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The Ideology of Sustainable Cities

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Abstract: This article focuses on the concept, characteristics, theoretical research, and international mainstream urban models of sustainable cities. Sustainability city refers to a city that is able to provide sustainable well-being for its inhabitants without reducing urban ecosystem services under certain socio-economic conditions. The theoretical study of sustainable cities has a wide range of perspectives covering all aspects of social development. It deals primarily with the physical composition of cities and the more abstract environmental, economic, social, cultural, political systems, and social equity aspects, and is characterised by efficient public transport systems, the use of renewable energy sources, sustainable buildings, and an overall commitment to reducing carbon emissions. Factors involved in sustainable urban forms such as new urban spatial forms, urban-rural relationships, scale and density, transport principles and land use patterns are explored. The validity of the compact city theory is proved or disproved from different perspectives, and the negative impacts of compact urban form, including the impact of high-density buildings on the ecosystem services of urban green spaces and urban biodiversity. In the context of rapid urban change and globalisation, the construction of sustainable cities is bound to face more challenges and opportunities. These studies have greatly enriched the connotation of sustainable cities and laid a theoretical foundation for the practice of building sustainable cities.

Keywords: Sustainable City; Renewable Energy; Sustainable Buildings; Idyllic City.

1. General

Since the 1960s, environmental pollution caused by rapid industrialisation has become increasingly serious, causing a high degree of alertness among scholars in western countries. 1962, the American marine biologist Rachel Carson, in *Silent Spring*, described the environmental pollution caused by pesticides and the many negative impacts brought about by industrial civilisation, and although there has always been controversy over the scientific validity of the contents of the book, it is undeniable that Rachel Carson promoted the cause of ecological and environmental protection worldwide in the 20th century. Although the scientific validity of the book has always been controversial, it is undeniable that Rachel Carson promoted the cause of ecological and environmental protection worldwide in the 20th century, and the alarm bells of environmental protection have been ringing ever since.

Cities are complex, multi-layered holistic systems, and a sustainable city is one that, under certain socio-economic conditions, is able to provide sustainable well-being for its inhabitants without diminishing the services of the urban ecosystem.

A sustainable city is more than just having ample green space; it embodies a holistic approach to environmental responsibility, economic vitality and social equity. These cities are characterised by efficient public transport systems, the use of renewable energy, sustainable buildings and an overall commitment to reducing carbon emissions.

Urban sustainability, which can also be referred to as sustainable urban development, is similar to the terms urban sustainability, sustainable cities and eco-cities. These three terms express the idea of sustainable development in urban development from different perspectives (i.e. urban sustainability emphasises the process of how things develop, while urban sustainability and sustainable cities are more concerned with the conditions and states of things. Eco-city is the environmental ecology of urban sustainability) expresses the application of sustainable development thinking to urban development, while their connotations are the same, i.e. how cities are evolving towards sustainability.

Since 1996, when the concept of sustainable development was first formally mentioned at the second United Nations Conference on Human Settlements, held in Istanbul, Turkey, the concept of sustainable cities has evolved along with the concept of sustainable development, and there has been a proliferation of international conferences, projects and initiatives related to sustainable cities. In recent years, a series of international conferences, such as the Urban Forum for the Twenty-first Century and the Millennium Summit of the United Nations in 2000, the World Summit on Sustainable Development and the launch of the World Urban Forum series in 2002, and the World Summit in 2005, have brought the sustainable urban development movement to its peak.

Sustainable urban theory studies a wide range of perspectives on various aspects of social development. It mainly involves the physical composition of the city (including urban form, system structure, function and metabolism) and the more abstract aspects of the environment, economy, society, culture, political system, social equity, etc. Based on the theories of ecology, geography, planning, environmental sciences, economics, management, sociology, systematics, engineering, operations research and other disciplines, the urban system presents an increasingly complex and in-depth intersection and synthesis. The theoretical study of urban systems based on the disciplines of ecology, geography, environmental science, economics, management, sociology, systematics, engineering, and operations research has become more and more complex and in-depth.

2. Sustainable Cities from Different Perspectives

Sustainable urban development is a process that can be analysed from environmental, economic and social perspectives.

