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METHODOLOGICAL PRINCIPLES OF RESEARCHING THE SYSTEMATIC OF POPULATION DISTRIBUTION: A COMBINATION OF ADMINISTRATIVE-TERRITORIAL AND GENETIC PARADIGMS

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In domestic social and geographical science, research into the systematics of population settlement is traditionally based on the administrative-territorial paradigm, within which settlement systems of different hierarchical levels are considered as given elements of the modern administrative-territorial structure. This approach leads to the predominance of descriptive-comparative studies and, at the same time, limits the possibility of in-depth analysis of the genesis, evolution and spatio-temporal dynamics of population settlement. In the context of the transformation of state regional policy and the actualisation of European principles of territorial organisation of society, there is a growing need to rethink the methodological principles of researching the systematics of settlement. The article justifies the expediency of combining administrative-territorial and genetic paradigms in the methodology of studying the systematics of population settlement. Particular attention is paid to the genetic approach, which focuses on identifying the historical and geographical prerequisites for the formation of settlement systems, analysing the processes of primary settlement, the economic development of the territory, and subsequent transformations and changes in the spatial structure of the population. It is shown that the genesis of settlement is a complex socio-geographic process, characterised by its own dynamics, development trends and a specific demographic and socio-economic trajectory. It is proven that the genetic systematics of settlement allows us to move from the formal separation of settlement systems beyond administrative boundaries to their scientifically substantiated identification, based on careful consideration of historical and geographical factors and the evolution of the settlement network. The conclusion is that further theoretical and methodological development is needed in the field of research on the systematics of population settlement in the context of modern ekistics.

Key words: *systematics of settlement, administrative-territorial paradigm, genetic paradigm, historical-geographical approach, ekistics, population.*

Яворська Вікторія, Корнус Олеся. Методологічні засади дослідження систематики розселення населення: поєднання адміністративно-територіальної та генетичної парадигм

У вітчизняній суспільно-географічній науці дослідження систематики розселення населення традиційно ґрунтуються на адміністративно-територіальній парадигмі, в межах якої системи розселення різних ієрархічних рівнів розглядаються як задані елементи сучасного адміністративно-територіального устрою. Такий підхід зумовлює переважання описово-порівняльних досліджень і водночас обмежує можливості глибокого аналізу ґенези, еволюції та просторово-часової динаміки розселення населення. В умовах трансформації державної регіональної політики та актуалізації європейських принципів територіальної організації суспільства зростає потреба у переосмисленні методологічних засад дослідження систематики розселення. У статті обґрунтовується доцільність поєднання адміністративно-територіальної та генетичної парадигм у методології дослідження систематики розселення населення. Особливу увагу приділено генетичному підходу, який орієнтований на виявлення історико-географічних передумов формування систем розселення, аналіз процесів первинного заселення, господарського освоєння території, подальших трансформацій та змін просторової структури населення. Показано, що ґенеза розселення

є складним суспільно-географічним процесом, який характеризується власною динамікою, тенденціями розвитку та специфічною демографічною і соціально-економічною траєкторією. Доведено, що генетична систематика розселення дозволяє перейти від формального виділення систем розселення за адміністративними межами до їх науково обґрунтованої ідентифікації на основі комплексного врахування історико-географічних чинників і особливостей еволюції поселенської мережі. Зроблено висновок про необхідність подальшого поглиблення теоретико-методологічних і методичних розробок у сфері дослідження систематики розселення населення в контексті розвитку сучасної екістики.

Ключові слова: *систематика розселення, адміністративно-територіальна парадигма, генетична парадигма, історико-географічний підхід, екістика, населення.*

Introduction. A key issue in the study of population settlement is its systematics, which structures spatial population organisation and provides a theoretical basis for analysis. In Ukraine, the settlement system has traditionally been treated as the basic taxonomic unit, forming a clear hierarchical taxonomy applied in socio-demographic, economic-geographical research and territorial planning.

