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Quantitative and qualitative characteristics of the Drohobych district territory in the context of planning development objectives

Abstract. The aim of the study was to analyse spatial disparities in facilities, functions, and user distribution in the Drohobych district to develop a strategy for balanced territorial development. A GIS-based analysis was employed to determine the following quantitative indicators: population density, distribution of transportation infrastructure, and localisation of historical and cultural sites. These factors served as the foundation for determining the potential of territorial communities and their capacity for cooperation. Also, it was analysed the advantages of joint strategic planning based on the territorial characteristics of the Drohobych district and its municipalities. It was highlighted spatial imbalances and the varying degrees of accessibility and infrastructural development across the district. Also, attention was given to the role of agglomeration principles as a mechanism for uniting fragmented communities into cohesive planning entities. The study considered the significance of natural and cultural resources, such as Carpathian landscapes, mineral springs, and preserved planning structures of historical German colonies, as tools for sustainable tourism development. These assets contributed to the formation of distinct functional clusters within the district. Research identified weak transport connections between peripheral and central areas as both a challenge and an opportunity for targeted interventions. It was argued for the adoption of integrated, community-based development strategies that accounted for local conditions, while aligning with regional and national planning frameworks. By combining quantitative spatial analysis with strategic planning principles, the study offered practical insights into fostering balanced, resource-efficient, and collaborative territorial development

Keywords: territorial communities; population density; transport network structure; historical and cultural sites; spatial disparities

INTRODUCTION

A key aspect of the development of territorial communities was determining the mechanisms for their cooperation in strategic planning. One such mechanism, according to V. Yatsenko (2020), was functioning based on the principles of agglomeration, which involved the unification of geographically close settlements, integrated both functionally

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and spatially into a single system. Researchers M. Dyomin *et al.* (2022) noted that theoretical and methodological approaches to agglomerative development of large territories primarily focused on functional-spatial zoning. In the context of spatial development, a key objective was to achieve a balanced integration of economic, social, and environmental interests across communities. Ensuring such equilibrium necessitated the equitable distribution of infrastructure and public services between central urban areas and peripheral territories. According to the study by N. Lysiak *et al.* (2022), the deindustrialisation of the economy led to the loss of competitive industrial production in various regions. This issue can be mitigated through the development of functional specialisations within specific regional taxa, particularly those oriented toward industrial activities.

With regard to the general principles of spatial planning and the coordination of development among individual communities within a larger administrative unit, the study by S. Schmidt *et al.* (2021) demonstrated the advantages of coordinated actions. Scientists suggested that a more centralised and integrated planning framework fostered more compact urban development and contributed to the efficient use of territorial resources. This study proposed the hypothesis that adjacent territorial communities can adopt agglomeration principles in resource utilisation – both tangible and intangible – by developing and implementing a joint development strategy. According to T. Kalahsnykova (2020), spatial determinants of human development represented a distinct aspect of analysis. The study identified four groups of factors influencing human development: the characteristics of physical space, economic and social environment, and the conditions of everyday life for the population. In summarising the threats to human development, the author distinguished four classes of risks: inequality in access to social goods, particularly education; uneven distribution of urbanised and less urbanised areas, leading to polarisation and uneven placement of infrastructure; the isolation of settlement groups from the rest of the territory due to natural or anthropogenic barriers. These threats can be mitigated or exacerbated depending on the development of a crucial criterion for territorial functioning – transport accessibility.

The development of a spatial development strategy for communities should be based on quantitative indicators of the characteristics of the area and their cross-analysis. Quantitative characteristics included such basic parameters as: district area, population size, density, land use structure, and the availability of engineering and transport infrastructure. According to the authors N. Hugo & D. Viertel (2024), the use of GIS in obtaining actual data on planning territories was a key tool in planning their development. Researchers emphasised the need to systematise spatial data. It enabled the visualisation of land use conflicts, analysis of development options, and the creation of data-based development scenarios. At the same time, there were still challenges at the local level with updating cadastral maps, as well as with access to environmental and statistical information. So, the study aimed to determine quantitative indicators of territorial communities in the Drohobych district to identify spatial disparities, including population density and transport coverage imbalances, as well as misalignments between cultural heritage clusters and other territorial features.

MATERIALS AND METHODS

The study covered the territory of the Drohobych district in the Lviv region, which served as a representative example for analysis due to its geographical location, resource potential, demographic dynamics, and socio-economic conditions. The study of the Drohobych district was based on a cartographic analysis to assess the quantitative characteristics of the territory. The research and schematic representations were conducted using the QGIS (Quantum Geographic Information System) geographic information system, utilising open geospatial data from OpenStreetMap (n.d.) as of 2024. Also, QGIS was used to analyse spatial data layers such as settlement boundaries, transport infrastructure, land use, and terrain.

Population estimates (as of 2022) were used to calculate density within built-up areas of 89 settlements. These were spatially divided into 1 km^2 grid cells in accordance with the NUTS-3 typological framework, adapted for Ukraine. Each cell's population density was categorised into one of four types: high (>800), medium (201-800), low (51-200), and very low (⩽50) people per km^2. Based on these clusters, the territory was functionally classified into urban, potentially urban, and rural zones. Urban areas included cells with a density above 300 people/km^2 and adjacent areas with aggregated populations exceeding 5,000. Rural zones included those below 150 people/km^2, while intermediate ranges were considered potentially urban. Transport accessibility was analysed using QGIS network analysis tools to model shortest road routes from each settlement to Drohobych and key regional centres (e.g., Lviv, Stryi, Uzhhorod).

Each route was weighted by population to determine relative transport load, highlighting areas of both strong connectivity and isolation. Topographical features were assessed using digital elevation models (Global Multi-resolution Terrain Elevation Data 2010, U.S. Geological Survey), allowing for the identification of mountainous areas per EU regional typologies. Historical and cultural elements, such as 18th-19th century German colonies, were mapped and integrated as thematic GIS layers to assess their development potential. This integrated methodological approach enabled a multi-layered evaluation of Drohobych district's spatial, infrastructural, and socio-economic structure. An auxiliary aspect of the research methodology involved the selection of information characterising the socio-economic processes at the level of the Drohobych district. In particular, according to the theory of K. Mezentsev (2005), the Stryi-Drohobych core represented a formed intra-regional nucleus, considered promising for the development of new propulsive types of human activity. At the same time, the workforce necessary for implementing these propulsive

activities was likely available, since, according to N. Prytsyuk & M. Flaga (2005), the "share of pension-age individuals in the total population" in the Drohobych district was only 17.9% as of 2005.