Environmental perspectives usually assume that the public should constantly endeavour to improve the natural and human environments of their neighbourhoods and regions, while at the same time contributing to global sustainable development. A researcher named Tjallingii, referring to the growing urban environmental problems, points out that it is a duty and responsibility not to leave these environmental problems to future generations or to the wider community or even to the world at large at will, and from this characterisation refers to the sustainable city as Responsible City. Most scholars have pointed out that the use of the laws of the environment and ecology to solve urban Most scholars have pointed out that the use of environmental and ecological laws to solve urban environmental problems is the fundamental problem facing sustainable urban development.

From an economic perspective, sustainable urban development refers to the coordination of the structure and functions of urban systems in the global implementation of sustainable development. Specifically, it is the promotion of coordination of new urban structures and functions with and within the old ones through a balanced distribution of urban activities, such as agriculture, industry and transport, around the central link of the production process, which is achieved mainly through government planning behaviour.

According to the World Health Organization (WHO), sustainable urban development should be based on the premise of minimising the use of resources, so that the urban economy develops in the direction of greater efficiency, stability and innovation.

Naikamp also argues that cities should realise their full potential and continuously pursue high quantitative and qualitative socio-economic and technological outputs in order to maintain their stability and consolidate their position and role in the urban system in the long term. For most cities, especially those in the third world, their vitality can only be maintained if they increase their productivity and output of material goods.

And from a social perspective, Iftaki suggests that the social aspect of sustainable urban development should seek a city where human interaction, information dissemination and culture are greatly developed, characterised by dynamism, stability and equity, absence of criminality, and so on.

Tjallingii also pointed out that the social characteristics of a sustainable city are twofold: a sustainable city is a living city that should realise its full ecological potential for a healthy city, taking into account not only the totality of the city, but also adapting the different environments to the needs of the different ages and lifestyles of people in the city; and a sustainable city is a participatory city in which the public, associations, governmental bodies and others are actively involved in discussions of urban issues and in urban decision-making.

Early research in sustainable city theory germinated in the field of urban planning. Nearly 100 years ago, Geddes proposed the 'Eutopia' of the nature-integrated city, whose concept of nature in the urban area and Howard's 'idyllic city' planning discourse of the same time period profoundly influenced the concepts, procedures, methodologies, and theories of twentieth-century urban planning.

3. Concept and Practice of Sustainable Urban Planning

After the theory of sustainable development was put forward, the concepts of "eco-city" and "sustainable urban planning" became hot topics in the field of urban planning, giving rise to many urban planning concepts and practices based on the concept of sustainable development and ecological principles.

A number of cities around the world are well-known examples of sustainable urban development. These cities have implemented various initiatives and policies that prioritise environmental, economic and social sustainability. Here are some examples:

1. Copenhagen, Denmark

Copenhagen is known for its commitment to cycling infrastructure, with an extensive network of cycle lanes and bike-share programmes. The city has set ambitious climate targets, aiming to be carbon neutral by 2025 through renewable energy, green building practices and energy-efficient public transport.

2. Amsterdam, Netherlands

Amsterdam's urban planning prioritises pedestrian-friendly streets, public transport and an extensive canal system. The city promotes sustainable transport through a cycling culture and efforts to reduce car use.

3. Curitiba Brazil

Curitiba pioneered a Bus Rapid Transit (BRT) system that reduces traffic congestion and air pollution while providing affordable public transport.

4. Vancouver Canada

Vancouver focuses on green building practices, with LEED-certified buildings that emphasise sustainability in urban development. The city's commitment to reducing greenhouse gas emissions and promoting renewable energy is notable.

5. Singapore

Singapore prioritises urban greening, including vertical gardens, rooftop green spaces and extensive parks. The city uses advanced water purification and recycling technologies to manage water resources effectively.

6. Portland, Oregon, USA

Portland is known for its integrated public transport system and its commitment to urban planning that encourages walking, cycling and public transport use. The city has strict land use policies to prevent urban sprawl and protect green spaces.

7. Stockholm, Sweden

Stockholm is committed to sustainable urban development, including environmentally friendly transport, energy-efficient buildings and extensive recycling programmes. The city aims to be fossil fuel-free by 2040, with an emphasis on renewable energy.

8. Freiburg, Germany

Freiburg is known for its sustainable urban planning, featuring solar-powered homes, car-free neighbourhoods and green roofs. The city prioritises community participation in the decision-making process.

