

The transformation of the engineering and planning organization of the territory of the Luhansk region in the conditions of the functions changing of the regional typology

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Abstract. The conditions of the origin, development and transformation of the Donetsk and Luhansk regions of Ukraine are considered. There is an irreversible tendency to reduce the industrial potential of the coal and metallurgical industry, the collapse of the urban base. The nature and scale of the impact of the armed conflict in eastern Ukraine on the state of engineering and planning organization in the territory of Luhansk region is studied. Trends of development, circumstances and preconditions of formation of agglomerations of the region are determined. The correspondence of regional typologies on the basis of function in modern conditions of armed conflict is analyzed. The analysis allows us to identify the following important aspects. A gradual but irreversible process of deindustrialization is recorded. The transformation of the engineering and planning organization of the territory of the Luhansk region in the conditions of the armed conflict in the East of Ukraine is a fait accompli. A new political and economic reality is being formed. The Luhansk and Donetsk regions are artificially divided. The internal status of the region has led to the formation of a large number of urban agglomerations, a dense transport network. The analysis of a demographic condition, a territorial, town-planning complex testifies to discrepancy of typological signs of the area in the modern conditions. The Luhansk region is becoming a cross-border region with a dense border. It is expedient to expand the existing classification of regions by introducing certain special functions of the regional typology. In modern conditions in the Luhansk and Donetsk regions the border region is formed. Along this line, the function of cross-border cooperation is complemented by the function of border control. This function aims to limit a certain type – the fixation of the border, the mode of its crossing, strict compliance with statutory procedures. The addition of the functions of the regional typology should be taken into account in the tasks of improving the territorial – planning organization of Luhansk region.

1 Problem statement

The Donetsk and Luhansk regions form the Donbass region, which is characterized by the highest level of urbanization in Ukraine. It is an old industrial region based on the coal and metallurgical complex. The phase of extensive development based on the active exploitation of minerals, primarily coal, has passed. The need for a continuous increase in coal production no longer exists. An irreversible tendency towards a decrease in the industrial potential of the coal and metallurgical industry is forming. Due to a decrease in industrial potential, a reduction of the urban planning base is recorded. In 2014, an armed conflict broke out in the East of Ukraine, inspired from the outside, which significantly worsened the situation, and introduced unforeseen circumstances in the form of alienation of the part of the territories. The strategic directions and tasks of the territorial development of the Luhansk region require updating and adjustment.

The territories of the Luhansk and Donetsk regions are highly urbanized. As of 2014, the percentage of the urban population of the regions reached 80-90%.

The population of the Donetsk region amounted to 4,356,000 people, Lugansk region – 2,256 million people, together more than 6,600,000 people, which in aggregate more than in some small European countries. Of the 47 European states, 27 have a population of less than 6 ml. people. [1] The artificial division of the territories of the two regions radically changed the engineering and planning organization of the region. The task of urban development, territorial planning should take into account the circumstances caused by the armed conflict. Research and analysis of the problems of territorial development of the region are relevant.

2 Purpose, idea and research methodology

The goal of the research – to study the nature and extent of the impact of the armed conflict in the east of Ukraine

on the state of the engineering and planning organization of the territory of the Luhansk region. Determine development trends, circumstances and prerequisites for the formation of the agglomerations in the Luhansk region. To investigate the place and role of the Lisichansk-Severodonetsk agglomeration in the system of regional settlement and the Luhansk region, to establish the peculiarities of the formation of the functional spatial structure of the agglomeration, its development trends, the evolution of the regional settlement system, the state and problems of urban development. Analyze the correspondence of the regional typologies on the basis of function in modern conditions of the armed conflict.

The idea. Ukrainian Donbass has unique historical features. In fact, this industrial region instantly emerged and developed. However, the focus on the coal and metallurgical complex, the outdated industrial structure led to a gradual decline in the region. The complex of socio-economic problems has multiplied the complexity of the armed conflict. All development strategies, territorial planning tasks, territorial development management tasks have lost their relevance. The need arose to improve the methodological prerequisites for managing the development of territories.

