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AN INTERNATIONAL COOPERATION-BASED APPROACH TO ASSESSING THE RECREATIONAL POTENTIAL OF THE DANUBE REGION TERRITORIES

Abstract. The article explores the possibilities of assessing the recreational potential of the Danube region territories within the framework of international cooperation. Special attention is given to the analysis of the European Union Strategy for the Danube Region (EUSDR), its effectiveness, and future implementation prospects. The research focuses on theoretical justification, economic analysis, and the development of practical proposals to enhance international cooperation among the countries of the Danube region, including EU member states and associated countries. The research work was carried out in accordance with the agreement “Danube Wetlands and flood plains Restoration through systemic, community-engaged and sustainable innovative actions” within the scope of the research and innovation program “Horizon Europe” (a grant agreement between Igor Sikorsky...
Kyiv Polytechnic Institute and the European Climate, Infrastructure and Environment Executive Agency (CINEA). The research employs a range of interdisciplinary and specific research methods, including decomposition, scientific abstraction, and generalization to refine the conceptual-categorical apparatus of recreational potential and sustainable development of territories. A comparative analysis is conducted to compare the relationship between tourist activity and the use of natural resources in different countries to identify similar and different aspects and determine their impact on the territorial recreational system. Additionally, the study utilizes the method of systems analysis. The obtained results are systematized and visualized using graphical methods. Special attention is paid to defining methodological approaches to assessing the recreational potential of the Danube basin territories. An analysis of the average spending of foreign tourists and rent for natural resources in the European Union and associated countries is provided. An assessment of the relationship between tourist activity and the use of natural resources is conducted. The research findings underscore the importance of international cooperation in recreational sector development and ensuring sustainable use of natural resources in the Danube region.

**Keywords:** recreational potential, Danube region, Danube region program, integration processes, international cooperation, logistics, national economies

**Problem statement.** The recreational potential of water basins is a crucial factor for the sustainable development of tourism and natural resource use in a regional context. Specifically, the Danube Basin is identified as one of the key water corridors of the European region, maintaining significant ecological and economic potential. The area covered by the Danube River Basin is 817,000 km², which exceeds the area of Ukraine and constitutes 8% of Europe's total territory [1; 2]. Current research directions in the socio-economic processes within the Danube Basin include increasing youth employment, improving the quality of education, optimizing logistics in line with sustainable development principles, and enhancing cooperation between universities and businesses. These measures contribute to the economic, social, and political integration of the Danube region countries, environmental protection, the well-being of national economies’ populations, and regional strengthening. However, ensuring the sustainable and efficient use of the recreational opportunities in this region requires thorough analysis and the development of appropriate methodological approaches. International cooperation is particularly important in this context, serving as a significant factor for the successful development and conservation of the Danube Basin's recreational resources. Despite its great potential, the recreational development of the Danube Basin territories faces numerous challenges, such as water pollution, biodiversity loss, management discrepancies, and insufficient infrastructure development.
Addressing these issues necessitates a comprehensive approach where international cooperation plays a key role. Through the joint efforts of the Danube region countries, effective methodological approaches for evaluating and managing the recreational potential of the Danube Basin territories need to be developed, promoting its sustainable development and conservation for future generations.

**Analysis of recent research and publications.** The socio-economic development issues of the Danube Basin territories and the implementation of the European Strategy for the Danube Region have been extensively studied and highlighted in the scientific works of researchers [1–6] and others. Scholars [7; 8] have developed theoretical and methodological foundations for managing the efficiency of recreational complexes, forming territorial recreational systems, and have investigated methodologies for assessing recreational potential, along with formulating practical recommendations for their implementation. The informational base of this study includes analytical reports from international organizations, legislative and regulatory documents, preprints, scientific publications, and information-analytical materials from conferences. This research also draws on the socio-economic directions, specific mechanisms, and methods identified in previous publications by the authors [2; 7; 9]. Despite the significant body of scientific work, it is noteworthy that these issues remain critically important in the context of contemporary uncertainty, increasing risks, and the transformation of national economies. This has determined the choice of research topic in the form of developing methodological foundations for assessing the recreational potential of water basins based on international cooperation.

**The aim of the article** is to identify opportunities and mechanisms for international cooperation to stimulate the sustainable development of the recreational potential of the Danube Basin territories, particularly involving European Union member countries and associated countries.

**Presentation of the main research material.** The Danube region is a major international watershed and ecological transport corridor in Europe, that is crucial for the economic, social, environmental, and recreational development of the countries located along its course. The Danube Basin exhibits significant heterogeneity in the levels of economic development among different regions of the European Union and associated countries. It is noted that the wealthiest and poorest regions are in close spatial proximity. For instance, in 2015, the per capita income of the richest region was approximately six times higher than that of the poorest region [10]. This development gap widens when considering non-EU countries. One of the development vectors of the Danube is to balance the socio-economic disparity among countries and achieve an optimal ratio between their resource availability and resource efficiency.

