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THE IMPACT OF THE OBLAST CENTER ON REGIONAL SOCIO-ECONOMIC DEVELOPMENT: THE CENTER-PERIPHERY DIMENSION

Purpose. *The paper aims to examine the impact of the oblast center on regional socio-economic development in the context of the center-periphery relationship.*

Methodology / approach. *The general scientific methods (analysis, synthesis, generalization, systematization, graphic method) and special ones (statistical analysis, comparison, organizational and managerial modeling) were the basis of the methodological approach. The author improved the scientific-methodological approach to the comprehensive evaluation of a region's socio-economic development in terms of the center-periphery relationships based on interrelated stages and methods. It stipulates the research of the impact each district of a region has on the major socio-economic parameters of an oblast; calculation of the District Socio-Economic Development Index and its comparison with the district's distance to the oblast center; evaluation of interdependencies between the districts' shares in major socio-economic parameters of respective oblasts and their distance to the oblast center; and analysis of the development intensity of the oblast districts depending on their distance to the oblast center.*

Results. *Testing the scientific-methodological approach on the example of three oblasts of Ukraine (Lvivska, Poltavska, and Chernihivska), which are developing in different spatial-geographic, socio-economic, and demographic conditions, has contributed to substantiating the features of generation and development of the center-periphery relationships in the regions with different initial development conditions; outlining the areas of socio-economic centers' impact on the districts; detecting the intensity of positive stimulus generation and their absorption in the region considering the role of local "growth poles" in the process.*

Originality / scientific novelty. *The paper further develops the theoretical-methodological foundations of researching the center-periphery relationships in a region at the oblast center – oblast area level. The results of calculations following the author's methodological approach have allowed developing the space structure for Ukrainian regions under research in the context of the center-periphery relationships.*

Practical value / implications. *The conducted research based on the methodology developed by the author is quite important both in terms of the scientific-methodological aspect and in the context of addressing the important regional development tasks and searching for balanced and coherent spatial development.*

Key words: *center-periphery concept, spatial development, regional development, oblast center, periphery, semi-periphery, growth pole.*

Introduction and review of literature. The issue of disproportionate regional development, which was first covered in the works of scientists in the early XX century, have remained of urgent importance till nowadays.

The oblast center, in fact, performs the function of connecting the region with the global and national relationships and processes, transferring the development momentums originating from these relationships to the adjoining areas. Despite the clearly delineated and institutionalized boundaries of the oblast center, the momentums generated and transferred by it cause structural changes in the socio-economic development of the entire region.

According to J. Friedmann's regional development theory [1], unequal economic growth of the regional system and the process of spatial polarization inevitably generate misbalances between the "core" and the periphery. The periphery is not a homogeneous area, it is divided into the so-called domestic (neighboring), which is closely related to the "core" and gets the development momentums from it, and external (remote), which is hardly the subject to the "core's" mobilizing impact. At any spatial level, the center and the periphery are connected by the flows of information, capital, goods, workforce, etc. Meanwhile, the directions of these flows determine the nature of the relationship between the central and peripheral structures, transforming the space into the growth pole. The continuous qualitative transformation of the "core" due to the generation, implementation, and diffusion of innovations are the drivers or kind of engines securing the consistent development and reproduction of the center-periphery relationship system [2].

Therefore, "the identification of the vector of impact and intensity of relationships in the center-periphery system at the oblast center – oblast districts level is the important and relevant task from the viewpoint of objectivity of decentralization (in Ukraine), urbanization, and metropolization (in Ukraine and worldwide). It will help to regulate the relationship between the "core" (oblast center), its central (suburban), semi-peripheral, and peripheral districts, and make relevant managerial decisions to boost the stimulating role of the oblast center as the growth pole and producer of innovative transformations in spatial aspect due to existing financial-economic, human, educational-scientific, transport, and infrastructural, etc. capacities" [3].

"Center-periphery" is a fundamental category which characterizes the set of hierarchical order of geographical objects and explains the heterogeneity of geospace. The internal (genetic) order of geospace triggers the hierarchy of geographical objects concerning their spatial organization. Therefore, according to I. Pylypenko [4], the "center – periphery" category can be considered as an extent of geospace hierarchy.

P. J. Taylor, M. Hoyler and D. Smith [5] argue that the idea of allocating the central and peripheral districts is based on the polarity of socio-economic space, which is especially intensive in the zone of the cities' impact because there we can observe the interaction between the districts of the highest level – the so-called core – with the least developed – peripheral. Following the center-periphery model in its modern interpretation, both central and peripheral districts are recognized not as static but as those capable to transform and undergo several development stages. Moreover, the process can be interpreted even more broadly – as the continuous process of establishing the center (core-making) and the periphery (periphery-

making) [6].

The dominance of the concept of "center-periphery" is now widely offered in the solution of numerous political-geographical tasks (for example, work I. Prykhodko (2017) [7], M. Wojcik (2018) etc. [8], M. Kozłowska-Adamczak (2018) [9]) and socio-economic nature (for example, work by A. Kostyaev, G. Nikonova (2021) [10], G. Petrakos etc. (2021) [11], J. Rhydian etc. (2012) [12]) at all levels of the hierarchy of territorial systems.

Based on the theory of "center-periphery", D. Rae (2017) [13] explores: in what ways is peripherality relevant to entrepreneurial learning? How can centre-peripheral connectivity enhance this? What are the implications for communities, learners and educators? The author proposes the concept of central-peripheral Entrepreneurial learning, which may assist in rebalancing central-peripheral value creation, innovation and regeneration.

Meanwhile, when examining the development of rural peripheral areas in Lithuania, G. Pociute-Sereikiene and E. Kriauciunas [14] predict that the center-periphery spatial structure will in the nearest future become one of the main factors determining the priorities and impacting the regional development.

The purpose of the article. The paper aims to examine the impact of the oblast center on regional socio-economic development in the context of the center-periphery relationship.

Methodology. The dependence of the level of socio-economic development of the region's administrative units on their distance to the oblast center as the place of resources and capital concentration and business activity center constitutes the main research hypothesis.

The research of Ukrainian regions' socio-economic development in the context of the center-periphery relationships was partially examined when researching the development of a city's and adjoining area's labor market (in particular, migration activity of the residents of an area adjoining a city) [15; 16], transport system, recreational and other types of services, etc. However, the research does not allow developing a comprehensive picture of the relationship between the socio-economic development of an area and the functioning of an oblast center as a consolidating core, as well as substantiating the dependence between the area's development and accessibility to the centers of resources and capital concentration.

Considering the abovementioned, the impact an oblast center has on the socio-economic development of a region in the context of the center-periphery relationships is offered to be researched based on the author's methodology presented by Fig. 1. The developed methodology allows the comprehensive evaluation of the regions' socio-economic development in the context of the center-periphery relationships based on interrelated stages and methods. It stipulates the research of the impact each district of a region has on the major socio-economic parameters of an oblast; calculation of the District Socio-Economic Development Index and its comparison with the district's distance to the oblast center; evaluation of interdependencies between the districts' shares in major socio-economic parameters of respective

oblasts and their distance to the oblast center; and analysis of the development intensity of the oblast districts depending on their distance to the oblast center.

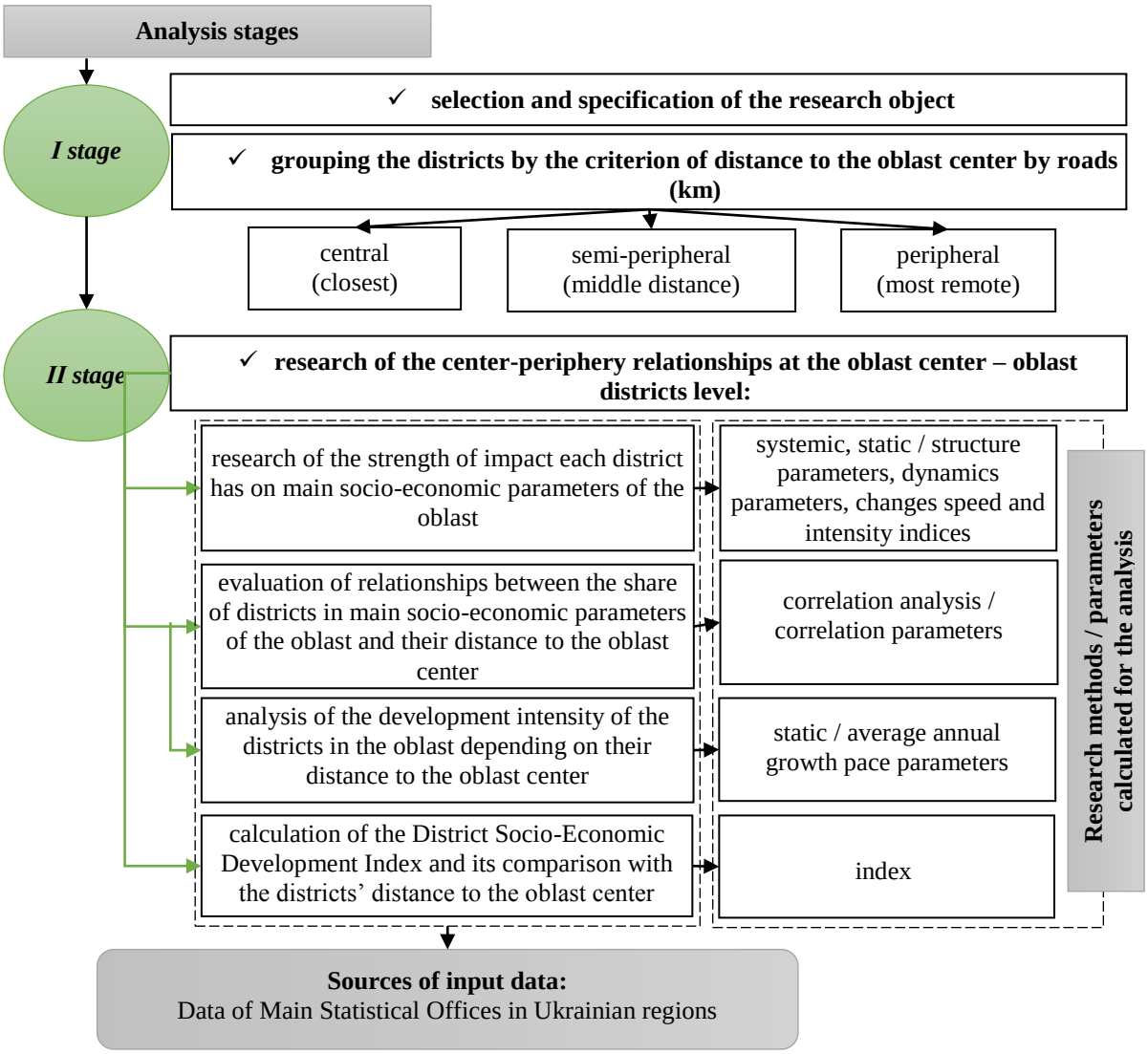


Fig. 1. Methodological approach to evaluating the center-periphery relationships at the oblast center – oblast districts level

Source: developed by the authors.

