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Geo-Spatial Analysis of Population Density and Annual Income to Identify Large-Scale Socio-Demographic Disparities

Abstract

The study describes a methodological approach that analyses socio-demographic and -economic data in large-scale spatial detail. The aim is to gain a deeper insight into spatial components of socio-economic nexuses.

The developed methodology was tested in a national case study in Germany but is easily transferable to other countries with comparable data sets. The analysis was carried out utilizing data about population density and average annual income linked to spatially referenced polygons of postal codes. These were disaggregated initially via a readapted three-class dasymetric mapping approach and allocated to large-scale city block polygons. Univariate and bivariate choropleth maps generated from the resulting data sets were then used to identify and compare spatial economic disparities for a study area in North Rhine-Westphalia (NRW), Germany. Subsequently, based on these variables a multivariate clustering approach was conducted for a demonstration area in Dortmund.

In the result, it was obvious that the spatially disaggregated data allow more detailed insight into spatial patterns of socio-economic attributes than the coarser data related to postal code polygons. This could be advantageous for political decision-making, target group advertising in the field of geo marketing and for the site searches of new shop locations as well as for further socio-economic research and urban planning.