RESULTS

The Drohobych district was characterised by dispersed urbanisation (Bardyn, 2023), which had resulted from the active development of specific industries based on natural resources. According to the Lviv Regional Military Administration (n.d.), Drohobych district was classified as a mixed industrial-resort region. The primary resort centres were located in the cities of Morshyn and Truskavets, while a small portion of the mountainous micro-region functioned predominantly within the tourism sector. The industrial zoning scheme of Lviv region, as outlined in the Development Strategy, identified the cities of Drohobych and Boryslav as the core of a unified industrial hub, covering a significant portion of central Drohobych district – extending from Medenychi (the administrative centre of Medenychi territorial community) in the northeast to Skhidnytsia (the centre of Skhidnytsia territorial community) in the southwest. The unique spatial structure of these cities – Drohobych, Boryslav, and Stebnyk – was historically shaped by the need to optimise industrial connections. However, in the present context, this industrial interconnectivity was gradually losing its relevance. According to data from N. Fomenko (2007) and Drohobych Agglomeration Planning Scheme (Baranetskyi, n.d.), Truskavets city council (n.d.), the resources of the Drohobych district can be categorised into three main types. This classification was further supported by M. Odrekhivskyi (2002) in research on regional resource distribution.

The first type of resource was natural mineral resources, which served as the foundation for the development of the extraction and processing industries from the mid-19th century to the 2025 and played a key role in the formation of the Drohobych agglomeration. The second type of resource was natural-recreational resources, including Carpathian mountain landscapes, and mineral springs, which formed the basis of the well-developed sanatorium sector. With the decline of industrial factors, these resources have become pivotal in the development of the Drohobych district. The third type of resource was historical and cultural heritage, which, in the context of a non-industrial economy, served as an important resource for the development of territories. These three main types of resources were examined in the work within the context of the following structure: population density and the pattern of distribution of this characteristic; density of transportation connections across the territory and the identification of the nature of these connections.

One of the key indicators in the development of communities was the availability of labour resources, or population density and the distribution of this indicator across the territory. Population density (people/km^2) in this study was defined as the ratio of the total population to the area in cells of 1 km^2. The analysis of the obtained population density data for Drohobych district through QGIS mapping allowed for the identification of local territories with distinct ratios of area to population density. Through ranking, the area was divided into 4 density types: 1) high density (4894-801 people/km^2); 2) medium density (800-201 people/km^2); 3) low density (200-51 people/km^2); 4) very low density (50 or fewer people/km^2). Clusters were then selected according to these 4 categories (801+/201-800/51-200/50-) and grouped accordingly. Geospatial data from OSM was used to extract the forest areas of Drohobych district, which were then overlaid onto the density ranking scheme (key = landuse, value = forest). This approach allowed for the identification of conditionally uninhabited areas. Given the average population density in Ukraine of 70.7 people/km^2 (Verner, 2022), the grading used in this study was conditional and was adopted for a detailed analysis of Drohobych district and the creation of a map of indicator distribution (Fig. 1).

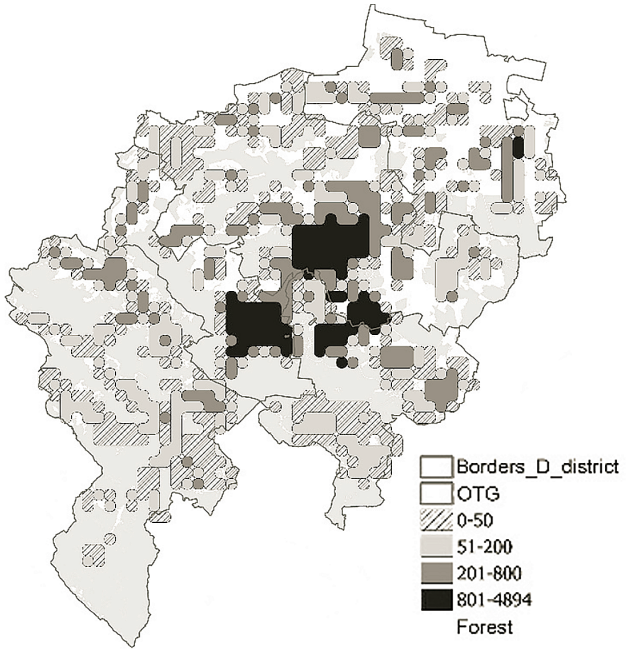

Figure 1. Population density and distribution in the Drohobych district
Source: developed by the authors

The analysis of population density within settlements revealed the following gradation – the highest population density, up to 4894 people per km^2, was found in the cities of Drohobych, Stebnyk, and Truskavets. A lower, yet still high density, of up to 1215 people per km^2 was found in Boryslav and the adjacent village of Popeli, as well as the villages of Bolekhivtsi and Opary. The last settlement, Opary village, likely maintained a high population due to the operation of a significant gas field on its lands from 1940 until the end of the 20th century, which required workers for its maintenance. The group of settlements with high population density – up to 1179 people per km^2 – also included the towns

of Medenychi (which had city status until the early 20th century) and Pidbuzh, as well as the villages of Voroblevychi and Tyniv, with densities up to 791 people per km^2. The next settlements in terms of population density included the villages of Storona, Rykhytchi, Zaluzhany, Nahuyivchi, Hrushiv, Ripchitsi, and Urizh, with densities of up to 617 people per km^2. The remaining villages had significantly lower population density, especially in the mountainous areas of the Drohobych district (Bardyn, 2023).

