TRANSFORMATION OF TRANSPORT ACCESSIBILITY IN UKRAINE: SPATIAL ANALYSIS

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Abstract. In the last decades the transport system of Ukraine has undergone significant changes. There are transformation spatial organization, new structural elements, concentration of traffic, increasing mobility. These processes are largely reflected at the transport accessibility, which is the main product of the transport system and determine the geographic advantages of a region, city or territory from the placement and use of transport infrastructure in their territory. Dynamics of transport accessibility on the example of changing the transport distance regional centers of Ukraine during the 1989-2010 was studied. The study used network analysis, spatial interaction models and models of transport accessibility, which are implemented using GIS.

Introduction. The transport system is an important component of the infrastructure in the economy of Ukraine, which creates and implements the conditions for the operation of production and life of the population. Level of transport services, the technical condition of transport infrastructure significantly affects the cost of freight and passenger, mobility, the accessibility of settlements and socio-economic development of the region.

Now in modern studies in geography transport to the fore qualitative aspects of the transport system are nominated, including mobility, accessibility, connectivity, transport discrimination population, behavioral geography, increasing its value in the spatial development of countries and regions (Farrington, 2007; Hall, 2010). Along with this was a change of paradigm in regional planning and transport planning - a departure from the planning the volume indicators to of socio-oriented indicators that reflect a turn digression from manufacturers of transport services to their customers (Bugromenko, 2011). However, the Ukrainian geography almost no research on the issues of transport accessibility, this indicator is only used in city planning practice. Insufficient development of this area requires a thorough study of the concept of transport accessibility, models and methods of research.

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The definition of transport accessibility. Transport accessibility is the main product of the transport system. It defines the geographic advantages of the territory (region, city) for all other territories. Indicators of accessibility measures the benefits received by people and businesses of the territory on the availability and use of transport infrastructure in the area. The important role of transport infrastructure for regional development in the simplest form is that areas with better accessibility to places of raw materials and markets, ceteris paribus, more productive and competitive and accordingly more successful than those that are remote and isolated (Linneker, 1997). Thus, the capacity and location of transport infrastructure are key elements in determining accessibility.

There are difficulties in the selection of indicators for measuring transport accessibility. Traditionally, for the determine of transportation development used area density coefficients and Engel’s, Goltz’s, Uspensky’s coefficients, later - the index of the graph theory.

We can identify three steps in the complexification of the concept (of accessibility) (Table 1). Accessibility as a topological concept: physical measurement of the properties of space or the transport system. Accessibility as a relationship between opportunities of interaction and cost, based on the gravity model of spatial interaction. Accessibility as the net utility of the transport system, based on the neo-classical theory of consumer behaviour. The topological indicators of accessibility measure the differentiation of (physical) space created by the transport system. The gravity type indicators introduce weighting of accessibility by interest attached to a specific location. The utility type indicators further develop this model of spatial interaction by integrating the friction of space into the optimisation calculation of economic agents, not as distance in itself (or connectivity), but as the (negative) utility of distance (Martínez, 2013; Miller, 1999).

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<tr>
<th>Type</th>
<th>Measurement</th>
<th>Theoretical background</th>
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<tr>
<td>Topological indicators:</td>
<td>- Distance</td>
<td>Topology of the transport network:</td>
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<td></td>
<td>- Time</td>
<td>Euclidean space</td>
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<td>- Transport cost</td>
<td>Graph Theory</td>
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<td>- Connectivity</td>
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<td>Economic indicators:</td>
<td>Spatial interaction (attraction function / impedance function) utility function (net utility: gross utility of nodes – transport cost)</td>
<td>Gravity model</td>
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<td>Neo–classical theory of consumer</td>
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Transformation processes in the transport system of Ukraine and their impact on the accessibility. Ukraine has a developed transport network (road, rail, waterways). Total transport network of Ukraine includes 21.700 km of railways, 165.800 km of roads paved, 4.800 km of oil pipelines, 39.800 km of gas pipelines,
2.200 km of river waterways with access to the Azov and Black seas. According to the Ministry of Infrastructure of Ukraine is now in the transport function 32 airports, 20 public seaports, 10 river ports, 6 railways, 97 aviation and 150 shipping companies of different ownership, over 58 thousand entities that operate market of motor transport.

In last decades, integration processes, globalization, new transportation technologies, increasing container traffic, the use of information technology to manage traffic flows led to the transformation of the territorial organization of the transport system. Improving transportation systems increase global cooperation and determine changes in the concept of "location" is the process of "compression of space" - an increase in the space-time accessibility. There are changed speed traffic volume traffic flows between countries and regions, narrowed distribution by specialization of certain types of traffic, new elements of the territorial structure (container terminals, intermodal logistics centers). In conditions of integration processes multisectoral transport system is modified into unified supply chain, actively developing intermodal combined transport, the formation of a unified market for transport services (Pashynska, 2011).

