

## Description for the general public

**The main objective** of the MA-trix project is of a **cognitive nature** and involves a theoretical analysis of the relationships between accessibility and the mobility of people and an empirical verification of this phenomenon in 21<sup>st</sup> century Poland. The cognitive aspect will come from superimposing, in a systemic conceptual framework, complex methodological considerations (methods of investigating accessibility, attributes of accessibility, components and dimensions of accessibility) and the structure of mobility in the form of a multi-criterion classification system of motivations for travel, onto empirical data at the gmina level (destinations) and the network level in Poland in 2015. This dependency will be identified using the author's own NeST-box model using: 1. a network approach; 2. a spatial approach; 3. a context of the travel situation; and 4. a reference to the conditions of an individual traveller (household). As a result the project envisages a multi-criteria analysis of feedback loops between accessibility and mobility in Poland. The **methodological objective** will be to derive a methodology for investigating feedback loops between accessibility and mobility using the author's own NeST-box model of accessibility conditions and a matrix framework (MA-trix). The systemic approach proposed here will allow a simultaneous analysis of research methods, attributes, components, dimensions and conditions of accessibility with reference to the feedback loops between mobility and accessibility produced in relation to such aspects as the vulnerability of the transport system, infrastructure access, suburbanisation processes, induced traffic and the ratio of production potential to the attraction of labour traffic. **The methodological and applied objective** will be to prepare various options of how to present the feedback loops between accessibility and mobility in Poland both on a map and using text with graphs.

There are two main reasons why the MA-trix research project is worth pursuing. First and foremost is the **scientific reason**. It offers the opportunity to fill a gap in Polish research, which does not offer a comprehensive analysis of the dependency between accessibility and mobility. Indeed, the project proposes to combine the theoretical side of the analysis of accessibility and mobility (including the author's NeST box model and the MA-trix mobility-accessibility matrix) with its empirical verification in 21<sup>st</sup> century Poland. The application of a model of potential, here achieved with the author's OGAM application and the VISUM package, is the only possible solution to the scientific problem when a municipality-level resolution is to be achieved. This is because the investigation of accessibility (potential model) and mobility (gravity model) across thousands of traffic areas, with trips possible between each pair of these areas, is carried out using matrices and each one of them contains thousands of columns and rows. Therefore, the aspect of the project associated with the empirical verification of the feedback loops between accessibility and mobility in Poland is of a pioneering and innovative nature at every step of the procedure and has no precedent in Poland. Its outcomes would primarily be useful to theorists and practitioners of the geography of transport. However, as the project is interdisciplinary in nature and partly digital, it is expected that it will influence several various disciplines, including geography, economy, sociology, traffic engineering, and even defence, through the proposed book and papers (especially including those published in journals on the ISI Master Journal List). The results are to be disseminated not just in Poland, but also through publications (the project manager has experience in publishing with the most established journals covering the geography of transport, including Transport Policy, Journal of Transport Geography or Journal of Transport and Land Use).

A further reason that this project should receive support to enable it to proceed is its **applied aspect**. The results of the MA-trix project will allow an analysis to be made of the feedback loops between accessibility and mobility in Poland at a high level of spatial disaggregation (municipality) and using the latest spatial and network data (2015). It is expected that over the coming decades, and especially by the end of the current EU budgetary cycle 2014-2021, Polish road and railway networks will expand considerably thus boosting the speed of travel and, consequently, the accessibility of many regions. From the spatial planning and policy-making point of view, it is important that such accessibility improvements do not lead to an excessive generation of induced private car traffic combined with a modal shift. The MA-trix project is focusing on presenting specific cases of feedback loops between accessibility and mobility. The results of the potential and gravity (hypothetical traffic distribution) models will be shown on maps for each motivation for travel and for the potential quotient of the labour market at the municipality level. Theorists (including geographers and economists) and practitioners (entrepreneurs, planners, policy-makers and local authorities) will be able to use them to compare the effects of capital projects, disasters, and terrorist attacks, as well as of suburbanisation processes, on accessibility and mobility. The project stands to make a particular contribution to the efforts of planners and decision-makers as the methods developed will help them understand changes in accessibility and mobility resulting from infrastructure projects.