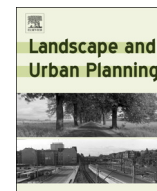




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Editorial

Urban expansion, sprawl and inequality

1. Introduction

According to the [United Nations, 2014](#) 'World Urbanization Prospects', the pace of urbanization in the recent decades has been rapid, often doubling in size every decade; urbanization could add another 2.5 billion urban residents by 2050, with close to 90 percent of the increase occurring in Asia and Africa. The greatest urban growth will take place in developing countries such as China and India. This unprecedented increase in urban population could not only pose challenges to providing jobs, housing, and infrastructure, but also exert more pressure on urban land management, spatial equity, and more generally sustainable development. The recent global financial crisis has intensified the debates over inequality ([Stiglitz, 2012](#); [Wei, 2015](#)), and equity has become a top sustainable development goal of the UN's post-2015 development agenda.

As cities are where population is increasingly concentrated, and land is a vital yet limited resource, equitable and sustainable development of urban land and urban space to cater the needs of this growing urban population is seen as one of the key challenges globally ([UN-Habitat, 2011](#); [Wei, 2017](#); [Wei & Ye, 2014](#)). Urban expansion and sprawl have been identified as the most significant aspects of urbanization and urban development. A key tenet for sustainable development and smart growth is promoting equitable urbanization and land development and mitigating land use conflicts ([Wei, 2017](#)). However, there is relatively limited scholarship that explores the global characteristics and mechanisms of urban land expansion and sprawl and their implications on equity and sustainable development ([Ewing & Hamidi, 2017](#)). The causal relationship between urban sprawl and spatial inequality has not been comprehensively and thoroughly examined; current literature overemphasizes subjects of patterns and experiences of the West ([Li, Wei, & Korinek, 2018](#); [Wei, Li, & Yue, 2017](#)). Moreover, existing literature connecting urban development with inequality mainly emphasizes environmental dimensions, and the subject of social sustainability is particularly under-researched ([Frenkel & Israel, 2018](#)).

Therefore, we need more sophisticated studies examining processes, mechanisms, equity, and sustainability of urban expansion and sprawl globally and comparatively, to understand the myriad ways in which urban expansion/sprawl, spatial inequality, and sustainable development relate to each other. We also need efforts to develop new theories, and innovative concepts and methods to understand the myriad ways in which these three constructs correlate with each other.

This special issue focuses on the inter-relationship between urban expansion/sprawl and equitable and sustainable development. It examines patterns, structures, and dynamics of urban expansion/sprawl

and their effects on spatial inequality from multiple dimensions (economic, social, political, environmental etc.). We seek to examine how urban expansion/sprawl affect sustainable outcomes, especially spatial inequality.

We announced a call for papers in various academic and professional organizations including AAG and ACSP to broaden the participation and publicize our efforts. All the submitted papers have been reviewed following the *Landscape and Urban Planning's* standard review protocol and quality standards. Ten research articles that address theoretical, methodological, empirical, and policy issues in urban expansion/sprawl and its effects on spatial inequality in the broad contexts of globalization, urbanization, and institutional change have been included in this special issue, including [Wei et al. \(2017\)](#), which was mistakenly published separately.

2. Objectives and research questions

This Special Issue aims at providing new insights on urban expansion/sprawl and spatial inequality, with relevance to *Landscape and Urban Planning* and its related fields. In the recent years, urbanization has accelerated in developing countries, and equitable and sustainable urban development has found relevance in diverse contexts and countries across the globe. With increasing global urbanization, interests in equity and sustainability of urban places continue to grow among researchers, academics, and practitioners engaged in urban planning, public policy and sustainable development in diverse nations, including United States, China, India, and United Kingdom.

While there have been several special issues on urbanization and sustainability (e.g., [Wei, 2017](#); [Wei & Ye, 2014](#)) and special issues on spatial inequality (e.g., [Wei, 2015, 2017](#)), no special issues have focused on the linkages between urban expansion/sprawl and spatial inequality. This Special Issue is unique. It includes articles from a varied group of scholars from interdisciplinary fields and international contexts. Conclusively, this Special Issue will provide a new lens on urbanization and equitable development, with four unique contributions: 1) comparative perspectives, 2) global coverage, 3) multiple dimensions and interactions, and 4) equity as a key component of sustainable development. We hope that this issue will contribute to broadening the understanding of the spatial and temporal aspects of urban expansion/sprawl – their patterns, processes and intertwinement with equitable and sustainable development.

While leaving an amplitude of space for innovative contributions that bring a new lens on equitable and sustainable urban development, this Special Issue examines spatially and temporally patterns and processes of urban expansion and sprawl, analyzes the effects of urban

expansion/sprawl on spatial inequality and equitable development, and provides helpful insights for urban planners and administrators to balance efficiency and equity, in policy making and implementation. It focuses on papers that address questions such as the following:

- What is the nature, structure, and trajectory of urban expansion/sprawl in different contexts, including institutional change, global urbanization and climate change?
- How is urban expansion/sprawl displayed in terms of spatial convergence/divergence, dimension, scale and time?
- What are the underlying concepts, mechanisms and the main drivers of urban expansion and sprawl?
- What are the governance and political processes? How are the roles of geography, contexts, and institutions in urban expansion/sprawl best measured?
- What effects do they have on equitable development at the local, regional, and global scales? Does urban sprawl increase residential segregation, spatial mismatch, digital divide, environmental injustice, and in general spatial inequality?
- How are developments in GIS, multimedia, and big data best used to advance our knowledge?
- What are the theoretical and policy implications of the research? How can they be used to promote equitable and sustainable urbanization and development in terms of policy, governance, and practices?