However, this system has largely been shaped by the administrative-territorial paradigm, where settlement systems are defined by current administrative boundaries. This approach focuses mainly on quantitative characteristics and comparative analysis, while the methodological procedures for identifying settlement systems remain secondary. Consequently, the genesis and evolution of settlement systems, historical-geographical prerequisites, stages of territorial development, changes in economic specialisation and the evolving role of settlements are often underexplored, rendering settlement systems relatively static in analyses.

Amid spatial transformations, administrative-territorial reforms, and alignment with European regional development principles, the genetic paradigm becomes increasingly relevant. It interprets settlement systems as outcomes of long-term historical development and interactions among natural, demographic, socio-economic and cultural factors. Integrating administrative-territorial and genetic paradigms enables a more comprehensive understanding of settlement systematics, moving from formal delineation to scientifically substantiated identification of settlement systems as real spatial formations, thereby advancing ekistics theory and socio-geographical methodology.

Materials and methods. The methodological basis of the study is grounded in modern social geography, geodemography and ekistics, focusing on the systematics of population settlement as a form of territorial organisation. The research is theoretical and methodological, analysing conceptual approaches to settlement systems within administrative-territorial and genetic paradigms.

The study applies a historical-geographical approach to examine the formation and evolution of settlement networks, a comparative geographical method to assess the cognitive potential and limitations of both paradigms, and theoretical generalisation to systematise existing approaches and justify the development of genetic systematics. A systemic approach considers settlements as hierarchically organised territorial systems, while the genetic method supports the identification of settlement types reflecting conditions of establishment and network evolution. Logical-structural analysis aids in constructing generalised schemes and comparative characteristics.

Quantitative modelling and empirical spatial verification are not included, as the primary goal is a methodological understanding of settlement systematics and the formulation of theoretical foundations for future applied research. Materials include scientific works by Ukrainian and foreign scholars, as well as international studies that employ evolutionary, systemic and genetic approaches to settlement analysis.

Analysis of previous research and publications. Among modern foreign sources, attention is drawn to works that develop a systematic approach to the study of settlement systems in the context of complex adaptive systems and their "historical evolution" (settlement systems as spatial adaptive systems), where settlement is considered as the result of long-term processes of interaction of individuals in space and their consequences for the macrostructures of settlements [7]. Another important publication is a study of spatial hierarchy and long-term changes in settlement systems, which highlights the influence of socio-economic and political factors on the spatial structure of settlement [3]. Among the methodological developments at the international level, a study was also used that expands the concept of geodemographic classification as a tool for modelling spatial variations in population and the relationships between settlements and social processes [5]. This approach is relevant for comparison with genetic approaches, as it demonstrates how modern classification systems can take into account not only administrative, but also contextual socio-spatial characteristics of the population.

Modern Ukrainian studies of population settlement examine transformations in settlement networks, spatial organisation at local and regional scales, and the interplay between administrative-territorial structures and demographic processes. Thus, a spatial analysis of changes in the rural settlement network in Ukraine was conducted within the framework of a study of the rural settlement network for the period from 1959 to 2021 [6], which illustrates the historical-geographical trends in the transformations of rural settlement and is important for understanding long-term changes in the structure of settlements in the context of administrative-territorial reform. Analysis of the transformation of the settlement system using the example of the Pidhirska territorial community in the Ivano-Frankivsk region demonstrates the use of historical-geographical and spatial analysis to identify the heterogeneity of the demographic situation and the relationships between migration processes and the spatial distribution of the population [2]. Also important is the analytical work on the settlement system at the regional level, particularly in the Odessa region, which combined demographic indicators and spatial patterns of settlement placement in the context of Ukraine's new administrative structure [1].

The aim of the work is to conduct a methodological comparison of the systematics of population settlement on administrative-territorial and genetic grounds, with the aim of identifying their cognitive capabilities, limitations, and role in the formation of a scientifically sound approach to the study of settlement systems.

