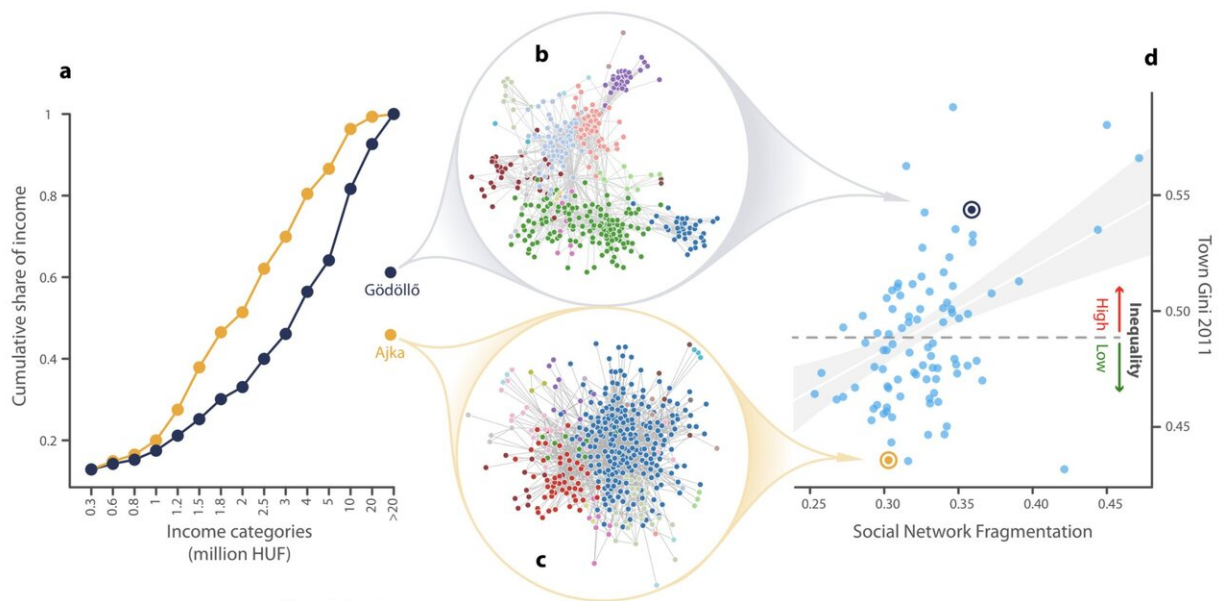


Geography can become a root cause for inequality when cities are built in a way that fragments social networks

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Data from two Hungarian towns, i. e. Goedoelloe (b) and Ajka (c), show that economic inequality (expressed by the Gini index) is higher in Goedoelloe, where social networks are strongly separated. Data were retrieved from iWiW, an early online social network once used by around 40 percent of the population in Hungary. Urban geographies turn out to play a key role in this relationship. Credit: Nature Communications (18 Feb 2021); the authors of the paper

Communities worldwide are trying to address inequality. One promising

approach could be to look at the design of a city, according to research with real-world data in the journal *Nature Communications*.

An international team of scientists, including members of the Complexity Science Hub Vienna (CSH), show that [urban planning](#) directly influences the formation of social networks in a [city](#) and subsequently the socio-economic equality or inequality of its citizens.

"We know how important social networks are for our social and economic outcomes," explains CSH researcher Johannes Wachs, one of the authors of the paper. Social relations provide individuals with essential access to resources, information, economic opportunities and other forms of support. In towns with more evenly distributed social networks, the economic inequality tended to be much lower than in towns with highly fragmented social networks, the study shows.

The scientists even found a vicious cycle: the higher the fragmentation of social networks, the higher was the income inequality in a town over time.

On the wrong side of the tracks?

But where does such fragmentation come from? The researchers argue that one root cause lies in geography.

To test their hypothesis, the complexity scientists used a large dataset from Hungary with 2 Mio individuals from about 500 towns. The data were retrieved from iWiW, a once—and before Facebook—very popular social media platform used by nearly 40 percent of the Hungarian population.

"Urban sociology research says that people cannot easily build [social ties](#) when they are separated by large physical obstacles such as rivers,

railways, highways or walls," Johannes Wachs points out. "It was impressive to see this confirmed in our data: we could see evidence of strong physical boundaries in a city just by looking at its social [network](#)."

City design and income go hand in hand

"We hypothesized—and confirm it with our findings—that if valuable ideas and information cannot float freely through a city because that city is physically fragmented, which in turn causes social fragmentation, we will see inequality. We clearly see how strongly geography and income inequality are related."

Of course, social networks do not form in a vacuum. A lot of different mechanisms influence with whom we are in regular contact. For instance, humans tend to befriend similar people ("homophily"). Friends of friends also show the tendency to become friends too ("triadic closure"). Yet, the iWiW data found geographic indicators of towns as an additional strong predictor of fragmentation in social networks.

The findings are of great value for city planners.

"You hardly can change social networks directly via public policy—you cannot force people to interact if they don't want to," says the CSH researcher. Yet, towns and cities frequently make decisions about the built environment that will have effects on how their inhabitants can meet and interact. "If these decisions reflect on our findings, we predict that cities will have fewer problems with [inequality](#) in the future," Johannes Wachs concludes.

More information: G. Toth, J., R. Di Clemente, A. Jakobi, B. Sagvari, J. Kertesz, B. Lengyel, "Inequality is rising where social network segregation interacts with urban topology," *Nature Communications* (18 Feb 2021) [DOI: 10.1038/s41467-021-21465-0](https://doi.org/10.1038/s41467-021-21465-0)

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