

# Regional Air Transport Systems as a Factor of Geo-Dimensional Tourism Structure: Geographic Context

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**Annotation.** The article proves increasing impact of air transport on territorial structure of tourism. Social-geographic methodology explains the essence, mechanisms of creation, structural and territorial peculiarities of regional air transport system which arises as a result of air transport-geographic process, the impact of this process on the creation of geo-dimensional tourism structure following air transport regional structures. The article analyses such forms of air transport organization as air transport hubs, macro regional, mid-regional and local centers with their functions and geographic parameters. The authors offer a pattern of geo-dimensional tourism structure with two substructures, comprising territorial components and integral territory, which can be traced at elementary, local and regional levels. As to their spatial shapes components of geo-dimensional tourism structure can have discrete, continual and network forms. The authors also introduce such a term as regional geo-tourist system and distinguish specific forms of geo-tourist structure (formed under influence of air transport systems), they are: Capital, Western, Northeast, Transdnieper, Donetsk and Crimean regional geo-tourist systems.

## 1. Introduction

Air transport in tourism is getting more and more important. Ukraine possesses a branched network of airports, airfields and runways which cooperate and interact creating regional framework of air transport system. Air transport infrastructure is an important element of the national transport system, but its regional structure has almost been ignored by researchers. Besides, it is a meaningful factor of tourism development. Air transport allows not only quickly and in a comfort way overcome space gaps between residential areas and tourist destinations but it causes development of tourist centers and zones. On the other hand, some national transport systems which do not correspond to the world standards of comfort, efficiency and safety can restrain tourism development. And here arises a necessity to formulate and prove properly hypotheses concerning social and geographic foundations to research air transport. One of the important trends is its regional optimization. This is caused by the mainly “regional character” of transportation activities (it provides regional communications and “unites” regions) and furthermore, reasonable regional transport system defines economic, social and ecological efficiency of tourism business activities.

Another aspect which needs attention is how regional air transport system influences efficiency of tourism business activities, in particular through spatial and regional mechanisms.

## 2. Materials and methods

For the latest twenty five years there have been published no monographs or integral textbooks concerning air transport infrastructure or geographic problems of transport in general. Among the published textbooks we can distinguish the textbook of K. Kotsenko (1983) as a successful attempt to theoretically generalize the problems of transport geography; the similar problems were investigated in the integral textbooks of M. Komarov (2000) and O. Topchieva (2001), where the authors demonstrate modern scientific approaches to research transport problems from the geographic point of view. The works of O. Bordun (2002), L. Cherniuk (2003) and Yu. Pashchenko (2003) started a new stage in studying common problems of transport and geography. Among remarkable works in this sphere we can also distinguish the work of I. Smirnov (2008) which concentrates on transport logistics, the work of V. Doroshenko (2010) which explains theoretical and methodological foundations of transport geography and the works of I. Kolotukha (2015-2019) which deal with transport system of big cities. At the same time geographers have left such an important sphere as air transport out of their attention – as a result, we have no scientific publications concerning geographic investigations of the national air transport.

The certain works published by the staff of the International Tourism and Country Studies department at National Aviation University have filled this gap. The researchers have concentrated on the problems of regional transport systems (I. Dudnyk), development of world air tourism (G. Balabanov, L. Tkachuk) and regional air transport systems in Ukraine (O. Borysiuk, I. Dudnyk).

Under modern conditions theoretical and applied trends in tourism development should be deeply changed, as traditionally they have concentrated on studying branch aspects of tourism, suffered from simple descriptions and haven't reached the level of proper theoretical and methodological generalizations. In any case, such researches have some scientific and educational meaning, but they do not allow solving certain specific practical problems of tourism. Overwhelming majority of researches, especially in the sphere of geography demonstrate lack of attention to prove the essence and specific features of tourism as a complicated and functionally integral social geographic system, which is various as to its internal structure.