The methodological approach has been described in other studies of the author before [17]. Yet, in this paper, it is improved and increasingly tested.

The District Socio-Economic Development Index (I_d) is calculated as the arithmetic mean of its Economic Development Index (I_e) and Social Development Index (I_s) (Table 1).

Taking into account the fact that the parameters provided in Table 1 are heterogeneous, i.e. they cannot be compared and have substantial intraregional fluctuations, the process of their standardization is necessary as it will secure the compatibility and comparability of the created information basis.

Table 1

Parameters to calculate the District Economic and Social Development Indices

No.	Indexes	Type of influence of the indicator
Economic Development Index (I_e)		
1	Capital investment per capita, thous. UAH	Stimulator
2	Provided services per capita, thous. UAH	Stimulator
3	Commissioning of the housing space per 1000 of the population, sq. m	Stimulator
4	Average number of full-time employees per 1000 persons, persons	Stimulator
5	Number of companies-economic entities, units per 10000 persons	Stimulator
6	Companies' retail turnover per capita, thous. UAH	Stimulator
7	Sold industrial products (goods, services) per capita, thous. UAH	Stimulator
Social Development Index (I_c)		
1	Average monthly nominal wages, on average per employee, UAH	Stimulator
2	Housing space available to the population (as of the end of the year, sq. m of the total space per capita)	Stimulator
3	Children coverage with pre-school educational facilities, %	Stimulator
4	Demographic burden on the population aged 15–64 (at the beginning of the year, persons aged 0–14 and 65 and older per 1000 persons aged 15–64)	Destimulator
5	Natural growth, persons per 1000 of the de-facto population	Stimulator
6	Migration growth, persons per 1000 of the de-facto population	Stimulator

Source: developed by the authors.

The standardization procedure should be carried out taking into account the fact that the provided parameters are the stimulators (the growth of their rates positively impacts the level of economic / social development of the district) or destimulators (the growth of their rates, respectively, affects the level of economic / social development of the district):

$$N_i = \frac{Z_i - Z_{min}}{Z_{max} - Z_{min}}; \qquad N_i = \frac{Z_{\max} - Z_i}{Z_{max} - Z_{min}}, \tag{1}$$

where N_i – the normalized value of the i parameter in the district;

Z_i – the value of the i parameter in the district;

Z_{max} – maximum value of the i parameter in the district;

Z_{min} – minimum value of the i parameter in the district.

The normalization of primary parameters by the formulas (1) will bring their values within the range [0:1]. Meanwhile, the higher is the index, the higher is the development level of the district by the respective index, and vice versa.

The use of the suggested methodological approach (Fig. 1) will contribute to determining the spatial zones with various intensities of the "core's" impact in the region, defining the areas of central, semi-peripheral, and peripheral types, and determining their sub-types.

The impact the oblast center has on the space structure in the context of the center-periphery relationships will be researched on the example of three Ukrainian

oblasts – Lvivska, Poltavska, and Chernihivska, which are developing in different spatial-geographical, socio-economic, and demographic conditions (Annex A).

To evaluate the center-periphery relationships between the oblast center and the districts in the region, the latter ones are conditionally divided into three groups depending on the distance between them (by roads; Table 2).

Table 2

The districts in the region grouped depending on the distance to the oblast center (by roads)

Regions / Indexes		Lviv	Poltava	Chernihiv
Group of districts	central	Pustomytivskyi, Zhovkivskyi, Horodotskyi, Mykolaivskyi, Kamyanka-Buzkyi and Peremyshlyanskyi districts – *distance to the regional center – up to 50 km*	Dykanskyi, Karlivskyi, Kotelevskyi, Mashivskyi, Novosanzharskyi, Poltavskyi, Reshetylivskyi and Chutivskyi districts – *distance to the regional center – to 70 km*	Gorodnyanskyi, Kozeletskyi, Kulykivskyi, Menskyi, Ripkynskyi, Chernihivskyi and Snovskyi districts – *distance to the regional center – to 70 km*
	semi-peripheral	Yavorivskyi, Buskyi, Mostyskyi, Zolochivskyi, Zhydachivskyi, Radekhivskyi and Stryjskyi districts – *distance to the regional center – from 50 km to 75 km*	Velykobagachanskyi, Zinkivskyi, Kobeliatskyi, Kozelshchynskyi, Myrhorodskyi, Khorolskyi and Shyshatskyi districts – *distance to the regional center – from 70 km to 110 km*	Bobrovytskyi, Borznianskyi, Koryukivskyi, Nizhynskyi, Nosivskyi and Sosnytskyi districts – *distance to the regional center – from 70 km to 130 km*
	peripheral	Sambirskyi, Sokalskyi, Drohobytskyi, Starosambirskyi, Brodivskyi, Skolivskyi and Turkivskyi districts – *distance to the regional center – more than 75 km*	Gadyatskyi, Globinskyi, Hrebinkivskyi, Kremenchutskyi, Lokhvytskyi, Lubenskyi, Orzhytskyi, Pyryatynskyi, Semenivskyi and Chornukhynskyi districts – *distance to the regional center – more than 110 km*	Bakhmatskyi, Varvinskyi, Koropskyi, Novgorod-Siverskyi, Semenivskyi, Sribnyanskyi, Talalayivskyi, Ichnyanskyi and Prylukyi districts – *distance to the regional center – more than 130 km*

Source: developed by the authors.

Results and discussion. ***Lvivska oblast.*** The results of districts development intensity analysis for Lvivska oblast depending on the distance to the oblast center, evaluation of interdependence between the share of districts in main socio-economic parameters of the country and the distance to the oblast center, and research of the impact of each district on main socio-economic parameters of the oblast (following the author's methodological approach, see Fig. 1) have contributed to making the following conclusions regarding the current development condition and peculiarities of the oblast center (Lviv) and central, semi-peripheral, and peripheral districts of the region in the context of the center-periphery relationships:

1) Lviv's impact on the development of the districts in the oblast is quite

differentiated. The coefficients of correlation between the distance to Lviv and socio-economic development parameters of administrative districts in Lvivska oblast (Table 3) show a close relationship (> 0.7) between the parameters, especially in the districts of the oblast located close to Lviv (20–49 km). The "core" impacts the semi-peripheral and peripheral districts a little less.

Table 3

Interdependence between the distance to Lviv and economic development parameters for administrative districts in Lvivska oblast (by the specific weight) in 2014 and 2019 (coefficient of correlation)

Indexes \ Areas		Central		Semi-peripheral		Peripheral	
		2014	2019	2014	2019	2014	2019
The share of districts in the regional indicator,%	retail turnover of enterprises	-0.762	-0.743	-0.206	-0.220	-0.304	-0.101
	the total area is accepted for housing use	-0.745	-0.784	-0.336	-0.393	-0.732	-0.538
	average number of full-time employees	-0.896	-0.959	-0.206	-0.292	-0.460	-0.330
	volume of sold services	-0.762	-0.770	-0.155	-0.323	-0.217	-0.722
	number of enterprises	-0.853	-0.857	-0.327	-0.334	-0.769	-0.795

Source: calculated by the authors based on the data [18].

2) central districts have more weight in the oblast parameters. Meanwhile, Yavorivskyi district accounts for a high share in the oblast parameters among the semi-peripheral districts (even somewhat higher by most of the analyzed parameters than several central districts). Although the district borders the oblast center in the east, it can be assumed that its economic capacity is mostly boosted by border checkpoints on the Ukrainian-Polish border located here and the proximity in the west to Jarosławski and Lubaczowski powiats of the Republic of Poland. Moreover, the district has a convenient transport-geographic location at the crossroads of international East-West routes. Namely, the European route E-40 Yavoriv-Lviv passes here (route M10 Lviv – Ivano-Frankove – Krakovets – to Kraków) and a section of Kyiv-Lisbon highway that is part of III Crete corridor is being built;

3) the analysis of average annual growth paces of main socio-economic parameters shows the higher development intensity of peripheral districts compared to other districts in the region (by 7 of 10 analyzed parameters). It is caused by the peculiarities of their domestic development capacity, where local growth poles – cities of oblast significance – have much impact (business activity and capital concentration cores), as well as located here powerful industrial hubs and international border checkpoints on the Ukrainian-Polish border, etc;

4) agriculture is developing most intensively in the periphery. Turkivskyi and Skolivskyi districts were the leaders by average annual agricultural output growth paces in 2014–2019, where the respective parameters amounted to 460 % and 441 %;

5) industrial production is developing more intensively in peripheral districts compared to other districts in the oblast (in particular, heavy industry), which is related to the functioning of powerful industrial hubs here – Chervohohradsko-

Sokalskyi, Drohobytsko-Boryslavskyi, and Stebnytskyi, which are important components of the territorial structure of the region's industry. In addition to the abovementioned so-called "old" or "traditional" industrial hubs, the 2021–2027 Lvivska Oblast Development Strategy stipulates the establishment of "new" industrial hubs in the periphery – Chervohohradsko-Dobrotvirskoho in the north of the oblast, Brodivskoho in the east, and Sambirsko-Dobromylsko-Hyrivskoho in the south west [19] – to improve the infrastructural framework of remote districts, create new jobs, and therefore – boost socio-economic development of the periphery;

6) Sokalskyi district has a high specific weight among peripheral districts in a range of oblast parameters (namely, employment, residential construction, foreign economic activity), being in the zone of intensive impact of the local socio-economic growth pole – city of oblast significance Chervonohrad, which:

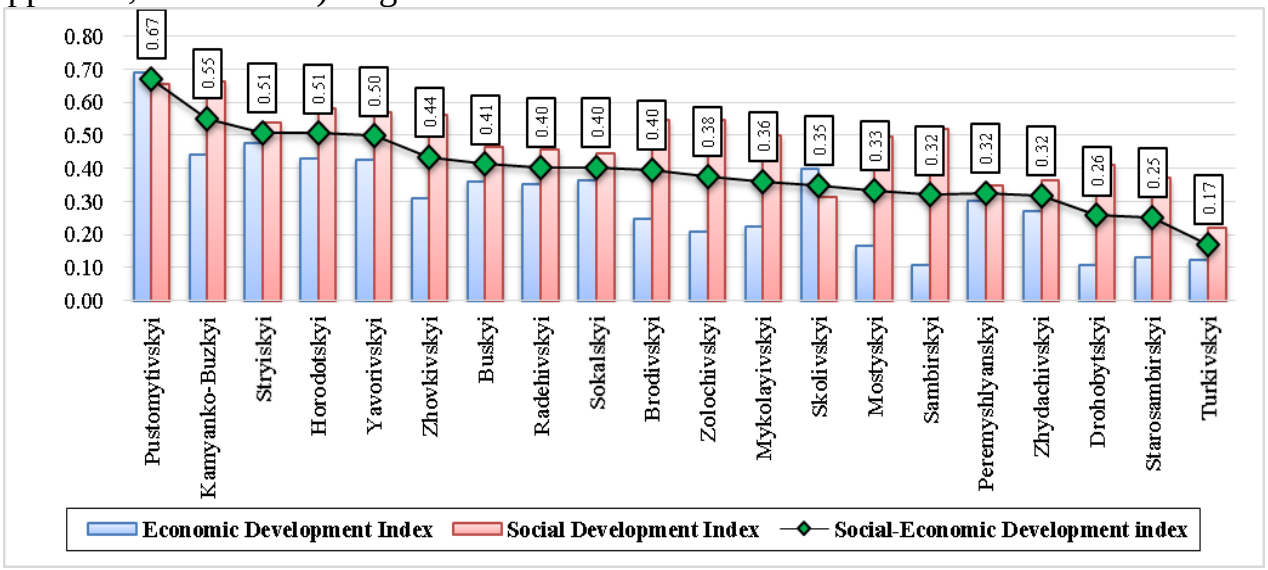
- is the third city by population in Lvivska oblast;
- is an important center of the mining industry in the Lvivsko-Volynskyi coal basin;
- is located on the highways Kovel-Zhovkva, Chervonohrad-Rava-Ruska, national highway Lviv-Chervonohrad-Kovel with a branch in Brest direction (Belarus), etc. Moreover, the city is an important railway hub;
- is located close to border checkpoints on the border with Poland (namely, distance to the border checkpoint Dołhobyczów – Uhryniv is ≈30 km, to international automobile border checkpoint Rava-Ruska – Hrebenne – 55 km);
- is a powerful local labor market because the city concentrates a large number of economic entities, including large enterprises – taxpayers. Moreover, average monthly nominal wages (on average per full-time employee) in 2019 substantially exceeded the rate in other cities of oblast significance;

The comparative analysis of the center-periphery relationships in Lvivska oblast shows a somewhat lower socio-demographic development level in peripheral districts. For example, the distance of districts centers to Lviv closely inversely correlates with such parameters as the number of pupils in schools (R= -0.79), the number of children covered by pre-school education (R= -0.56), positive (negative) migration balance (R= -0.70), etc. As for the latter parameter, these processes are intrinsically linked, in the first place, to more intensive entrepreneurship development in central districts (as job place), and higher labor remuneration, etc.

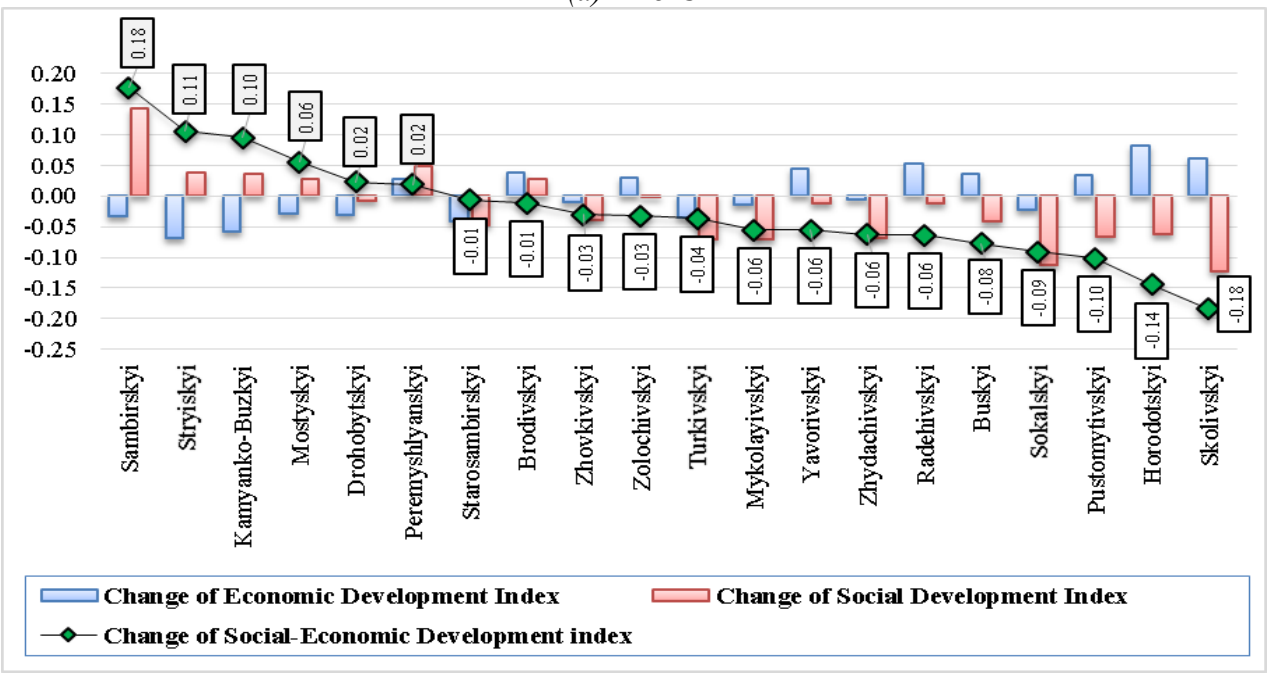
Meanwhile, commuting from central districts to Lviv is more intense. According to the transport flows research conducted by Lviv City Council in partnership with Vodafone Ukraine [20], half of the total human flows are generated by residents of the 15-km zone around the oblast center. On average, this is more than 76000 residents every day, including about 16 % − the residents of settlements located closest to Lviv (up to 4 km); 25 % − the residents of settlements located in the 4−10 km zone around Lviv; 9 % − the residents of settlements located in the 10−15 km zone around Lviv.

Below the indices of social, economic, and socio-economic development of districts in Lvivska oblast will be calculated and analyzed taking into account the

distance of districts to the oblast center (following the author's methodological approach, see Table 1). Fig. 2 shows the calculation results.



(a) – 2019



(b) – change in indicators of 2019 compared to 2014

Fig. 2. The Districts' Socio-Economic Development Index in Lvivska oblast

Source: calculated by the authors based on the data of the Main Statistical Office in Lvivska oblast [18].

The socio-economic development level of the districts in Lvivska oblast is characterized by high variability, acquiring the highest value in the central Pustomytivskyi district ($I_d = 0.67$) and the lowest – in the peripheral mountain Turkivskyi district ($I_d = 0.17$). The economic-geographical (close distance to Lviv; close distance to the border with the EU Member States) and transport-geographical (2 Trans-European transport corridors passing here; existing developed transport network (roads, railways); close distance to Lviv Danylo Halytskyi International Airport) locations are the essential advantages of Pustomytivskyi district. Having a

well-developed transport-logistics infrastructure and ICT sector, the district is characterized by the most positive migration balance and the highest capital investment rate[1] per capita in the region, and the highest among the oblast's districts de-facto population density, commissioned housing per capita rate, employment, number of enterprises per 10000 of the population, and volume of provided services per capita, etc.

Top-5 of Lvivska oblast districts by socio-economic development consists of districts included in Lvivska Agglomeration (Kamyanka-Buzkyi, Horodotskyi, Yavorivskyi, and Zhovkivskyi districts in addition to the abovementioned Pustomytivskyi district). Having the well-developed transport-logistics infrastructure within the Agglomeration, the districts have the closest relationship with the "core" – Lviv.

In 2019, Social Development Index exceeded the Economic Development Index in all districts of Lvivska oblast, excluding Pustomytivskyi and Skolivskyi. Yet, the dynamics of the Social Development Index in the reporting year against 2014 was characterized by the upward tendency only in 30 % of the region's districts. Instead, the Economic Development Index increased in the period under research in 45 % of the region's districts.

The semi-peripheral Stryiskyi district is among the leaders by socio-economic development in Lvivska oblast (I_d = 0.51). At the background of a slight fading of Lviv's impact, existing internal potential and competitive advantages play an essential role in the district's development. Firstly, Stryisko-Rozdilskyi industrial hub is located at the district's territory – an industrial formation of mixed type with the development of mining and processing industries. Secondly, the district is the leader in the oblast by average monthly wages (in 2019 – 11078 UAH, exceeding the average oblast rate by 1807 UAH); the leader among the oblast districts (behind Buskyi district) by attracted FDI per capita (in 2018 – 1219.6 UAH, the respective oblast rate – 658.3 UAH); is ranked third by sold industrial output per capita, about 88 % of the total turnover of which is realized by TzOV "Leoni Wiring Systems UA GmbH" – one of the largest enterprises with foreign investment in Lvivska oblast by investment and production (investment project in the production of electrical equipment for engines and vehicles, investment – over 65 million Euro. The cables made at the factory are supplied to the factories producing the cars of global brands Opel, Porsche, Volkswagen, Audi, and Lamborghini) [21]. Meanwhile, the local growth pole – the city of oblast significance Stryi – has a substantial stimulating impact on the socio-economic development of Stryiskyi district. It is the leader of the oblast (behind Lviv) by retail turnover, second (behind Pustomytivskyi district) by migration balance, and is characterized by positive foreign trade in services balance.

