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# The Transformation of Social and Cultural Space in the Context of the Development of Transport Corridors

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## Abstract

This article discusses the methodology of analysis and forecasting of complex spatial systems, taking into account a lot of economic, social and cultural relationships that determine the specifics of the individual territories' development. Particular attention is paid to the formation of specific zones on the basis of urban settlements along the path of transport corridors. In this regard, the authors introduce the concept of "urban renewal centers" and give a definition. For its disclosure, the methodological part provides a list of related concepts, defines their boundaries and relationships, and also reveals the essence of the definitions of 'transport corridor' and 'zone of transport corridor'. The authors proposed the use of vector estimates for the analysis of heterogeneous spatial systems of extended information volumes with the inclusion of sociological data and problem-oriented adaptation of visualization and processing of graphic data. As a result of a new, more detailed statement of the problem, we can go on to assess the prospects for the development of space for the complex and heterogeneous macro-regional and transboundary transport corridor Ural — Northern Kazakhstan.

The study has fixed that development of urban renewal centers acts as a driver for the development of social and cultural spheres, as well as general economic conditions. The social and cultural transformation of urban settlements over time begins to determine their economic development potential. Such settlements are becoming centers of gravity in the labor market with many far-reaching development scenarios.

**Keywords:** regional development, urban settlements, urban renewal, transport corridor, visualization

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## 1. Introduction

The development of economic social and cultural interconnections of territories in modern difficult and rapidly changing conditions is becoming increasingly difficult for forecasting. Similar new conditions are quite diverse. Among them is globalization, structural crisis, the development of agglomerations, the merger of cities and towns and others. All this significantly complicates the analysis of current trends and the search for the best scenarios for the development of complex spatial systems. At the same time, the basic principles of the methodology for the analysis and forecasting

of complex spatial systems are inevitably taken into account, taking into account the many economic social and cultural relationships that determine the specifics of the development of individual territories. Updating the basics opens up a number of new opportunities for the formulation and solution of new non-standard tasks of managing spatial development.

Such updates in the methodology fully affect a number of the multidimensional qualitative-quantitative analysis key provisions of the of complex and heterogeneous territorial systems development. An important place among them is occupied by a detailed study of the competitive advantages determined by the specifics of the territories. In general, geographical differences predetermine heterogeneity and uneven development of territories. Further, the development of transport corridors, as routes for moving the flow of goods and services, is superimposed on a heterogeneous set of territories. In turn, the development of transport corridors has a significant impact on all aspects of the economic, social and cultural development of territories. Of particular interest here is the formation of specific zones on the basis of urban settlements. Such zones become “growth points” on the route of the transport corridor — “centers of economic social and cultural attraction, redevelopment the urban environment to the modern standard of quality and comfort” (hereinafter referred to as urban renewal centers).

A detailed study of the competitive advantages and development prospects of urban renewal centers is associated with two important aspects of the territories transformation and a change in the quality of the population life. The first aspect is associated with agglomeration processes and urbanization of territories and the spread modern comfortable urban environment elements. The second aspect is connected with the communications development of mobility various forms in the conditions of transport corridors, which also contributes to an increase in the quality of life.

Updating a number of the methodology provisions for analysis and assessment of the urban renewal centers impact on the routes of transport corridors opens up a number of new opportunities for researching trends and determining the prospects for spatial development. Here, questions of a more detailed systematization and classification of various factors determining the specifics of development come to the fore. The following are questions of a multicriteria assessment of the development of such territories and the corresponding zoning. Of particular importance is the use of information technology (IT). To study a larger number of factors, such studies are focused on using the maximum available amount of heterogeneous information. These are traditional statistics and, most importantly, sociological. Creating problem-oriented tools allows you to switch to

a qualitatively different level of research information support. The study of specific issues of spatial development, in the context of poorly structured information, is provided by problem-oriented adaptation of visualization and graphical data processing tools.

Summarizing the above, the present work is devoted to the study of the analysis of spatial competitive advantages with consideration of the economic, social and cultural aspects of the development of transport corridors in rapidly developing territories. In this case, individual, largely specific conditions for the formation of urban renewal centers are considered.

## 2. Methodology and Methods

Studies of the development of economic social and cultural relationships between territories are largely interdisciplinary. In the general case, the expansion of the scope of such interconnections is associated with economic growth and the subsequent development of the social and cultural component of the urban environment.