The countries in the Danube region include nine EU member states: Austria, Bulgaria, Germany (states of Baden-Württemberg and Bavaria), Romania, Slovakia,
Slovenia, Hungary, Croatia, and the Czech Republic, as well as five non-EU countries (associated countries): Bosnia and Herzegovina, Moldova, Serbia, Ukraine (four regions: Zakarpattia, Ivano-Frankivsk, Odesa, Chernivtsi), and Montenegro. According to the European Union Strategy for the Danube Region (EUSDR) [10], the key tasks of the community are to strengthen international ties between the Danube region countries, emphasize the need to develop the Danube as a region with significant recreational potential, and overcome economic and social inequality in the region. The EUSDR is based on the principles of responsible use of natural resources for sustainable development. As noted in the report, the task of the EUSDR will be to support the aspirations of Ukraine and Moldova for EU membership [11].

International cooperation among the Danube Basin countries involves implementing a set of measures that include the following [10]: increasing employment levels (especially among youth and graduates of higher education institutions); improving the quality of education and its adaptation to labor market needs; ensuring inclusive education, vocational training, and equal opportunities; and expanding cooperation between universities and businesses to enhance mobility between sectors.

Overall, the mentioned strategy combines the following fundamental components.

1) Economic, social, and political integration of Danube region countries. This component includes the development of transport infrastructure, promoting the use of renewable energy sources, and enhancing the culture and tourism sectors.

2) Environmental protection. This component involves restoring and maintaining the quality of the Danube's water resources, preserving biodiversity, landscapes, air, and soil quality, and managing environmental risks.

3) Enhancing population welfare. This one focuses on developing a knowledge-based society, ensuring enterprise competitiveness, and investing in human skills, knowledge, abilities, and competencies.

4) Strengthening the region. This component includes expanding the capacity of organizations, institutions, and enterprises, improving cooperation, and jointly ensuring security and combating organized crime and serious offenses.

To implement the strategy, the Danube Transnational Programme (DTP) [12] was developed, promoting the economic, social, and territorial cohesion of the Basin countries. The program defines four main priorities, divided into ten specific objectives, aimed at supporting, among other things, the EUSDR program, focusing on areas where transnational cooperation offers the best opportunities for stimulating positive changes in the Danube region.

The program includes four priorities, which are divided into ten specific objectives:

1. Smart priority (a more competitive and smarter Danube region) is concentrated on two specific objectives: 1.1 – enhancing innovation and technology
transfer; 1.2 – developing smart specialization skills, industrial transition, and entrepreneurship.

2. Green priority (a greener Danube region with low carbon content) is concentrated on four specific objectives: 2.1 – greening the energy and transport sectors in the Danube region by integrating renewable energy sources; 2.2 – promoting adaptation to climate change and combating natural disasters at a transnational level; 2.3 – sustainable, integrated, transnational water resource management in the Danube river basin; 2.4 – protecting and preserving biodiversity in ecological corridors and eco-regions of transnational significance.

3. Social priority (focused on the social aspects of the Danube region) is concentrated on three specific objectives: 3.1 – accessible, inclusive, and efficient labor markets; 3.2 – accessible and inclusive quality services in education, vocational training, and lifelong learning; 3.3 – socio-economic development through heritage, culture, and tourism.

4. Cooperation priority (better cooperation management in the Danube region) is specified in two objectives: 4.1 – supporting the coordinators of the EUSDR priority areas (PAC EUSDR) and the Danube Strategy Point (DSP); 4.2 – supporting EUSDR governance [13].

Researchers are increasingly focusing on the Danube region's potential to take a leading position in trade and entrepreneurship within the EU through the creation of research and innovation opportunities [3]. Specifically, they are analyzing ways to bridge the education and employment gap between countries, as well as mechanisms to ensure safety and security in the region, with an emphasis on addressing conflicts, marginalization, and crime. The development strategy involves a comprehensive approach to the region's socio-economic and environmental enhancement, including integrated multi-system transport routes that do not harm the environment, improving the efficiency of energy resource use, and strengthening alternative energy sources [4]. Many regional issues, such as floods, transport, energy connectivity, and environmental protection, transcend borders and require a unified approach to their resolution [5]. The report indicates that the EUSDR has played a significant role in reducing bureaucratic procedures for the shipping industry by introducing harmonized and digitized control documents and has promoted transnational cooperation between schools to strengthen teachers' digital skills in the Danube region [11]. Furthermore, [6] notes that the EUSDR should include developing a Danube brand for the region, ensuring the sustainable preservation of cultural heritage and natural values.

Additionally, significant attention is being paid to harmonizing with EU environmental standards and implementing the concept of sustainable development. In this context, researching the recreational potential based on international cooperation is crucial. The region’s recreational potential, which includes natural,
cultural, and historical resources, is significant but often underutilized. Integrating efforts from various countries will optimize the use of these resources, promote sustainable tourism development, and enhance the region’s attractiveness to investors and tourists. International cooperation in this area will facilitate knowledge exchange and best practices, helping to improve service standards, preserve natural and cultural wealth, and ensure long-term socio-economic development of the region.