The average population density was observed concentrically around the urbanised core of high density, within a radius of up to 5 km, and gradually "fades out". Additionally, the analysis identified dispersed areas with uniformly low population density, particularly a belt 3.5 km wide in the Western part of Drohobych district and along the border with Sambir district. It was also evident that the population was sparse in the mountainous areas of Drohobych district. The extremely low density, according to the processed maps, was concentrically located around the periphery of medium-density territories. As the distance from the core of the district increases, the population density became more uniform, with no visible areas of higher settlement density. Extremely low population density, less than 50 people per km^2, in Drohobych, Boryslav, and Truskavets municipalities, was a local phenomenon and was represented in the form of agricultural areas. Within the Medenychi territorial community, a population density of less than 50 people per km^2 was mostly found in areas, whose lands were state-owned (Public cadastral map, n.d.). The largest sparsely urbanised areas were found in the Skhidnytsia territorial community, as these areas were classified as mountainous.

Quantitative characteristics of the five united territorial communities of the Drohobych district based on the urban, potentially urban, and rural areas were established through GIS cluster analysis (cells of the territory under study with a size of 1 km × 1 km). Although the European typological methodology (European Union, 2018) was applied in this study, intermediate population density gradations were introduced, given the lower level of urbanisation in Ukraine compared to European countries. The clusters of the grid applied to the Drohobych district territory were classified as follows: urban areas: a) population density >300 people/km^2; b) areas adjacent to those with a population density >300 people/km^2 and having a total population >5,000 people; potentially urban areas: intermediate areas between urban and rural, with a population density ranging from 150 to 300 people/km^2; rural areas: areas with a population density of <150 people/km^2.

The Drohobych urban territorial community had the highest number of "urban areas" based on a population density of over 300 people/km^2, with 81 clusters. The Boryslav urban territorial community followed, with 37 clusters classified as urban. The Truskavets urban territorial community had 30 clusters with a population density exceeding 300 people/km^2. The Skhidnytsia settlement territorial community had 20 clusters, while the Medenychi territorial community had only 6 clusters with a population density of over 300 people/km^2 (Bardyn, 2023). Territories adjacent to areas with a population density of more than 300 people/km^2 were also classified as urban and were divided into two types. The first type included territories with a total population of more than 5,000 people. The second type included territories, where the population density ranges from 150 to 300 people/km^2. It has been established that territories classified as "urban" according to the criteria outlined were only presented in the urban territorial communities of Drohobych, Boryslav, and Truskavets, and were absent in the Medenychi and Skhidnytsia territorial communities.

So, it was identified a type of territory, which based on population size and density was the "potentially urban areas", which had a population density ranging from 150 to 300 people/km^2 and do not border "urban" areas. This type of territory had high quantitative indicators in rural territorial communities – Medenychi had 24 clusters, and Skhidnytsia had as many as 33 clusters, indicating a high labour force potential in these communities. In contrast, the Truskavets urban territorial community had only 6 clusters with a population density of 150 to 300 people/km^2, while Drohobych and Boryslav each had 25 clusters. The next type of territory that was identified classified as rural, with a population density of less than 150 people/km^2. The highest number of "rural" clusters – 140 units – were found in the Medenychi rural territorial community. The Skhidnytsia rural territorial community had 69 clusters with a population density of less than 150 people/km^2. Urban territorial communities also had a significant percentage of sparsely populated areas: the Drohobych community had 92 clusters, and the Truskavets community had 75 clusters. The lowest percentage of areas classified as "rural" in the study was in the Boryslav community – 17 clusters per 1 km^2. The proportion of areas classified as urban and rural in different communities had been determined. The Drohobych community had 61% urban areas, the Boryslav community had 81% urban areas, the Truskavets community had 42%, the Medenychi community had 18%, and the Skhidnytsia community has 43%. These quantitative population density indicators of the Drohobych district suggested that the old industrial cities and their adjacent areas – Drohobych and Boryslav – despite the decline of extractive and processing industries, continued to have a high potential in terms of the labour force.

It has been established that the Truskavets territorial community had the most balanced proportion of urban and rural areas in terms of quantitative indicators. However, the geometry of their placement was diametrically opposed, as urban areas – such as the city of Truskavets and the adjacent lands classified as urban – were grouped in the northern part of the community. In contrast, the Southern part of the community was entirely rural. The Drohobych and Boryslav communities, based on population density, can be classified as urban areas. Meanwhile, the Medenychi and Skhidnytsia communities, given their population density, were agrarian communities. This territorial

differentiation required appropriate approaches in planning and infrastructure development, particularly taking into account the unique characteristics of each community. For an objective characterisation of territories, it was necessary to analyse a number of key factors, among which particular attention should be paid to spatial accessibility and the nature of their connections. Spatial accessibility defines the level of convenience and efficiency of transportation connections between different parts of a territory, which affected the mobility of the population, access to resources, and services. The nature of the connections, in turn, reflected the degree of integration between territories, which was an important factor in the socio-economic development of communities. These characteristics were determined by the quantitative indicator of the probable road traffic load. The assessment of the calculated road traffic load was carried out in QGIS by considering the statistical population number in settlements as 100% and distributing them according to transportation connections to the district centre, the city of Drohobych. The result of the calculation was the transportation load, which was expressed in the conditional number of people per direction or as a percentage ratio, where the most loaded direction was taken as 100% (Fig. 2).

