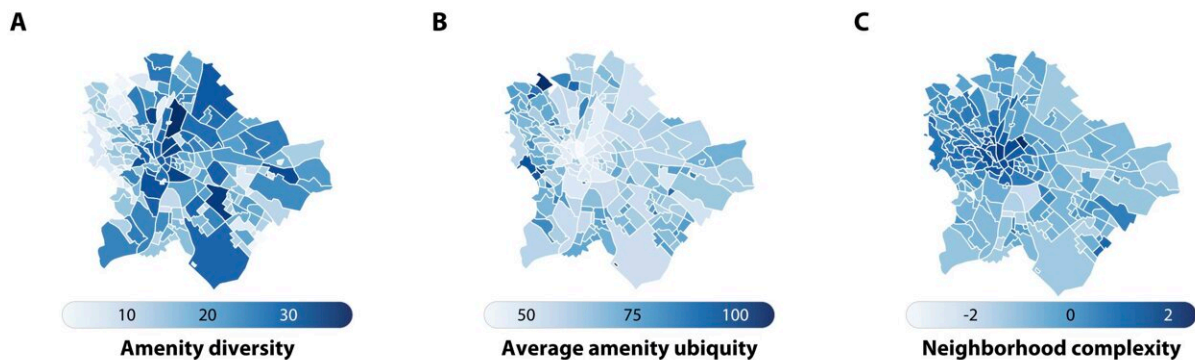


Unlocking urban diversity: The magnetism of complex amenities

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Map of Budapest colored by (A) the amenity diversity (B) the average amenity ubiquity (C) the amenity complexity of neighborhoods. Credit: Complexity Science Hub

Diversity fuels prosperity in cities, but where do people from diverse backgrounds meet? A study from the Complexity Science Hub now indicates that locations offering a range of rare shops and services may hold the key.

Extensive research consistently underscores a common factor in successful cities: diversity. Encouraging interactions between individuals of different backgrounds fosters the exchange of ideas, leading to innovation and economic success. "However, segregation persists in [urban areas](#), not solely based on residence but also on the places people

frequent," CSH researcher Sándor Juhász explains.

Where do diverse people meet?

Given this premise, it would be advantageous for cities to proactively establish spaces where individuals from varying socio-economic backgrounds can come together.

Juhász says, "To achieve this, we must comprehend the characteristics of urban locations that attract people from diverse strata and understand why these locations possess such an appeal."

Diverse but not ubiquitous

This new study contributes a piece here. Working alongside colleagues from ANET Lab Budapest, Juhász demonstrates that locations in Budapest offering diverse but not widely available amenities effectively attract people with different socio-economic backgrounds.

These "complex" locations provide a range of shops and services, such as cinemas, zoos, and [coffee shops](#), which are not universally accessible, like a zoo, for instance. Juhász explains, "We draw inspiration from the economic complexity framework, which posits that economies with a diversified product portfolio, featuring numerous non-ubiquitous outputs, tend to thrive."

Following this approach, the researchers developed indices reflecting the complexity of neighborhoods in Budapest based on the distribution of different Point-of-Interest (POI) categories on Google Maps.

They also assessed the complexity of amenity types by considering their ubiquity and the number of other POI types available nearby. Just like

neighborhoods, less common amenities, such as zoos, surrounded by various POIs attract a more diverse audience.

Both are strongly tied to how centrally located the respective neighborhood or amenity is. While the mixing of different people naturally depends heavily on centrality, understanding the complexity of neighborhoods and amenities provides an even more precise insight.

Mobility data from apps

To uncover visitation patterns inside Budapest, the researchers employed GPS data from mobile phones. Juhász clarifies, "When you use smartphone apps, you may be asked to permit the collection of your [location](#) data. If you consent, the app developers can collect information on your mobility, including time and precise location, but without personal data. This anonymous data can be used by researchers like us to find out how cities can become a better place for everyone."

The team then tracked all the places where people stopped for a short stay over months in Budapest, considering at what period of the day. During the night, the stop is most likely at people's homes, and from 9 am to 5 pm, it's most likely their workplace. "So, we focused on so-called 'third places,' such as coffee shops or cinemas, as potential locations for interaction," Juhász states. They also used real estate prices in the individuals' residential areas as an indicator of their wealth.

People with different objectives come together

By combining this information, the researchers could assess a person's economic situation and the types of places they frequented. In Budapest, Városliget, the city's largest and oldest public park, stood out as the most complex neighborhood, boasting a museum, spa, zoo, and other unique

facilities not widely accessible. In terms of amenity categories, Zoo turned out to be the most complex type.

"People with various aims and objectives are drawn to locations like these, offering a diverse portfolio that includes super-rare amenities. This is why we believe that socio-economically diverse individuals will adhere to this rationale and seek out complex places," Juhász notes. While interaction in these places isn't guaranteed, the likelihood is significantly higher than in other, less complex neighborhoods or amenities.

"Consequently, for policymakers, this knowledge is essential as it enables them to identify potential areas of segregation in their city using the economic complexity framework and to implement measures to mitigate it," Juhász emphasizes.

The paper is published in the journal *EPJ Data Science*.

More information: Sándor Juhász et al, Amenity complexity and urban locations of socio-economic mixing, *EPJ Data Science* (2023).
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