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# Want to Fix Urban Sprawl? Ditch the Cul-de-Sac

Streets arranged in grids, with few dead-ends, encourage walking and transit. But in developing countries, growing cities are taking the opposite route.



THE WORLD'S CITIES are growing fast. Half the human race already lives in urban areas, and another 2.5 billion people could join them by 2050, the United Nations forecasts. While urban growth is inevitable, urban sprawl—with its long commutes and increased congestion—doesn't have to be.

In the developed world, cities are slowly beginning to try to reconsider sprawl and embrace more walkable, transit friendly development. But, according to a new study, the opposite is true in many parts of the global south, where cities not only are experiencing the most headlong growth but are also taking a development path that could lock them into dependence on cars—and all their associated problems—for decades.

The problem, the study suggests, are “disconnected” street networks—think neighborhoods filled with cul-de-sacs, dead-ends and large block sizes. Highly disconnected street patterns increase travel distances and car dependency. Street designs with low levels of connectivity have been shown to increase traffic on major roads, increasing congestion and carbon emissions.

The alternative: connected street networks, like Manhattan's regular grid of streets and avenues, that encourage walking, increase access to mass transit, and reduce traffic and car-related pollution.

“Transit doesn't work well without connected streets, and if you build lots of cul-de-sacs and gated communities, you're essentially transit-proofing the city for generations to come,” says Adam Millard-Ball, an associate professor of Environmental Studies at UC Santa Cruz and an author of the study.

Millard-Ball and Christopher Barrington-Leigh, an associate professor at McGill University's Institute for Health and Social Policy and the McGill School of Environment, used satellite data to trace the evolution of street grids since 1975. They found a marked increase around the world in developments with disconnected streets. The most disconnected type of network design, typically found in gated communities, has nearly doubled worldwide since 2000, with the sharpest increases seen in Southeast Asia and Latin America.

Connected street networks help reduce traffic on major thoroughfares, are cheaper to build and maintain and by reducing travel distances, make walking and biking more desirable options. Perpendicular street grids like Manhattan's or Barcelona's, for instance, combine street connectedness with high density really well. Irregular but highly connected street patterns like Paris's or Tokyo's also do the job—you're never very far away from a public transit stop.

What's more, the way streets are laid out now determines the pattern of later growth. “Street connectivity fundamentally constrains both people's travel choices and also how cities can adapt and evolve in the future,” says Millard-Ball.

Throughout much of the 20th century, urban growth in North America and Europe emphasized car-led development. Cul-de-sacs were perceived as family-friendly and safer for children, but contributed to car-dependency and other problems associated with sprawl.

Today, at least in higher-income countries, more cities are moving away from disconnected street networks and are adopting policies that encourage walkability and transit-oriented development. A 'hipsturbia' trend sees developers catering to the millennials by building neighborhoods with easy walking access to cafes, restaurants and local shops.

That isn't the case in lower and middle-income countries, where most of the world's population growth is taking place, much of it on the periphery of cities.

One billion people are currently thought to be living in slums that typically grow up without government planning or oversight.

Middle classes are also drawn to the edges of these cities to escape soaring real estate prices in the urban core. These new developments are often built by private interests with little consideration for environmental impact or social equity.

“As the middle class swells in many of these countries with income growth, those preferences for having a larger home is leading to this move to the periphery,” says Anjali Mahendra, the Director of Research at the World Resource Institute’s Ross Center for Sustainable Cities. “Private developers are coming in to cater to that demand.”

Gated communities, an extreme example of a disconnected neighborhood, are flourishing in response to fears about urban crime. In South Africa, walled-off estates that originally were reserved for whites during apartheid have since evolved into exclusive properties for the well-off. High-end gated estates represent 15 percent of the value of the country’s entire property market, but only 5 percent of the number of residential properties, according to a 2016 analysis by Lightstone Property, a local real estate valuation firm.

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ADAM MILLARD-BALL UC SANTA CRUZ

Sometimes, governments are the ones who spearhead sprawl. In 2001, Mexico embarked on an ambitious \$100 billion project to build affordable housing across the country. But many of the new developments were built far away from city centers and job opportunities, and featured long blocks of houses clearly designed around car ownership. In some cases, the government failed to bring in public infrastructure, so new residents didn’t have access to tap water, a stable electricity supply, or transit. Some of the new neighborhoods began decaying, and hundreds of thousands of people have since left those homes.

“You're seeing cities willfully put affordable housing in very disconnected locations, and that is a big problem because they're doing it at a very large scale,” Mahendra says. “You're going to see these inequalities increase, and the environmental impact increase.”

Brazil initially followed a similar path. The federal government assumed that building homes on cheap suburban land was the most cost-effective way to provide large-scale public housing, but the developments only contributed to sprawl. Researchers from WRI were able to demonstrate that whatever savings the government would make on land values would be offset by the cost of bringing essential services there. In 2017, WRI's work led to a new law requiring new public housing developments to be pedestrian friendly and have access to public transit, essentially blocking construction of new gated communities.

Millard-Ball says cities in developing countries can find a handful of models of appropriate growth. “Buenos Aires, Tokyo, Khartoum in Sudan... These are some cities that had to build connected streets in a way that reflects planning traditions and local norms and values,” he says. Tokyo, for example, is hailed as a city that balanced growth with strong metropolitan governance and aggressive public transport policies.

Mainly, Millard-Ball says, even large cities can be healthy and livable if they emphasize accessibility, connectedness, and walkability, not just growth.

“Many people have this visceral reaction towards megacities that somehow they're engines of pollution, or that bigger cities are inherently bad, but I don't think that's the case at all,” he says. “The question is, can we build cities that provide travel choices that aren't car dependent, that are sustainable and equitable? And size really doesn't affect any of these outcomes that we care about.”