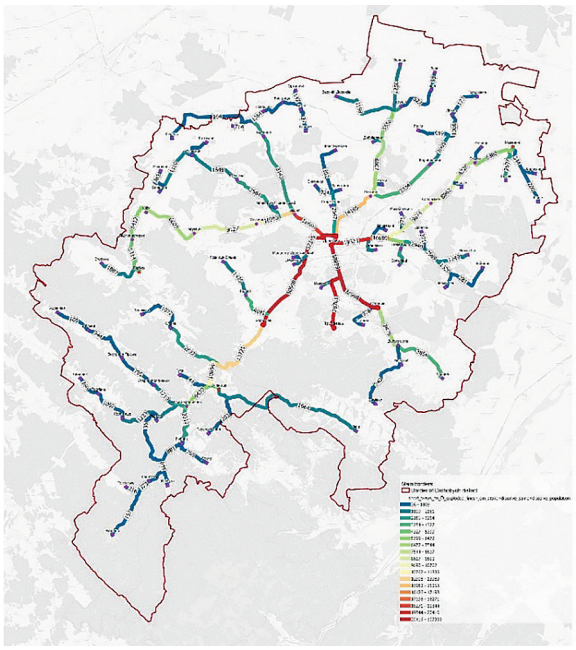

Figure 2. Structure and road traffic load of the Drohobych district
Source: developed by the authors

The most significant transportation direction for the Drohobych district was the connection of settlements in the district with Lviv, the regional centre. According to the quantitative calculations, the "ideal probable" maximum number of people traveling along this connection was 206,109 individuals. The maximum number of movements from settlements in the Drohobych district to the city of Sambir was 239,080 individuals, while to the city of Uzhhorod (via Sambir) the number was 240,809 individuals. The connection to the city of Stryi had an even higher traffic load, with 231,022 individuals. The maximum number of movements from Stryi to the city of Mukachevo was 240,809 individuals (Bardyn, 2023). The calculated data indicated that the connection through the Drohobych district in the west-east direction was more relevant, as the maximum traffic load densities on these routes, particularly to Uzhhorod, Stryi, and Mukachevo, suggested a high level of transportation activity and the significance of these routes for regional mobility.

So, it can be concluded that the historically formed connections of Drohobych with the cities of Stryi and Sambir created areas with higher potential in terms of spatial accessibility, compared to the areas located along the Lviv transport corridor. This limited the active cooperation between the two centres of the united territorial communities – the village of Medenychi in the north and the village of Skhidnytsia in the south, as these areas had weaker transport links and were further from the main highways. The weak connections within the district can be seen as an opportunity for the development of isolated areas as tourist or agricultural centres. The comparison of cartographic data on population density and the density of transportation coverage allowed for the identification of two types of local areas with specific characteristics. The first type of areas with specific characteristics – areas with the lowest population density within the influence zones of transport corridors (Fig. 3). These areas can be considered as potential sites for future development and for the anticipated localisation of new facilities.

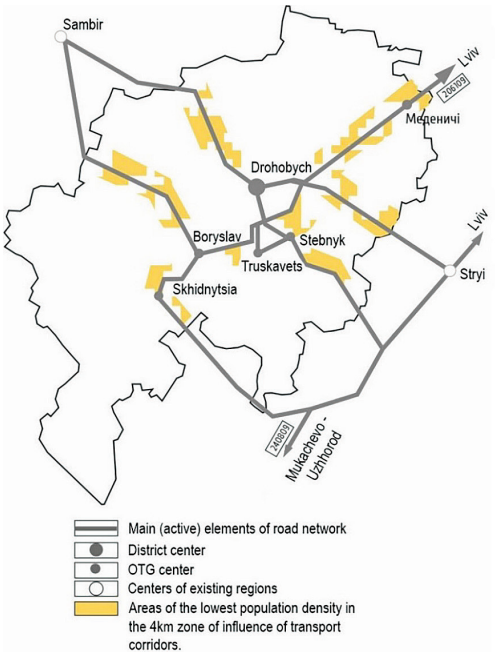

Figure 3. Areas of the lowest population density in the zones of influence of transport corridors
Source: developed by the authors

The second type of areas with specific characteristics – areas with high population density outside of cities, but with low coverage by the transportation network. Areas with the highest density of rural population, located in zones least integrated into the overall road network leading to the centre of the district, were the most distant from the centre and were adjacent to neighboring settlement elements – cities and transportation networks of the surrounding districts of Sambir and Stryi, yet they lack direct transportation links with them. Their transportation isolation led to economic losses. These local territories were characterised by having workforce potential but lack the infrastructure for its mobility and required economic activation – new types of activities based on existing resources (Zubekhina & Matviichuk, 2025). The peculiarity of spatial planning in the Drohobych district was that the centres of the territorial communities were located along the axis of the transport connection between the district centre and the regional centre, rather than in the centre of the land of each territorial community. This axis, stretching from the northeast to the southwest, can be referred to as the "urban density" axis of the region's potential and active functions (Fig. 4). It was formed based on the shared resource and raw material potential of the cities of Drohobych, Boryslav, Stebnyk, and Truskavets, with the region's most prominent and concentrated resources – industrial raw materials (potash salts, oil, natural gas) and health and wellness resources – mineral springs, some of which were unique in their therapeutic properties. The historically and culturally significant resource was also predominantly concentrated along the urbanised axis.

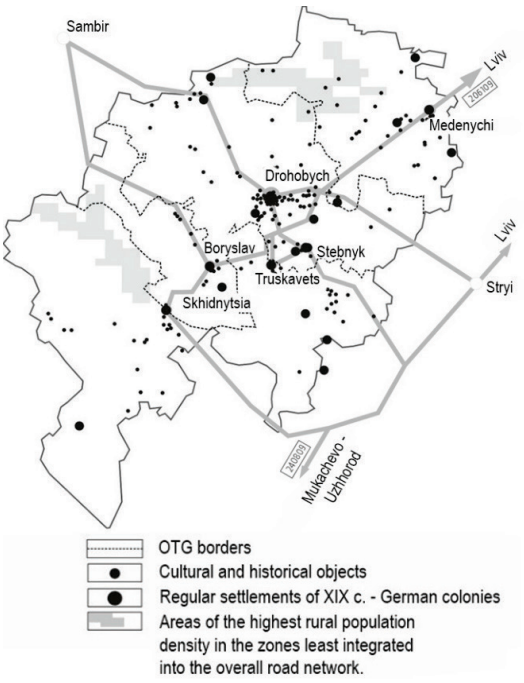

Figure 4. Areas of the highest rural population density in the zones least integrated into the overall road network
Source: developed by the authors

Urbanised areas influence economic indicators even beyond their boundaries. According to the findings of R. Ahrend *et al.* (2017), within a 90-minute drive from the urban agglomeration, a 0.4% increase in productivity had been recorded, compared to areas outside the influence of urbanisation. Therefore, it can be assumed that the influence of the "urban density" axis extended to remote areas, and the spatial planning feature of the Drohobych region was an advantage, when communities cooperate based on agglomeration principles. In this model, cities and towns – the centres of territorial communities – form the infrastructure core, while their territories had the opportunity for equidistant access to the use of infrastructure. In the industrial-tourist development direction of the Drohobych district, which was supported by urban planning documentation (Baranetskyi, n.d.), and scientific research by M. Odrechivskyi (2002), I. Mizernyk *et al.* (2006), priority was given only to the main transport links that promoted the development of key centres.