These modern processes and trends greatly influence on transport system of Ukraine. There are processes concentration of traffic flows, formed transportation corridors, multimodal transportation hubs that combine different types of transport service for large international cargo and passenger traffic. In particular, advantageous transportation and geographical position of Ukraine towards the main transit flows between Europe and Asia through Ukraine the 4 Cretan international transport corridors, corridors The Organization for Cooperation of Railways and the Baltic - Black Sea, Europe - Asia, TRACECA are transiting.

The intermodal combined transport is developing. The most active intermodal technology implemented on Ukrainian railways. Now Ukrzaliznytsya organized more than 10 container trains and combined transport trains, including "Viking", "Zubr", "Yaroslav". They are an example of the growth of transport accessibility in freight traffic. There are intermodal transportation, the rapid growth of container traffic, thereby accelerating of cargo delivery. Ukraine also is forming a network of transport and logistics centers, which also accelerates the cargo delivery. For example is the development of transport and logistics centers in the metropolitan area.

At the same time the disparities in the development of transport systems, key indicators of transport, provision of transport infrastructure increases in regional context.

**Dynamics of transport accessibility of regional centres of Ukraine during the 1989-2010.** Dynamics of transport accessibility was studied on the example of changing the transport distance of regional centers of Ukraine. In particular, it was determined by the difference in time spent on travel by rail in 1989 and 2010.
Figure 1 - The change of the transport distance of the regional centers of Ukraine

Figure 1 shows the linear anamorphosis, which shows the change of the transport distance of the regional centers of Ukraine. From the center (Kyiv) conducted direct line to the regional centers, which delayed the distance (time spent on the trip by rail) in 1989 and 2010. Analysis of changes in transport accessibility to the regional centers of Ukraine relatively Kyiv during 1989-2010 was shown that intensive loss of distances and changes in transport accessibility occurs between Kyiv and powerful economic centers - the city of Kharkiv (-11,46 minutes/year), Dnipropetrovsk (-11,56), Donetsk (-10,55), Lviv (-15,36), Zaporizhya (-9,51). This is due to the fact that between the capital and cities there are intensive economic, financial, business, information and cultural relations. However, socio-economic relations and transportation accessibility between regional centers of Ukraine is much weaker than between the capital. The exception is the Odessa - the largest Ukrainian of port city, which operates as an international transport and logistics center. Process of reducing the distance and increasing transport accessibility is "time-space compression". Thus, the greatest rate of "time-space compression" occurs between the capital and powerful economic centers of Ukraine through the introduction of high-speed means of transport (in this case, increasing the movement of rail transportation). In 2012 introduced the Intercity high-speed trains on the directions of Kyiv-Lviv, Kyiv-Kharkiv, Kyiv-Donetsk, Kyiv- Dnipropetrovsk. In addition to improving transport accessibility, speed compression space between the economic centers of Ukraine depends on their socio-economic development, including population (correlation coefficient is 0,69) and size of GRP (correlation coefficient 0,61).
Using Spatial Analyst was conducted interpolation of data on the dynamics of transport accessibility by Inverse Distance Method (Fig. 2.). The largest a temporary reduction in the distances occurs between major economic centers of Ukraine. At the same time, the accessibility between the central and peripheral regions has not changed.

**Conclusions.** In the last decades the transport system of Ukraine has undergone significant changes. There are transformation spatial organization, new structural elements, concentration of traffic, increasing mobility. These processes are largely reflected at the transport accessibility, which is the main product of the transport system and determine the geographic advantages of a region, city or territory from the placement and use of transport infrastructure in their territory. Dynamics of transport accessibility on the example of changing the transport distance regional centres of Ukraine during the 1989-2010 was studied. The intensive loss of distances and changes in transport accessibility occurs between Kyiv and powerful economic centers. At the same time, the accessibility between the central and peripheral regions has not changed.

Figure 2 – Ukraine. Dynamics of transport accessibility

**REFERENCES**

BALTIC-BLACK SEA GEOPOLITICAL REGION:
THE NATIONAL INTERESTS OF UKRAINE IN THIS SYSTEM OF REGIONAL INTERACTIONS

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Abstract. The research is dedicated to the investigation of the geopolitical region (the example of the Baltic-Black Sea geopolitical region), which is a key category for study the world geopolitical structure and place of separate country in the system of regional relations. Influence of political and geographical conditions on the appearance of specific geopolitical regions on the world political map, over the processes of their formation and operation was studied. The mechanisms of interaction between the countries in the geopolitical region were disclosed through characterization functional spaces of the system of regional interactions. Conceptual foundations of political and geographical position of Ukraine in Eurasian geopolitical axis are marked at the regional level. Mechanisms of realization of the national interests of Ukraine in regional Baltic-Black Sea space both at the bilateral level of relations with all countries in the region and collaboration within the framework of regional structures are formulated.

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