[1] The largest capital investment volumes account for such economic activity types as construction, manufacturing, wholesale and retail trade, vehicles repairs, transport, and warehousing. The enterprises' funds were main source of capital investment in 2014–2019.

The peripheral mountain Turkivskyi district has the lowest socio-economic development level in the region (I_d = 0.17). It is related to the following factors:

firstly, difficult geography (the Law of Ukraine "On the Mountain Settlements Status in Ukraine" grants the settlements of the district the mountain status. Moreover, Turkivskyi district has the longest distance to the "core" (oblast center) of all Lvivska oblast districts – over 130 km);

secondly, low socio-economic development level of neighboring districts (namely, in Starosambirskyi district I_d = 0.25);

thirdly, the lack of a powerful local growth pole that would secure the perception of the development impulses generated by Lviv or other oblast centers (distance to Uzhorod is 118 km, Ivano-Frankivsk – 216 km) as well as closest border checkpoints (distance to checkpoint Vyšné Nemecké at the border with Slovakia is 118 km, checkpoint Medyka at the border with Poland – 123 km) [22].

Other mountain districts of Lvivska oblast also have low development levels – Drohobytskti (I_d = 0.26) and Starosambirskyi (I_d = 0.25). Mountain areas have common problems of insufficient business development, low investment attractiveness[2], poor transport and road infrastructure[3], structural problems in the labor market, and environmental problems.

Geographical peculiarities of mountain areas impact the parameters of coverage with social infrastructure. The coverage of children with education in mountain districts is the lowest among administrative units in Lvivska oblast (in 2019, in Starosambirskyi district – 34.6 %, Sambirskyi district – 34.0 %, while in Turkivskyi district – only 21.0 %; average oblast rate – 55.0 %). As far as there are many underfilled schools on these territories, the average number of pupils in schools remains below the standard rate (15 pupils in the class) and substantially below the average oblast rate (21 pupils in the class). The network of hospital beds also needs optimization. Indeed, while the standard rate is 37.5 beds per 10000 of the population, the rate in Turkivskyi district remains one of the highest in the region and amounts to 58.1 beds [23].

Despite the fact that Lviv is the largest transport hub of the Western Region of Ukraine, Lvivska oblast faces the problem of low transport accessibility of some areas. The problem is the most acute for mountain villages of Lvivska oblast that are not covered by railways.

The calculations made above allow detecting several territorial patterns between the districts' socio-economic development in the oblast and their distance to the oblast center, i.e. making the region's space classification (structuring) depending on the development of the center-periphery relationships.

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[2] For instance, in 2014–2018, Turkivskyi district was characterized by the lowest FDI attraction rates among administrative units of Lvivska oblast (per capita in 2014 – 1.05 USD, and in 2018 – 0.99 USD).

[3] In 2017, 27 % of the total program expenditures of Turkivskyi district's budget were allocated for roads development, which is the major investment development factor in mountain areas.

The central type includes the districts located close to the "core" (district centers located not more than 50 km from the oblast center) with the Socio-Economic Development Indices (according to the research conducted above) within $0.5 < I_d < 0.7$. The semi-peripheral districts are somewhat further from the "core" compared to the central ones (50–75 km). The research results show that their I_d range is within 0.3–0.5. The peripheral districts have the longest distance to the oblast center and $I_d < 0.3$. Meanwhile, certain inconsistencies between the oblast districts' distance to the oblast center and their socio-economic development levels were detected. It generated the need to single out subtypes in addition to main types (Fig. 3).

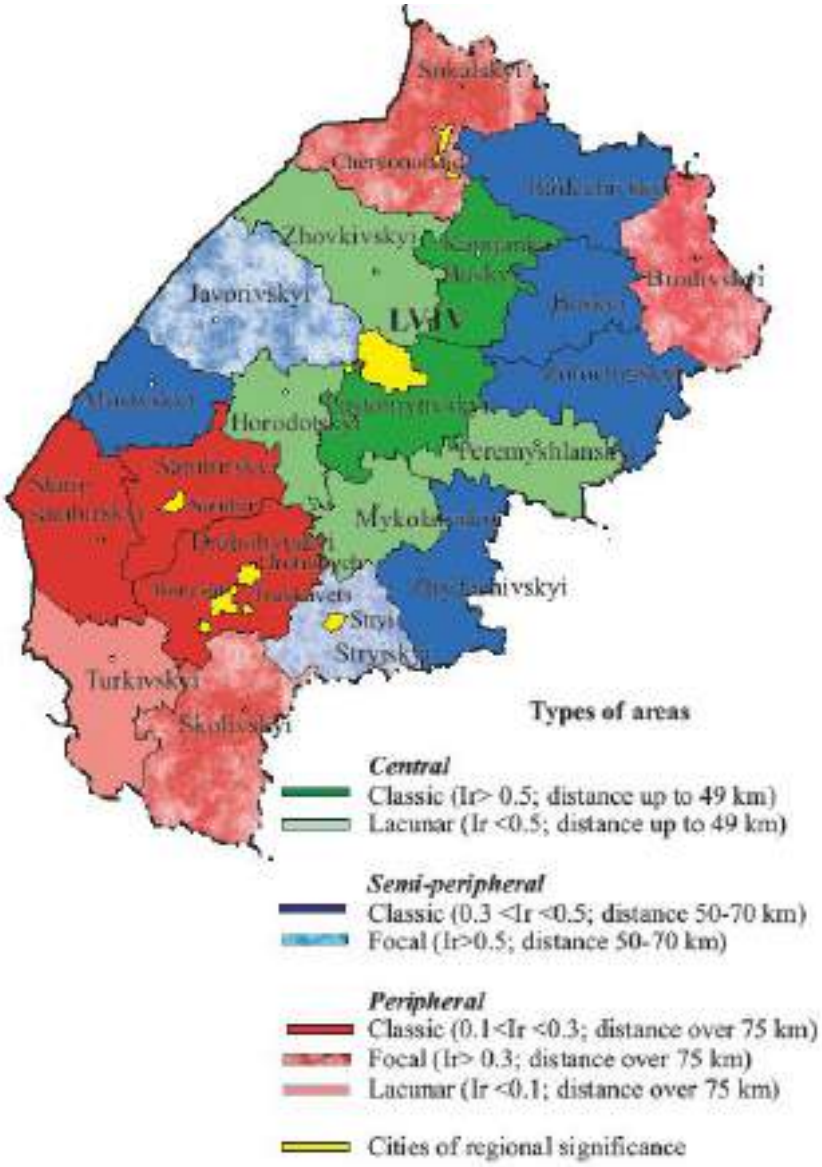


Fig. 3. Types of districts in Lvivska oblast by socio-economic development and distance to Lviv

Source: developed by the authors.

The research results show that there is a group of administrative units among the central districts, where the socio-economic development levels are somewhat lower despite their territorial proximity to the oblast center, namely Horodotskyi,

Zhovkivskyi, Peremyshlyanskyi, and Mykolayivskayi. They are the lacunar-subtype central districts.

Despite the semi-peripheral location in relation to Lviv, Yavorivskyi district is characterized by a higher socio-economic development level than other semi-peripheral districts. Therefore, the administrative unit acquires the centrality features beyond the impact of the oblast center and is, in fact, the heart of socio-economic activity in the semi-periphery.

Peripheral districts of Lvivska oblast are also different. Skolivskyi, Sokalskyi, and Brodivskyi districts, in fact, acquire semi-peripheral features because they are characterized by somewhat higher development levels compared to other peripheral administrative units. Therefore, they are classified as core-subtype semi-peripheral districts.

Poltavska oblast. The results of the development intensity analysis for Poltavska oblast districts depending on their distance to the oblast center, evaluation of interdependences between the share of districts in main socio-economic parameters of the oblast and their distance to the oblast center, and research of each district's impact on main socio-economic parameters of the oblast (following the author's methodological approach, see Fig. 1) have contributed to detecting the following facts:

1) insignificant impact of the oblast center on the industry development in the region's districts as indicated by low rates of coefficients of correlation between the distance to Poltava and industrial output sold by the region's districts. It is caused, in the first place, by the unequal spatial distribution of industry development in the oblast, its substantial concentration in the east of the region in the cities of oblast significance Poltava, Kremenchuk, and Horishni Plavni (these cities sold about 80 % of the region's industrial output in 2019; the leading industrial enterprises in the region are located in these cities, in particular, engineering and metal processing enterprises). Regarding the industry development in the periphery, it is interesting that the reducing impact of Poltava on the respective processes and the growing impact of Kremenchuk were observed in the period under research (in 2019, the coefficient of correlation between the distance to Kremenchuk and the share of peripheral districts in industrial output sold by the region was -0.34 points);

2) centrifugal nature of entrepreneurial development. That is, in the period under research, the oblast center – Poltava – impacted the development of the abovementioned sectors in the central districts the most and in the semi-peripheral and peripheral districts of the region a little less;

3) centrifugal vector of trade development. Meanwhile, the oblast center hardly impacted the development of trade in the periphery;

4) unequal spatial development of residential construction. In 2019, the central Poltavskyi district accumulated 30.5 % of commissioned housing in the oblast and the other 15.6 % of new residential buildings are concentrated in Poltava. Meanwhile, the district's share in the oblast rate for new construction had an upward trend in 2017–2020 at the decreasing rate in Poltava. The peripheral Kremechutskyi district

has a substantial specific weight in the regional rate of new commissioned housing compared to other districts (in 2019 – 5.1 %; +1.7 p.p. compared to 2017). Inter alia, it can be caused by the growing population in the city of oblast significance Kremenchuk, growing volumes of new construction, and removal of some part of new residential buildings to the outskirts and suburban zone, which, in fact, is the district's area. The share of other districts of Poltavska oblast in the regional rate of commissioned housing in 2019 was below 1 % (excluding Novosanzharskyi (1.3 %) and Kobelyatskyi (1.8 %) districts). No new residential buildings were commissioned in Chornouhynskyi district in the period under research;

5) the low share of districts in the oblast rate of provided services – <1 % in all districts under research, excluding Poltavskyi (1.6 %), Kremenchutskyi (1.9 %), and Hadyatskyi (1.7 %) districts. Considering that these districts are developing around the cities of oblast significance and taking into account a high share of Poltava in the oblast rate of provided services (62.8 %), we can argue that the development of the services sector in the researched region gravitates towards large cities rather than districts;

6) slightly lower socio-demographic development level in peripheral districts. For example, positive (negative) migration balance inversely correlates with the distance from district centers to Poltava (R^2 = -0.58). So, the districts located close to the oblast center are characterized by a lower natural population decline rate compared to more remote districts (e.g. Hadyatskyi, Lubenskyi, Horolskyi, etc.). Such a situation is the consequence of more intensive business development (as a job place) in the "core" area, higher demand for the labor force and labor remuneration, etc.