Methodology. Research is based on systematic analysis, analytical comparison, historical methodology. The paper investigates external and internal factors influencing the functional and planning organization of the region. The information base consists of literary and archival sources, cartographic materials.

3 The research results

In the theory and practice of regional planning, the classification of regions according to the features of function and form is used. By functional purpose, there are the metropolitan, transport and cross-border regions. According to special natural conditions, there are coastal, riverside and regions with minerals. [2] In the Luhansk and Donetsk regions, a border region is formed, which arose and functions in the context of an armed conflict. The border control function aims at a certain type of restriction – fixing the border, the mode of crossing it, strict adherence to legally established procedures. The addition of the functions of the regional typology should be taken into account in the tasks of improving the territorial planning organization of the Luhansk region.

7 agglomerations were formed on the territory of the Luhansk and Donetsk regions of Ukraine (Fig. 1). [1]

The Luhansk region is located in the east of Ukraine and since 2015 is located in the zone of the joint forces operation (JFO), part of the region's territory is not controlled by state authorities. The regional center, Lugansk, was seized by illegal armed groups and lost its administrative and economic significance. The administrative functions of the regional level were transferred to the city of oblast subordination, Severodonetsk.

The region is characterized by a high level of

urbanization. By the number of cities, it ranks second in Ukraine. On the territory of the region, it is possible to distinguish the agrarian north, the industrial center, the coal mining south. According to the type of settlement, the following agglomerations can be distinguished: Central-Lugansk (Alchevsk – Kadievka), Severo-Lugansk (Lugansk), Yugo-Lugansk (Khrustalny), Severodonetsk – Lisichansk agglomeration. (Fig. 1). [1]

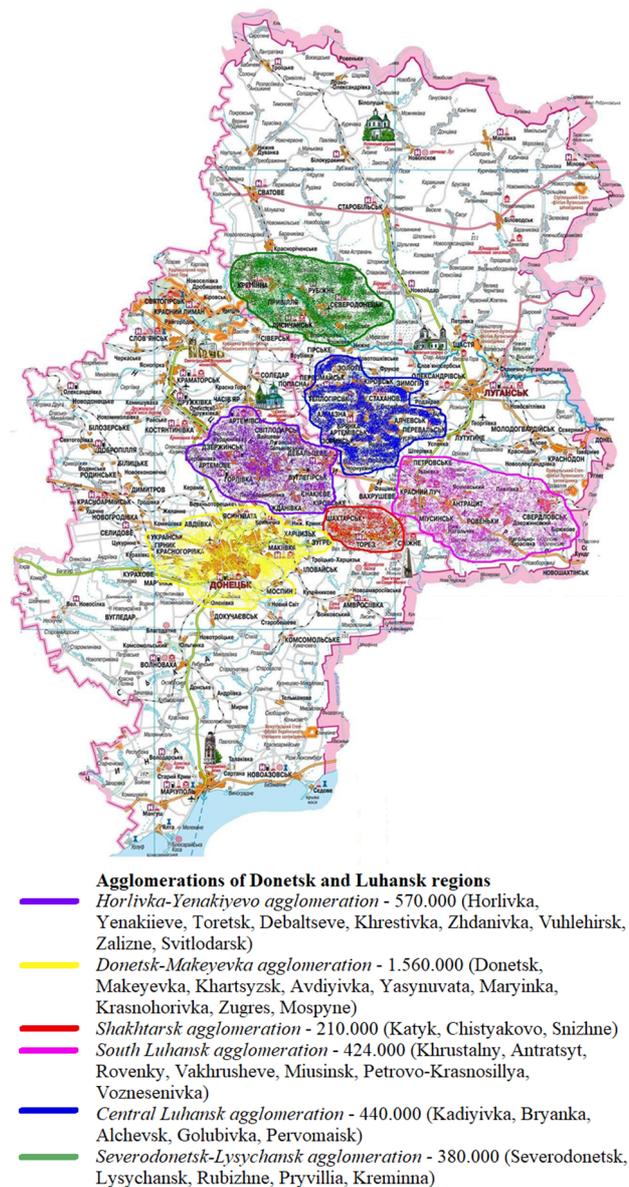


Fig. 1. The agglomerations of the Donbass region.

