


On Sustainable | Sustaining City Streets

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City streets have long been the subject and context for research. In this *Sustainable | Sustaining City Streets* volume, streets and their vast array of activities are examined by sustainability scientists and urbanists from many backgrounds. We hope that these papers promote an understanding of the reciprocal nature of the phenomenon of streets and their relationships with urban inhabitants. The more we reveal and activate sustainable approaches to streets, the greater the likelihood that our streets will help sustain life in cities.

In a late-1950s issue of *Fortune*, visionary urbanist Jane Jacobs wrote, “The street works harder than any other part of downtown. It is the nervous system; it communicates the flavor, the feel, the sights. It is the major point of transaction and communication. The real potential is in the street” [1]. A generation of scholarship and professional application on city streets followed, largely focused on morphology, infrastructure, policy, and program: the physical forms, spaces and patterns, and related human activities and rules, that characterized “good” streets. As the new millennium approached, there were broader calls for multi-disciplinary and evidence-based investigations of the dynamic processes that streets and urban corridors accommodated—or discouraged, as the case may be.

Meanwhile, the global population lodged in cities continued to expand, with especially serious challenges in the Global South. In particular, since the mid-20th century, policy-makers’ abetting of the automobile’s dominance has impacted cities and city life around the world. By the turn of the century, however, critique of the unsustainable streets-belong-to-cars paradigm gained momentum, and today cases of more balanced approaches are surging.

While diverse in scholarly background and geography, the authors introduced below are quite unified in seeing streets for the complex, impactful, and malleable urban phenomena that they are. Each paper shows ‘street smarts’ as it reveals ways to manage and craft more sustainable street systems. As a whole, this collection offers an interdisciplinary, multi-methods discussion on:

1. What makes for safe, healthy, efficient, convivial and inclusive city streets.
2. Why streets are vital to the well-being of urban inhabitants.
3. How scholars and practitioners can collaborate on effective interventions along the street as key factors in urban sustainability.

This collection features 13 papers on an array of subjects, although there are topical clusters. The plus-50 authors hail from 23 research organizations and 13 countries. Five of the six populated continents are represented—only Australia is missing from the list. Streets and street-based phenomena are investigated in western Europe and the United Kingdom; central Africa; east, southeast, and south Asia; and the United States. Almost 20 distinct disciplines collectively represent the social sciences (psychology, geography, economics, logistics, development science), engineering (civil, transportation, systems), design and policy professions (landscape architecture, urban design, city planning, architecture), and health and physical sciences (epidemiology, environmental toxicology, atmospheric science).



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In terms of the spatial scope of the inquiry, five papers explore sustainability at the scale of a precinct in a single city; four papers look at multiple sites in a single city; two address a single entire metropolis; and two are multi-city in scope.

Of course, there are gaps. For example, there is only passing reference to electric-assisted micro-mobility, which is quickly becoming entrenched in some cities. The shift toward more sustainable modes of moving people and materials in the city calls for timely study and dissemination by a wide cadre of urban scholars. Moreover, no papers deal substantively with ecology and changing urban climate along the street corridor and the intriguing opportunities for more robust ecosystem services in the heart of the city.

Eight papers address pedestrian activities and perceptions related to streets and adjacent land uses, perhaps recognizing that streets are as much vessels for human life as they are conduits for machines in motion. There is a growing understanding that active mobility—walking, biking, and a whole range of other muscle-driven or hyper-efficient modes of urban transport—has positive effects on cities and their citizens. Even partial liberation from the automobile is resulting in more equitable, healthier, and climate-responsive shared public spaces and transport modes, along with a variety of green infrastructure possibilities at local and urban regional levels.

Two papers discuss the use of eye-tracking technology to assess respondents' reactions to visual stimuli along the city streetscape. Simpson, Thwaites, and Freeth blend environmental psychology and landscape architecture methodologies in using mobile eye-tracking glasses to gauge pedestrians' visual engagement with street edges in Sheffield, UK.

Kim and Park, in a contrasting research context, employ eye-tracking within a virtual street-view environment to determine respondents' fixation on signboards as a way of informing municipal regulation of street-based advertising in Seoul, Korea. Both papers show the efficacy of eye-tracking in documenting visual interactions on the street. Further, both produce tangible results that could help guide policy and design seeking to improve pedestrian experiences within the street canyon.

Perović and Šestović address socio-spatial sustainability in the southeast European city of Podgorica, the capital of Montenegro. Through theoretical and case study analyses, they affirm the role of a traditional public open space in helping bolster social identity, and their design guidelines make a case for shaping human-scale spaces that enhance socialization and personal well-being.

