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Title: **Multiple-criteria decision-making support model for transport infrastructure planning with consideration of land use**

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Current deliberations on transport infrastructure development emphasize the planning process as its most crucial element. Infrastructure planning involves defining the framework for actions oriented on achieving specific developmental goals. Such important role of planning, as well as its complexity, imply the increasing need for solutions in decision-making support. Since sustainability and life quality improvement are currently considered as major goals of modern land use development, negative consequences of incorrect decisions in transport infrastructure planning could implicate a wide array of impacts on the society and environment.

In the area of transport infrastructure development, plans are employed through preparation and implementation of infrastructure projects, i.e. construction, expansion and modernization of the infrastructure. Therefore, the process of planning should be oriented on selecting solutions leading to the accomplishment of aforementioned land use development goals. In Poland, there is a very little use of methods evaluating the compatibility of infrastructure projects with these goals, as indicated by the literature and author's own professional experience.

Aiming to address these gaps, the thesis begins with an outline of the research area, including a review of literature and normative acts, which combined with the author's experience in infrastructure planning, serve as the basis for defining the research problem, and for stating the thesis' major objective and specific goals in the terms of multiple-criteria decision-making support model, based on fuzzy logic. Next, the model is executed within the MATLAB environment and adapted for practical implementation in transport infrastructure development with consideration of land use aspects. Multiple-criteria methods were described in detail, indicating fuzzy logic as a useful tool for evaluating transport infrastructure development projects. Next, decision-making criteria, applied in the model as linguistic variables, were specified.

The second part of the thesis presents the developed decision-making support model based on fuzzy logic, explains the methods used by the model for infrastructure planning, and discusses computer implementation of the model and its validation based on real-life data. The developed model contains a structure along with defined linguistic variables reflecting the decision-making criteria; also, it includes membership functions, application rules as well as solution quality indicators. This section also defines the methodological procedure, including specific algorithms. The discussion also includes a comprehensive description of the model implementation in MATLAB environment.

For verification purposes, the decision support model was applied in several real-life project evaluation cases, including a variety of projects in construction, development, and renovation of rail and road infrastructure. The thesis is concluded with implications indicating the accomplishment of its stated research goals. Directions for further research are also outlined.

PRZEWODNICZĄCY
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