The urban communicative environment largely transforms the social and cultural space. At the same time, the urban population becomes the main carriers of social and cultural specifics [13]. Thus, the spatial socio-settlement framework that determines the development of urban settlements becomes crucial in the transformation of the social and cultural space of the territories.

The development of the transport corridor will inevitably increase the influence of a number of factors of the social and cultural space on the territories transformation. The study of the urban environment object and transport corridors joint development is associated with assessments of some characteristics of various scales and specifics urban settlements.

The conceptual framework for such studies is associated with the formalization of the conditions for the development of a very complex and heterogeneous set of interconnected urban settlements. In general, the construction of a model reflecting the development of such a system is associated with the adaptation of the classical model of the territory. Her example is a multi-level symmetric hierarchical model of the concept of systemic stability of the economy [7, 8]. Adaptation in this case involves the transformation of the model in accordance with the structure of the spatial socio-settlement framework. The network structure of such a framework carries information about the specifics and location of urban settlements.

The format of urban entities is diverse. The most complex form is agglomeration with the concentration of settlements around large cities. A poorly structured form of urban

integration is conurbation. In general, the structure of agglomerations is complex and heterogeneous. It includes various components such as large city center — core cities of the agglomeration, edge cities — cities on the outskirts of the agglomerations, urban area — cities within the boundaries of a real built-up space (outside administrative boundaries) and metropolitain area — clots of settlements around large cities, etc. Population concentration in such urban structures, primarily, is due to the characteristics of economic development. At the same time, a significant part of urban settlements falls on separately located, although interconnected, medium and small cities and urban settlements. Further, such specifics of urban development significantly alters the regional social and cultural space.

The complexity of the structure of the settlement frame and the uneven distribution of the population increases even more with the advent of the transport corridor specific zones — urban renewal centers. The considered characteristics of the transport corridor in various tasks differ markedly [15]. The basic classical logistic definition of a transport corridor [3] characterizes the path along a specific route, without transit transportation. Studies of the spatial development of the transport corridor are considered in a broader sense.

Zones of the transport corridor — urban renewal centers are becoming particularly significant and promising objects of spatial development. They act as a set of territories of high transport accessibility, having competitive advantages through the use of a transit transport component (trunk) to solve local problems. In this case, zones of social and cultural attraction of various settlements are superimposed on the traditional linear space of the transport corridor.

Such zones are characterized by an increase in the concentration of the population in urban settlements and the intensification of economic, social and cultural processes. Such zones may include agglomerations, individual cities, and small towns [14]. The development of such zones is largely determined by agglomeration processes. For many projects (excluding mega highways), the issues of the economic impact of transport corridors on nearby territories are still poorly understood [12].

As a result of such a transformation, a much more complex heterogeneous spatial structure is formed than the initial one. The concept of a transport corridor zone is generally applicable to any of a diverse set of objects located near a transport corridor and developing nearby settlements of various formats. Such spatial objects then become centers of renewal of the urban environment in relation to other territories. The multi-level system of such economically rapidly developing centers of urban renewal largely determines the evolution of the surrounding social and cultural space.

In real conditions, when researching the specifics of such spatial objects in conditions of limited information, specialized, information-adapted approaches based on the principles of “soft systems methodology” get an advantage [2]. They allow you to refine the provisions and analysis procedures directly in the search for solutions. Clarifications of provisions in this case are integrated into the stages of the search for solutions.

The informational basis for the study of assessments of the current level and prospects of social and cultural development of both the territory as a whole and the zones of the transport corridor is associated with the adaptation of the approach to assessing the quality of life based on vector assessments. The use of sociological information provides a qualitatively new informational basis for such assessments. The totality of such sociological assessments forms the vector of assessment of the current situation (self-esteem by society). The addition of traditional very limited statistical data makes it possible to have a unified approach to a representative reflection of the characteristics of the most diverse territorial objects. At the same time, the problem of lack of information is also solved.

A similar vector approach to assessing the quality of life has already been tested in assessing development priorities based on the preferences of society in two groups of indicators. These are assessments of the quality of infrastructure (housing, transport, utilities, etc.) and assessments of the quality of life in terms of healthcare, cultural education, including the demand for social and cultural services [6].

Here, a special place is occupied by the analysis of the discrepancy between the estimates of the population when comparing the assessment vectors for different territories. When comparing territories, vector estimates are primarily associated with the analysis of the situation and their subsequent mutual comparison. The accumulation of information on preference vectors in the systematization and formation of a specialized information-analytical database creates the basis for further research on the analysis and forecasting of society’s preferences in a territorial aspect. The totality of such vector estimates for the entire totality of the territories under consideration characterizes both the position of individual territories, as the main trends in the transformation of social and cultural space.