Poorly integrated territories were increasingly isolated (Dijkstra & Ruiz, 2010). According to the Regional Development Working Papers compiled by M. Brezzi *et al.* (2011), remote rural regions showed a stronger decline in population and a faster ageing process than rural regions close to a city. The remoteness of rural regions was in fact a significant factor explaining regional outflows of working age population. Geographical distance significantly affected access to opportunities, particularly in rural areas, where distance from major economic and social centres can lead to social isolation of the population. Areas with low population density, located at a considerable geographical distance from cities with populations exceeding 50,000 (considering the time needed to reach the city by car), can be classified as "lowest in opportunities". These areas faced economic difficulties as the lack of proper infrastructure and limited access to markets and resources created barriers to entrepreneurship and improving the quality of life for residents. This also exacerbated the risks of social alienation and depopulation.

The development of connections between remote areas of the district and the established axis of "urban density" was possible provided that an inventory was conducted within these areas, not only of material or infrastructural potential concentrated in the centre of the district, but also of cultural-symbolic and natural potential. As demonstrated by N. Sosnova *et al.* (2020), "the integration of a territory's natural value with its historical significance provides a basis for the development of tourism infrastructure within local communities". Local heritage sites, unique settlement layouts, landscape features, traditional agricultural practices, and other elements could form the basis for the development of the tourism sector. As an example of promoting the cultural and historical potential of the Drohobych district, this paper analysed the area for distinctive planning solutions of rural settlements. Valuable historical objects included the planning solutions of German colonies (settlements) built in the 18th-19th centuries (Fig. 5), of

which there were about ten within the modern Drohobych district, according to the German settlement map (Galizien German Descendants, 2025). In terms of planning structure, the colonies were linear villages, mostly with development on one side of the street (Oleshko & Heinz, 1996).

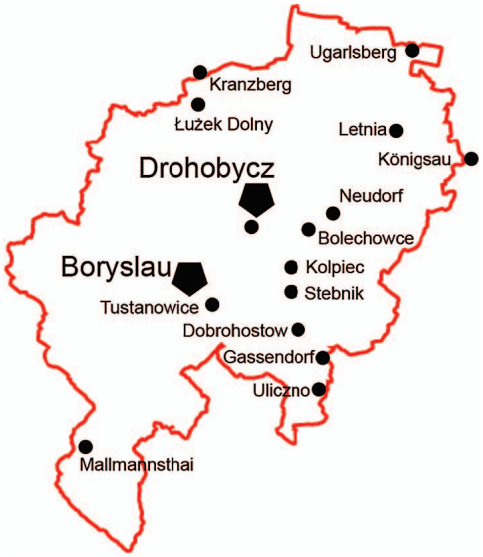

Figure 5. Regular settlement planning types – German colonies of the late 18th century in the lands of the Drohobych district
Source: based on Galizien German Descendants (2025)

The documentation of settlement planning on the Second Military Survey of the Habsburg Empire: Galicia and Bucovina (1861-1864) (Timár, 2006) (Fig. 6) provided data on the spatial structure of the settlement and its precise location within the Drohobych district. The settlement of Ugartsberg was a former German colony located in the vicinity of Vypuchky, 5 km North of Medenychi in the Drohobych district of the Lviv region (Chlebowski *et al.*, 1880). The colony was established in 1785 during the Josephine colonisation. In 1900, the settlement had 29 houses with a population of 222 (Oleshko, 1999). In September 1939, the residents of the colony were evicted (Rąkowski, 2013).

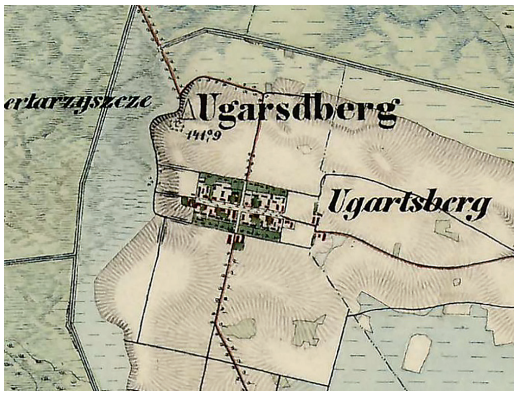

Figure 6. Settlement of Ugartsberg
Source: based on G. Timár (2006)

As of 2025, according to aerial imagery on Google Maps, neither the streets nor the buildings of the settlement have been preserved (Fig. 7). A comparison of the maps from the Second Military Survey of the Habsburg Empire: Galicia and Bucovina (1861-1864) (Timár, 2006) with the 2025 aerial imagery allowed for the precise identification of the land parcel on which the Ugartsberg settlement once existed. The site was occupied by arable land, divided into two parts by the former central road of the settlement.

Figure 7. Area of the former settlement of Ugartsberg. Satellite imagery
Note: coordinates – 49.47869062176148, 23.74332881021904
Source: based on Google map (n.d.)