Wakil et al. address sensory engagement along the streetscapes of Lahore, Pakistan. They test a novel methodology for the systematic development of a visual pollution assessment tool for streetscapes. Their expert-based tool teases out consensus on the characteristics of various visual pollution objects, as applied to a series of street-based locations.

The focus on pedestrian accommodation on the street continues with the paper by Campisi et al. Using a multi-criteria analytical hierarchy process analysis, the authors evaluate walkability in busy pedestrian areas of Rijeka, Croatia. Although their street-side surveys were administered pre-COVID-19, they make a solid case for pedestrian behavior analyses to inform tactical planning that enhances walker mobility while promoting social distancing and air quality.

Rodriguez-Valencia and Ortiz-Ramirez examine green infrastructure trends on streets in three American cities: Portland, Seattle, and Philadelphia. Using a qualitative case study methodology grounded in multi-agent interviews, documentary analyses, and site observations, they trace the evolution of traditional street design approaches and document emerging green street design protocols that focus on sustainable stormwater management in tight urban spaces.

Im's paper also explores the theme of urban green streets, this time by examining select civic green street manuals and constructed stormwater-oriented streetscape projects in select American cities. The author's collation of green street benefits results in a proposed design typology that is then affirmed through multi-expert review.

Lee and Kim address the hazards of walking along the narrow "organically shared" streets of the dense residential core of Seoul, South Korea. They investigate the effective-

ness of the city's pedestrian priority street (PPS) strategy for shared space using on-site videography and a questionnaire survey to assess perceptions of traffic safety along local streets. Their findings should prove useful for informing government officials and residents about the value of PPS design protocols.

Tchinda and Kim examine fear of crime in public urban spaces in Yaoundé, the central African capital of Cameroon. They conduct street corner sampling of pedestrians' fear of crime perceptions at five key street intersections. Survey results are then referenced to spatial data acquired through drone aerial photography of real-time pedestrian density. Their work confirms the hypothesis that, in the case of Yaoundé, fear of crime rates rise as street-side congestion increases.

Lim et al. also address street crime, this time in Kuala Lumpur, Malaysia. Based on data gleaned from a large survey questionnaire of street-based respondents in the high-crime Dang Wangi commercial district, the authors conclude that the "Safe City Program works only when a combination of initiatives from the perspectives of guardians, victims, and offenders are integrated well."

The consideration of social factors and civil incivilities on and around city streets is broadened by Marzbali, Safizadeh, Tilaki, and Abdullah's contribution. Applying social disorganization theory to a neighborhood in Penang, Malaysia, they suggest, among other things, that the human-place bond may lessen the impacts of incivilities on residents' health in city neighborhoods. They conclude by discussing practical implications for enhancing place attachment and social identification.

Jia, Ma, and Hu are the sole team that address a complex public transportation system, in this case in the Chinese city of Xi'an. Their experimental study leverages complex network theory to investigate the topological properties of Xi'an's busing network, and then proposes an optimization model based on betweenness centrality and policy guidance.

Finally, Tönisson et al. present the most transdisciplinary paper of the collection, with physical, health, and social scientists collaborating as a choreographed unit. Their mixed-methods approach analyzes quantitative and qualitative data to propose mitigation strategies for black carbon emissions afflicting the streets of Manila, Philippines.

If there is a meta-concept that holds this compendium together, it is the street's chameleon-like capacity to simultaneously accommodate flows of life, material, and energy, while also providing spatial volumes and edges along which urban placefulness, civil society, and metro-scale economies may develop.

Indeed, during the COVID-19 era, city streets have taken on renewed meaning as public places of camaraderie, protest, and other forms of expression. The pandemic has also heightened our collective appreciation of the basic role of streets in the deceptively simple task of hosting safe and agreeable passage from point A to point B. The street's dramatic interplay of infrastructure, environment and humans in motion call for new collaborations—including fuller engagement with city inhabitants. As these papers suggest, the time is ripe for city leaders, scholars, planners, and residents to rethink the street as a key driver of sustainable urban futures.

To conclude, we would like to thank our author colleagues for contributing to this Special Issue, as it indicates a step forward in the understanding of sustainable streets and street systems. We also extend our sincere appreciation to peer reviewers. This volume would not have been possible without their rigorous critique and generous insight during the manuscript review process. Finally, we express gratitude to the MDPI Sustainability Editorial Office for their enthusiasm and support throughout the process.

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Reference

1. Jacobs, J. Downtown Is for People (*Fortune*, 1958). Reprinted in *Fortune Classic* 2011. Available online: <https://fortune.com/2011/09/18/downtown-is-for-people-fortune-classic-1958/> (accessed on 10 January 2021).