Shifting the Density Discourse: The Future of Soft Density

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Abstract

This study by UCL Sustainability Lab, Mott MacDonald, and the IStructE explores the factors influencing the sustainability of the built environment in its urban ecosystem. The research extends beyond structural engineering to a holistic view of sustainable urban development. With more than half of the global population living in urban areas, effective sustainable urban densification strategies must be deployed to address multiple climate and housing challenges. This project aims to bridge disciplinary gaps in the built environment sector, identify characteristics of sustainable urban ecosystems, and establish a guide for integrating urban development with sustainability. Focusing on transportation, green spaces, and carbon emissions, the research suggests soft-density strategies as optimal, highlighting the necessity of a multidisciplinary, collaborative approach that avoids one-size-fits-all solutions.

Keywords: *urban development; high-rise buildings; carbon footprint; urban densification; transportation; sustainability; soft density.*

1 Introduction

Today, 55 percent of the world's population lives in urban areas, expected to reach 68 percent of a growing population approaching ten billion by 2050 [1]. As cities grow, their expansion and complexity [2], especially in the context of climate change and the built environment accounting for more than 40 percent of global emissions [3], become critical with the sustainable implementation of urban density being the principal challenge. The question is not whether density is bad or good, but rather at what price and how. Planners and decision-makers need to focus on optimum density for each location while considering the impact on humans and the global environment [4]. Urban density has become a highly debated topic [5, 6] and exacerbated by the coronavirus pandemic due to social isolation, intensified by the lack of spaces in dense areas. Planners, developers, and politicians need to consider what higher density should look like and how it can be as sustainable possible to achieve our climate ambitions.

1.1 Concepts

Sustainable Built Environment Ecosystems

Sustainability focuses on providing an environmentally friendly, cost-effective and just life without compromising future generations' ability to fulfil their own needs [7, 8, 9, 10]. Al-Kodmany's framework, the '3 Ps' (people, profit, planet) was used in the bibliometric analysis, literature review and case studies [7]. It organises issues related to tall building development around sustainability, from structural systems and materials to in-outdoor spaces relationships and urban ecosystem integration.

Density

Urban density could be defined as the population-to-area ratio. The OECD considers high urban density as over 1,500 inhabitants per km^2 [11]. In the United Kingdom, density is often measured differently by dwellings per hectare. While the UK is the third most densely populated in Europe, it has fewer people per dwelling (2.3) compared with the rest of Europe (e.g., Spain 3; Ireland 2.9). Density does not just imply the urban form; in some cases, high-density developments were used to support tall buildings proposals representing only one possible high-density model. While tall

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