3. Urban expansion/sprawl: characteristics and measurements

The debate over urbanization and its consequences have been ongoing since the late 1940s with the end of the World War II. Globalization since the late 1980s has stimulated a new wave of urbanization (Sassen, 1991). Demographic urbanization is accompanied by equally rapid urbanization of land, and the rise of urban problems such as access to jobs, housing affordability, and inequality, as well as environmental and health challenges. Massive state investment in infrastructure and mega-projects characterize Asia's efforts to promote their cities and capitalize on globalization (Chen, 2009; Wei, Leung, & Luo, 2006; Wu, 2003). Scholars have been increasingly concerned with equity and justice issues worldwide in the broad contexts of globalization and urbanization (Benner & Pastor, 2012; Fainstein, 2010; Wei, 2017).

Urban expansion and sprawl have been treated as two different terms describing physical urban development process in developing countries and developed nations, respectively. Characterized by low-density, single-use, scattered, leapfrog development, urban sprawl has been identified as the most critical feature of urbanization and suburbanization in the United States (Ewing, 1997). Urban land development in developing countries has been identified as urban expansion, since most of this process lacks the characteristics of leapfrog and low density (Li et al., 2018). However, there is no clear dividing line between sprawling and compact development, and the process of urban land development in many cities cannot simply be characterized as sprawling development (Ewing & Hamidi, 2017). Over the years, infill development has reduced the level of urban sprawl in many cities, even such cities as Los Angeles, which has been at the center of the debate over urban sprawl (Ewing, 1997; Gordon & Richardson, 1997).

Since divergent definitions have been employed to capture the two similar processes of urban expansion and sprawl, different geographic and spatial patterns, measurements and underlying mechanisms have also been developed. Based on the application of GIS techniques, scholars have developed a series of methods to identify the spatial patterns of urban sprawl using different indicators such as time cost of traffic, mixed land uses, centrality of population distribution, density of development, and compactness scores (Galster, Hanson, Wolman, Coleman, & Freihage, 2001; Hamidi, Ewing, Preuss, & Dodds, 2015; Sierra Club, 1998; Tsai, 2005).

In this special issue, Talen, Wheeler, and Anselin (2018) provide a GIS-based analysis to identify urban sprawl through urban morphological patterns in the United States. By examining six diverse U.S. metropolitan regions: Boston, Atlanta, Chicago, Las Vegas, Portland, and Sacramento, they find that loops & lollipops, rural sprawl, upscale enclaves, degenerate grids, and garden suburbs are the core residential landscapes of sprawl, joined by non-residential built landscape types such as heavy industry, airports, trailer parks, and commercial strips.

Contemporary globalization and urbanization have important spatial dimensions, with the rise of central business districts (CBDs) for advanced business services, newly formed production centers in suburban areas, and spatially segregated neighborhoods dividing the rich and the poor, especially in developing countries such as China. Studies of China have also found unique patterns of urban expansion, manifested in multiple forms, including leapfrogged industrial parks, low-density suburban residential communities, and chaotic peri-urban informal development (Liu, Fan, Yue, & Song, 2018). Consequently, urban expansion in China has occurred at unprecedented rates, and Chinese cities have become multinucleated or polycentric, even in China's western cities (Schneider, Chang, & Paulsen, 2015).

The magnitude and measurement of urban expansion in developing countries have also been improved by the development of GIS and RS techniques. Based on the reclassification results of satellite images, the absolute changes and growth rates of built-up areas and construction land uses have been widely used to capture the urban expansion process (Huang, Wei, He, & Li, 2015; Li, Wei, Liao, & Huang, 2015; Li, Wei, & Zhou, 2017; Wei et al., 2017). With the social data revolution and big data technology, increasing numbers of studies have focused on the application of open data sources. In this special issue, using the data of points of interest, night light images, and Weibo records from 2009 to 2014, Long, Zhai, Shen, and Ye (2018) re-define the natural urban area in China based on the fractal analysis. They assess the magnitude and pattern of natural cities and their expansion in size and space, and then find that the spatial expansion rate of official statistics has been significantly underestimated. Their study provides a more realistic picture of urban land expansion in China.

Besides the magnitude and dynamics of urban expansion, a key issue concerning urban land development is the efficiency of urban land use. Patterns of urban land development differ within cities, and the extent of urban sprawl differs within metropolitan areas as well. It is important to understand the internal structure of cities, which influences the efficiency of urban land use. Researchers have started to evaluate the quality of urban land development based on the indicator of land use efficiency, which is defined as the economic output of an area of land. In general, the existing literature finds that the quality of urban expansion is highly associated with patterns of urban development, environmental change, industrialization, economic transition, as well as the establishment of development zones (Barbosa, Bragança, & Mateus, 2015; Huang, He, & Wei, 2016; Wu, Wei, Huang, & Chen, 2017).

Additionally, Long, Zhai, Shen, and Ye (2018) utilize the perspective of natural cities to evaluate the quality of urban expansion by calculating the ratio between the density of the expanded urban areas and that of the existing urban areas in the BTH, the Yangtze River Delta (YRD) and the Pearl River Delta (PRD). They find that the BTH has the highest functional quality of urban expansion, while the PRD has the best social quality. Urban land use efficiency in the YRD has improved over time, with the process of globalization and the improvement of accessibility (Wu et al., 2017).

4. Mechanism

The underlying mechanism of urban land development has also been hotly debated. With the development of GIS and modeling techniques, scholars have concluded a series of studies on the mechanisms of urban expansion and sprawl (Li et al., 2018). Transportation

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