To investigate the impact of air transport on geo-dimensional tourism structure we have mainly used such specific geographic methods as analysis of phenomena regional differentiation and zoning of manufacturing and geographic cycles, which has led to a scheme consisting of the following stages:

- Stage one – a task is to define and provide a profound research of scientific principles concerning processes and air transport regional structuring which act as a factor of geo-dimensional tourism structure;
- Stage two – a task is to analyze geo-dimensional tourism structures to discover the ones which can be efficiently impacted by air transport;
- Stage three – a task is to discover and realize the main mechanisms which coordinate the elements of both air transport and tourism systems and prove that the elements of geo-dimensional tourism structure depend on mainly air transport systems.

## 3. Results

*Stage one.* Transport system comprising different subsystems is a kind of social-geographic system. Air transport system as one of the subsystems plays an important role according to the definition of O. Borysiuk who states “that it unites ways of transportation and transport means on a definite territory and combines all kinds of transport to develop integral social-geographic system” [1]. From the point of view of social geography national air transport system is an example of such a spatial system within the country and it comprises much smaller subsystems – regional and local.

The system functions as “both air transport-geographic process”, which means that air transport provides transportation and geographic relations either directly (passengers and cargoes are transported through spaces and territories) or indirectly (air transport availability, transport provision of a region,

social geographic differentiation). Due to this process we receive essential system-building connections which provide system integrity and sustainability [2].

According to O. Borysiuk [1], the most important categories of national air transport system of Ukraine are air transport centers, their impact zones (radius of service provision) and their hierarchy with regional, mid-regional and local subsystems.

Air transport center (a nucleus of a regional system) is a settlement which provides air transportation for a much larger territory than it occupies itself. Settlements which have airports, a certain amount of population and corresponding significance can serve as such nuclei.

Radius of air service provision (impact zone of a particular air transport center) defines the area air transport center serves. The radius depends on the distance which the passenger agrees to overcome to receive such a service, and the distance should be economically and socially proved.

Hierarchy of air transport centers and corresponding air transport systems in Ukraine are formed by interconnected elements: air transport point – local center/ mid-regional center – macro regional center – air transport hub. The following definitions can help to distinguish the terms:

1<sup>st</sup> level comprises macro regional air transport systems formed by powerful multifunctional air transport hubs in the cities which are nuclei of vital activities in particular regions. Such hubs can cause formation of aerotropolises – a wide variety of various businesses concentrated on particular areas and directly connected with air transport activities (manufacturing, logistic, hospitality, trade and other businesses). A lot of such airports function as hubs, in other words, they are principal transit or transferring places (centers).

2<sup>nd</sup> level comprises mid-regional air transport systems formed on the basis of corresponding settlements which create a range of regional and local residential areas subordinate to macro regional centers.

3<sup>rd</sup> level comprises local air transport systems formed on the basis of local settlements which provide limited occasional non systematic air transport services. Such systems are usually located in small towns or settlements. They are represented by civil, military or business/private airports.

Integral regional air transport system can be regarded as one of the most complicated systems (which functions as a part of the national air transport system) and it can be defined as an interconnected and hierarchical set of airports, airfields (together with collateral businesses) and airlines within integral business territory (area, social and geographic region) [2].

*Stage two.* According to professor I. Dudnyk we should understand geo-dimensional tourism structure as territorial expansion and combination of elements which form regional structure of tourism in order to arrange, regulate and optimize the system [3]. If we analyze researches made by a lot of scientists, M. Scarpino [4] in particular, which were systemized by O. Vysochan [5], we can assert that a specific feature of geo-dimensional tourism structure from the point of view of social geographic methodology lies in gnoseological perception of tourism as a regional (geographic) system [3].

Tourism due to its variety of essences with various qualities is closely connected with a number of sciences, and geography takes a specific place among them. Firstly, we should geographically prove regional structure of resourceful and especially recreational component of tourism; secondly, we should learn regional differences and determine regional proportions of tourism development; and thirdly, we should geographically prove research models and trends on regional tourist markets [2].