9. San Francisco, California, USA

San Francisco has set ambitious climate goals, including zero waste by 2020 and 2030 per cent renewable energy by 100 years. The city promotes recycling, composting and renewable energy.

10. Helsinki, Finland

Helsinki focuses on energy efficiency and sustainable transport and plans to phase out car ownership by providing comprehensive public transport and travel services. The city encourages innovation and start-ups in the field of clean

technology.

These cities are inspiring examples of how urban areas are prioritising sustainable development through innovative policies and practices that improve the quality of life of their inhabitants while minimising their impact on the environment.

In 2023, five cities - Salvador, Brazil; Kampala, Uganda; Brisbane, Australia; George Town, Penang, Malaysia; and Fuzhou, China - were honoured with the inaugural Global Sustainable Cities Awards (Shanghai Awards).

1. Salvador, Brazil

The Master Plan for Urban Development of Salvador (PDDU) was published in 2016, establishing the right to sustainable cities as one of its principles. A systematic development plan has been developed, with specific and multifaceted plan refinement and deepening in line with the UN Sustainable Development Goal 11.In 2019, El Salvador launched its Resilience Strategy, which proposes a long-term plan to develop initiatives and public policies that recognise resilience as a core value that will generate dividends in a number of areas. The Salvadoran Climate Change Mitigation and Adaptation Plan was completed and launched in December 2020 in order to strengthen sustainable and resilient planning.

2. Kampala, Uganda

Kampala is one of the important economies in Uganda, accounting for more than 65 per cent of the country's GDP. In the process of urban development, Kampala faces many challenges, such as transport safety issues and ecological problems. Kampala has developed a five-year development plan for 2020-2025, which includes four key dimensions: economic growth, governance and civic engagement, quality of life and urban resilience. In order to respond to urban development issues, Kampala proposes a series of action strategies that are in line with the Sustainable Urban Development Goals.

3. Brisbane, Australia

Brisbane, Australia's fastest-growing capital city, has developed an ambitious yet realistic vision and translated it into a long-term development plan. The fact that much of Brisbane's greenfield land is fully developed means that increased density must be accommodated by regenerating the existing inner city and suburbs. Brisbane is built on a floodplain and needs good planning and construction to make the city more resilient. The Brisbane City Plan 2014 is the city council's planning plan that guides how Brisbane's land can be used and developed to help the city grow, while maintaining the character of its suburbs and creating Neighbourhood Cities. The Brisbane Sustainable Growth Strategy sets out ways to manage the city's growing population while protecting and enhancing Brisbane's desirable lifestyle. In order to re-densify the inner city, which is running out of room for growth, Brisbane has adopted a number of commendable solutions, including affordable housing programmes, new forms of connectivity and sustainable transport strategies.

4. George Town, Penang, Malaysia

Penang is an important trading port in Malaysia and became the centre of Malaysia's electronics and electrical (E&E) industry in the 1970s, as well as a UNESCO World Heritage Site. In the midst of rapid urbanisation and urban sprawl, Penang has adopted a number of policies and programmes to address the challenges of environmental issues and to reduce its carbon footprint. 2018 saw the introduction of Penang Vision 2030, which focuses on sustainability, livability, and smart development driven by cross-sectoral technologies. "Penang Vision 2030 encompasses all the United Nations Sustainable Development Goals (SDGs). Based on natural climate resilience and environmental protection, it emphasises public and multi-stakeholder participation, and implements a comprehensive range of urban governance measures.

5. Fuzhou, China

Fuzhou has long adhered to a low-carbon development model, and has made great efforts to develop high-tech, digital economy, marine industry, culture and tourism, and has achieved remarkable results in sustainable development. With urban resilience and safety as the bottom line, Fuzhou has implemented urban water system management projects to optimise water resource allocation and reduce water use and waste. Fuzhou is also promoting sustainable environmental strategies to build a green, low-carbon and eco-friendly city of "a city of a thousand gardens". Fuzhou has built 18 pilot sustainable communities. The Liuhua Stream project is one of the typical cases of comprehensive water system management in Fuzhou.

On the other hand, scholars have begun to explore the factors involved in sustainable urban forms such as new urban spatial forms, urban-rural relationships, scale and density, transport principles and land-use patterns, and there is as yet no conclusive evidence as to which is more sustainable: the compact city or the decentralised city.