The need to study the efficiency of recreational complex enterprises arises due to the growing impact of recreation and tourism on the development of other sectors of the national economy and the formation of a positive image of countries in the global tourism market. Managing efficiency allows to analyze the current state and forecast the development of enterprises not only in the recreational complex but also in related industries. In this context, the development of a territorial recreational system [7; 8] is a key task, as it integrates various interdependent components of recreational potential and ensures their coordinated interaction within the geosystem to meet the needs of anthropogenic subjects. Thus, developing recreational potential through international cooperation is an important element of the overall development strategy for the countries of the Danube region, contributing to strengthening its economic and social foundations.

The implementation of the EUSDR in the recreational complex segment is carried out in the context of climate change, particularly through the SEERISK project [14], which enabled risk management to mitigate flood damage. Indirectly, the recreational complex is influenced by navigation safety, which has improved due to the implementation of the results of the FAIRway Danube and DARIF (Danube River Forum) projects [15].

To assess the recreational potential of the territorial recreational system of the Danube region, it is essential to identify the sites that are of greatest interest to recreationists, focus on promising types of tourism, and develop corresponding tourist products using statistical observation and scaling methods with nominal and relative scales. Evaluating the recreational potential of an area involves applying the principle of comprehensive resource assessment: identifying recreational sites through a comparative analysis of visits and prioritizing types of tourism, assessing the threshold values of recreational resources, establishing usage limits for certain types of resources, and analyzing the impact of seasonality.

An important indicator is the rent on natural resources, which acts as a fiscal tool that encourages users to minimize the loss of natural raw materials while utilizing recreational areas.

For an in-depth investigation of the causal relationship between tourism activity ($I_{TAEn}$) and the use of natural resources by countries, let's consider the following indicators:

- $I_{ITE}$ – International tourism, expenditures (current US$);
- $I_{ITN}$ – International tourism, number of arrivals;
The international tourism expenditure per visit $I_{\text{TAEN}} = \left( \frac{I_{\text{ITE}}}{I_{\text{ITN}}} \right)$ varies depending on the rent of natural resources.

Figure 1 provides a visualization of the relationship between the expenditures of one foreign tourist relative to the rent of natural resources. The area of the circle provides a reference to GDP per capita. All data are for 2019, as all necessary data are available for this year, and it is the last year before quarantine restrictions. In the following years, there were significant limitations on tourist trips, particularly international ones.

![Figure 1](image-url)

**Fig.1. Relationship between the average expenditure of one foreign tourist and rent for natural resources for countries in the Danube region (with GDP per capita shown for reference by the area of the circle).**

Analysis of pairs of values for the year 2019 allows us to assert the following:

1. Expenditure per one foreign tourist in the European Union amounted to $387.
2. The maximum expenditure per one foreign tourist is characteristic of Moldova ($2752.87), which requires further investigation.
3. Germany ranks second ($2558.73), noting that the country has the highest GDP among the countries in the region.
4. The vast majority of countries fall within the range up to $500 (10 out of 14) expenditure per one foreign tourist.

5. Ukraine has a slightly lower value ($650) compared to the average for the 14 countries ($700).

Fig. 2. Dynamics of average expenses of one foreign tourist and rent for natural resources for the countries of the Danube region.

Comparing the indicators of average expenditure per foreign tourist and natural resource rent for European Union countries and the global average, we note the following: both indicators for the EU are lower than the global average. Therefore, it is extremely important to focus efforts on developing the recreational potential of the water basins in the Danube region, creating a comprehensive territorial recreational system. Such an approach will contribute to increasing economic efficiency and competitiveness of the regions, allowing not only to increase tourism revenue but also to ensure sustainable use of natural resources, preserving them for future generations. The development of recreational potential will also improve the quality of life for local populations and strengthen socio-economic stability in the regions.

Conclusions. The analysis conducted has shown the presence of a significant number of international initiatives aimed at the development of the Danube region. However, unresolved problems remain, caused by various factors, including those beyond the scope of targeted programs or partially addressable with specific tools. In summary, it is worth highlighting the reserves for improving regulatory and
economic support for the Danube Basin, taking into account current issues. Considering the existing challenges and steps already taken towards the recovery and socio-economic development of the basin, these reserves include:

- development of regulatory mechanisms to balance economic development and the standard of living in the region's countries;
- intensification of international partnerships involving countries facing significant environmental resource use problems, based on innovative technological solutions for water purification;
- development of interdisciplinary research in biodiversity conservation involving universities and other academic organizations;
- implementation of EU educational initiatives for businesses in Ukraine to motivate Ukrainian companies to resume innovative activities in conditions of prolonged conflict;
- further development of strategies for the Danube region’s development, including short-term projects to address environmental disasters resulting from military aggression;
- ensuring proper working conditions in the transportation sector to renew and develop human resources, including youth engagement.

The transition of Danube region territories to the path of sustainable development means a balanced solution to socio-economic development tasks, preserving favorable environmental conditions, and natural resource potential to meet the needs of present and future generations. In the context of strengthening integration processes and international cooperation, the formation of a territorial recreational system aimed at optimal use of existing resources, rational logistics, balanced anthropogenic load on the geosystem, and promoting green transition will be effective. A further direction for the authors' scientific research will be the further development of integration strategies for international cooperation in the socio-economic development of the Danube Basin territories.

References:


