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## Progress in Planning

journal homepage: [www.elsevier.com/locate/pplan](http://www.elsevier.com/locate/pplan)



# The size of cities: A synthesis of multi-disciplinary perspectives on the global megalopolis

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### ARTICLE INFO

#### Article history:

Received 13 June 2015

Received in revised form 31 March 2016

Accepted 31 March 2016

Available online xxx

#### Keywords:

Physical size  
Natural limits  
Pangaean City  
Growth  
Geopolitics  
Utopia

### ABSTRACT

This interdisciplinary treatise integrates notions from the biological, geographical, sociological, politico-administrative, economic, psychological, futurist, and other scientific literature about the expansion of urban areas by taking the reader through a series of conjectures about the practical upper limits of the size of cities, and centering the discussion around the possibilities for a world-spanning megalopolis or city-planet. It specifically frames urban growth against a survey of known conceptual and logical limits established by previous research in the natural and social sciences, and demonstrates that while there are absolute and practical constraints to the establishment of what the author calls a Pangaean City, they might be overcome by new technologies, innovations in governance, and behavioral adjustments. The author also shows that there are prior, overlapping, or parallel sociopolitical and cultural constraints that govern city size, and that while these are not immutable, they represent sets of actual influences on development of the magnified urban form itself, including its reach beyond physical presence. Finally, while it is shown that a thorough-going planetary urbanization may be physically impossible, the research concludes by suggesting what planners can or should do about such a phenomenon. It further relates the discussion to the rich body of utopian planning literature, where the aspiration for an all-embracing urbanity remains to mirror the panoramic analyses of this paper.

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## 1. Introduction

*"If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate from it, for the mere purpose of enabling it to support a larger, but not a better or happier population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it."*

John Stuart Mill (1848)

Whether based on "common sense", intuitive reasoning, scientific analysis, or long reflection, both urban scholars and laypersons by and large name two dimensions that describe the apparent mass of any city: physical size and population size. In addition, there are at least two underlying assumptions to these

dimensions, which are consistent with most historic and literary definitions of what a city is. Physical size presumes the presence of a physical plant (Bauer, 2010); that is, at least one relatively compact, built-up area that functions as the initial core of the city, which is superlative in mass and often in craftsmanship relative to other smaller cities or non-cities of its epoch. Population size presumes a diversity of people (i.e. non-kin, male and female, adults at reproductive age of various ages and occupations), whose day-to-day interactions result in some sort of autochthonous ordering principle, formally achieved through a government or ruling caste, or informally, through customary rules of trade, language use, festive mingling, religious observances, and so on. All other measures of size that enter into defining cities follow from these two elements: density is population divided by a unit of physical space,<sup>2</sup> massings of verticality and indices of horizontal ramification, such as road grids, are but extensions or

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<sup>2</sup> This is the simplest definition of density, although Churchman (1999) reminds us of other variants of density, such as residential density, as well as the distinction that psychologists make between spatial density (given number of people within different spaces) versus social density (different numbers of people in the same space).

multiplications of the seed settlement's nascent physicality. Even the number of typical urban establishments (e.g. municipal halls, markets, cathedrals, railway centrals and museums), or the counts of urban economic activity (e.g. laborers in coarse and fine-scale manufacturing, virtual services, etc.) and income from the work of citizens, are themselves derived measures of physical development and population growth, respectively. These more complex metrics of size are also used to determine whether a given human settlement is advanced in contrast to other communities in the same wider region that makes up the non-urban backdrop relative to a given city, or cities.

While there is a substantial body of literature on density, growth-&-decline patterns, and particular drivers of morphological change such as land controls (Bertaud & Malpezzi, 2003; Glaeser, Kolko, & Saiz, 2001; Jabareen, 2006; Levy, 1999; Zhu, 2012), urban studies seem to rarely revisit concepts of basic physicality and peopling, perhaps because these seem to be such obvious, self-explanatory phenomena. In response, this research places a reflective focus back on the original notions of physical size and population size, and interrogates them as determinants of one ultimate manifestation of planned urbanization: a *Pangaeon City*—this term being but provisional and descriptive, that would span as much of the planet as possible, following the logic of agglomeration and self-organization that has historically been observed in ever larger human settlements formed out of smaller communities. Or, to put it simply, because more human settlements have been growing since the dawn of history, with the city being the most common apex form at present, how much bigger can they get? Shall they reach the point of growing together into a world-spanning urbanity? This research primarily works through the possibility for that end-point. Starting with biophysical comparison, it problematizes the factors in terms of their practical limits; that is, reviews and integrates from both past studies and the author's own analysis about what are the natural limits to the city in terms of growing ever bigger, when one considers the extremes of physicality and population. The research also investigates, based on contemporary patterns of city formation, what the political and sociocultural structures are that seem to bound urban growth. The study takes these and suggests how such societal phenomena may have to be deconstructed and reconceptualized, given the unwieldiness of both expanding populations in a world where urban spaces have become the dominant human habitat. By integrating core literature from the natural and social sciences, the author builds two propositions: first, there are incontrovertible limits to the physical size of human settlements, which are worth summarizing in exegesis, if only to survey what has been written about cities thus far at the opening of this first urban century. Second, even before physical limits are reached, there are practical upper limits to the sizes of cities as we know them that are rather political, economic and sociocultural; in other words, the result of human intellection and interrelations. The author justifies these two propositions using the panoramic survey of literature from multiple fields—some, like psychology and archaeology, being far removed from urban studies, in order to come face-to-face with an entity that may no longer be a city as many of us are familiar with. In such a futuristic, urban entity of yet-unattained size and population magnitude, only certain technological and behavioral innovations, suggested towards the end of the paper, can allow citizens to habituate themselves to the size and shape of these colossal neo-cities that are here envisioned to have evolved beyond their present cognizable features.

In addition, this research works with some basic premises upon which consideration of the city is rooted. These can be summed up in these statements: [i]. The study begins with the definition of the city as a dense and heterogeneous agglomeration of diverse people, inhabiting a distinct built-up area that has been originally

monocentric and centrally-governed, and is evidently physically superior to, or a superlative expression of, lesser, contemporaneous settlements (non-cities), and whose typical population has been sufficiently described by sociologists as different from its rural counterparts. This shall be our working definition, until modified further down. [ii]. Despite the various recent neologisms for larger urban phenomena, or the assertion that the city is dead (it has allegedly been killed, along with distance, by the Internet, per anecdotal lore), any conurbation greater in size or complexity or human diversity that currently exists is still, essentially, a city. It may consist of several cities strung together into a region, or it may alone have metastasized into an ugly mass on the way to covering the planet, but it is still more of the same old familiar *urbs*, plus its suburbs. It is not henceforth inhabited by an enhanced *Übermensch* (Nietzsche, 1883), say, in places like Germany, Denmark, or Japan, where most people seem to eat and live a sight better, but by the same urbane species, who may be only attitudinally and noetically, but not anatomically different from their hillbilly cousins in the boondocks. Indeed, anthropologists have tried to distinguish the latter as part of “folk culture”, distinct from both the more advanced city-dwellers, as well as from primitive tribes (Foster, 1953) [iii]. Ergo, given the two preceding statements, unless and until it can be empirically proven (it seems not), that the present super-sized urbanizations are radically and comprehensively distinct from their original incarnation, then something *city-like* shall here be taken as the end-manifestation which this research tries to project onto a planetary scale. [iv] This does not however, discount or dismiss the possibility that in working through the evidence presented below, the city as we know it must needs metamorphose or be supplanted by a yet unnamed form of planetary urbanization. In fact, as the argument unfolds, it will be shown that the likely end result begins to lean towards a more decentralized assemblage of co-equal polities, which nevertheless could become a unified form of urban encrustation, populated by humanoids who may or may not genetically resemble our present selves.

The research neither favors nor rejects any aspiration to realize an urban Pangaea as an ideal to attain within an indefinite time, given present rapid urbanization of the planet. Rather, for the purposes of planners and policy-makers, it seeks to contribute to the literature by assembling and subjecting to integrative analysis the known biophysical and sociopolitical limits of human settlement growth, searching for the point at which the gigantic sprawl of urbanity might either cease to function as a livable space or lose its familiar urban character altogether. Drawing from decades of research in other disciplines, it is for example, the irrefutable nitrogen-oxygen envelope contaminated by pollution or the predictable onset of anti-social behavior in overbred crowds that planning may have to consider, even if by fits and starts, given the visible distension of extended metropolitan regions in places like Pacific Asia (Douglass, 2006) and the twinned advance of cyber-cities and slums in India (Madon & Sahay, 2001). Furthermore, the planner must anticipate the propensity of societies, led by the moneyed elites and pioneering intellectuals, to build places bigger and sometimes better, or to at least to push the reach of human presence, the cognitive engines of which are almost always located in cities.

If anything is subtly proposed or aspired-for in this research by way of presenting a macro-scale urbanity, it would be this: that of many possible futures facing a world of disparate populations who are mostly majority-urban and exponentially interconnecting by the year, the paragon remains for an ecologically viable, culturally robust, yet-undefined, human settlement or group of settlements that accommodates all without causing the deprivation or banishment of others. Some might say that the Pangaeon City is wholly unlikely, because worldwide trends show that the number

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