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Editorial

Sustainable City Planning and Development: Transport and Land Use

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1. Background

The Sustainable Development Goals (SDGs) are a set of 17 global goals established by the United Nations' *Transforming our World: the 2030 Agenda for Sustainable Development* in 2015 as a universal call to action to address various social, economic, and environmental challenges facing the world. The SDGs, such as No Poverty (SDG 1), Zero Hunger (SDG 2), and Good Health and Well-being (SDG 3), are designed to tackle a wide range of global challenges, promote sustainable development in many facets, and improve quality of life for people around the world while emphasizing a commitment to leaving no one behind. These goals provide a shared blueprint for countries, businesses, and individuals to work toward a more sustainable and equitable future by 2030.

Referred to as "Sustainable Cities and Communities", SDG 11 seeks to address the extensive challenges associated with urbanization and promote the development of inclusive, safe, resilient, and sustainable cities and communities. At its core, SDG 11 recognizes the unprecedented trend of urbanization, with over half of the world's population now residing in cities. This goal acknowledges the opportunities and complexities arising from this demographic shift, emphasizing the need for cities and human settlements to prioritize environmental sustainability, social inclusivity, and economic prosperity. In essence, SDG 11 envisages cities and communities as dynamic hubs of innovation, opportunity, and inclusivity. Through addressing various dimensions of urban/community development, the goal encourages us to create cities and communities that provide a high quality of life for all residents. Notably, achieving SDG 11 requires collaborative efforts from governments, local communities, businesses, and international organizations, emphasizing the importance of shared responsibility in building sustainable cities and communities for the future.

A prerequisite for achieving SDG 11 is the sustainable development of transport (spatial interaction) and land use (spatial development) [1]. Transport and land use are intricately linked components that jointly shape the physical, social, and economic fabric of cities, communities, and human settlements [2,3]. It is widely accepted that transport affects land use through accessibility, while land use affects transport through activities (Figure 1). More specifically, on the one hand, land use generates travel/activity demand and profoundly affects residents' trip production, attraction, distribution, and choice of mode of transport, thus influencing their travel patterns. On the other hand, transport changes the accessibility of land and the demand for urban development. This relationship plays a pivotal role in determining the efficiency, sustainability, and livability of cities, communities, and human settlements. Evidently, it is very complex and requires careful consideration and examination.

For an extended period of time, in numerous countries, including China, there has been a notable disconnection (or, at least, a semi-disconnection) between urban transport planning and land-use planning. Addressing this deficiency is key to resolving various interconnected urban challenges, such as traffic congestion and urban sprawl. The crucial solution lies in the strategic integration of urban transport and land-use planning. Therefore,

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in recent years, the topic of coordinating transport and land use has entered the public discourse, and its significance has been greatly emphasized.