Donbass arose and developed instantly, by historical standards (Fig. 2, 3). History has not known such cases [3, 4].

Rapid growth of the extensive type threatens the decline of developmental factors. In an industrial economy, excessive urbanization overloads the territory. In conditions of limited natural resources, the maintenance of the vast majority of the working population causes structural distortions of the development. The city's own exports should prevail, then the city has the opportunity to develop. This statement is also true for agglomerations [5]. In the archaic agrarian

period, this region is better known as the Wild Field. The Donbass region belongs to the zone of risky farming, when only 2 out of 10 years are usually productive. Thus, from 1799 to 1856, for a period of 57 years, there were 28 non-productive years [3].

There were 1.1% of skilled agricultural workers at the beginning of the twentieth century in the Donetsk region, and correspondingly in the Luhansk region. – 1.3% of the population. Such low indicators show, firstly, an insufficient level of provision of the region with its own food, secondly, the resource of further urbanization is almost exhausted, and thirdly, the lack of agricultural land, however the possibilities of intensifying agricultural production are clearly demonstrated by such states as the Netherlands and Israel.



Fig. 2. The scheme of the main industrial regions of Europe during the Industrial Revolution.

It should be noted – Donbass has always been an inland region. It had transport and geographical advantages and contributed to its development as a powerful industrial hub.

The rapid development of Donbass begins in the 70-80s. of the 19th century, when the action of the several key factors of the industrial revolution coincided:

- The aggression of the Russian Empire in the direction of the Balkans and the Black Sea, which required a large number of weapons, hence metal;
- The emergence and spread of steam engines and steam locomotives – consumers of coal;
- Ukrainian chernozems became safe agricultural economic territories after a series of Crimean and Turkish wars, the partition of Poland.

In 1895–1900 the production of iron and steel in the Donbass equaled the volume of production in the Urals, that is, from this period Donbass can be considered a new industrial center of the Russian Empire. [3]

The events of the XX century, IWW and IIWW affected the territorial development of the region.

Donbass experienced a decline in 1918-1924, which was caused by the civil war and the absence of a central government. In fact, adjusted for the era, the problems were / are of the same nature, and the consequences are generally similar – reduced production, migration of people and workers, widespread gardening to avoid famine, hunger, impoverishment and natural exchange. [6]

For the second time, Donbass was destroyed during the German occupation during World War II. The consequences of the occupation were also exacerbated by the “scorched earth” policy used by the Soviet authorities.

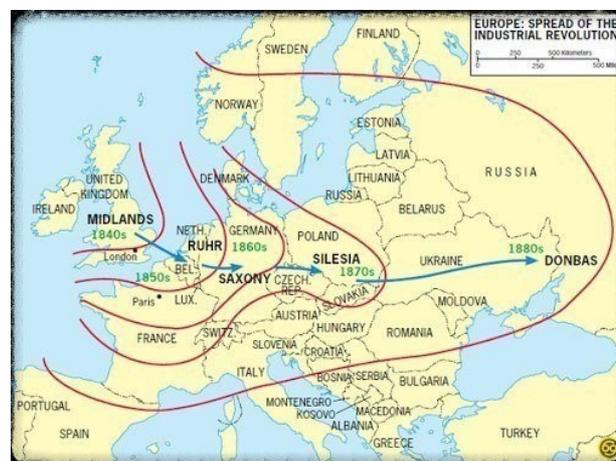


Fig. 3. The speed of the spread of the industrial revolution in Europe [4].

The status of the inland region allowed to quickly restore industrial potential.