Another settlement examined in this study was Königsau, which was founded in 1783 on the lands of the village of Letnya, 22 km northeast of the city of Drohobych and 6 km southwest of the town of Medenychi. The settlement was planned for approximately 300 inhabitants. The total area of the settlement, including agricultural lands, was 766 ha (data calculated based on the cadastral map of the mid-19th century at a scale of 1:28,800) (Central State Historical Archive of Ukraine, n.d.). The pentagonal structure of the settlement was unique in European urban planning and was documented on the Second Military Survey of the Habsburg Empire: Galicia and Bucovina (1861-1864) (Timár, 2006) (Fig. 8). From the central square, five roads were planned, interconnected with concentrically arranged blocks. The settlement project was designed by the Austrian engineer Kallbrunner, who had an office in Drohobych. The settlement was a unique example of the implementation of classical urban planning principles in a rural area. At 2025, the settlement was known as the village of Rivne. As of 2025, aerial imagery on Google Maps clearly revealed the pentagonal shape of the settlement, and the street layout remained discernible (Fig. 9). According to the map, the built-up areas were partially preserved, but showed gaps along the streets, indicating that some of the historical residential buildings no longer exist. It can be assumed that a significant portion of the houses had been reconstructed on the sites of the original colonists' homes.

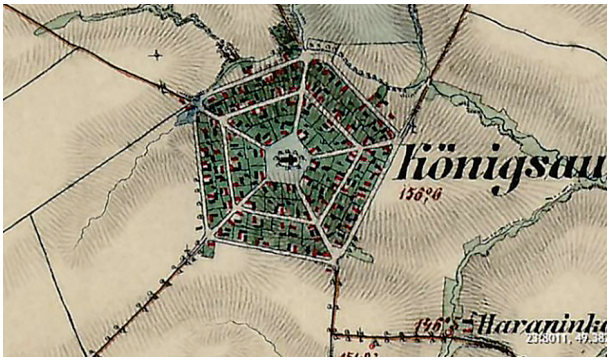

Figure 8. Königsau on the 19th-century map
Source: based on G. Timár (2006)

Figure 9. The village of Rivne (former Königsau) as of 2024
Note: satellite imagery. Coordinates: 49.380291250529176, 23.78177962680194
Source: based on Google map (n.d.)

The described examples of regular settlement planning on the lands of Drohobych district were presented as an example of the territory's features that need to be considered in the development plans of united territorial communities, as potential for the development of the tourism sector.

DISCUSSION

Similar to the findings based on the example of the Drohobych district, contemporary studies showed that shortcomings in the inventory of territorial potential and an unclearly defined set of priority functions for these areas led to unsuccessful implementation of spatial development plans. The authors J. Barry *et al.* (2018) emphasised that ineffective assessment of local resources often undermined strategic regional initiatives. B. Davy *et al.* (2025) argued that the concept of planning and its practical realisation frequently diverge, creating inconsistencies between the expected and actual outcomes of spatial policies. Moreover, A.M. Hersperger *et al.* (2018) noted that the paradigms of spatial and urban planning rely too little on the specific characteristics of local communities, their indicators, and individual potential, as national legislation (Portal of State Building Standards of Ukraine, n.d.) often dominated over contextual needs.

The classification of areas into rural, urban, and peri-urban, as proposed by V. Cattivelli (2021), served as a prerequisite for planning the cultural, social, and economic needs of communities in the implementation of municipal plans – aimed at reducing the gap between planned actions and their outcomes at the time of implementation. A study on land use changes at the interface of metropolitan and rural areas conducted by N. Siamian *et al.* (2025) demonstrated that the increase in migration from rural to urban areas was driven by the lack of a clear land classification system. According to the indicators obtained in the study, in Iran during the research period (1990-2020), urban and built-up areas expanded by 384.94 km^2 (47.15% of the study area), while agricultural land decreased by 61.05 km^2 (8.02%). Scientific studies demonstrated that the dichotomies of "urban"-"rural" and "industrial"-"recreational" territories required improved methods of territorial delineation to support well-grounded planning decisions and strategies, particularly, when addressing the differing infrastructure development needs of urban and rural areas. Equally important is ensuring that planning aligns with current legislation and strategic documents – such as the Resolution of the Cabinet of Ministers of Ukraine No. 695 (2020). Compliance with these frameworks allowed for coordination among various institutions, avoidance of project duplication, and cohesive development.

Although decentralisation was generally considered an effective solution, T. Firman (2003) pointed out that regional disparities can also be interpreted as a negative phenomenon, leading to spatial development based on the "islands" principle. Geographically large distances and low population density in rural regions led to their isolation and increase the risk of social exclusion among the population. P. Bertolini (2019) highlighted that such conditions result in low levels of investment due to the decline in human capital reserves. Accordingly, to prevent the emergence of non-integrated territories within administrative units, it was essential to apply agglomeration-based governance principles. Urban planners interpreted agglomerative formations as zones of shared interests. I. Rusanova & I. Sklyarova (2010) described them as systems, where a group of cities and their adjacent territories, supported by well-developed infrastructure networks, facilitated economic development. Similarly, B. Portnov & E. Erell (2001) and A.J. Scott (2001) defined agglomeration as a mechanism for stimulating economic growth rather than a strictly delimited territory. M.M. Conroy & J. Evans-Cowley (2006) emphasised that this mechanism enabled collaboration among functionally diverse territories and settlements through joint economic strategies – for example, integrating tourism routes that connected historical sites with agricultural areas and picturesque landscapes. Qualitative characteristics, in turn, reflected the level of access to social services, the environmental condition of the area, road quality, infrastructure provision, and cultural-historical heritage. L.D. Hopkins & G.-J. Knaap (2018) analysed planning theory and implementation models that emphasised

participation, where communities consider not only their own interests, but also those of neighboring territories. Another important aspect was community participation in the planning process. N. Grynchuk & M. Baginskyi (2023) pointed out that modern approaches to urbanism involved broad engagement of the local population at the stages of data collection and public discussions, which helped build trust in authorities and increases the effectiveness of plan implementation. Accordingly, the analysis of population distribution in the Drohobych district, conducted in this research, provided a foundation for developing a community development strategy.

CONCLUSIONS

So, as a result, it was indicated a noticeable differentiation of the united territorial communities of the Drohobych district based on urbanisation indicators, and, accordingly, the approaches to the development of these territories will vary. The territories of Drohobych district, within which specific characteristics had been established, such as: areas of the lowest population density in the zones of influence of transport corridors; areas with the highest rural population density in the least integrated zones of the overall transport network, were considered as areas of primary importance for functional-planning changes. The study identified local areas (Medenychi, Skhidnytsia, Drohobych, Boryslav, Stebnyk, Boryslav) within the Drohobych district that can be considered as potential sites for future development. Additionally, areas were determined that were potentially at risk of stagnation and loss of human capital due to their lack of integration into the district's planning structure.