According to the standardized qualifications of service sphere based on character of manufacturing and service provision and according to their regional forms we can distinguish the following *specialized regional service systems*: regional trade systems, regional consumer service systems, systems of medical care, education, recreation, finance, culture, science, management, utilities etc. Such systems comprise a range of more specified subsystems. For instance, a regional education system has specified subsystems of secondary education, vocational education, higher education etc. [6].

Such logic leads us to an obvious but rather important conclusion that any regional service system has a regional tourist subsystem as its component. This subsystem possesses some functional integrity and content difference together with specific structure and forms, which allows us to identify it as a relatively autonomous, in ontological sense, system and a specific object of study.

Applying the above theoretical inferences and approaches to systematic comprehension of tourism, which were proved in the works of the mentioned authors, we can offer the following theoretical model of geo-dimensional tourism structure as an object of social-geographic study.

- Geo-tourist structure (GTS) is regarded as a set of closely interacting various tourist businesses within integral territory.

- Comparing two terms “social-geographic system” and “geo-tourist structure”, we can notice a high level of their structural isomorphism, in other words, they are rather similar as to their structure and organization [5]. As GTS is a natural subsystem of the “social-geographic system”, so this term depicts its objective gnoseological essence in the most appropriate way.

- GTS appears and develops as a result of regional (geo-dimensional) interaction among components of tourism structure within integral territory (region). Such an interaction is based on various connections which can be presented as exchange of people, goods, energy and information among the components within integral territory. These connections usually appear and circulate at all levels of tourist process. And their integral component is transport, especially air transport. A specific feature of GTS is its connection with a particular territory, which is reflected in all aspects of its functioning and organization: procedure, time, structure, activities, etc. Connection with a particular territory as a specific feature of GTS can become obvious through the following features of tourism [3]:

- Tourist product is closely tied to the regional resources, i.e. tourist product can be created within a particular territory/area;

- Tourist activities are mainly localized and concentrated within a particular area;

- Majority of tourist activities and the ways of their consumption are determined by the region, so we can consume them only where they were created;

- Manufacturer and consumer of tourist activities are distanced from each other – and it is a consumer who “approaches tourist activity” contrary to the situation in other spheres, where the product is delivered to a consumer.

The main components of GTS are tourist-resourceful subsystem, tourist-manufacturing subsystem, tourist-infrastructural subsystem, general infrastructural subsystem and tourist managerial subsystem. These components are far from being homogenous. Hierarchy of components (equipotentiality) is explained by availability of various and numerous subsystems: tourist-resourceful subsystem in its turn comprises nature-resourceful, culture-resourceful and utility- resourceful subsystems; tourist-infrastructural subsystem comprises hotel, catering and transport subsystems; general infrastructural subsystem comprises entertainment, catering, information, transport and utility subsystems; tourist managerial subsystem comprises regional and local authorities, departments of national authorities, bodies of administrative and legal services, NGOs [3, 5].

Subsystems of lower levels should also be distinguished, at least for cognitive purposes. If we distinguish a transport subsystem in an infrastructural one, we should also pay attention to the subsystems of the third layer: motor transport, water transport, railways and air transport. So, we can regard air transport as a certain component of GTS. Regional structure of GTS has two types of structures, consisting of some components and integral, both influencing all levels from local to regional and national. As to their spatial forms components of GTS can have discrete, continual and network forms.

*Stage three.* Geo-dimensional interaction of air transport system with tourism service should be viewed within the context of social-geographic process which is clearly reflected in functioning of both systems, on the one hand, as an internal system-building factor of them, and on the other hand, as an important condition of intersystem integration.

Social-geographic system is based on territorial interaction of the society and nature which results in changes of the Earth landscape components and geo systems, together with evolution of the territorial organization in social life. If we look in more detail this process depicts how population and economy were spreading over the earth surface with all their resources, how social-geographic systems were developing changing territorial structures. Such meaningful evidences prove that the process should be investigated through deep analysis of geo-dimensional connections [1].