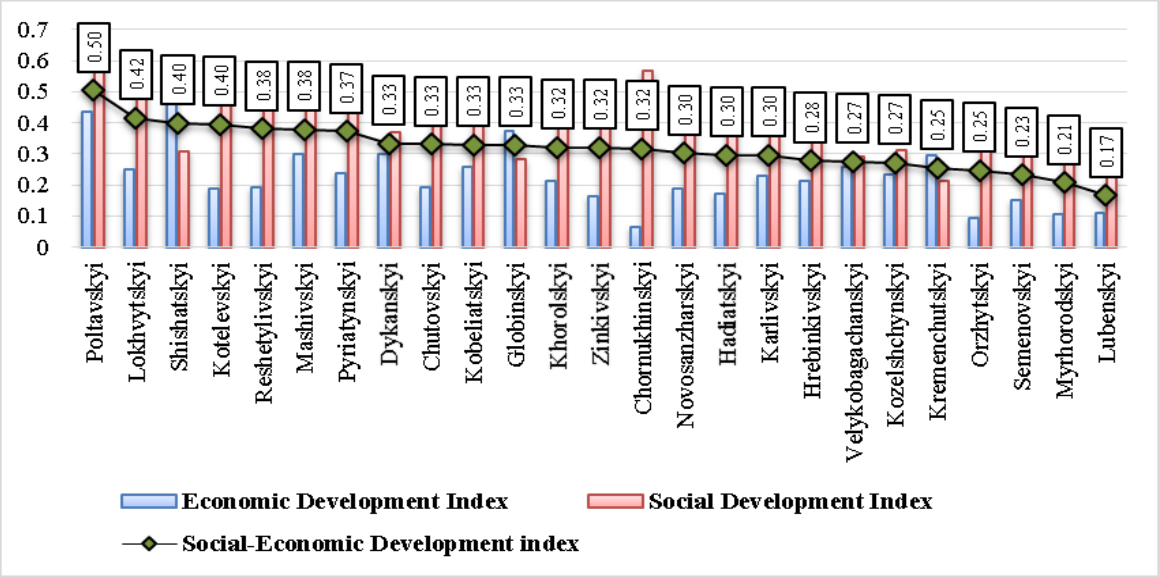
The socio-economic development level of the districts in Poltavksa oblast (Fig. 4) has high variability, acquiring the highest rate in the central Poltavskyi district (I_d = 0.50) and the lowest – in the peripheral Lubenskyi district (I_d = 0.17).

Therefore, the spatial development of Poltavska oblast is unequal. In particular, according to the research results, 4 of 7 central districts were attributed to the category of lacunar. So, their socio-economic development level is lower than the standard rate for the respective group of regions ($0.4 < I_d < 0.5$) determined in the process of the research. In 2014–2019, the Socio-Economic Development Indices for all central districts (excluding Chutivskyi district) were characterized by a downward trend. The process was the most dynamic in Dykanskyi district (-0.18 points).

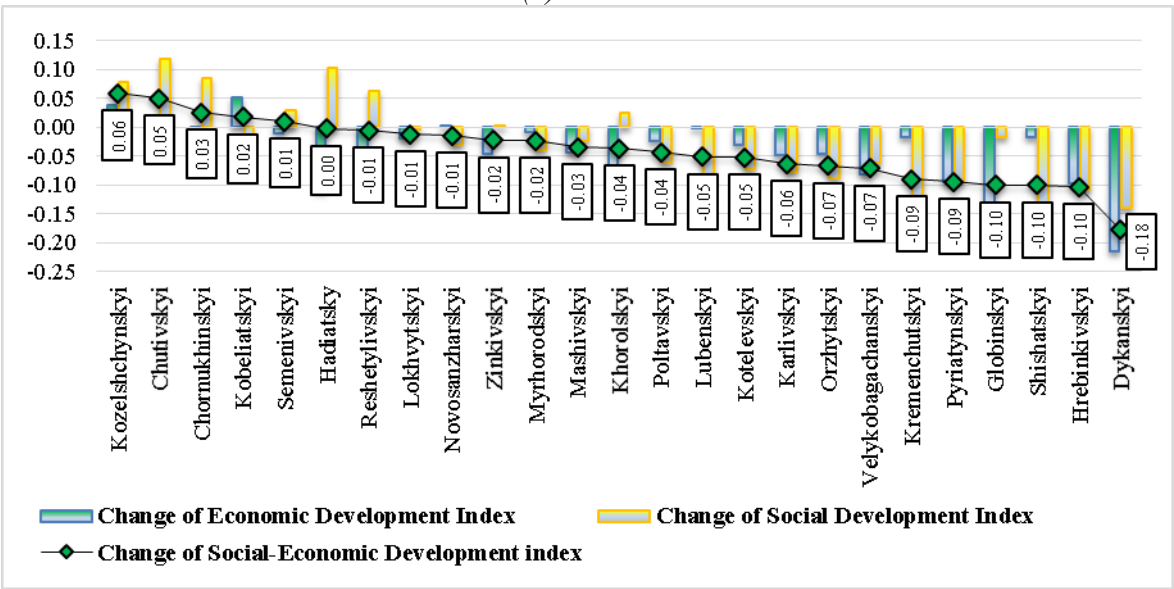
Poltavska oblast has a peculiar developed (in socio-economic context) semi-periphery. *Firstly*, there are no lacunar districts here, and *secondly*, the socio-economic development level (I_d) is higher than the established standard rate for the respective group of districts ($0.3 < I_d < 0.4$, i.e. these districts are the development centers in the semi-periphery) in 2 of 6 semi-peripheral districts.

Periphery is rather developed in Poltavska oblast. Lohvytskyi district (I_d = 0.42) that acquires the signs of the local-level "core" is the leader by socio-economic development.

Therefore, taking into account the research results, Fig. 5 shows the space structure in Poltavska oblast with consideration of the center-periphery relationships.



(a) – 2019



(b) – change in indicators of 2019 compared to 2014

Fig. 4. Socio-Economic Development Indices for districts in Poltavska oblast

Source: calculated by the authors based on the data of the Main Statistical Office in Poltavska oblast [24].

Chernihivska oblast. The results of the development intensity analysis for Chernihivska oblast districts depending on their distance to the oblast center, evaluation of interdependences between the share of districts in main socio-economic parameters of the oblast and their distance to the oblast center, and research of each district's impact on main socio-economic parameters of the oblast (following the author's methodological approach, see Fig. 1) have contributed to detecting the following facts:

1) residential construction and trade sector develop more intensively in the central districts of the region compared to the other districts, which is natural from the viewpoint of the larger population, in the first place, and close distance to Chernihiv – the center of business activity concentration, in the second place;

2) the share of central districts in the oblast employment rate is slightly lower compared to other districts of the region, which can be the result of Chernihiv "dragging" the workforce from central districts (38.3 % of employed in the oblast worked in the city in 2012, and 41.5 % – in 2019);

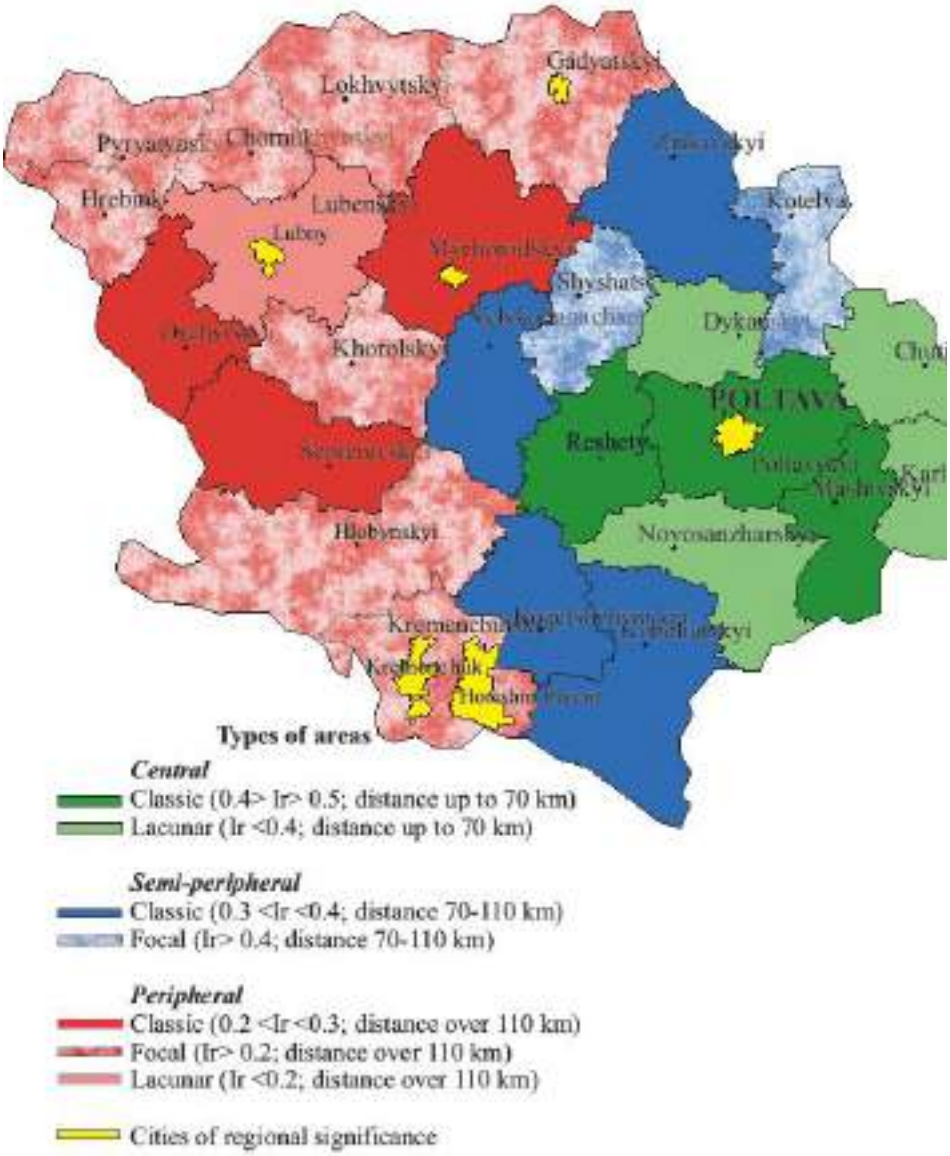


Fig. 5. Types of districts in Poltavska oblast by socio-economic development and distance to Poltava

Source: developed by the authors.

