

The level of citizen participation in community governance plays a significant role in the assessment process. Implementing tools such as participatory budgeting, public consultations, and online platforms for regional monitoring helps improve governance transparency and engage citizens in decision-making.

The assessment of a community's environmental potential is an essential component of comprehensive development analysis. The key indicators of environmental conditions include water and air quality, pollution levels, and the presence of protected natural areas. The use of environmental indices, carbon footprint calculations, and energy efficiency analysis helps develop sustainable development strategies.

Developing integrated indices enables a comprehensive assessment of community development based on multidimensional data. The use of multifactor analysis, factor models, and index-based approaches facilitates obtaining generalized assessments that can be used for strategic decision-making.

Thus, the assessment of the development potential of territorial communities is a multifaceted process that requires the use of both quantitative and qualitative analysis methods. The application of modern information technologies, the involvement of expert communities, and the enhancement of citizen participation in community governance will contribute to the development of effective strategies and ensure the sustainable growth of regions.

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TRENDS IN THE DEVELOPMENT OF THE ROLE OF GEOINFORMATION TECHNOLOGIES IN SPATIAL PLANNING

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Geographic information technologies (GIS) have confidently taken their place in modern spatial planning. They provide efficient collection, analysis and visualisation of geospatial data. The year 2025 will continue the general trends in GIS development that have been laid down before, and this will have a significant impact on approaches to planning and management of territories.

One of the key aspects is the integration of GIS with Building Information Modelling (BIM) technologies. This combination allows to create

multidimensional models that provide a detailed analysis of objects and their interaction with the environment. Such models help to forecast the development of territories more accurately and optimise resources [1].

Another important recent trend is the use of open data and cloud services. Expanding access to such resources helps to increase transparency, public accessibility and efficiency of planning processes. It enables collaboration on projects, reduces infrastructure costs and simplifies access to up-to-date information.

Particular attention should be paid to machine learning and the use of artificial intelligence in this area. Modern GIS actively uses artificial intelligence and machine learning algorithms to automate the processing of large amounts of data. This allows to improve the accuracy of forecasts, identify hidden patterns and make informed decisions in spatial planning [2].

Spatial planning is a complex process that requires analysing a large amount of data to make informed decisions about the development of territories. With the emergence and development of AI and ML technologies, new opportunities have emerged to improve the efficiency and accuracy of this process.

First of all, optimisation of geospatial data analysis. This has become possible because ML algorithms are able to process large amounts of geospatial data, identify patterns and trends, which, in turn, contributes to more accurate forecasting of territories development.

One of the traditional tasks in territory planning is to optimise transport systems. In this situation, machine learning helps to analyse traffic flows, predict congestion, and optimise routes, which improves mobility in cities.

Artificial intelligence is also used to monitor and manage natural resources, ensuring their rational use and conservation.

Considering the specifics of machine learning algorithms and the use of artificial intelligence, the following advantages of using these tools should be noted:

- Increased efficiency – automation of data analysis and decision-making processes reduces time and resources.
- Accuracy of forecasts – ML algorithms are able to detect complex relationships, which increases forecasting accuracy.
- Adaptability – AI-powered systems can adapt to changing conditions and update their models to reflect new data.

However, it is equally important not to neglect the limitations of ML and AI and the challenges they pose:

- Data quality – AI requires large volumes of high-quality data to work effectively; inaccurate or incomplete data can lead to erroneous conclusions.
- Infrastructure requirements – AI implementation requires appropriate technical infrastructure and skilled personnel.

The wider use of artificial intelligence and machine learning in spatial planning is a promising area that can increase the efficiency of territory management, ensure sustainable development and improve the quality of life of

citizens. However, in order to maximise the benefits, it is necessary to work on the shortcomings and limitations associated with the use of these technologies.

In general, GIS plays an important role in achieving sustainable development goals and implementing the concept of smart cities. They provide tools for monitoring environmental indicators, optimising traffic flows, managing energy consumption and improving the quality of life of residents.

Trends in the development of geoinformation technologies in spatial planning for 2025 demonstrate a continued gradual increase in their integration with other digital technologies, the introduction of artificial intelligence, the use of open data and cloud services. These changes contribute to more efficient and sustainable development of territories, improving the quality of decision-making and optimising of management processes.

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DEVELOPMENT OF A THEORETICAL MODEL FOR PLANNING INTERMODAL FREIGHT TRANSPORTATION USING THE DIFFERENTIAL EVOLUTION ALGORITHM

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The differential evolution (DE) [1] method is an effective tool for optimizing processes in transport logistics, particularly in solving problems related to route and schedule optimization. Applying DE to intermodal transportation significantly enhances efficiency and reduces costs, which is crucial for the development of modern transportation systems. Our research in this area [2] focuses on adapting the proposed model to the specific conditions and requirements of transport logistics, particularly in the intermodal transport branch of "Lisky," as well as evaluating the effectiveness of the proposed model.

In this thesis, we have implemented our approach in the form of a flow chart diagram in the Replit environment [3], which outlines the key steps involved in the optimization process. This visual representation provides a clear overview of the methodology, from data collection and optimization to model testing and evaluation. By following this approach, we aim to achieve optimal solutions for