

An Analysis of the Intrinsic Link Between Urban Green Transition and Sustainable Economic Development

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Abstract. Amid the global push for the Sustainable Development Goals, urban green transition stands as a critical pathway toward achieving sustainable economic development. This paper reviews the literature from 2020 to 2026, focusing on the drivers, economic effects, and policy practices associated with urban green transition, with particular emphasis on its synergies with sustainable economic growth. The study clarifies the core concepts of urban green transition and sustainable economic development, summarizes the synergistic driving roles of policy, technological, and social factors, analyzes the economic growth, employment, and spatial equity effects brought about by green transition, and examines representative urban practices and policy effectiveness. The study employs comparative analysis and exemplary case studies to systematically examine the inherent relationship between urban green transition and sustainable economic development. Through comprehensive analysis, this study identifies that urban green transition serves as the pivotal pathway toward achieving sustainable economic development, while the latter constitutes the primary objective of the former.

Keywords: Urban Green Transition, Sustainable Economic Development, Policy Tools, Urban Governance

1. Introduction

Against the backdrop of intensifying global warming and increasingly stringent resource and environmental constraints, achieving sustainable development has become a focal priority for nations worldwide. The Sustainable Development Goals (SDGs), introduced by the United Nations in 2015, offer essential guidance for countries' economic and social development. Among these, cities represent the epicenter of human activity. Thus, the green transition of cities has profound implications for addressing environmental challenges and serves as a critical pathway toward sustainable economic development.

This research aims to systematically review the literature from 2020 to 2026, examining the logical relationship and concrete pathways through which urban green transition enables sustainable economic development. The research content conducts a literature review from three dimensions: driving factors, economic effects, and policy practices, using literature analysis and comparative analysis methods to summarize the core viewpoints.

Theoretically, this study helps to clarify the intrinsic connection among green development, urban transition and sustainable economic growth, which can provide a direction for subsequent researchers and fill the gap in the field. Practically, by analyzing the driving factors and economic effects of urban green transition, it provides valuable insights for the government to formulate green development strategies, thereby facilitating sustainable urban economic progress.

2. Core concepts and theoretical bases

2.1. Definition of core concepts

Urban green transition refers to the process whereby cities, guided by the principles of ecological civilization, undergo systemic reform to shift from traditional development models characterized by high energy consumption and heavy pollution toward sustainable development paradigms emphasizing resource efficiency, environmental friendliness, low-carbon circularity, and social inclusiveness.

Sustainable economic development, meanwhile, denotes a growth model that achieves long-term, inclusive, and efficient economic progress without compromising ecological integrity or depleting natural resources. It seeks harmony and balance among the three pillars of economy, society, and environment, reflecting a development approach oriented toward long-term well-being. Accordingly, while meeting contemporary societal needs, it emphasizes the potential impact of present actions on future generations, thereby encouraging more far-sighted and responsible decision-making [1].

From these concepts, it follows that in today's society, the realization of low-carbon and smart cities constitutes a concrete pathway for urban green transition, ultimately serving the broader objective of sustainable economic development.

2.2. Review of theoretical bases

According to the Environmental Kuznets Curve (EKC), there exists a close relationship between environmental pollution and economic development: economic growth may contribute to intensified environmental pollution. Therefore, it is imperative for governments to implement mitigation measures and enforce regulations in order to effectively mitigate environmental pollution. In fact, socioeconomic progress and ecological conservation are mutually reinforcing. As Yuan and Liu assert, "A sound ecological environment is a fundamental prerequisite for the sustainable development of the entire socioeconomic system," which underscores the synergistic relationship between urban green transition and sustainable economic development [2].

The theory of urban spatial justice elucidates the principle that both urban and rural residents possess equal rights to development opportunities, and that no individual's spatial entitlements should be infringed upon by others [2]. Urban development should thus ensure that the benefits of green transition are distributed inclusively across the population, thereby fostering sustainable and equitable economic growth.

3. Driving factors of urban green transition

3.1. Policy driven

Among the multifaceted drivers of urban green transition, policy stands out as a pivotal element. Rational policy instruments can effectively guide industrial upgrading and restructuring, steering the

economy toward a sustainable pathway, thereby providing institutional support for sustainable economic development.

For instance, in the green transition pathways of resource-based cities, local governments consistently play a critical role. Since the majority of key resource industries are state-owned enterprises, government intervention becomes inevitable during their transition process. Well-designed and contextually appropriate policies can address a range of challenges, including market failures and the adverse effects of resource dependency [3].