We can confidently assert that social-geographic process consists of the main sub-processes such as manufacture location, human settlement, relocation, regional development, differentiation, concentration, expansion, agglomeration, polarization, diversification, integration, zoning and regional division.

The essence of the mentioned above components of social and geographic process lies in interconnections. Interconnections are understood as material, energy and information exchange among geographic objects. Mainly we mean *territorial connections* when we try to *overcome the space*.

As a matter of fact, social-geographic process is investigated at least in two aspects:

- Firstly, changes of conditions (parameters, functions) of a particular object (system) in time;
- Secondly, spatial and territorial connections among the components of social-geographic system.

It is worth mentioning that the process itself and its components (sub-processes) exist due to transport availability and transportation is an essential requirement for their functioning. Transportation means relocation of people and cargoes, and in this meaning the terms social-geographic process and transportation overlap. So, we have reasons to introduce a category of transport-geographic process, as a set of actions and operations which connect the elements of social-geographic system. Only operations of geo-spatial character should be included into the process, such as transportation of cargoes and passengers transfer when different kinds of transport are used. Transport-geographic process is an inevitable part of such geographic phenomena as ***relocation, expansion, differentiation, polarization, diversification, integration***, etc. Moreover, in such processes as migration, settlement and traveling transport-geographical process is of primary importance [2].

Transport-geographic process in air transport or, in other words, air transport-geographic process which is considered as a component (sub-process) of transport-geographic process and wider as a social-geographic process, comprises a set of actions, operations and elements which provide spatial and territorial connections in air transport system in particular, in wider meaning, in social-geographic system, and finally in tourism which is its equipotential sub-system.

Transport-geographic process in tourism can be described as relocation of people among the elements of GTS connected with overcoming the space using one or several kinds of transport following a specific itinerary; so, we can distinguish air transport-geographic process (relocation of people among GTS elements by means of air transport) which demonstrates deep interaction of air transport and tourism which leads to their territorial approximation and integration. Just such process can form the basis for the appropriate GTS.

#### **4. Discussion**

Research for connected forms of geo-dimensional tourism system formed under the decisive impact of air transport systems can become the next logical step in analysis of the above mentioned theoretical concepts and inferences.

Following the context of social-geographic process and the results of previous researches [1,2] we can consider such kinds of interaction between air transport and tourism systems as the most extended: Harmonious balance – the mentioned systems change their features in the way to provide sustainable development of their components (for instance, air transport exists due to tourist flow which is a component of tourist system, simultaneously, we need air transport to provide tourist flow which is the essence of tourism), in other words, components of one system stimulate existence of components from the other system. Complementarity – as a functional interaction of components (caused by the necessity of common activities) – can be seen as diffusion (interpenetration) of the functions of regionally connected components of tourist and air transport systems to provide travel tours (for instance, cooperation of a tour agent with an airline concerning air tickets reservation or booking).

Territorial overlapping – or territorial extension of two systems is caused by similarity of their territorial framework. The results of previous researches convincingly demonstrate territorial overlapping of regional air transport system and regional tourist service system at the appropriate level

[1]. Just such interaction leads to creation of specific geo-dimensional tourist systems based on the framework of air transport systems.

Analysis of the above mentioned theoretical concepts and inferences together with the results of previous researches made by the authors will give an opportunity to offer the following model of GTS in Ukraine. Capital geo-tourist structure will comprise Kyiv, Zhytomyr, Chernigiv, Vinnytsa and Cherkassy regions. Western GTS will comprise Lviv, Ivano-Frankivsk, Transcarpathian, Chernivtsy, Ternopil, Khmelnytsk, Rivne and Volyn regions. Northeast GTS will comprise Kharkiv, Sumy and Poltava regions. Transdnieper GTS will unite Dnipropetrovsky, Zaporizhia and Kirovograd regions, Donetsk GTS will join together Donetsk and Lugansk regions, Odessa, Mukolaiv and Kherson regions will form Black Sea GTS and the Autonomous Crimea Republic will have its own Crimean GTS. All the systems have their own hubs or nuclei which can form them and regulate their activities.