Presentation of the main material. In Ukrainian urban planning and socio-geographical research, the systematics of population settlement has traditionally followed the administrative-territorial paradigm, which links settlement taxa to existing administrative units. Within this framework, settlement systems of different hierarchical levels correspond to national, regional, district and local administrative units. This approach is widely used in geographical and demographic studies, as well as in territorial planning, due to its legal consolidation of boundaries, compatibility with statistical accounting and direct applicability in governance.

The administrative-territorial approach assumes that settlement systems operate within state and local government structures and maintain administrative integrity. Administrative bodies are considered prerequisites for implementing socio-economic strategies and coordinating spatial decisions, making administrative cohesion a key feature for the practical management and integration of settlement systems into the national territorial framework [8]. At the same time, this approach creates a situation in which settlement boundaries are determined by factors external to the settlement process and analysis focuses mainly on already-defined territorial units.

Within the administrative paradigm, research focuses on population, density, hierarchy, infrastructure and inter-settlement relations. While practically useful, this approach constrains the analysis of settlement genesis and evolution, as boundaries follow administrative units and change with reforms, rendering systems relatively static and shaped more by management decisions than by long-term historical-geographical processes (Fig. 1).

The status of settlement systems is closely linked to changes in administrative-territorial structures. Consolidation or division of administrative units alters settlement boundaries and hierarchical levels, often independently of actual settlement connections or functional networks, highlighting the dominance of institutional criteria over historical-geographical inheritance and functional integrity. While this underscores the limitations of administrative systematics in explaining deep patterns of territorial organisation, it retains practical significance.

Alongside the administrative approach, historical-geographical and genetic methodologies consider settlements as historically and geographically grounded, shaped by natural environment, resources, political and economic contexts, transport accessibility, and socio-economic needs. Initial settlements formed a foundational framework that evolved through economic development, functional changes and self-organisation. The procedural dimension central to the genetic approach allows analysis of both current networks and their formation trajectories.

Despite its relevance, the genetic approach is underutilised in current settlement taxonomy. Genetic features. such as settlement timing, development stages, economic functions, functional evolution, and network dynamics, are rarely used as criteria for defining taxa and mainly serve to characterise administratively defined systems. This creates a methodological tension between administrative and genetic paradigms. Administrative taxonomy relies on institutional boundaries, whereas the genetic approach emphasises historical-geographical context and procedural evolution. Partial reconciliations, like local or functional-genetic interpretations, remain conceptually limited.

To enable integration, it is necessary to differentiate these approaches clearly and define their applications. Administrative systematics should remain a planning tool, while genetic systematics should develop independently to provide a deeper explanation of settlement formation and evolution. Introducing the genetic type of settlement as a

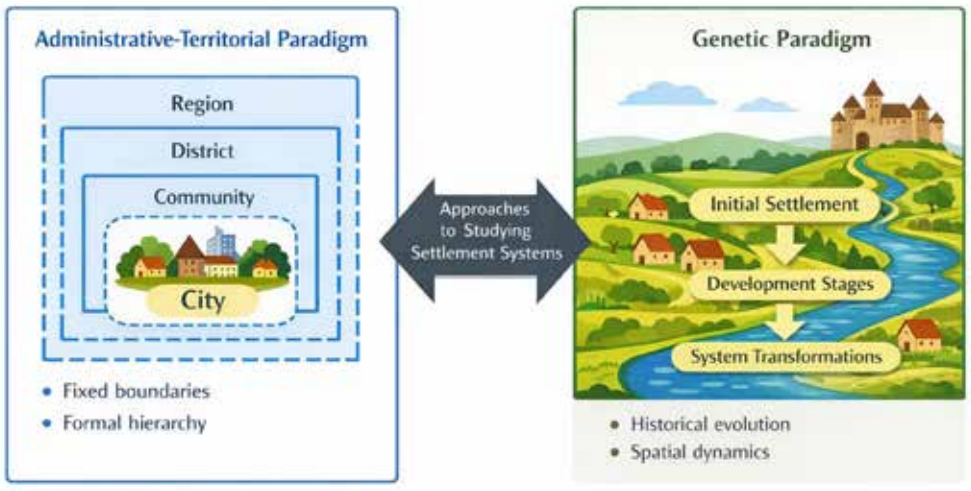

Fig. 1. Paradigms of research into population settlement systems (Author's own illustration, created using AI-assisted tools)

