Observations

The Rise of *Homo verticalis*

In an age of proliferating super-skyscrapers, especially in Asia, we know surprisingly little about vertical human mobility

By Roland Bouffanais, Sun Sun Lim on January 16, 2019

Shanghai skyline. Credit: Dong Wenjie *Getty Images*

The evolution of humankind is intimately intertwined with the development of our living spaces. All forecasts point to an almost complete urbanization of our planet by 2100. This process was accelerated by the industrial revolution, leading to rapid urbanization which has now entered a truly explosive phase. Predictions about our urban futures are often associated with dystopian depictions of cities being bogged down by massive pollution, traffic congestion and overcrowding.

However, one should not forget that cities have always been places of intense intellectual burgeoning and social creativity. Indeed, current utopian visions of smart cities envisage next-generation urban spaces as sustainable metropolises that facilitate social connections, stimulate entrepreneurship and liberate human mobility. The 19th-century French poet Charles Baudelaire described the *flâneur*, the artist-poet of the modern metropolis: someone who wanders about a city with no particular purpose, enjoying consummate freedom while exploring its vast expanse.

Beyond such romantic notions of individual mobility, what is the true extent of the urban citizen's freedom of movement? Over the last decade, advancements in complexity science have allowed us to dissect, with unprecedented accuracy, the fine details of human mobility in dense urban areas, thus enabling more strategic planning of our built environment. This breakthrough was triggered by the smartphone revolution, which made it possible to track and record the movements of millions of *Homo sapiens*.

Mining this "big data" revealed the burstiness of human wandering—short time frames of intense activity followed by longer periods of slow activity—that necessitated particular responses in urban planning. These studies, albeit fascinating and groundbreaking, were mostly carried out on large tribes of North American or European *Homo sapiens*, who live and wander in mostly flat cities that strain at their edges, congealing in an urban sprawl. Notably, therefore, the admittedly illuminating data were fundamentally limited to horizontal movements.

Yet the Asian urban landscape is quite distinct, manifesting a sprawl of an upward nature. The ongoing intensive urbanization in Asia is distinguished by the emergence of a specific type of city, namely the vertical one. Indeed, verticality is considered as one effective means to cope with high human density, in particular to overcome the known inefficiencies in public transportation associated with urban sprawls. How can we best leverage verticality to build more hospitable and livable cities as urbanization aggressively pushes forth?

While a flurry of brand-new skyscrapers is being erected every day around the globe, we know surprisingly little about vertical human mobility. This stands in stark contrast to our depth of knowledge and understanding of horizontal human mobility. Residents of these vertical cities wander about in three dimensions—up, down and across. Our everyday movements comprise a succession of jumps up and down, traversing floors via stairs and escalators, lubricated by elevator rides from high above the ground to several levels of basements underground.

This vertical mobility allows us to reimagine and reconfigure urban spaces. For instance, it is now common to find a hotel lobby on the 40th floor of a building in Tokyo, a garden embedded in the façade of a tower in Singapore, tennis courts on the rooftop of a sports center in Seoul, and so on. These are the possibilities, and realities, of life in vertical cities for hundreds of millions of Asian urban dwellers. This large tribe of *Homo sapiens* can be referred to as *Homo verticalis*.

How freely and how well can *Homo verticalis* wander given the nature of the vertical cityscape? We should first contrast the basic topographical features of a flat city with that of the vertical one. A bird's-eye view of the flat city would resemble a maze-like structure offering tremendous wandering opportunities characterized by a multitude of continuous paths between any two points.

However, anyone planning to go from the observation deck of a skyscraper to the rooftop bar on a neighboring building will inevitably have to descend to the ground floor and cross several blocks, before ascending again. The maze would thus become multilayered, with a mind-boggling array of possible routes that extend to and across every level of the tallest building in the city.

While the potential for wandering through the vertical city seems limitless, *Homo verticalis* faces many barriers in this man-made environment. In many new buildings, going up or down even a single level necessitates an elevator ride because staircases are tucked away from main thoroughfares. In shopping malls, escalators are strategically positioned to constrain wandering, with patently

commercial motives. Similarly, underground train stations that serve millions of commuters daily are designed to both promote and impede vertical mobility, seeking to prevent overcrowding at stations during peak hours, while enabling efficient evacuation during emergencies.

To uncloak the hidden barriers and identify facilitators to movement in the vertical city, designers and urban planners should work closely with complexity scientists to map the hitherto unknown patterns of vertical human mobility. The advent of affordable and efficient sensors to track such vertical movements can help to generate the big data that will shed critical light on these patterns. This new knowledge would be pivotal to the establishment of novel design principles that can enhance mobility and therefore livability in the vertical urban world. Only then can *Homo verticalis* become the new generation *flâneur*, luxuriating in the liberty of roaming freely across all three dimensions.

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