After the Second World War, the USSR implemented a large-scale plan to revive Donbass. Metal, energy, and fuel were needed to rebuild the state. However, at that time there were distortions associated with the dominance of the needs of the defense industry. Many companies were focused on the production of military products. [7]

For the period 1950-1980, a strategy for the development of Donbass was laid and partially implemented, which provided for the accelerated urbanization of the region. It is clear that the population growth was mainly due to labor migration, including the use of tough administrative measures.

During the days of independent Ukraine, the coal and metallurgical industry stabilized after the creation of vertically integrated corporations, concentrated in the hands of large oligarchic capital.

Geography does not always take into account state boundaries. Part of the coal deposits are located on the territory of the Russian Federation – in the Rostov region. The Russian part of Donbass still looks ugly, with the only prospect – accelerated degradation, social

and demographic. The coal industry practically does not exist in the region. Economic factors, logistics conditions have made the region's coal unprofitable. The mining and metallurgical complex of Russia is concentrated in the Urals. It is necessary to take into account the fact that in this direction the development of the situation in the Russian part of Donbass is ahead of two decades, which means that it indicates the similar consequences in Ukraine for coal-mining cities.

Analysis of the prerequisites for the formation of the Donbass phenomenon, the study of trends that are laid down by statistical data, allows us to determine the following important aspects.

The development of the region was uneven, based on a resource economy. When a natural resource is exhausted, a gradual but irreversible process of de-industrialization begins.

We note once again – the coal has not run out – the need for coal has decreased. As historians testify, J. Hughes, the founder of Yuzovka – Donetsk, counted on the life of his industrial empire for 50–60 years.

Large multidisciplinary cities have developed in an advantageous location, gradually increasing and pulling into their orbit nearby territories and settlements.

History knows cases when majestic capitals disappeared from the map of the world, and cities that had a strategic status and influence have now turned into second-class provincial cities (Carthage, Genoa, Venice).

The Agglomerations of Donbass were formed from settlements at industrial enterprises. Enterprises were grouped near mineral deposits. Socialist cities have their own history, which begins with workers' barracks next to factories.

It can be assumed that the exploitation of the natural resources of Donbass was of a colonial nature. After all, the first investors were foreign capital – the Scots, Belgians, etc. The Soviet government was also more willing to take as much resource as possible from Donbass in a short time. It is impossible to speak seriously about the priority of the development of the urban environment and the quality of life. Among the arguments in favor, opponents give examples of regional development programs for Donbass, but the results of the implementation of these programs speak for themselves:

- The urban development planning proceeded from the needs of the industry in workers. The primary bias is due to the narrow profile orientation of heavy industry. So, during the Soviet era, the question arose of a shortage of jobs for women – after all, mining is a predominantly male profession. Again, they tried to solve the problem in a directive way – they built enterprises focused on women's work. The results have not always been successful;
- the priority for the maximum indicators of industrial production has led to environmental pollution of the territory, which is partly irreversible;
- cases and threats of man-made disasters caused by overexploitation;

- catastrophic pollution of water resources. This fact alone may be enough to make the area uninhabitable;
- unfavorable demographic situation and depopulation, which is actually becoming a fact;
- deindustrialization – and, as a possible consequence, degradation of industrial potential; an excessive number of places of detention, which is typical for the Soviet economy with the use of prison labor.

The deterioration of the ecological situation, the instability of the economic complex, the high proportion of industrial and communal storage areas in the structure of the city have led to the fact that at the present time these “tired” cities are large industrial areas, a significant proportion of the population of which lives in sanitary protection zones. [7]

The consequence of all these distortions, multiplied by the political turbulence of the post-Soviet period, was a significant deterioration in the quality of life of the overwhelming majority of the population. The social, political, economic, and financial crises have deprived the resources necessary for decisive progressive changes. A somewhat deformed structure of employment has taken shape. At the beginning of the 21st century approximately 10% of the population of Donbass was involved in management, 30% of highly skilled workers for non-physical labor, 40% of skilled manual labor, 13% of unskilled professions. [8]

For the first time, Donbass faced a situation when, instead of a recipient of labor resources, it turned into a donor. Objectively, this is a completely natural process. Industrial degradation is causing job losses. The wage arrears crisis is making local jobs unattractive. First of all, young people and highly qualified personnel leave. The deterioration of the situation enters a new circle.