Scholars have proved or disproved the correctness of the theory of compact cities from different perspectives, while the negative impacts of compact urban forms, including the impacts of high-density buildings on the ecosystem services of urban green spaces and on urban biodiversity, still exist. In the evolving theoretical explorations in Europe and the United States, the view that sustainable cities should adopt compact development forms has become mainstream.

As early as 1994, the Aalborg Declaration in Europe began to advocate compact transport modes and energy conservation at high densities, and subsequently, the development of compact cities in conjunction with public transport has become one of the main strategies for implementing sustainable urban development in Europe and the U.S. In the late 1990s, the U.S. began to realise the urban sprawl brought about by the development of suburbanisation, as well as the many problems brought about by multi-centred metropolises, and in 2000, the Smart Growth Coalition of America was formed to propose a New Urbanism. In 2000, the U.S. Smart Growth Coalition was established and proposed New Urbanism. Under the influence of the compact city concept, the United States established the Smart Growth Coalition in 2000 and proposed "New Urbanism."" The smart growth concept at the heart of "New Urbanism" is a set of basic principles for suburban land use planning, with the fundamental aim of stopping urban sprawl and the reproduction of sanctuary-like suburbs.

In addition, criteria for sustainable urban form and structure, as well as sustainable urban micro- and macro-structures were introduced and discussed.

From the 1990s to the present, research on sustainable cities in Europe and the United States has gradually shifted from the urban system scale to the community scale, and Rudling put forward the concept of sustainable urban neighbourhoods, as well as the 4C model of sustainable and relevant settlements, i.e., environmental protection, residents' choices, community and cost, emphasizing the development

of compact settlements within cities and the establishment of equal neighbourhoods integrated with all classes of the population, and so on.

Based on the concept of compact cities, Sannecker has proposed an ideal model for sustainable housing in large cities. With regard to the ecological problems of sustainable cities, Ecology of Urbanisation has gradually shifted from the traditional theoretical scope of ecology to the fields of cities, human settlements, information technology and spatialisation, with specific studies ranging from the reduction of green space to the drastic changes in ecosystems and biodiversity, and many discussions on the environmental effects produced by urbanisation and the changes in the types and processes of the environment within cities have emerged. There have been many discussions on the environmental effects produced by urbanisation and the changes in the types and processes of urbanisation, and in recent years the hotspots of attention have gradually shifted to the directions of environmental carrying capacity and total urban control, ecological restoration and energy-saving technologies, sustainable urban environmental indicators, ecological land use patterns and urban ecological networks.

Research on the sustainability of metabolism and functions within urban systems is another entry point for exploring sustainable cities.

In 1965, Vollmann first proposed Urban Metabolism to understand the impact of cities on the environment, and the efficiency of urban metabolism is regarded as an indispensable element for sustainable development of cities, e.g. Boyden studied the operation of Hong Kong's urban system based on the metabolism of the urban system; at the same time, the construction of relevant system dynamics or metabolism At the same time, constructing relevant system dynamics or metabolism models to study the sustainability of urban systems has also become a research hotspot. For example, Newman further developed the urban metabolism model and argued that a complete urban metabolism model should also include the social characteristics of the city - livability. Egger proposed a sustainable city model from a systemic perspective to describe the connectivity, potential and resilience of the city, and set quantifiable indicators and parameters for the model in terms of the city itself and its linkages with its neighbourhood; Crillyc et al. proposed the Sustainable Urban Management System (SUMS) to analyse the mainstreaming and public acceptance of local policies and practices in cities, in order to help city managers in their efforts to develop sustainable urban management systems. Whitehead suggests that it is crucial to analyse the interactions, flows and mechanisms between the environment, economy and society in urban systems, to analyse the structural and policy forces that shape sustainable urbanism, and to rethink sustainable urban policies from a systems perspective. These studies have greatly enriched the connotation of sustainable cities and laid the theoretical foundation for the practice of building sustainable cities.