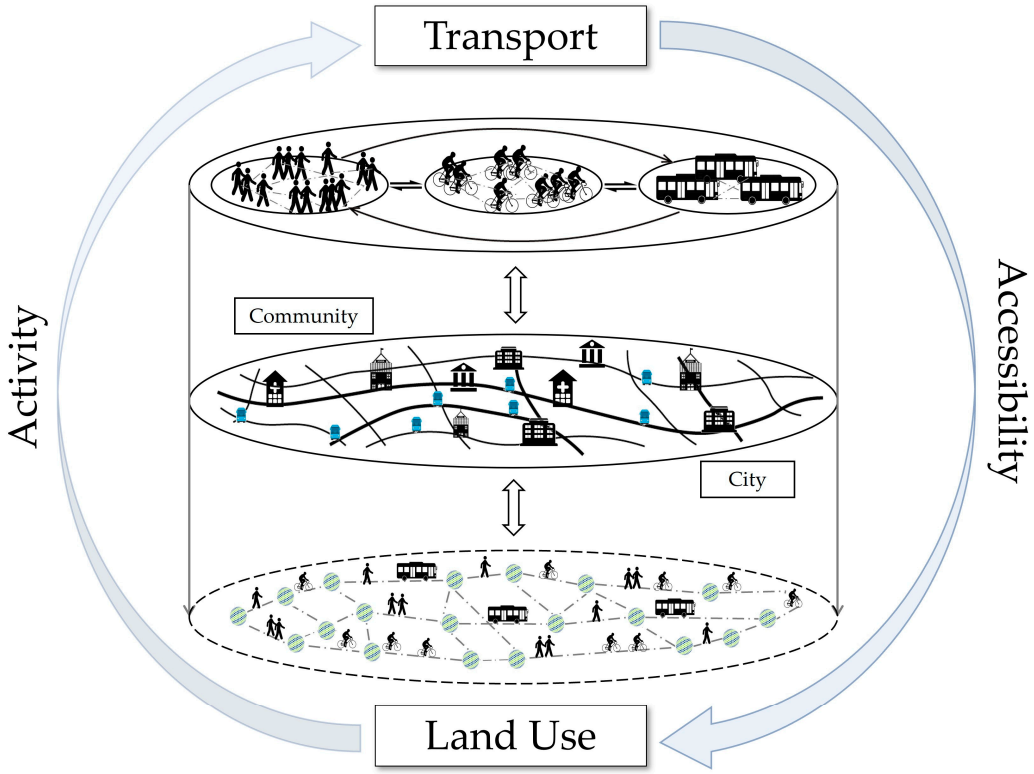

Figure 1. The interaction loop between transport and land use.

Systematic and rigorous evaluations and an enriched understanding of the interactions between transport and land use are urgently required to inform decision making and guide urban/transport planning, management, and development [4]. This is crucial to achieving transport–land-use integration and meeting SDG 11. The multifaceted connections between transport and land use need to be investigated, such as their historical evolution, contemporary challenges, and the critical role they play in the broader context of sustainable development, as well as approaches to the integration and coordinated development of transport and land use.

2. Overview of this Special Issue

This Special Issue opened in the Section "Sustainable Urban and Rural Development" of *Sustainability* in September 2021 and closed in July 2023. Its Guest Editors are five early career researchers specializing in Urban and Rural Planning or Transportation Planning and Management, including Dr. Linchuan Yang (Professor of Urban and Rural Planning at Southwest Jiaotong University), Dr. Yuanyuan Guo (Associate Professor of Urban and Rural Planning at Tianjin University), Dr. Yaoming Zhou (Associate Professor of Transportation Planning and Management at Shanghai Jiao Tong University), Dr. Wenxiang Li (Associate Professor of Transportation Planning and Management at the University of Shanghai for Science and Technology), and Dr. Jixiang Liu (Assistant Professor of Urban and Rural Planning at Xiamen University). The keywords for this Special Issue include transit-oriented development (TOD), transport policy, land-use policy, accessibility, mobility, travel behavior, shared mobility, built environment, and physical environment.

This Special Issue focuses on the interaction between transport and land use for sustainable urban planning and development. It offers a platform to share the latest accomplishments and research findings concerning the interaction between transport and land use, especially those with profound theoretical, methodological, and practical

implications and those focusing on new theories, data, variables, models, sites, and their associated implications in the realm of transport and land-use interactions. This Special Issue is designed to be a catalyst for informed discourse and innovative advancements in the field. By addressing the multifaceted aspects of the relationship between transport and land use, we seek to contribute a comprehensive body of knowledge that can inform and guide sustainable urban planning practices.

After approximately thirty submissions underwent the standard review process, thirteen papers were selected for this Special Issue. The acceptance rate was around 40%. Moreover, the inclusivity of this Special Issue is reflected in the international scope of its authors. They are from ten countries, namely, China, the United States, the United Kingdom, The Netherlands, Germany, the Republic of Korea, Pakistan, Thailand, South Africa, and Saudi Arabia. This global representation not only underscores the widespread interest in the intersection of transport and land use for sustainable urban planning and development but also highlights the collaborative and cross-cultural nature of contemporary research endeavors.

The collected papers cover a wide range of research topics. Traditional topics include the impacts of transport on land use (Contribution 1), the impacts of land use on transport (more broadly, activity) (Contributions 2 and 3), transit-oriented development (TOD) (Contribution 4), and transportation planning and management (Contribution 5). New topics include, but are not limited to, autonomous vehicles (Contribution 6), evaluating the potential of CO_2 emission reductions for carbon neutrality (Contribution 7), and roadmaps for future mobility development (Contribution 8). Moreover, the techniques utilized include regression analysis (Contributions 1-3, 9, 10), principal component analysis (Contribution 11), mathematical programming (Contribution 12), simulations (Contribution 13), foresight and/or scenario analysis (Contributions 7 and 8), Bayesian networks (Contribution 5), and qualitative approaches (e.g., semi-structured interviews) (Contributions 4 and 6). The diversity in the collected papers closely mirrors the high level of attention paid to sustainable transport and land use by researchers worldwide in many fields, such as urban and rural planning, transportation engineering, and transport geography. Furthermore, all thirteen papers included in this collection fall under the category of "Original Research". Regrettably, this Special Issue includes no literature reviews.

3. Future Research Directions

The future research directions for sustainable transport and land use cover a broad spectrum, including, but not limited to, the implications of emerging mobility (mainly comprising shared mobility, autonomous vehicles, and electric vehicles), the impacts of emerging mobility on TOD, smart growth and the integration of transport and land use, transit development and urban/community renewal, intercity commutes via high-speed railways and regional integration, accessibility modeling and planning, climate-resilient transport infrastructure and land-use solutions, the interplay between transport emissions and land use, the application of cutting-edge data and analytical technologies, and operational integrated land-use transport models [1].

Among the future research directions suggested, three areas are particularly worthy of investigation. The first pertains to the implications of emerging mobility [5]. It is widely believed that emerging mobility could potentially help improve transport efficiency and sustainability by reducing the vehicle miles traveled, energy use, required vehicle fleet size, service costs, and emissions, and could limit the emissions of greenhouse gases and non-CO_2 pollutants in the transport sector [6–8]. That is to say, emerging mobility could offer significant benefits if implemented and managed properly. However, relying solely on the theoretical advantages of emerging mobility without considering the real-world effects could be a misstep. For example, while emerging mobility has great potential for reducing trip costs through energy savings, cheaper trips may induce trips and spur excessive vehicle use. These types of counterbalances or trade-offs indicate that emerging mobility may not always have positive environmental impacts. All in all, a deeper understanding of the

implications of emerging mobility is beneficial in developing management strategies and supporting infrastructure (including land use) to help achieve the benefits of emerging mobility while mitigating any negative implications.

The second aspect of future research involves addressing climate change through the effective planning and management of transport and land use (i.e., seeking climate-resilient transport infrastructure and land-use solutions). Climate change profoundly influences ecosystems, weather patterns, sea levels, and human societies. It is the center of substantial attention from numerous stakeholders in today's society, evidenced by various national and local goals, such as carbon emission peak by 2030 and carbon neutrality by 2060 in China, carbon neutrality by 2045 in Sweden, carbon neutrality by 2045 in New Zealand, and carbon neutrality by 2025 in Copenhagen, Denmark. Addressing climate change through the effective planning and management of transport and land use is crucial, given that they are major contributors to greenhouse gas emissions. For example, the transport sector alone contributes to a quarter of total emissions [9]. Hence, sustainable practices in transport and land-use planning and management can play a significant role in mitigating climate change.

The third key research direction involves the application of cutting-edge data analytics to transport and land-use research. These data analytics have already revolutionized the landscape of transport and land-use research, offering unprecedented insights and transformative solutions. In recent years, advancements in collection methods for big/new data (e.g., global positioning systems, mobile phone signaling, and social media) have allowed urban/transport researchers and planners to gather detailed (even real-time) information about transport patterns, land use, and their dynamics. Moreover, cutting-edge data analytics, such as machine learning (more broadly, artificial intelligence), IoT (Internet of Things) analytics, and natural language processing, have emerged as powerful tools for processing large and complex datasets and extracting meaningful insights and patterns. These technologies enable researchers to analyze complex interactions between transport and land use, thereby facilitating a deeper understanding. Furthermore, the application of cutting-edge data analytics to transport and land-use research should not be regarded as merely "putting old wine into new bottles", as the Chinese proverb says. Instead, these analytics significantly enhance our capacity to comprehend the complexities of urban systems and contribute to evidence-based decision making. As cities continue to evolve and face the challenges of rapid urbanization, climate change, and resource constraints, applying cutting-edge data analytical techniques in research becomes paramount for creating innovative solutions that foster sustainable, inclusive, and resilient urban development.

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