Quote: “The number of workers in the Yekaterinoslav region in 1913 compared to 1861-1870 increased 41 times.” In modern conditions, such an increase looks like something extraordinary. [8]

In the society of the region, paternalistic expectations are widespread, the essence of which is briefly described by the thesis “Donbass feeds everyone”, “the center is robbing us”. The Donetsk and Luhansk regions took the last and penultimate places in terms of the aggregate level of human development in the region. The factors that led to the low rating are due to unsatisfactory indicators of the demographic state, living conditions of the population, the level of education, a very difficult ecological situation, and an inappropriate level of development of the social environment. However, Donetsk region took the third place in terms of material well-being out of 27 regions of Ukraine.

Statistics, however, show that this public belief contradicts economic indicators. The share of GDP of the Donetsk region in 2010 was 12%, and the total share of subsidies and transfers reached 20.9%, and 27% in 2011. The Luhansk region contributed 4% of GDP, while subsidies and transfers in 2010 and 2011 were 7.8% and 11%, respectively. That is, Donbass received 2 – 2.5 times more than it gave. At the same time, the

regions recorded the largest volume of wage arrears. [8]

Let us add one more aspect – the economic crisis has entailed humanitarian complications. The number of scientific workers, has decreased. But since the scientific staff had a narrow industry focus, this makes it impossible to use them in other areas.

Deindustrialization, social and humanitarian crises lead to the reproduction of an archaic type of survival – so-called “Copanks” (small illegal coalmine) and the collection of scrap metal. It is becoming the norm and no one is surprised when the trolley wire or cables are stolen.

But a crisis can turn into a disaster. All of the above are prerequisites for the current situation. The armed conflict was inspired, among other things, due to the deformed social and national structure of the region, regional proximity to the border, the lumpenization of the population makes the consequences in the region catastrophic.

At the beginning of the XXI century, the industrial cities of the Lugansk region faced a number of problems caused by the collapse of the industrial base. Such as: ecological overload of territories; outdated technology of the industrial era; curtailment of the urban planning base; decrease in the number of working-age population.

In 2014 this situation was aggravated by the armed conflict. There is a situation of artificial division of the territorial and economic complex, which has been going on for more than 6 years, the time period is comparable to the stage of implementation and planning of the general plan decisions. [9]



Fig. 4. The JFO demarcation line.

The JFO demarcation line separates the two regions of Donbass, blocks a number of highways and a national railway. The north and most of the agricultural land of the Luhansk region are under the control of Ukraine. The south and center are not controlled by the government. The front line runs along the boundaries of the main agglomeration formations and along natural barriers. (Fig. 4). [10]

The situation has certainly negative consequences, the issues of territorial development, improvement of urban planning and planning organization are generally removed from the agenda.

The uniqueness of the situation is that the place of conflict is an urban area. (Fig. 5). [11].

Despite the localization of the front line, the area of the conflict can be compared to a small European state. Ukraine does not control 407 km. state border, 47 000 km² or 12% of its territory (including the Crimea), the demarcation line reaches 427 km. (Fig. 6). [10, 12] 1.4 million people are registered as temporarily displaced, and almost 4 million remain in the uncontrolled territory. External military intervention has a hidden hybrid nature. Foreign policy factors dominate in resolving the armed conflict.