A similar approach to assessing the totality of the characteristics of social and cultural space is easily combined with the principles of “soft systems methodology”. It is flexible enough and allows you to integrate various other approaches and methods used in measuring the well-being and quality of life of the population in the territory of residence [9, 10].

The settlements geographically adjacent to the transport interregional corridor inevitably fall into the zone of “attraction” of urban renewal centers as agglomeration processes develop. Assessment of the current state and development potential of the transport corridor zones further allows us to move on to problem-oriented zoning of territories. Here, a special role is played by visualization technologies, which make it possible to more clearly identify the main objects of spatial development that are difficult to digitize. Adapted geoinformatics, problem-oriented technologies occupy a special place here [4].

The presented methodological foundations for the use of vector estimates on extended volumes of information with the inclusion of sociological data open up new opportunities for the study of complex spatial systems based on representative estimates of the population in certain territories. The objects of such studies are, as a set of heterogeneous interconnected and dynamically developing zones of transport corridors, as well as individual urban renewal centers of various formats. Such a multi-spatial representation of territories makes it possible to solve a wide range of spatial development management tasks at a qualitatively different level.

## 3. Results / Findings and Discussion

A new more detailed statement of tasks allows us to proceed to assess the prospects for the development of space for a complex and heterogeneous macro-regional and transboundary transport corridor Ural — Northern Kazakhstan (direction Chelyabinsk — Troitsk — Kostanay). One of the defining points here is problem-oriented zoning. Its results also become prerequisites for considering other problems of spatial interregional and regional development [1, 11, 17].

For the territories under consideration, the establishment of urban renewal centers is of particular importance for the development of social and cultural spheres, as well as relatively general economic conditions. The social and cultural transformation of urban settlements over time begins to determine their economic development potential. Such settlements are becoming centers of gravity in the labor market with many far-reaching development scenarios.

Among examples of approbation of the considered approach to research within the framework of solving current management tasks of spatial development, two approaches should be singled out. The first example is related to a problem-oriented analysis of the development prospects of the transboundary transport corridor Ural — Northern Kazakhstan territories [5]. The second example is associated with predicting

the spatial development of individual municipalities and the formation of a multi-level system of social services centers [16].

For example, the space of the Urals and Northern Kazakhstan is characterized by a significant length and complexity of the configuration of territories, remoteness of regional administrative centers from each other, low density and uneven distribution of the population. In such conditions, the formation of urban renewal centers (transport corridor zones) is of particular importance.

Multifactorial (economic, social, cultural) 'attraction' of the transport corridor zones increases spatial heterogeneity and differentiation of territories. However, increased transport accessibility helps smooth out differences. Such complex and sometimes conflicting trends provide various competitive advantages to settlements in the transport corridor zone.

The territories of transport corridor zones are determined regardless of administrative boundaries. Here, the criterion is the simple transport accessibility of the most significant objects of the urban environment for the population (for example, a 15-minute or other). Under special conditions with such zoning, there are territories with agglomeration processes.

For example, the number of urban renewal centers that benefit from the location of transport corridors in the zone includes various territorial objects. Among them are:

- large cities (determining the development of the macroregion);
- small and medium-sized cities (supporting socio-economic, production and distribution centers of territories);
- small urban settlements (small service centers of a limited set of sociocultural services).

The general structure of the entire system of the Ural — Northern Kazakhstan interregional, transboundary transport corridor zones section is shown in Figure 1. The territory of the agglomeration processes of the Chelyabinsk metropolis, which integrates the zones of small cities, is highlighted separately. Zones of small towns are limited by a dotted line, and villages by a solid line. The size of the zones in the diagram is proportional to the population.

The main processes for the spheres of the economy, society, and culture are largely extraterritorial. Accordingly, the best prospects for searching for "growth points" for the development of urban renewal centers, in this example and other cases, are in the directions of the most significant communications and regardless of administrative boundaries.

