

**GPS-based measurement of geographic *spillovers* in tourism\***

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**Abstract**

The goal of the paper is to identify and measure the geographic *spillovers* in tourism with the use of geostatistical information (GPS coordinates) – on the example of Polish districts. It is a part of a broader project concerning “inter-regional” agglomeration in tourism in Poland.

The basic premise of the spatial proximity and concentration of economic activity is that it can be beneficial due to agglomeration externalities to the overall economy as well as to sectors and firms clustered in a particular location (Krugman, 1991). In tourism which is very susceptible to concentration, since the localisation of tourism enterprises in relation to tourist attractions is of great importance, the agglomeration phenomenon spreads beyond the borders of the territorial units. This is referred to as a geographic *spillover* effect – an unintentional spatial interaction that a region’s tourism industries exert on tourist flows to other nearby regions (Yang, and Wong, 2012, Yang, and Fik, 2014).

The interdependent neighbouring regions can profit from agglomeration economies forming „inter-regional” clusters in tourism that are usually identified on the basis of statistics within regional administrative boundaries – which is insufficient due to omission of spatial dependency in neighbouring regions. Thus, in order to consider *spillover* effects we previously proposed to use the spatial statistics of autocorrelation (LISA) within the modified cluster-mapping procedure (Majewska 2015). The previous study has opened the challenge to determine neighbourhood in spatial agglomeration analysis more precisely as the statistical data, collected for territorial units (eg. districts), produce biased results (due to different size or shape of the administrative units affecting spatial statistics of autocorrelation).

In this research we test the usefulness of geostatistical information (GPS coordinates) calculating a neighbourhood matrix used in local Moran’s I statistics. We used the data collected by Polish Central Statistical Office at NUTS-4 level (tourists staying overnight in 379 districts) and by Polish Tourist Organization in Poland’s Official Travel Website database (14 390 GPS coordinates of individual entities: tourism firms and attractions).

The proposed identification of geographic *spillovers* in tourism based on GPS coordinates allowed to increase the accuracy of the results. The neighbourhood matrix constructed with the use of GPS coordinates to measure the distance between centres of tourism agglomerations eliminates (to some degree) the dependence of the results on the administrative division of a country, however there are still limitations.

**Keywords:** GPS coordinates, tourism agglomeration, geographic *spillovers*, Polish districts

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