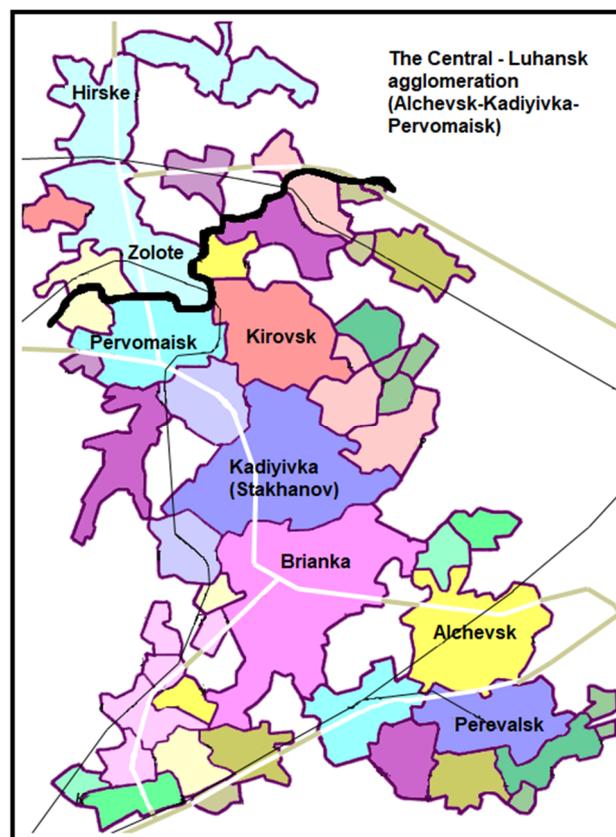


Fig. 5. The scheme of the Central – Luhansk agglomeration. The administrative boundaries of settlements.

Unfortunately, there is still no reason to assert that there is a well-developed, effective and resource-secured scenario for overcoming the crisis.

The political component dominates and makes economic forecasts insignificant.

There may be several basic scenarios:

- Return of control over the temporarily occupied territories in the near future;
- Return of the temporarily occupied territories in the distant perspective.

We will not consider the first scenario in our article, as it will probably involve a number of political agreements that create burdens.

The second scenario makes the territory of the Luhansk region controlled by Ukraine, with the only

large agglomeration – Severodonetsk-Rubezhnoe – Kremennaya, the object of research.

Yu. M. Belokon provides a classification of regions based on function and form. The regions of the first group are divided according to their functional purpose: metropolitan; transport; cross-border.

Regions of the second group, according to special natural conditions, are divided into coastal, riverside and regions with minerals. [7] The author notes that industrial regions with minerals have the same tasks of modernizing the coal industry, providing employment for the population, improving the environment, looking for new incentives for development. Separately, it was noted that cross-border regions should become an actual object of the urban planning. [7]



Fig. 6. The territories of Ukraine occupied by illegal armed group (the temporarily uncontrolled territories of Ukraine).

At the level of scientific discussion, the question arises of an extensive interpretation of the list of individual special functions of the regional typology. Along the demarcation line, along the existing border, which is temporarily uncontrolled by Ukraine, a de facto border region is being formed, within which the concept of “cross-border cooperation” can acquire another function – “border control” – when the state border plays a protective role.

It is advisable to direct further research to drawing up a balance of the available resources of the region. [13, 14] The list of balance groups under consideration should contain: population and its demographic structure; territory including agricultural land; industrial production volumes; available resources of minerals; level of provision (self-sufficiency) with water resources; level of security (self-sufficiency) with energy resources; transport development of the territory; the level of social development of cities and territories; the level of environmental pollution. It is also advisable to perform zoning of the region's territory in modern conditions.

4 Conclusions

The transformation of the engineering and planning organization of the territory of the Luhansk region in the conditions of the armed conflict in the East of Ukraine is a fait accompli. A new political and economic reality is being formed, which cannot be ignored. The Luhansk

and Donetsk regions are artificially separated. The industrial region developed as a coal and metallurgical industrial complex. Its status as an inland region has led to the formation of a large number of urban agglomerations and a dense transport network. The analysis of the demographic state, territorial, town-planning complex testifies to the discrepancy between the typological features of the region in modern conditions. The Luhansk region is turning into a cross-border region. The existing classification of regions provides for two groups – by typological features of function and form. There is a need to expand the list of individual special functions of regional typology. In modern conditions, in the Luhansk and Donetsk regions, a border region is formed, consisting of sections of the state border and the JFO demarcation line. On this line, the function of cross-border cooperation, where the dominant is the exchange of goods, services, cultural contacts, is supplemented by the function of border control. This function aims at limiting a certain type – fixing the border, the mode of crossing it, strict adherence to legally established procedures. The addition of the functions of the regional typology should be taken into account in the tasks of improving the territorial planning organization of the Luhansk region.