basic taxonomic unit enables the identification of territories that share natural-geographical and socio-economic conditions, settlement forms, characteristic locations, network structures, and coherent socio-economic development trajectories. Genetic types of settlement have a multi-level hierarchy and can be distinguished at the regional, subregional, meso- and microregional levels, which requires the development of an appropriate taxonomy [4, 10]. An important methodological aspect of genetic systematics is the recognition of settlement waves corresponding to different stages of territorial economic development. Primary, secondary and later waves, shaped by infrastructural, technological, or socio-economic changes, create a multi-layered settlement network. Linking the temporal sequence of settlement with economic functions allows defining functional-genetic settlement types, which collectively form genetic settlement types as territorially coherent formations with specific structures and dynamics.

A key genetic feature of settlements is their location and relation to the natural and geographical environment. Functional-genetic groups are associated with typical locations that reflect historical settlement conditions. Temporal changes in location indicate transformations of spatial niches and are closely tied to shifts in functions, transport systems, land use and population organisation. Therefore, location is a primary criterion for identifying relationships within settlement networks.

Another crucial component is the settlement network as an integrated system of interconnected settlements. Genetically related networks exhibit specific functional and hierarchical structures, central-place patterns and characteristic spatial configurations. Together, these features define the network's territorial structure and allow the identification of genetic settlement types as real spatial formations shaped by long-term historical and geographical development.

In population geography, settlement is viewed both as the existing spatial distribution of population and as the process of territorial occupation and economic development. For genetic systematics, integrating these static and dynamic dimensions is essential to adequately capture the stages of network development and levels of formation. Genetic types of settlement are characterised by settlement hierarchy, the centrality of key places, the completeness of the territorial structure, and the degree of economic development. Territories with longer settlement histories tend to exhibit more stable and established types. Therefore, genetic systematics represents a promising avenue for geodemographic and socio-geographical research, requiring further methodological refinement, clarification of concepts and the development of clear criteria for identifying genetic types. This approach complements, rather than replaces, administrative-territorial systematics, enabling a more comprehensive analysis of population organisation that combines institutional structures with historical-geographical insights and long-term settlement trajectories [10].

Further development of the genetic systematics of settlement involves a more detailed analysis of the internal structure of genetic settlement types and clarification of their role in shaping the territorial organisation of the population. Genetic settlement types are not abstract classifications but reflect long-term historical and geographical processes within specific territories, resulting from the interaction of natural conditions, economic activities, demographic dynamics and socio-economic transformations.

A key methodological advantage of the genetic approach lies in its ability to analyse the continuity and heredity of settlement structures. Unlike administrative systematics, which fixes settlement patterns within static territorial frameworks, genetic systematics enables tracing both continuity and discontinuity in settlement development, particularly in regions influenced by historical disruptions, political change, migration, or economic restructuring. This makes it possible to distinguish stable structural elements from transitional ones, which is essential for scientific interpretation of spatial population organisation.

Another important strength of genetic systematics is its capacity to identify asynchrony in settlement development. Within the same territory, different groups of settlements may represent distinct stages of formation, functional evolution, and demographic dynamics. While administrative approaches tend to smooth out such differences, genetic systematics reveals and explains territorial heterogeneity, allowing identification of local centres of growth and decline within settlement networks.

The relationship between the genetic systematics of settlement, regional policy and spatial planning is of particular importance. Although the genetic approach is primarily analytical, its results have clear applied relevance. Identification of genetic settlement types provides a more substantiated basis for assessing territorial development potential, sensitivity to external influences and adaptive capacity to socio-economic change. Knowledge of the genetic structure of settlement thus supports the differentiation of regional policy, the formulation of targeted development strategies, and the optimisation of social infrastructure and transport systems.

