old industrial regions; high production costs and consistently low prices for the final product, exceeding the amount of losses of industrial enterprises over profits);

3) monitoring of the state and development trends of the old industrial regions of the East of Ukraine

was performed. During the period 2019–2021, there is a decrease in population due to migration (0.1–0.2%) and natural increase (0.5–1.5%); raising the unemployment rate to 12–14%, which is 2–5% more than in the country; increase in the population with incomes below the subsistence level to a peak of 38% (the result of the Zaporozhye old industrial region); almost a third of industrial entities are unprofitable and this loss in some regions (Zaporizhia, Donetsk, Luhansk) exceeds the profits by 1.5–3 times, and in the Luhansk old industrial region at the time of 2020 by 8 times; catastrophic reduction in the number of employees in all industrial regions by 4–13%, which

greatly affects household income, poverty and unemployment;

4) the offered ways of transformation of old industrial regions in the conditions of recession: definition of anti-crisis strategy on the basis of monitoring of retrospective periods; formation of own regional policy and investment base for its implementation; support for old industrial regions and cities based on innovative aspects of the Industrial Revolution 4.0: blockchain, IoT, virtual and augmented reality, artificial intelligence; integration of regions into the system of world economic relations based on the experience of post-industrial countries.

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Шапуров О. О.

Клопов І. О.

Інженерний навчально-науковий інститут імені Ю. М. Потєбні
Запорізького національного університету

ТРАНСФОРМАЦІЯ СТАРОПРОМИСЛОВИХ РЕГІОНІВ В УМОВАХ РЕЦЕСІЇ

Анотація

У статті обґрунтовано системний підхід до трансформації старопромислових регіонів в умовах рецесії, який, на відміну від існуючих, дає змогу деталізувати понятійно-категоріальний апарат щодо питань формування старопромислових регіонів; структурувати основні риси старопромислових регіонів; сформувати шляхи трансформації старопромислових регіонів в умовах рецесії; ґрунтується на спеціальних методах дослідження: абстрактно-логічному аналізі, систематизації та комбінуванні, термінологічному аналізі, методі теоретичного узагальнення, методі моніторингу, статистичному аналізі, графічному та табличному підході. Деталізовано понятійно-категоріальний апарат щодо питань формування старопромислових регіонів та визначено, що старопромисловий регіон – це соціально-економічна система, яка має ретроспективно-історичний період формування в процесі якого не змогла перейти від виробництва товарів до виробництва ідей, функціонує в умовах рецесії з деградованою структурою, фізично зношеними основними засобами та постійним браком капітального та поточного фінансування. Визначено основні риси старопромислових регіонів: галузеві, регіональні, інфраструктурні, інвестиційно-інноваційні. Виконано моніторинг стану та тенденцій розвитку старопромислових регіонів Сходу України: проведено аналіз загальних показників розвитку старопромислових регіонів (динаміка чисельності населення, міграційний приріст, природний приріст, рівень бідності, рівень безробіття); зроблено моніторинг тенденцій розвитку промислових підприємств на основі абсолютних та відносних показників (кількість промислових підприємств, % збиткових підприємств, обсяг виробленої продукції, обсяг реалізованої продукції, прибуток, збиток, кількість зайнятих працівників). Запропоновані шляхи трансформації старопромислових регіонів в умовах рецесії: визначення антикризової стратегії на основі моніторингу ретроспективних періодів; формування власної регіональної політики та інвестиційного базису для її впровадження; підтримка старопромислових регіонів та міст виходячи з інноваційних аспектів промислової революції 4.0, інтеграція регіонів у систему світогосподарських зв'язків виходячи з досвіду постіндустріальних країн світу.

Ключові слова: старопромисловий регіон, гравітаційний регіон, іржавий пояс, постіндустріальна епоха, промислова революція.