The 15-minute city offers a new framework for sustainability, liveability, and health

In the countdown to The UN Climate Change Conference in Glasgow (COP26), two crucial reports, the Intergovernmental Panel on Climate Change 6th Assessment Report and the Nationally Determined Contributions synthesis report by the UN Framework Convention on Climate Change, have highlighted that global temperatures are poised to rise by 2·7°C by mid-century, substantially higher than the preferred 1·5°C more than preindustrial temperatures pledged in the Paris Agreement.[1] Such a rise in global temperatures will increase severe climatic events, with far-reaching ramifications on urban populations. Beyond the economic losses of up to 13·9% of the global gross domestic product from urban infrastructure damages,[2] the implications for livelihoods, properties, and health, among other negatives, are expected to affect the livelihood of urban communities globally.

However, this pursuit of economic stability, liveability, and emissions reduction will be a challenging endeavour, because more than 60% of global greenhouse gases are attributed to cities. In fact, WHO warns that urban air quality is a subject of increasing concern, where the number of urban residents now exposed to air pollution is 2·5 times higher than recommended, leading to an increasing number of patients with respiratory diseases, cancer, and heart diseases globally, affecting the global economy with estimated direct damages of between US$2 and $4 billion per annum by 2030.[3]

Additionally, increasing greenhouse gas emissions directly threaten the livelihood of communities; as of February, 2021, the number of deaths related to air pollution was more than 3·91 million in China and 2·46 million in India, accounting for more than a third of all deaths in India.[4] These numbers exclude deaths resulting from other complications such as heatwaves, malnutrition, and climate change-related events. This finding shows that unless emissions are substantially reduced globally as a matter of urgency, the situation of deteriorating air quality will worsen, with subsequent deaths, economic loss, and other challenges affecting many countries across the globe.

However, the issue of urban liveability cannot be approached via linear decarbonisation policies alone, because changing the 78% of energy consumed by different sectors in cities would need to be achieved without compromising liveability. Urban liveability demands societal cohesion and bonding, which is present and higher in human-scale cities (a city designed optimally for human use) compared with contemporary cities. This demand is shown by the latest ranking on the Urban Liveability Index 2021,[5] where cities that managed to promote social spaces such as allowing schools, restaurants, recreation centres, and other social spaces to stay open during the pandemic were ranked higher; including Auckland, Osaka, Adelaide, Wellington, Tokyo, Zurich, and others. Therefore, the aim of producing coherent decarbonisation policies should also increasing liveability, which can in turn repair societal fractures and improve economic equity.

The COVID-19 pandemic shone light on an emerging model, the 15-minute city, when the resilience of contemporary cities was tested. Initially proposed in 2016,[6] the concept advocates for so-called chrono-urbanism, supporting the notion that proximity-based planning can help in reducing car dependency, and in effect reduce fuel consumption and subsequently pollution. The model further calls for a new topology, where cities should be structured in such a way that basic services are accessible by urban dwellers in a radius of 15 min by foot or via cycling.[7] In fact, this need for more proximity is not only desirable for access to urban amenities, but can also influence consumption patterns, because studies during the height of the COVID-19 pandemic lockdowns showcased an increase in the production of local food and products for consumption.[8]

Estimating the aggregate global GHG emissions reduction of 15-minute city planning model would be valuable, because vehicular transportation accounts for more than 78% of emissions in urban areas and up to 70–80% of NO_2 emissions, and globally 14% of emissions are attributed to the transport sector.[9] Although it would be difficult to completely remove the need for mobility achieved by vehicles, it would be useful to estimate the emissions reductions that can be achieved via urban restructuring, that aligns with the

so-called chrono-urbanism concept, and via associated activities of local consumption and production.

A reduction in the emissions of greenhouse gases, improved air quality, and other benefits in cities could be further achieved by through three additional dimensions (density, diversity, and digitalisation) that form the basic pillars of the 15-minute city. Beyond traditional population and services density quotas, increasing access to urban amenities can result in optimal consumption being achieved without constraining available resources. This planning model also envisions mixed-used built environments accommodating residential, commercial, and entertainment functions, and at the same time promoting multiculturalism. With this model, health, social interactions, and relationships can be fostered and promoted.

The higher density (of population and services) and diversity from this model results in shorter travel distances, motorised traffic is replaced with active travel, leading to lower CO_2 and air pollution emissions and better air quality. The resulting freed public space can be used for green spaces, contributing to some extent to carbon sequestration and reducing urban heat island effects. Noise levels will be reduced too. Altogether, these factors will lead to better citizen health, with a reduction in health complications such as premature mortality and diseases of the cardiovascular and respiratory system, obesity, brain diseases (eg, Alzheimer's disease), and cancer.[10]

Digitalisation makes it possible for progress to be made in the other three dimensions, especially via data gathering through Internet of Things networks, resulting in better informed decisions along with the potential to automate different urban processes, producing more opportunities to achieve sustainability outcomes coupled with increased urban efficiency.

The 15-minute city concept builds on previous works of urban thinkers such as Christopher Alexander, Jane Jacobs, Nikos Salingaros, and Leon Krier, who collectively advocate for cities that respond to both human needs and environmental sensibilities. To achieve this we need to enhance human interactions and social complexities via the improved connection of urban components such as residential areas, walkways, markets, schools, recreation centres, and parks. In this process of urban regeneration, or that of creating urban life, their is important to include local communities,

because they would be the main stakeholders who will live with the urban outcomes. The four dimensions of the 15-minute city can thus be carefully studied at varying urban stages to ensure stronger sustainability outcomes at the same time as building higher social coherence, inclusivity, and economic equity. The pursuit of achieving wholeness, where components are ordered in a particular way to produce a complex and complete whole as promoted by Alexander,[11] is a key component in cohesive decarbonisation policies, because linear approaches focusing only on quotas will not work.

The subject of net-zero urban futures will soon be popular in light of the COP26 discussions, but it is necessary to proceed carefully with linear models focusing solely on emissions reduction. A whole-systems approach should instead be adopted, focusing on a range of different aspects such as urban planning, climate action, air quality, liveability, and health, among others. In addition, there is a need for cohesive solutions that can reduce emissions at the same time as increasing urban liveability and also repairing the socioeconomic fractures caused by contemporary urban planning principles. The 15-minute city appears to be a viable solution, based on sound human-scale principles, and further research can help policy makers understand how to operationalise this model in varying geographies.

*Zaheer Allam, Mark Nieuwenhuijsen, Didier Chabaud, Carlos Moreno
zaheer.allam@chaire-eti.org

Chaire Entrepreneuriat Territoire Innovation, Institut d'Administration des Entreprises de Paris, Sorbonne Business School, Université Paris 1 Panthéon-Sorbonne, Paris 75013, France (ZA, DC, CM); Live Smart Research Lab, School of Architecture and Built Environment, Deakin University, Geelong, VIC, Australia (ZA); ISGlobal, Barcelona Institute for Global Health, Campus Universitari Mar, Barcelona Biomedical Research Park, Barcelona, Spain (MN); Universitat Pompeu Fabra, Barcelona, Spain (MN); Centro de Investigación Biomédica en Red de Epidemiología y Salud Pública, Madrid, Spain (MN)

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