References

1. Mis'ki aglomeracii' Ukraïny, https://uk.wikipedia.org/wiki/%D0%9C%D1%96%D1%81%D1%8C%D0%BA%D1%96_%D0%B0%D0%B3%D0%BB%D0%BE%D0%BC%D0%B5%D1%80%D0%B0%D1%86%D1%96%D1%97_%D0%A3%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D0%B8 Accessed 25 October 2020
2. Yu.N. Belokon' *Regional'noye planirovaniye – teoriya i praktika* (Logos, Kyiv, 2003)
3. V. B. Molchanov, Ukraïns'kyj Donbas – ekonomichne dyvo drugoi' polovyny XIX – pochatku XX st., in *Grani istorii': zb. nauk. prac'. Special'nyj vypusk – materialy II Vseukraïns'koi' naukovo-praktychnoi' konferencii' «Bahmuts'ka starovyna: krajeznavchi doslidzhennja – 2018»*, 1(9), 103-113 (HIFL, Bahmut, 2018)
4. Shema rozpovsjudzhennja industrial'noi' revoljucii'. https://liberapedia.wikia.org/wiki/Industrial_Revolution?file=F1_07_pg51.jpg Accessed 25 Oct 2020
5. A.P. Ositnjanko, *Planuvannja rozvytku mista* (KNUCA, Kyiv, 2001)
6. V. Zh. Popov, Pasyanky proletars'koi' revoljucii': robochi mista Ukraïny v umovah humanitarnoi' katastrofy 1917–1920 rr., in *Grani istorii': zb. nauk. prac'. Special'nyj vypusk – materialy II Vseukraïns'koi' naukovo-praktychnoi' konferencii' «Bahmuts'ka starovyna: krajeznavchi doslidzhennja – 2018»* 1(9), 121-126 (HIFL, Bahmut, 2018)
7. V. A. Jacenko, Teoreticheskie i prakticheskie idei novogo gradostroitel'stva Donbassa: ikh proshloe, nastoyashchee i budushchee, *Mistobuduvannja ta*

- terytorial'ne planuvannja **21**, 359-366 (KNUCA, Kyiv, 2005)
8. S. Kul'chyc'kyj, L. Jakubova, *Donechchyna i Luganshhyna u XVII-XXI st.: istorychni faktory j politychni tehnologii' formuvannja osoblyvogo ta zagal'nogo u regional'nomu prostori* (NASU Institute of History of Ukraine, Kyiv, 2015)
 9. DBN B.2.2-12:2019, Planning and building of territories (Ministry for Communities and Territories Development of Ukraine, Kyiv, 2019)
 10. Karta linii' rozmezhuvannja OOS, <https://www.imbf.org/karty/images/karta-linii-razgranicheniya-fronta-donbasse-hq.jpg> Accessed 25 Oct 2020
 11. N.M. Demyan, Gorodskye aglomeracyy v kontekste yssledovanyja fenomena form y system rasselenyja. Mistobuduvannja ta terytorial'ne planuvannja **45**(1), 3-15 (KNUCA, Kyiv, 2005)
 12. Karta okupovanyh terytorij Ukrainy, <http://bintel.com.ua/uk/article/09-18-De-Occupation/> Accessed 25 Oct 2020
 13. R. Krzysztofik, M. Tkocz, T. Spórna, I. Kantor-pietraga, Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland. Moravian geographical reports **24**(1), 42-54 (2016). doi:10.1515/mgr-2016-0004
 14. R. Krzysztofik, I. Kantor-Pietraga, F. Kłosowski, Between Industrialism and Postindustrialism – the Case of Small Towns in a Large Urban Region: The Katowice Conurbation, Poland. Urban Science **3**(3), 68 (2016). doi:10.3390/urbansci3030068