Furthermore, fiscal and taxation policies serve as powerful mechanisms to accelerate urban green transition. Over the past century, the utilization of fiscal and tax instruments to regulate the development of the mining sector has become a common practice in many countries [4].

3.2. Technology driven

Technology serves as a critical enabler in steering urban development towards green and sustainable pathways. Its impact is primarily realized through two pathways. Firstly, green technology, focuses on clean energy and circular utilization to address high energy consumption and pollution at the industrial production source. For example, pressing issues such as thermal energy waste and wastewater discharge in the dyeing process of the textile industry can be effectively mitigated through the innovation and adoption of green technologies [5]. Type two is digital technology, represented by artificial intelligence and the Internet of Things, which optimizes the operation quality and efficiency of critical urban systems—such as transportation and energy—via intelligent regulation and enhanced sensing capabilities.

Besides, some scholars emphasize that technology-driven transitions are not isolated processes but are embedded within a synergistic framework involving policy and market. The systemic alignment of these three dimensions ensures the full realization of technological potential [6].

3.3. Social driven

Widespread societal engagement is the fundamental safeguard for the effective implementation and long-term success of urban green transition. This driving force is primarily manifested through two key actors: the enterprise and the public.

From the corporate perspective, integrating Environmental, Social, and Governance (ESG) criteria into core strategy represents not only a demonstration of corporate responsibility but a critical means of enhancing competitiveness. Practices such as green investment and sustainable production directly facilitate the optimization of industrial structures and the application of low-carbon technologies.

From the public perspective, as relevant research indicates, the deepening of environmental education has significantly raised public awareness of ecological protection. This has led individuals to increasingly favor green and low-carbon options in daily consumption and behavioral choices. Such shifts in awareness and behavior serve as a continuous source of social momentum for the advancement of ecological civilization [7].

In conclusion, corporate ESG practices and public environmental consciousness together constitute a social driving force. Their synergistic interaction ensures the inclusiveness and sustainability of urban green transition, thereby laying a solid social foundation.

4. Economic effects of urban green transition

4.1. Economic growth effect

In terms of economic growth effects, scholars have examined how green transition influences urban Gross Domestic Product (GDP) and industrial structure, yielding substantial consensus.

On one hand, the promotion of clean energy technologies not only addresses climate change but also drives economic growth. Taking Greece as an example, given its heavy reliance on imported technical equipment, the green transition has prioritized enhancing energy efficiency—for instance, by retrofitting power supply systems in older buildings. Such measures have not only significantly reduced greenhouse gas emissions but have contributed to GDP growth, thereby directly stimulating the economy [8].

On the other hand, urban green transition can facilitate industrial upgrading towards a low-carbon and high-value-added direction. Research has indicated that by investing in green technologies, and improving resource utilization efficiency, economic development can be sustained alongside environmental protection, thereby laying a sustainable foundation for future generations [9].

Studies at the corporate level have further revealed that green innovation capabilities enhance firms' financial performance [10], while employee training in sustainability also plays a facilitating role.

In a word, the green transition contributes positively to economic growth.

4.2. Employment effect

Within the dimension of employment effects, the academic community has reached a series of research conclusions.

From the perspective of job creation, urban green transition stimulates employment by generating new professions. For instance, under low-carbon city pilot policies, enterprises expand their operations driven by green production demands, which directly enhances urban employment levels [11].

In terms of employment structure adjustment, green transition drives labor flow towards the low-carbon field, leading to the formation of green jobs clusters. Concurrently, it imposes transition pressure on employment in high-carbon industries, necessitating skill reconstruction to adapt to the new economic paradigm.

Regarding employment quality, the intensification of corporate emission reduction efforts during urban green transition has not led to a decline in employee wages, and welfare levels have remained stable. This indicates that the employment impact of the transition is manageable [12].

In summary, urban green transition not only creates green jobs and optimizes employment structures but also requires facing the challenges of employment transition in high-carbon industries. Through policy guidance, synergy between employment and sustainable economic development can be achieved.

4.3. Spatial and equity effects

Studies on spatial and equity dimensions reveal that urban green transitions unfold unevenly across regions, with significant disparities in implementation and outcomes among cities. For example, noticeable differences exist in employment opportunities and benefits gained by diverse groups—such as urban and rural laborers and populations with varying skill levels—both between cities and

within them. These differences have, to some extent, exacerbated regional and inter-group inequalities.