3) although the share of services provided by central districts is higher compared to other districts of the region, it still remains insignificant – only 6.2 % in 2019. It is caused by the fact that large cities traditionally are the cores of services sector development (for example, in 2019, the share of Chernihiv in the oblast rate of provided services was 73.8 %, and the share of all cities of oblast significance in this rate was 85.2 %);

4) the industry development is of centrifugal nature, which is indicated by a higher share of peripheral districts in the oblast rate of sold industrial output and higher average annual growth of industrial output sold by peripheral districts

compared to the other districts. A range of peripheral districts of Chernihivska oblast is included in Kyivskyi Industrial Area (Varvynskyi and Prylutskyi districts as important industrial cores) and borders the so-called Brovarskyi sector of Kyivska Industrial Agglomeration (and therefore, they develop under its impact).

The research of relationships between the distance to Chernihiv and economic development parameters for administrative districts in Chernihivska oblast (by specific weight) in 2014 and 2019 confirms the impact (of different intensity) of the "core" on central and peripheral districts. Meanwhile, positive values of coefficients of correlation between the distance to Chernihiv and economic development parameters for semi-peripheral districts in Chernihivska oblast show that the "core" does not impact significantly the development of these areas.

We see the reason to it in the stronger impact of a range of other economic growth points on the development of semi-periphery:

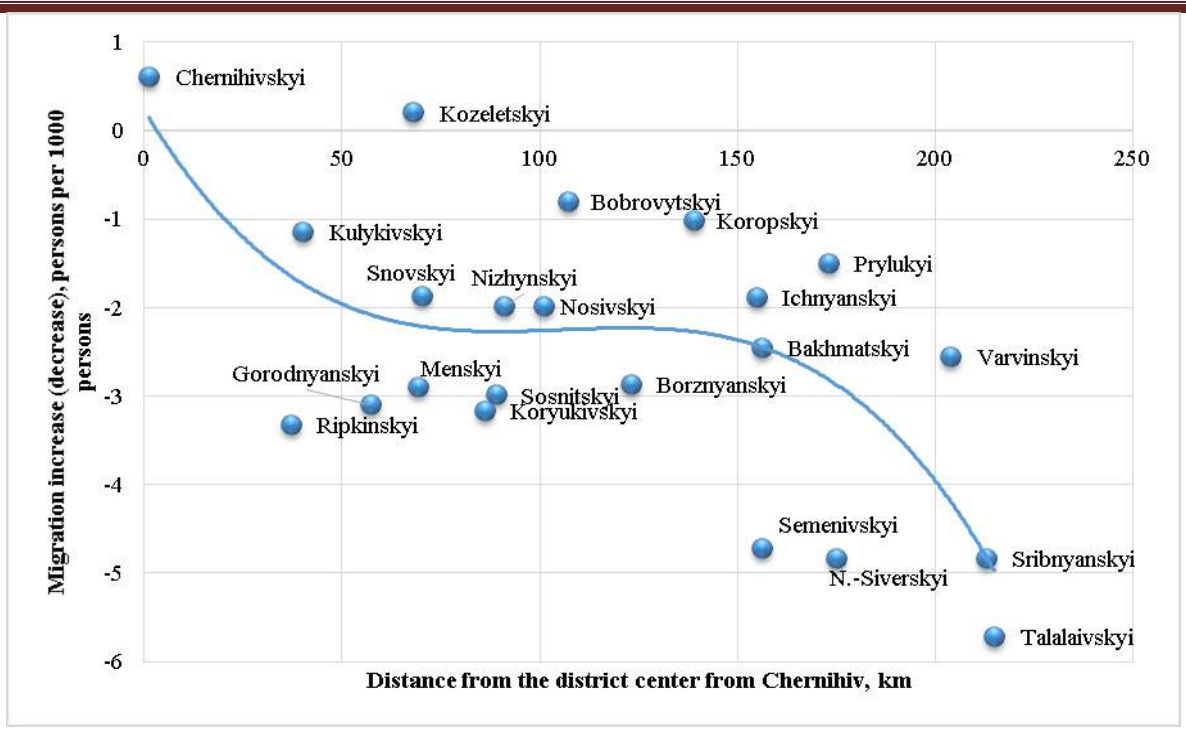
firstly, the city of oblast subordination Nizhyn – the trade and services provision center – is located here;

secondly, semi-peripheral districts are located close to the cities of oblast significance Hovhorod-Siverskyi (in the north-east) and Pryluky (in the south; these cities are peripheral in relation to the "core"). The distance to them from the centers of semi-peripheral districts is much smaller than to the oblast center – Chernihiv. Meanwhile, for instance, Pryluky is a powerful poly-sectoral industrial center of the region (about one-third of the industrial output of the oblast is sold here) and an important railway and automobile hub. Labor remuneration in the city is among the highest in the region;

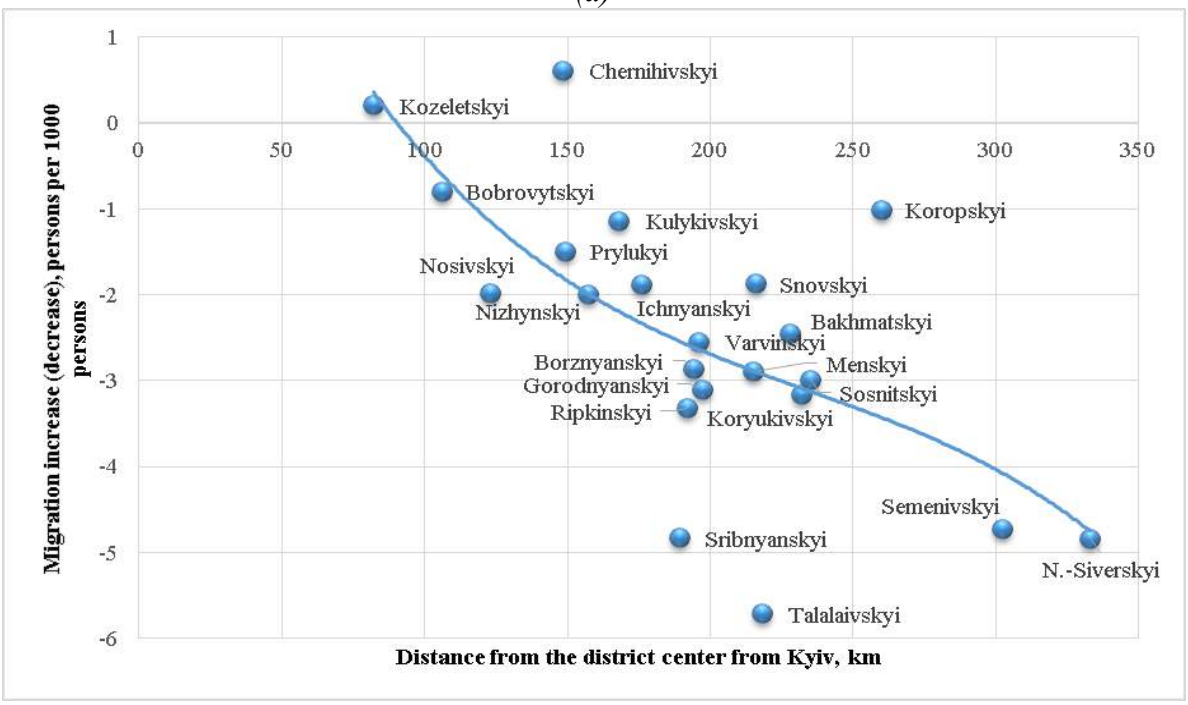
thirdly, semi-peripheral Bobrovytskyi and Nosivskyi districts are located close to Kyivska oblast, so their development is to some extent determined by the development of the neighboring oblast and Ukrainian capital – Kyiv.

Regarding the semi-peripheral Bobrovytskyi and Nosivskyi districts, it is worth emphasizing that their beneficial geographical location (close location to Kyivska oblast; relatively close distance to Kyiv; adjacency to the cities of oblast significance Nizhyn (in the north-east) and Pryluky (in the south-east)) generates higher average annual growth paces in these regions by most socio-economic parameters compared to other semi-peripheral districts of the region. The growth of goods turnover of retail trade enterprises is the highest in Chernihivska oblast (after Menskyi district).

The comparative analysis of the center-periphery relationships in Chernihivska oblast shows a slightly lower socio-demographic development level in peripheral districts. For example, the distance of district centers from Chernihiv inversely correlates with positive (negative) migration balance (R^2= -0.57; Fig. 6a). Therefore, the districts close to the oblast center are characterized by less negative migration balance (Kozeletskyi and Chernihivskyi districts – by a positive balance) compared to more remote districts (for example, Talalayivskyi, Sribnyanskyi, Novhorod-Siverskyi, and Semenivskyi districts). The fact that several districts of Chernihivska oblast border Kyivska oblast and Kyiv substantially impacts the positive (negative) migration balance in the oblast is quite interesting (R^2= -0.66; Fig. 6b).