The need for the creation of new clusters, such as residential, tourist, and industrial, remained relevant for the further development of the region. The planning objects of the Drohobych district, which were part of the material and cultural-historical potential of the district, form the foundation for the development of new functional clusters. Effective cooperation among communities can be achieved if the relationships between their resource-based territories shift from competition to collaboration, fostering a new spatial development model. The expected outcome of the research was the development of a model that integrated the quantitative indicators obtained in this study with demographic data. The prospects for further research on the characteristics of the Drohobych district territory in the context of planning development objectives lie in updating demographic data and accounting for its impact on the settlement system.

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REFERENCES

[1] Ahrend, R., Lembcke, A., & Schumann, A. (2017). The role of urban agglomerations for economic and productivity growth. *International Productivity Monitor*, 32, 161-179.

[2] Baranetskyi, T. (n.d.). *Analysis of opportunities and needs for cooperation between local communities within the Drohobych agglomeration*. Lviv: Public Organisation "European Dialogue".

[3] Bardyn, Yu. (2023). *Spatial-functional development of Drohobych agglomeration*. (Doctoral dissertation, Lviv Polytechnic National University, Lviv, Ukraine).

[4] Barry, J., Horst, M., Inch, A., Legacy, C., Rishi, S., Rivero, J.J., Taufen, A., Zanotto, J.M., & Zitcer, A. (2018). Unsettling planning theory. *Planning Theory*, 17(3), 418-438. doi: 10.1177/1473095218763842.

[5] Bertolini, P. (2019). *Overview of income and non-income rural poverty in developed countries*. Addis Ababa: United Nations Economic Commission for Africa.

[6] Brezzi, M., Dijkstra, L., & Ruiz, V. (2011). OECD extended regional typology: The economic performance of remote rural regions. *OECD Regional Development Working Papers No. 2011/06*. doi: 10.1787/5kg6z83tw7f4-en.

[7] Cattivelli, V. (2021). Methods for the identification of urban, rural and peri-urban areas in Europe: An overview. *Journal of Urban Regeneration and Renewal*, 14(3), 240-246. doi: 10.69554/NUTF5313.

[8] Central State Historical Archive of Ukraine. (n.d.). *Fund No. 1234, Description 567. Case 89*. Retrieved from https://cdiak.archives.gov.ua/.

[9] Chlebowski, B., Sulimierski, F., & Walewski, W. (Eds.). (1880). *Geographical dictionary of the Kingdom of Poland and other Slavic countries*. Warsaw, Poland.

[10] Conroy, M.M., & Evans-Cowley, J. (2006). E-participation in planning: An analysis of cities adopting on-line citizen participation tools. *Environment and Planning C: Government and Policy*, 24(3), 371-384. doi: 10.1068/c1k.

[11] Davy, B., Förster, A., & Shepherd, E. (2025). Normative conflicts and the foundations of spatial planning. *Planning Theory & Practice*, 17-20.

[12] Dijkstra, L., & Ruiz, V. (2010). *Refinement of the OECD regional typology: Economic performance of remote rural regions*. Brussels; Paris: DG Regio, European Commission; OECD.

[13] Dyomin, M., Yatsenko, V., & Korotkova, T. (2022). Some assumptions on the methodology of the initial stage of formation of territorial communities as a group of local level systems. *Urban Development and Spatial Planning*, 79, 13-25. doi: 10.32347/2076-815x.2022.79.13-25.