### Conclusions

The offered results give an opportunity to observe an integral picture of geo-dimensional tourism development from the new point of view. Detected forms of geo-dimensional tourism development, air transport, modes of their territorial interaction and structures created as a result of such interaction offer new possibilities to expand and deepen scientific researches on the one hand and to make efficient managerial decisions concerning both a particular enterprise profitability and balanced sustainable region development on the other.

The received results provide new trends for further scientific research as well.

Firstly, we should deeply implement social-geographic paradigm into research of tourism in general and its geo-dimensional manifestations in particular. The paradigm efficiency provides the grounds to receive brand new scientific results in learning tourism on its basis. The most efficient way to describe geo-dimensional tourism system is to use classic systematic geographic methodological algorithm: prerequisites of integrity and factors of development – system structure and evidence of its components interaction – the way components function – the way the system functions on a particular territory – the way the system leads to a sustainable development – prospects for further progress and optimization.

Secondly, while preparing the staff for tourist industry, especially Masters in Tourism, we should emphasize more the general features of geo-dimensional tourism development and its regional comprehension and regional differentiation in particular.

### References

- [1] O Borysiuk and I Dudnyk 2013 Air transport system of Ukraine (regional aspect); Monograph/ edited by I Dudnyk (Kyiv: publishing house of the National Aviation University “NAU-druk”) 214 p
- [2] I Dudnyk and O Borysiuk 2012 Air transport system of Ukraine as an element of tourist infrastructure. *Geography and Tourism*. Vol 20 pp 90-97- 2
- [3] I Dudnyk 2016 System-Geographical Aspects of Tourism Research. *Scientific issue of knowledge, education, law and management*. (Fundacja “Oswiata I Nauka Bes Granic PRO FUTURO”) No13 pp 73-77 3
- [4] M Scarpino 2011 Tourism System: An Analysis of the Literature for Improved Subnational Development [Electronic resource]. Mode of access: <http://www.conferencedevelopments.com/files/Scarpino.pdf> [Google Scholar 4](#)
- [5] O Vysochan 2014 Tourism as a system. *Herald of the National university “Lviv Polytechnic”, series “Management and Entrepreneurship in Ukraine: stages of formation and problems of development”*. No 797 pp 25-38 5
- [6] A Haidkuk 2001 Aspects of creation and development of tourist system in market economy. [Electronic resource]. Mode of access: <http://ena.lp.edu.ua:8080bitstream/ntb/97106>
- [7] V Gerasymenko 2013 Development of the theory of systematic approach to tourism research. *Herald of the National Academy of Tourism* No 2(26) pp 11-15

- [8] O Liubitseva 2002 The market of Hospitality (geo-dimensional aspects) (Kyiv: Alterpress) 436 p
- [9] L Mazhar 2014 Tourism through time and space: geographer's point of view / L. Mazhar Modern problems of service and tourism. No1 pp 16-23
- [10] T Tkachenko 2009 Sustainable development of tourism: theory, methodology, business reality: monograph. 2<sup>nd</sup> edition, revised and expanded. (Kyiv: the Kyiv National University of Trade and Economics) 463 p
- [11] V Pazenok 2010 Philosophy of tourism in the framework of philosophy. *Scientific Notes of the Kyiv University of Tourism, Economics and Law. Series: philosophy*. Vol 8 pp 7-22
- [12] C Kaspar 1992 Wprowadzenie do zarządzania w turystyce (przekład M Lenart) (Warsawa-Osrodek Doskonalenia Kadr "Orbis") p 7
- [13] N Leiper 1979 The Framework of Tourism: Towards a Definition of Tourism, Tourism and the Tourist Industry. *Annals of Tourism Research*. Vol 6 No4 pp 390-407