(a)



(b)

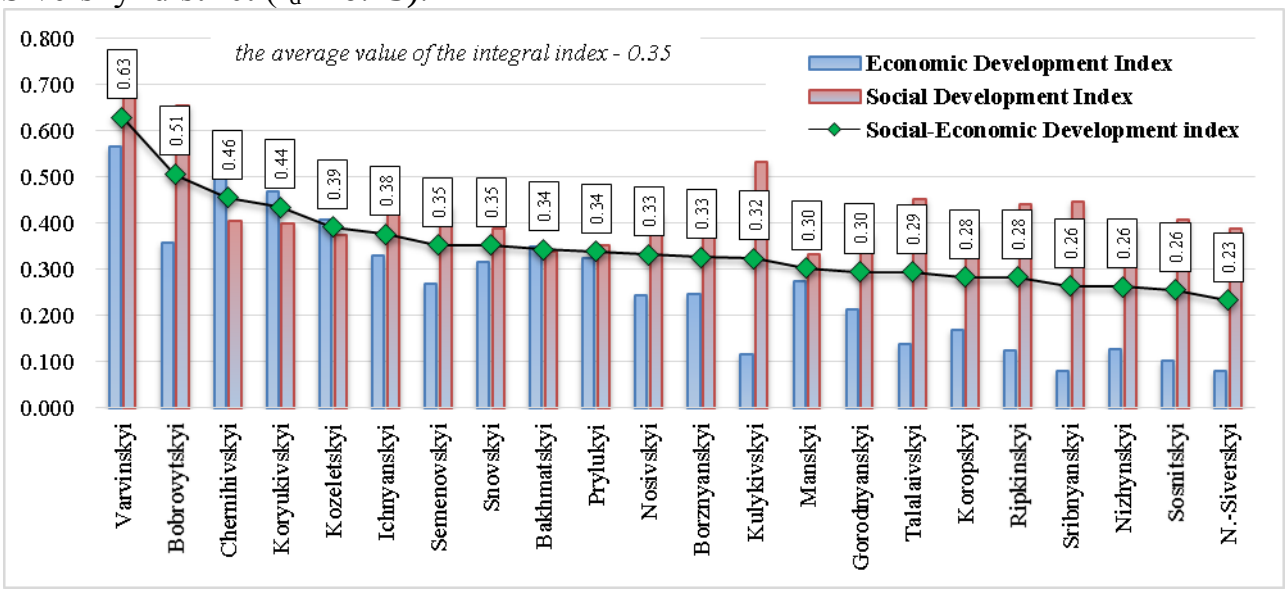
Fig. 6. Dependence of positive (negative) migration balance on the distance of district centers to Chernihiv (a) and Kyiv (b), 2020

Source: calculated by the authors based on the data of the Main Statistical Office in Chernihivska oblast [25].

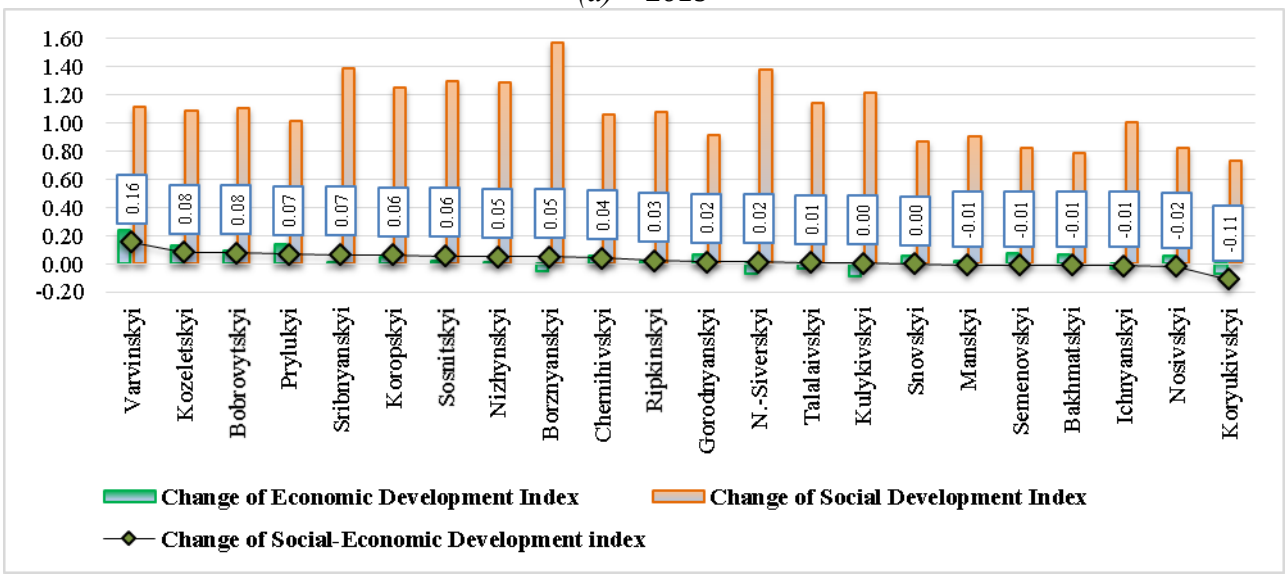
It is especially noticeable in Kozeletskyi and Bobrovytskyi districts that border Kyivska oblast and in Prylutskyi, Nosivskyi, and Varvynskyi districts located nearby. A higher share of job offers in Kyiv (12.9 % of the total job offers in Ukraine as of January-September 2019; it is the highest rate among Ukrainian regions) and Kyivska oblast (7.5 %), while the same rate in Chernihivska oblast was only 2.1 % [26], is the

precondition for the existence of this domestic mobility vector in Chernihivska oblast.

Calculation of the indices of social, economic, and socio-economic development of the districts in Chernihivska oblast (Fig. 7) allows indicating high variability of the development of administrative units in the region under research. The highest rate is in the peripheral Varvynskyi district (I_d = 0.63) and the lowest – in Novhorod-Siverskyi district (I_d = 0.23).



(a) – 2019



(b) – change in indicators of 2019 compared to 2014

Fig. 7. Socio-economic development indices for the districts in Chernihivska oblast

Source: calculated by the authors based on the data of the Main Statistical Office in Chernihivska oblast [25].

Beneficial economic-geographical location is a substantial advantage of Varvynskyi district (relative proximity to Kyivska oblast and Kyiv[4]; being a part of

[4] The distance between the cities Varva and Chernihiv is 204 km and between the cities Varva and Kyiv – 196 km.

Kyivkyi Industrial Area; presence of a range of oil and gas fields, etc.). The district is characterized by the following highest rates in the region (per capita): average number of full-time employees; labor remuneration; sold industrial output (behind Koryukivskyi district); capital investment (behind Bobrovytskyi district).

Moreover, one of the lowest natural population decline rates in the region were recorded in Varvynskyi district. In fact, this district is the center of a little lower local hierarchical level that was formed beyond the zone of intensive impact of Chernihiv and managed to increase its socio-economic capacity the most compared to other districts in the region (including central ones).

A range of centers of somewhat lower local hierarchical level was formed in the semi-periphery and periphery beyond the zone of intensive impact of Chernihiv – Koryukivka, Pryluky, Ichnya, etc. The existing development capacity of these centers allows them to impact the socio-economic development of their and neighboring regions.

Meanwhile, the analysis of deviation from the graph of dependence between the distance to Chernihiv and socio-economic development of districts in Chernihivska oblast (Fig. 8) indicates higher development level of the districts located close to Kyivska oblast. So, despite the impact of the regional center on the development of these districts – Chernihiv, spatial vectors of Kyiv's impact are quite essential.

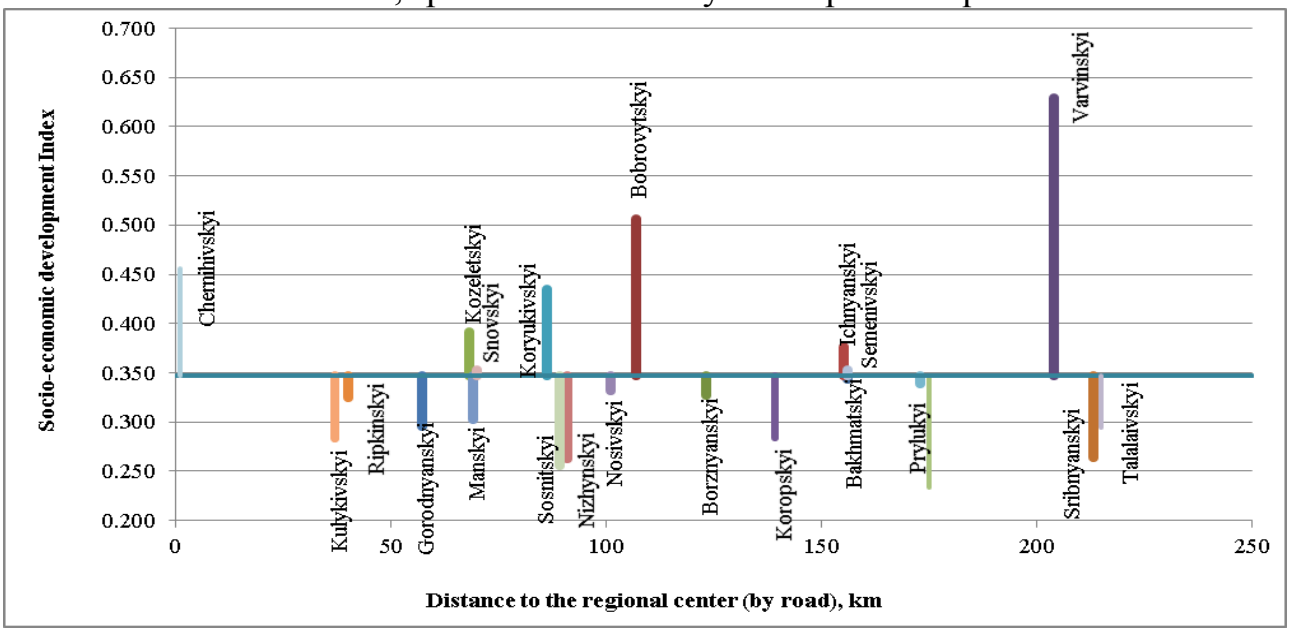


Fig. 8. Deviation from the graph of dependence between the distance to Chernihiv and socio-economic development of districts in Chernihivska oblast

Source: calculated by the authors based on the data of the Main Statistical Office in Chernihivska oblast [25].

The calculations outlined above allow structuring the space of Chernihivska oblast in the context of the center-periphery relationships (Fig. 9).

The districts located in close proximity to the "core" are included in the central-type districts (district centers located no more than 70 km from the oblast center), and their Socio-Economic Development Index (I_d) is > 0.4. The semi-peripheral districts

are more distant from the "core" compared to the central ones (70–130 km). The results of the research show that their I_d is ranging within 0.3–0.4. The peripheral districts are most remote from the oblast center and have the $I_d < 0.3$.

