Toward a Theory of Urban Evolution

IN HIS 1937 ESSAY "WHAT IS A CITY?," Lewis Mumford described an evolutionary process through which the "badly organized mass city" would evolve into a new type of "poly-nucleated" city, "adequately spaced and bounded":

> "Twenty such cities, in a region whose environment and whose resources were adequately planned, would have all the benefits of a metropolis that held a million people, without its ponderous disabilities: its capital frozen into unprofitable utilities, and its land values congealed at levels that stand in the way of effective adaptation to new needs."

For Mumford, such cities, designed with strong public participation, would become the nuclei of new poly-nucleated metropolitan regions that result in:

> "A more comprehensive life for the region, for this geographic area can, only now, for the first time be treated as an instantaneous whole for all the functions of social existence. Instead of trusting to the mere massing of populations to produce the necessary social concentration and social drama, we must now seek these results through deliberate local nucleation and a finer regional articulation."

Unfortunately, since Mumford wrote these words, we have not achieved poly-nucleated cities or regions. Nor have we advanced a theory of urban evolution. Urban theorists have described cities, used basic pattern recognition to detect relationships among the potential components of urban evolution, or offered narrow prescriptions to fix one urban challenge while generating inevitable unintended consequences that pose new challenges. This is because we have never developed a real science of cities.

For more than a century, planners, sociologists, historians, and economists have theorized about cities and their evolution by categorizing them, as noted by Laura Bliss in a well-documented 2014 CityLab article about the likelihood of an emerging evolutionary theory of cities. They generated multiple typologies of cities, from functional classifications to rudimentary taxonomies (see Harris, 1943, *Functional Classification of Cities in the United States*; Angel et al, 2012, *Atlas of Urban Expansion*; Knox, 2013, *Atlas of Cities*). But they based these classifications on arbitrarily chosen categories and did little to inform our understanding of how cities became what they are or to presage what they might become.

Even Jane Jacobs, in a foreword to her 1961 book, *The Death and Life of Great American Cities*, called for the development of an ecology of cities—a scientific exploration of the forces that shape cities—but provided only narrative accounts of what defined great cities, mostly with regard to design, as part of her ongoing assault on the orthodox planning profession. In some of her later work, Jacobs set out principles to define great cities, based mostly on form, but she never provided a framework to improve the science of urban theory.

Modern urban theory is plagued by several shortcomings. It is not analytic. It fails to provide a framework for generating hypotheses and the empirical analysis to test those theories. And the research, in general, focuses on big iconic cities, rather than a representative global selection of urban settlements that captures the differences between big and small cities, primary and secondary cities, industrial and commercial cities. Importantly, the research provides little guidance regarding how we might intervene to improve our future cities to support sustainable human habitation on the planet.

The New Urban Agenda—to be announced in October at the third UN-Habitat conference, in Quito, Ecuador—will present consensual global objectives for sustainable urbanization. These objectives provide guidance for United Nations member states as they prepare for the gargantuan task of welcoming 2.5 billion new urbanites to the world's cities over the next thirty years—culminating the 250-year process through which human settlement moved from almost entirely rural and agrarian to predominantly urban contexts. But before we attempt to implement the New Urban Agenda, we must confront the serious limitations in our understanding of cities and urban evolution. A new "science of cities" would buttress our efforts to get this last stage of urbanization right.

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I do not intend to present a new science of cities in this message. Instead, I will suggest a way to frame one that borrows from evolutionary theory. The evolution of species is driven by four main forces, and it seems reasonable that corollary forces help to shape the evolution of cities. These forces are: natural selection, gene flow, mutation, and random drift. And they play out in predictable ways that shape cities—where city growth replaces reproductive success as an indicator of evolutionary success.

From the medieval town hall of Mons, Belgium, the Guardhouse Monkey overlooks the city. Credit: © Jochen Tack / Alamy Stock Photo.

Natural selection is a process of impulse and response. It relates to how a city responds to changing external factors (impulses) that support or inhibit success. Impulses can be economic, environmental, or political, but they are, importantly, outside the control of the city. Economic restructuring, for example, might select against cities that depend on manufacturing, have inflexibly trained workforces, or extract or produce single commodities that face changes in demand in global markets. Climate change and sea-level rise will inhibit the success of coastal cities or those exposed to severe weather events. Political impulses might include regime changes, social uprisings, or war. Or they might be something as seemingly minor as a change in allocation formulae for national revenues. Every impulse will benefit some cities and harm others. A city's ability to respond to different impulses might be a measure of its resilience, which is directly influenced by the three other evolutionary forces.

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Migration (gene flow) helps to diversify the economic, social, and age structures of cities through the exchange of people, resources, and technologies. Presumably, the in-migration of people, capital, and new technology improves a city's ability to respond to external impulses. Out-migration, in general, would reduce this ability.

Mutation, for cities, is an unpredictable change in technology or practice occurring within a city. It might be shorthanded as innovation or disruption.

Random drift involves longer-term changes in cities that result from cultural or behavioral shifts. These might include decisions to maintain or preserve long-term assets, real or cultural. Drift describes the unpredictable ways that cities might change their character.

As noted, I do not want to lay out a new theory of urban evolution here. I merely want to recommend this direction in order to invigorate our thinking around urban change more rigorously and systematically. A significant amount of work has already gone into quantifying elements of this framework. Risk theorists and insurers have quantified many of the external impulses that challenge cities. Demographers and population theorists have studied human migration, and macroeconomists have studied capital flows. A lot of attention has been paid to innovation and disruption in the last couple of decades. Random drift is a little less studied. But, as Bliss points out, big data and new technologies might help us to detect longer-term drift. In any case, a larger framework that weaves these disparate areas of work together would advance our understanding of urban evolution.

On a cautionary note, while an evolutionary theory of cities would be a signal advancement of urban theory, it is useful to remember that, unlike evolution, which is a mostly passive process—species enduring the external forces that act on them—cities, in theory at least, are driven by more purposive behavior: planning. But planners need better tools to drive their practices and to test their approaches. If we are to successfully implement the New Urban Agenda, a toolkit based on evolutionary science would be hugely helpful. As Mumford concluded in his 1937 essay:

> "To embody these new possibilities in city life, which come to us not merely through better technical organization but through acuter sociological understanding, and to dramatize the activities themselves in appropriate individual and urban structures, forms the task of the coming generation."

We at the Lincoln Institute of Land Policy stand ready to support coming generations in comprehensive and scientific analysis of urban evolution and the important role that effective land policies can play in driving it. Our urban future depends on it.