In response, scholars emphasize the need to pursue inclusive urban green transitions. This entails designing targeted policy measures to support lagging regions and assist workers in affected industries. For instance, tailored support should be provided to resource-dependent cities and vulnerable groups to narrow development gaps and ensure equitable transition processes. The core objective is to promote social fairness and regional coordination while advancing green economic development, thereby ensuring that the benefits of progress are distributed more broadly across society [13].

5. Policy practices and models of urban green transition

5.1. Typical urban practices cases

As a resource-constrained state, Singapore has placed environmental sustainability at the core of its national strategy since its inception. As early as the 1960s, the country established the vision of a garden city and formally integrated environmental objectives into its planning framework. Entering the 21st century, with advancements in construction technology, the Singaporean government further recognized the intrinsic link between the construction sector and environmental sustainability. It progressively incorporated green building development into urban governance, thereby laying an institutional foundation for green transition.

To overcome path dependency in technological transition, Singapore has adopted a policy mix of mandatory regulations and diversified incentives, effectively mobilizing the intrinsic motivation of market participants. Firstly, the government employed economic measures such as tax incentives and subsidies to guide developers in pioneering green building practices. Secondly, it enacted the Building Control (Environmental Sustainability) Regulations in 2008, using mandatory legislation to compel the private sector to engage in green building transition. This governance model, combining mandatory standards with incentives, has significantly accelerated the widespread adoption of green buildings and provided transferable experience for green economic development in resource-constrained cities.

Unlike the model of Singapore, the European city of Copenhagen has leveraged its locational advantages and social consensus to establish a transition pathway centered on prioritizing green mobility and achieving carbon neutrality. By enhancing its cycling infrastructure and promoting district heating systems, Copenhagen has deeply integrated the green transition with public well-being. This strategy not only reduces the urban carbon footprint but also fosters emerging industries such as clean energy and green transportation, thereby achieving synergies between environmental benefits and economic growth [14].

5.2. Effectiveness of policy tools

Current research provide a comparative analysis of the implementation effectiveness of two core categories of green urban policies. The first category comprises command-and-control policies, which are centered around mandatory regulations. These policies can effectively constrain energy-intensive and high-emission activities; however, they tend to suppress enterprises' motivation for technological innovation and entail relatively high implementation and compliance costs. The second category involves market-based incentive policies that guide resource allocation towards green sectors through fiscal subsidies and similar measures. Such policies are more effective in

stimulating proactive corporate engagement in technological innovation and transition practices, although they generally require a longer period to yield noticeable results.

In conclusion, existing studies have reached a clear consensus: integrating command-and-control and market-based incentive policies, while strengthening interdepartmental collaboration, can fully mobilize market vitality and overcome the fragmentation inherent in single-sector governance. This approach significantly improves the efficiency of green transitions and provides a solid foundation for sustainable economic development.

5.3. Connection between global and local actions

Current research on urban contributions and international cooperation within the global climate governance framework has primarily focused on pathways linking global collaboration with local action. Scholars emphasized that, while safeguarding humanity's long-term common interests, it is crucial to account for varying national development stages and socioeconomic conditions, encouraging countries to participate in climate action based on their respective capabilities.

At the city level, local green transition practices must align with global climate objectives, facilitating the sharing of technology, expertise, and resources through international collaboration. Within this context, high-income economies should take a leading role by providing developmental support to low- and middle-income countries and cities, helping them overcome resource and technological barriers.

In short, the effective integration of global governance and local action represents a core pathway to advancing urban green transition and achieving sustainable global economic development, with strengthened international cooperation and knowledge-sharing serving as critical safeguard [15].

6. Conclusion

This paper systematically examines the synergistic relationship between urban green transition and sustainable economic development, highlighting their deep interconnection. Urban green transition serves as a critical pathway to achieving sustainable economic development, while the latter constitutes the core objective of the former. A relatively well-established research framework has been developed, offering substantial academic support for practical applications.

However, existing studies predominantly focus on cases from developed economies, with insufficient attention paid to developing economies. Moreover, interdisciplinary integration remains superficial, and the dimensionality of research requires further expansion.

Therefore, future research should prioritize urban case studies in developing economies to explore specific pathways aligned with their national conditions. Additionally, emphasis should be placed on investigating the long-term dynamic effects of their synergistic development and constructing enduring research frameworks.

By advancing these directions, the research system on how urban green transition facilitates sustainable economic development can be further refined, thereby strengthening academic foundations for global urban sustainability efforts.

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