In this context, the spatial heredity of administrative decisions becomes especially relevant. Reforms that ignore the genetic characteristics of settlements may disrupt historically established connections, weaken the functional integrity of settlement networks and reduce the effectiveness of territorial development management. Genetic systematics can serve as a tool for scientifically evaluating administrative decisions, assessing their alignment with actual spatial structures and long-term territorial development trajectories [9].

The interdisciplinary potential of genetic systematics is considerable. Genetic settlement types can serve as analytical units in socio-economic, demographic, environmental, transport, and related studies. By integrating historical-geographical, socio-economic, and demographic features, they provide a holistic interpretation of spatial processes beyond traditional administrative units. Methodologically, establishing genetic systematics requires formalised criteria for identifying settlement types, including chronology, dominant functions, location, network structure, and demographic dynamics.

Importantly, genetic systematics does not replace the administrative-territorial approach but complements it. Clear

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Table 1

Comparative characteristics of the administrative-territorial and genetic paradigms of population settlement systematics

Comparison criterion	Administrative-territorial paradigm	Genetic paradigm
Basic logic of taxonomy	Isolation of settlement systems within the current administrative-territorial structure	Isolation of genetically related settlement structures regardless of administrative boundaries
Basic taxonomic unit	Territorial settlement system (region, district, etc.)	Genetic type of settlement
Role of administrative boundaries	Determinative, sets the spatial configuration of systems	Secondary or absent
Temporal dimension	Mainly static, fixing the current state	Processual, oriented towards genesis and evolution
Key selection criteria	Institutional integrity, managerial control	Time and conditions of settlement, nature of development, functional evolution
Attitude to historical and geographical factors	Auxiliary, explanatory	Determinative
Sensitivity to administrative reforms	High	Low
Explanatory potential	Limited in terms of settlement evolution	Highly regarding the regularities of formation and development
Main scope	Management, territorial planning	Scientific analysis, typology and expertise of spatial solutions

functional delineation allows administrative systematics to maintain management and planning roles, while genetic systematics contributes explanatory and typological insights (Table 1). It is this combination that can orient domestic ecological systematics to a qualitatively new level of analysis of the territorial organisation of the population [10].

The development of genetic systematics of settlement represents not only a theoretical challenge but also a necessary step toward updating the methodological foundations of socio-geographical research. It enables overcoming the limitations of an exclusively administrative interpretation of settlement by integrating the historical-geographical dimension into systematics and by developing a more adequate model of the spatial organisation of the population that reflects both its current structure and long-term processes of formation.

Conclusions. The analysis demonstrates that Ukrainian socio-geographical and urban planning research has been traditionally dominated by the administrative-territorial paradigm. While this approach ensured institutional coherence and applicability for territorial planning, it constrained analytical possibilities, rendering research predominantly descriptive and marginalising the genesis and evolution of settlement structures. Despite its relevance for understanding settlement processes, the genetic approach has not been integrated as a primary criterion in settlement systematics. Genetic characteristics are mainly applied as auxiliary features within administratively defined systems, limiting the explanatory power of historical-geographical analysis and preventing a full understanding of spatial organisation patterns. This creates a fundamental methodological tension between administrative-territorial and genetic paradigms that cannot be resolved mechanically.

Developing a genetic systematics of settlement as an independent direction of population geography, grounded in historical-geographical principles and distinct taxonomic logic, allows moving from formal administrative delimitations to the scientific identification of territorially coherent formations shaped by long-term settlement, economic development and socio-economic evolution. Genetic types of settlement, reflecting origin, functional specialisation, location, spatial organisation, and geodemographic dynamics, provide a deeper explanation of population settlement differences.

Genetic systematics exhibits a multi-level hierarchical structure applicable at regional to local scales. Its further development requires refining conceptual definitions, harmonising methodologies, and formalising criteria for identifying genetic types. At the same time, it complements rather than replaces the administrative-territorial approach, enabling its more informed and scientifically justified use in management and spatial planning.

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