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ABSTRACT OF THE DISSERTATION

„A Method for Assessing Public Transport Exclusion
for Sustainable Mobility Planning”

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Public transport exclusion has been the subject of public debate in Poland for more than 10 years, following a period of significant decline in rural public transport. Currently, it is difficult to clearly identify areas where this phenomenon occurs, and the methods developed so far rely on strictly defined criteria. These criteria are controversial, among other reasons, because they use different threshold values for rural and urban areas.

This work proposes an approach to assessing transport exclusion without assuming specific thresholds for its occurrence. Instead, it designates areas to which transport exclusion values in the range $\langle 0.00; 1.00 \rangle$ are assigned, based on a collected set of input data. A multi-criteria assessment method was used, in which the distance of the analysed variant from the ideal and anti-ideal solutions is calculated based on the values of the adopted criteria.

Chapter one presents the current state of knowledge on transport exclusion, beginning with a derivation of concepts in Polish and English literature. It also presents provisions in normative acts, factors influencing exclusion, barriers to public transport, and best practices in preventing transport exclusion.

The second chapter discusses the links between sustainable mobility planning and transport exclusion. It was determined that the assessment of transport exclusion should be part of Phases 1 and 4 of the SUMP cycle, while the countermeasure strategy should be prepared in Phase 2, and preventive actions in Phase 3.

The third chapter summarises methods and tools for assessing public transport exclusion. Methods for collecting both quantitative and qualitative data are presented. Two most

developed methods for assessing transport exclusion in Poland, based on the Gospostrateg project and developed by Professor Rosik's team, are also described and critically assessed.

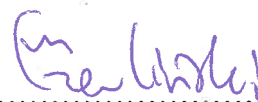
The fourth chapter defines the work's purpose, main thesis, and sub-objectives.

The fifth chapter proposes the Integrated Multi-Criteria Assessment Method for Public Transport Exclusion (ZMOW WK), which is divided into three modules: input data, processing algorithm (based on the trip search algorithm and the TOPSIS method), and interpretation of the output data – the transport exclusion indicator.

The sixth chapter describes the computer implementation of the ZMOW WK method, whose key elements include statistical databases (from the Central Statistical Office, the transport organizer, and spatial data), geospatial analysis tools (QGIS), an Excel spreadsheet, and the OTP trip search algorithm implemented in Docker and PowerShell, which was also multiplied in queries by a program written in Python.

The seventh chapter provides an example of the method's practical application in Grodzisk County. The WK index was determined for each of the 33,746 residential buildings in the county, yielding an average index value of 0.42 for the entire county, a minimum of 0.32 for the Milanówek and Grodzisk Mazowiecki municipalities, and a maximum of 0.69 for the Baranów municipality. The results are also visualised in heat maps.

The eighth chapter summarises the entire work in relation to the study's aim, thesis, and specific sub-objectives. The most important achievement of this work is the development of a method for assessing public transport exclusion that does not assume predetermined boundary parameters. This method allows for the assessment of a specific area and the identification of sub-areas potentially most vulnerable to transport exclusion.



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