Abstract

THE METHODOLOGY FOR IDENTIFYING
HOMOGENEOUS FUNCTIONAL AND SPATIAL ZONES IN THE CITY
USING GIS AND NUMERICAL TAXONOMY

The world is urbanizing at an increasing pace. Although cities occupy only a small part of the Earth's surface, they are inhabited by more than half of the world's population. The rapid and unplanned development of urban areas poses a threat to the sustainable development and quality of life of their residents. Therefore, society faces a considerable challenge regarding the proper management of urban space.

The functional and spatial structure of the city is the outcome of the interaction of the social, morphological, functional, spatial, and many other layers. It constitutes a complex system that calls for a multidisciplinary approach to city management. The dissertation proposes an original methodology for identifying homogeneous functional and spatial zones in the city. The proposed methodology can be a tool to improve the process of local spatial planning.

The research area that served as the case study of the application of the proposed methodology was the city of Kraków. The changes that took place in the city, both in the historical and contemporary context, have caused considerable diversification of its functional and spatial structure. Like many other cities, Kraków is struggling with numerous problems, including those related to spatial development and planning.

The dissertation proposes a series of indicators characterising the functional and spatial structure of the city. The values of these indicators for the selected research area were determined using GIS analyses. They served as input data for numerical taxonomy methods. The taxonomic methods were employed to organize and classify the data and to identify clusters of similar objects. These clusters constituted the basis for the delimitation of homogeneous functional and spatial zones in Kraków. The proposed methodology is universal and can be applied to any urban area.

Keywords: functional and spatial structure, geographic information systems, numerical taxonomy, urbanization