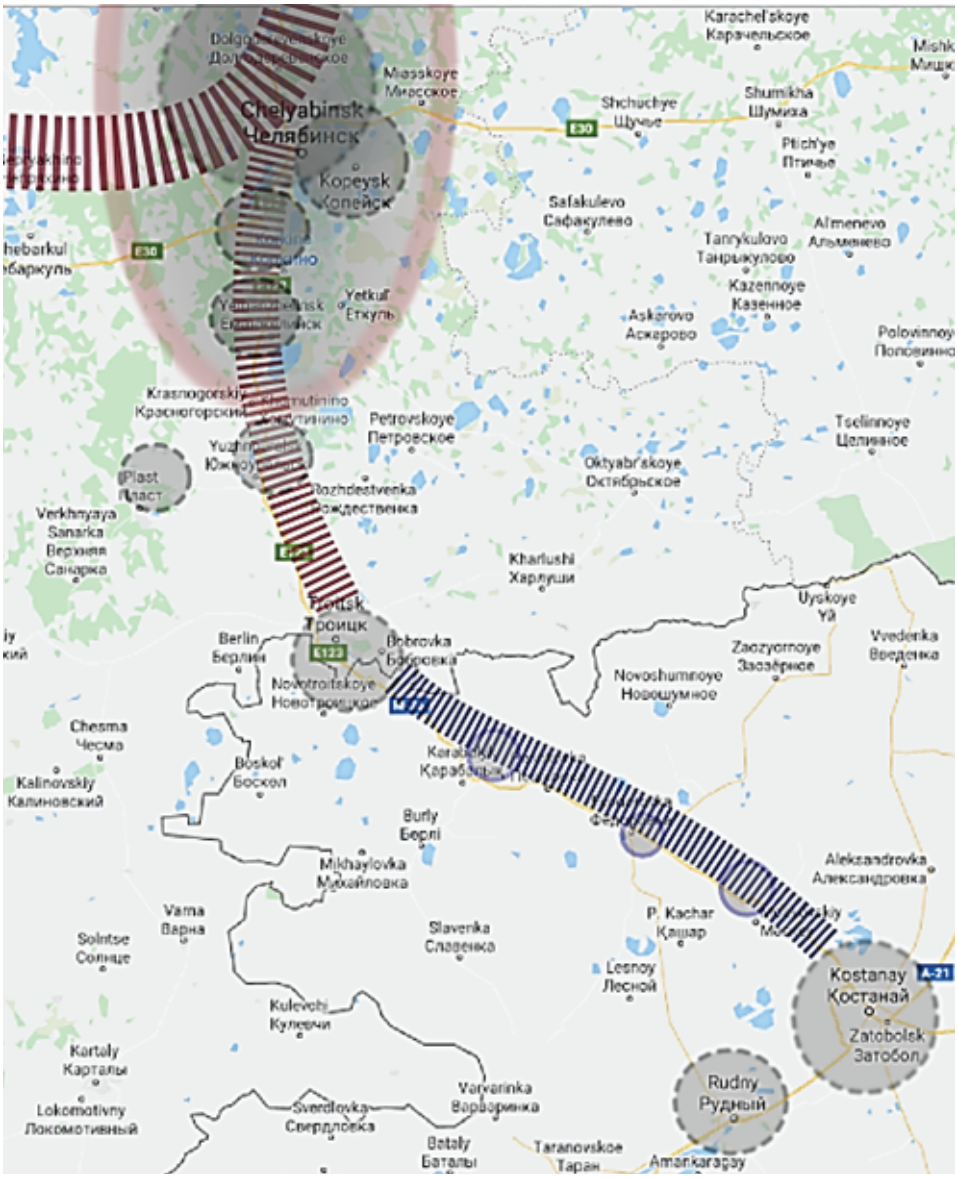


**Figure** 1: Ural — Northern Kazakhstan (Chelyabinsk agglomeration and highways) — on the cross-border section of Chelyabinsk — Troitsk — Kostanay

Further study of possible development scenarios is associated with several areas of subsequent research. Conducting an analysis with an increase in the number of details of the factors studied and considering the interests of individual social groups are among them. This implies the use of more complex information-adaptable models and the improvement of IT visualization tools, geographic information technologies.

## 4. Conclusions

The presented version of the multi-spatial methodology for the development of a complex system of heterogeneous territories involving a variety of sociological information

is open for improvement, development and adaptation for other studies. Further more detailed classification and systematization of the development factors of transport corridor zones — urban renewal centers, allows us to solve new challenges for the long-term development of both individual settlements and territories as a whole. In this case, transport corridors act as drivers of perspective spatial development. At the same time, it becomes possible to more efficiently develop economic social and cultural relationships between territories. Additional opportunities for the development of such studies are largely provided by the expansion of IT capabilities including specialized and problem-oriented, associated with spatial analysis.

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