[14] European Union. (2018). *Methodological manual on territorial typologies*. Luxembourg: Publications Office. doi: 10.2785/930137.
[15] Firman, T. (2003). Potential impacts of Indonesia's fiscal decentralisation reform on urban and regional development: Towards a new pattern of spatial disparity. *Space and Polity*, 7(3), 247-271. doi: 10.1080/1356257032000169712.
[16] Fomenko, N. (2007). *Recreational resources and resortology*. Kyiv: Center for Educational Literature.
[17] Galizien German Descendants. (2025). Retrieved from https://galiziengermandescendants.org/cms/index.php/en/.
[18] Google map. (n.d.). Retrieved from https://www.google.com/maps/@50.3906304,30.5987584,14z?entry=ttu&g_ep=EgoyMDI1MTEwMi4wIKXMDSoASAFQAw%3D%3D.
[19] Grynchuk, N., & Baginskyi, M. (2023). Urbanization and state policy for territory development. *Public Administration: Improvement and Development*, 12. doi: 10.32702/2307-2156.2023.12.13.
[20] Hersperger, A.M., Oliveira, E., Pagliarin, S., Palka, G., Verburg, P., Bolliger, J., & Grădinaru, S. (2018). Urban land-use change: The role of strategic spatial planning. *Global Environmental Change*, 51, 32-42. doi: 10.1016/j.gloenvcha.2018.05.001.
[21] Hopkins, L.D., & Knaap, G.-J. (2016). Autonomous planning: Using plans as signals. *Planning Theory*, 17(2), 274-295. doi: 10.1177/1473095216669868.
[22] Hugo, N., & Viertel, D. (2024). The use of GIS for land use planning: Recommendations for PPGIS in the United States. *International Journal on Engineering, Science and Technology*, 6(3), 329-337. doi: 10.46328/ijonest.220.
[23] Kalahsnykova, T. (2020). Spatially determined risks for human development. *Demography and Social Economy*, 4, 93-105. doi: 10.15407/dse2020.04.093.
[24] Lviv Regional Military Administration. (n.d.). *Strategy for the development of Lviv region for the period 2021-2027*. Retrieved from https://loda.gov.ua/documents/49999.
[25] Lysiak, N., Habrel, M., & Khromyak, Y. (2022). The planning scheme of the oblast territory as a strategic basis for substantiating the Territorial Community's Integrated Development Concept. *Regional Economy*, 3, 24-36. doi: 10.36818/1562-0905-2022-3-2.
[26] Mezentsev, K. (2005). *Socio-geographical forecasting of regional development*. Kyiv: Publishing and Printing Center "Kyiv University".
[27] Odrekhivskyi, M. (2002). Innovative model for the development of the "Drohobych-Boryslav-Stebnyk-Truskavets-Skhidnytsia" agglomeration. *Regional Economy*, 4, 128-134.
[28] Oleshko, O. (1999). *Planning and compositional structure of settlements of German settlers in Galicia in the late XVIII – early XX centuries*. (PhD dissertation, Lviv Polytechnic National University, Lviv, Ukraine).
[29] OpenStreetMap. (n.d.). Retrieved from https://www.openstreetmap.org/#map=6/48.54/31.17.
[30] Portal of State Building Standards of Ukraine. (n.d.). Retrieved from https://dbn.co.ua/.
[31] Portnov, B., & Erell, E. (2001). *Urban clustering: The benefits and drawbacks of location*. Farnham: Ashgate.
[32] Prytsyuk, N., & Flaga, M. (2007). Peculiarities of demographic processes in Ukrainian-Polish frontier. *Visnyk of Lviv University*, 34, 210-221. doi: 10.30970/vgg.2007.34.2627.
[33] Public cadastral map. (n.d.). Retrieved from https://kadastrova-karta.com/.
[34] Rąkowski, G. (2013). *Ukrainian Carpathians and Subcarpathians. The Western part. Guide*. Warsaw: Rewasz.
[35] Resolution of the Cabinet of Ministers of Ukraine No. 695 "On Approval of the State Strategy for Regional Development for 2021-2027". (2020, August). Retrieved from https://zakon.rada.gov.ua/laws/show/695-2020-%D0%BF#Text.
[36] Rusanova, I., & Sklyarova, I. (2010). *Experience and prospects for the development of Ukrainian cities. Suburban areas. Urban Agglomerations*. Kyiv: DIPROMISTO.
[37] Schmidt, S., Li, W., Carruthers, J., & Siedentop, S. (2021). Planning institutions and urban spatial patterns: Evidence from a cross-national analysis. *Journal of Planning Education and Research*, 44(3), 1186-1197. doi: 10.1177/0739456X211044203.
[38] Scott, A.J. (2001). *Global city-regions trends, theory, policy*. Oxford: Oxford University Press. doi: 10.1093/oso/9780198297994.001.0001.
[39] Siamian, N., Azadi, H., Yousefi, S., Fürst, C., Lopez-Carr, D., Sklenicka, P., & Janečková, K. (2025). Nexus of land for food and urbanisation: Application of DPSIR model and remote sensing data in a developing economy. *Land Degradation & Development*, 36(13), 4438-4457. doi: 10.1002/ldr.5645.
[40] Sosnova, N., Bardyn, Yu., & Lenyik, Yu. (2020). Natural and cultural features of the territory as potential for the development of territorial communities. In *Proceedings of the 4th all-Ukrainian scientific and practical conference "Management and rational use of land resources in newly established territorial communities: Problems and solutions"* (pp. 338-340). Kherson: Kherson State Agrarian University.
[41] Timár, G., Molnár, G., Székely, B., Biszak, S., Varga, J., & Jankó, A. (2006). *Digitized maps of the Habsburg Empire – the map sheets of the second military survey and their georeferenced version*. Budapest: Arcanum.
[42] Truskavets city council. (n.d.). Retrieved from https://tmr.gov.ua/urbanus/mistobudivna-diialnist.
[43] Verner, I. (Ed.). (2022). *Statistical yearbook of Ukraine 2021*. Kyiv: State Statistics Service of Ukraine.

[44] Yatsenko, V. (2020). Agglomeration processes of balanced development of suburban areas of large cities of Ukraine. *Research Conservation and Restoration of Historic Fortifications*, 13, 157-172. doi: 10.23939/fort2020.13.157.
[45] Zubekhina, T., & Matviichuk, L. (2025). Methods for assessing the balanced development of entrepreneurship in the field of cultural tourism. *Economic Forum*, 15(1), 74-82. doi: 10.62763/ef/1.2025.74.

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Кількісні та якісні характеристики території Дрогобицького району у задачах планового розвитку

Анотація. Метою дослідження було проаналізувати просторові диспропорції у розміщенні об'єктів, функцій та користувачів у Дрогобицькому районі з метою розробки стратегії збалансованого територіального розвитку. Для визначення кількісних показників, таких як щільність населення, розподіл транспортної інфраструктури та локалізація історико-культурних об'єктів було застосовано ГІС-аналіз. Ці фактори стали основою для оцінки потенціалу територіальних громад та їхньої спроможності до співпраці. Також було проаналізовано переваги спільного стратегічного планування, заснованого на територіальних особливостях Дрогобицького району та його громад. У роботі висвітлено просторові дисбаланси, різний рівень доступності та розвитку інфраструктури в межах району. Окрему увагу було приділено ролі агломераційних принципів як механізму об'єднання фрагментованих громад у цілісні планувальні утворення. У дослідженні розглянуто значення природних і культурних ресурсів – карпатських ландшафтів, мінеральних джерел та збережених планувальних структур історичних німецьких колоній – як інструментів сталого розвитку туризму. Ці ресурси сприяли формуванню окремих функціональних кластерів у межах району. Дослідження виявило слабкі транспортні зв'язки між периферійними та центральними територіями, що розглядалися як виклик і водночас можливість для цілеспрямованих управлінських рішень. Було обґрунтовано необхідність впровадження інтегрованих, громадо-орієнтованих стратегій розвитку, які враховували місцеві умови та узгоджувалися з регіональними й національними рамками планування. Поєднання кількісного просторового аналізу з принципами стратегічного планування дало змогу сформулювати практичні рекомендації щодо забезпечення збалансованого, ресурсоефективного та партнерського територіального розвитку

Ключові слова: територіальні громади; щільність населення; структура транспортної мережі; історико-культурні об'єкти; просторові диспропорції