Spatial accessibility of the public libraries - an example from Krakow, Poland

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Abstract

Spatial accessibility is one of the crucial factor of the attractiveness of the library. Usually the locations of libraries have long history and are integral part of the neighbourhood. In the city of Krakow there is 57 public libraries. Visual analysis shows that most of them are concentrated in the city center and very few serves new neighbourhoods. There is a good practice in locating libraries – the bigger share of citizens have less than 15 minute walking distance to the closest library the better.

The analysis we conducted in the research was aimed to compare real (defined as hot spots) and theoretical service areas of every single library in Krakow and in near future to find optimized locations for proposed libraries. As a service area we understand statistically important concentration of the users in particular gird cell. In order to preform it we have obtained census database for every address point in the city. We have also received addresses of the users of every library. To define theoretical service areas we have conducted network analysis using Open Street Map data.

First step was to define theoretical service area for every library. Having network dataset ready we have defined 5-10-15 walking time service areas using two methods: for each library separately and merged for all libraries. First type showed areas where service areas overlap – potentially some of them are redundant. The second one showed which parts of the city are missing facilities and need urgent investments. For every service area we have obtained age structure of the population.

Second step was about to find real service areas. After unification of the data from different databases we have assigned each record from the database with the official address point. In order to count users we have divided the city into 150m hexagons and counted. Using Getis-Ord Gi* hot spot analysis we have found the most important concentration areas. Taking into consideration differences in users number of each library and in population density, hot spots were calculated for each library separately. For every real service zone we have described potential users as walking distance, time to the library and age structure of the population.

Third step was to compare real service areas with the theoretical ones. Analysis showed, that spatial accessibility not always is the crucial factor for the users. Most hot-spots confirmed the theory of 15-minute walking distance. Some hot spots showed-up in very remote parts of the city. The most extreme case was the 15-minut walking zone with no single user of the library not mentioning a hot spot, and the neighborhood is served by another, definitely more remote library.

In the near future the project‘s purpose will be to find also other factors that can explain the differences in locations of new/relocated libraries and to find optimal conditions for it in order to serve as much potential users as possible.

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