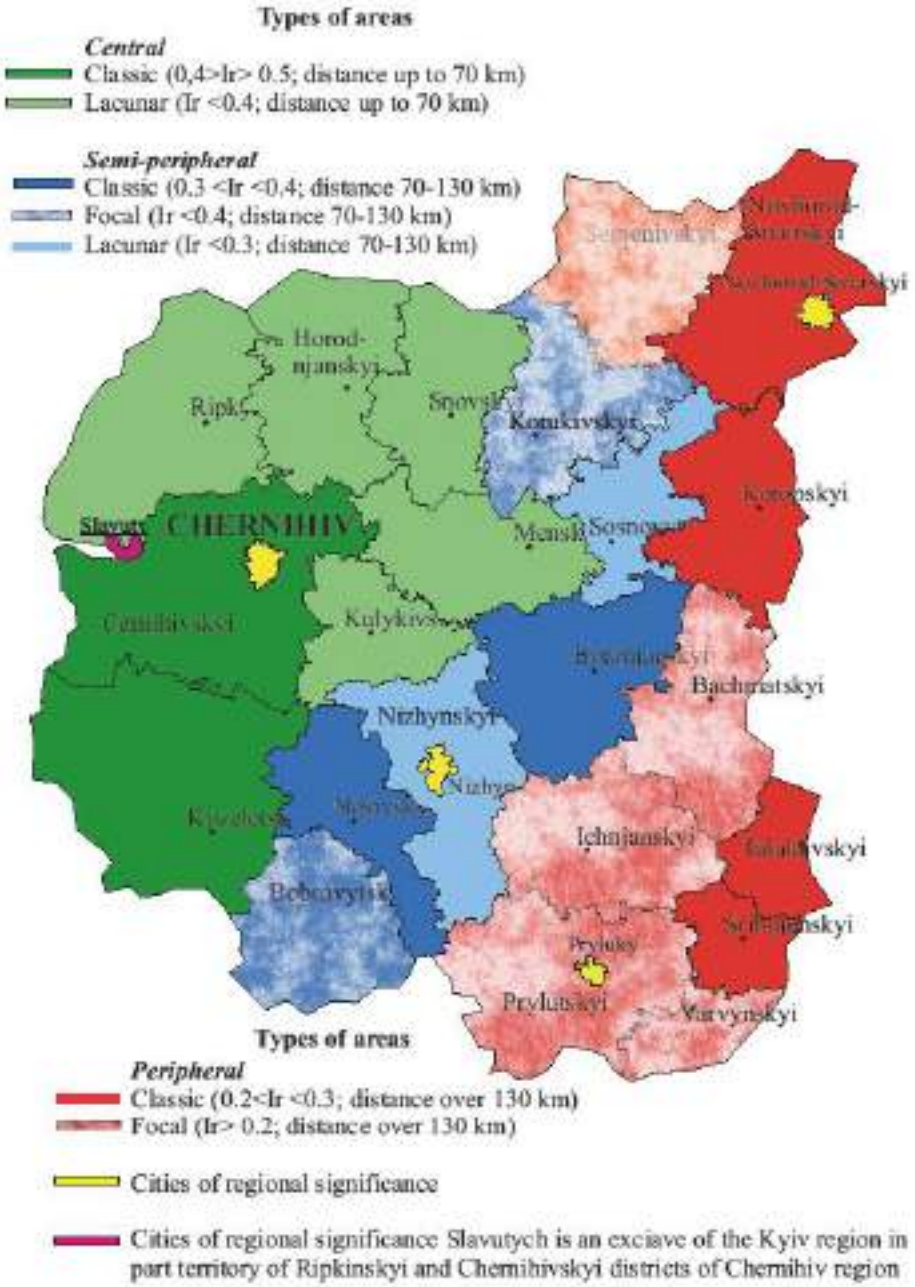


Fig. 9. Types of districts in Chernihivska oblast by socio-economic development and distance to Chernihiv

Source: developed by the authors.

Meanwhile, there is a group of administrative units among the central ones with slightly lower socio-economic development levels despite the territorial proximity of these districts to the oblast center. They are Snovskyi, Kulykivskyi, Menskyi, Horodnyanskyi, and Ripkynskyi districts. They are recognized as the lacunar-subtype central districts.

Despite their semi-peripheral location in relation to Chernihiv, Bobrovytskyi and Koryukivskyi districts are characterized by higher socio-economic development

levels than other semi-peripheral districts. Therefore, these administrative units acquire the signs of centrality beyond the impact of the oblast center and are the cores of socio-economic activity in the semi-periphery.

Peripheral districts of Chernihivska oblast are not homogeneous either. Ichnyanskyi, Semenivskyi, Bahmatskyi, and Prylutskyi districts, in fact, acquire the signs of semi-periphery because they are characterized by slightly higher development levels than other peripheral administrative units. Therefore, we classify them as the core-subtype peripheral districts. Meanwhile, peripheral Varvynskyi district is characterized by the highest socio-economic development level in the region, acquiring in such a way the signs of centrality beyond the impact of Chernihiv.

Conclusions. Testing the author's methodological approach to evaluating the regions' economic development in terms of the center-periphery relationships on the examples of three oblasts of Ukraine (Lvivska, Poltavska, and Chernihivska) has led to the conclusion regarding the centrifugal-zonal nature of the oblast centers' impact on the socio-economic development of administrative districts. The intensity of the impact declines as increases the distance of district centers to the oblast center – the consolidating core of social and business activity, capital and resources concentration, etc.

Meanwhile, the districts' socio-economic development level derives from the power of development externalities generated by the oblast center and is determined by existing local spatial-geographical, socio-economic, demographic, etc. capacity and ability to absorb the development impulses generated by the "cores" and other local growth poles (e.g. cities of the oblast significance, agglomerations, etc.).

The research conducted based on the methodology developed by the authors has significant importance both in the scientific-methodological aspect and in the context of solving the essential regional development tasks and searching for balanced and cohesive spatial development. Therefore, in the future, the authors should develop a conceptual approach to improving the center-periphery relationships between the oblast center and the oblast districts at the current stage of decentralization. The following should be major cooperation (interaction) directions: infrastructure modernization; development of the tourism and recreation network; development of sectoral clusters; innovations generation; business support infrastructure development; digitalization; interaction in the context of social and civic opportunities development.

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Annex A. Spatial-geographic, socio-economic, and demographic conditions and development features of Lvivska, Poltavska and Chernihivska oblasts of Ukraine

Parameters		Oblasts		
		Lvivska	Poltavska	Chernihivska
Development conditions and features of the region	spatial-geographic	1) is one of three oblasts of the Halychyna historical-cultural region and a part of the Carpathian Euroregion; 2) is located close to the state border with the Republic of Poland; 3) the southern part of the Lvivsko-Volynskyi coal basin and the western parts of the Peredkarpatska oil and gas area and Peredkarpatskyi sulfur basin are located in the region; the region has balneal resorts of international importance (Truskavets, Morshyn, and Shidnytsya); 4) has favorable conditions for the development of the rural and recreation economy.	1) the region has significant deposits of various minerals that constitutes a substantial advantage over other Ukrainian regions (16 out of 25 districts of the region are reach with oil and gas);	1) according to the 2021–2027 State Regional Development Strategy, four districts in the oblast (Semenivskyi, Koryukivskyi, Snovskyi, and Novhorod-Siverskyi, total area – 5928 sq. km; 18.6 % of the oblast area) are granted the status of border areas in disadvantageous conditions due to land border with Russia. In 2019, 18.6 % of the oblast population resided in these areas; 2) a considerable part of rural areas of the region (in the first place, border ones) is depressed representing the "vanishing" villages characterized by growing depopulation, low density of population, long distance to services centers, and ageing of the population; 3) the city of oblast subordination Slavutych is located in the region. Its area is the exclave of Kyivska oblast at the territory of Ripkynskyi and Chernihivskyi districts of Chernihivska oblast.
	socio-economic	1) in 2019, GRP per capita amounted to 85200 UAH (average rate for the country – 94600 UAH); 2) in 2019, the share of the region in the national GRP was 5.4 %.	1) in 2019, the GRP per capita was the highest (after Kyiv) – 134400 UAH (average rate for the country – 94600 UAH); 2) in 2019, the share of the region in the national GRP was 4.7 %; 3) as of 1 June 2021, the revenues of the total budget fund of the region per capita (without transfers) were the highest among Ukrainian regions (after Kyivska oblast); the level of budget subsidiarity in the oblast was the lowest among Ukrainian regions (after Kyivska oblast); the oblast was among five leaders by capital expenditures per capita; 4) it is a part of the Northern-Eastern economic area.	1) in 2019, GRP per capita in Chernihivska oblast amounted to 78100 UAH (average rate for the country – 94600 UAH); 2) in 2019, the share of the region in the national GRP was 2.0 %.
Development conditions and features of the region	demographic	1) is in the Top 3 Ukrainian regions by the population density; 2) the natural population decline coefficient was 6.1 persons per 1000 of the de-facto population in 2020 (average rate for the country – -8.1 persons per 1000 of the population); 3) positive net migration – +864 persons. Migration processes are of urbanistic nature; 4) the settlement system: most of the population is concentrated in cities.	1) the population density in January-June 2021 was 47 persons per 1 sq. km (average rate for the country – 68 persons per 1 sq. km); 2) the natural population decline coefficient was 11 persons per 1000 of the de-facto population in 2020 (average rate for the country – -8 persons per 1000 of the population); 3) positive net migration – +523 persons. Migration processes are of urbanistic nature. 4) the settlement system: most of the population is concentrated in cities; the largest share of urban population is concentrated in two cities of the oblast significance – Poltava and Kremenchuk.	1) the lowest population density among all Ukrainian regions (in 2018, 17 districts of the oblast had a lower population than 15 persons/sq. km); 2) natural population decline coefficient in 2020 was the lowest among all Ukrainian regions – -13.8 persons per 1000 of the de-facto population; 3) negative net migration – -999 persons. Meanwhile, 90.2 % of migrants leaving the country are residents of rural areas; 4) in 2018, it was the outsider in Ukraine by the dependency ratio among aged 16–59.

Source: developed by the authors.

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