4. International Mainstream Urban Models

Internationally, the dominant urban models include the idyllic city, the liveable city, the healthy city and the wellness city. Idyllic cities advocate the earliest integration of nature into the city; livable cities emphasise the concepts of safety, health, convenience and comfort; healthy cities emphasise health-promoting processes as well as the improvement and maintenance of the natural and social environments; and eco-cities based on the principles of ecological preservation strategies, eco-infrastructures, the standard of living of the inhabitants, cultural and historical preservation, and the integration of nature and the city. At the same time, there is a proliferation of international conferences, practical programmes, competitions and prizes related to city building. At the same time, there have been numerous international conferences, practical programmes, competitions and awards related to urban construction. In summary, its development can be divided into five stages, namely, basic theoretical discussion, urban design, applied research, construction process and the formation of organic urban organisation or selection of urban titles, which change with the continuous cognition and deepening of urban issues. After the concept of sustainable development was introduced, it gradually became one of the core elements of each city building model, and scholars began to reinterpret the relevant concepts from the perspective of sustainable development, such as Salzano, who argued that the past and future are linked from the perspective of sustainable and livable cities, which respect both the imprints of the past (our footprints) and our future generations. The resurgence of eco-urban planning after the 1990s The resurgence of eco-urban planning after the 1990s has led to a great deal of exploration of the sustainability of eco-cities.

The earliest sustainable cities programme was the Sustainable Cities Programme (SCP) proposed globally by UN-HABITAT and the United Nations Environment Programme (UNEP) in 1991, but this project only dealt with the ecological component and was not really about sustainable urbanism.In 1994, the European Sustainable Cities and Towns Conference (ESCTC) released the Albor Programme of Action, which marked the beginning of the European Sustainable Cities and Towns Movement, thus setting off a more representative movement. movement, thus launching a more representative movement. The conference has provided participating cities with a series of toolkits for achieving sustainable towns and cities, and has been held successfully for four years now, with initial results in terms of practical guidance on concrete sustainable towns and cities, focusing on sustainable town planning concepts such as Compact Cities, Green Townships, Ecological Communities, Pedestrianisation of City Centres, and the promotion of Urban Public Transport Networks, as well as on urban ecological remediation, ecological taxation, eco-budgets and audits, energy labelling, forest certification, and the use of energy efficiency and energy efficiency in the design and implementation of sustainable towns and cities. Ecological budgeting and auditing, energy labelling, forest certification, etc. These include ecological budgets and audits, energy labelling, forest certification schemes, nature schools and other strategic or management mechanisms. As sustainable urban development is influenced by ecologically oriented urban development, it has more ecological aspects and fewer socioeconomic aspects.

In building sustainable cities, attention to process and willingness to move towards a sustainable city are key to success or failure. A comparison of case studies of three sustainable cities, Austin, Curitiba and Frankfurt, which are often cited as examples of sustainable cities, suggests that "public dialogue" (dialogue on the environmental aspects of the city) is a key success factor. Similarly, the International Council for Local Environmental Initiatives (ICLEI) field

study of the results of the Local Agenda 21 process in European cities and towns in 2000 concluded that the cooperation of local governments with stakeholders and active dialogue with citizens on the future of the city were the main reasons for the success of successful examples of sustainable urbanization.

5. Conclusion

Sustainable cities are a new pursuit and an inevitable choice. The infinite tension of sustainable urban construction is embedded in its rich connotation, including the principles of early warning, foresight, temporal and spatial dynamics, long-term, comprehensive and systematic coordination. The successful practice of building its ambitious projects implies a process of transformation of cities, societies and their civilisations in order to meet the needs of cities, promote social equity and civilisational progress, improve the efficiency of urban systems and forge the capacity of cities to achieve sustainable development. In the context of rapid urban change and globalisation, the construction of sustainable cities is bound to face additional challenges, mainly in the following three areas.

1. To deeply reveal the relationship between the structure, functions, metabolism and processes of the city's own system, supplemented by long-term dynamic observations and analyses, to anticipate and proactively guard against possible future hazards and risks in the long term, and to propose comprehensive, coordinated and forward-looking means.

2. To have a deep understanding of the city's own resource needs, development patterns and social, economic and ecological well-being, to be aware of the close links with other cities around the world in the context of globalisation, to compare and learn from different exemplary cases, to explore the sustainability of the key elements of ecological, social and economic well-being, and ultimately to achieve an efficient integration of the basic elements of the social, economic and natural systems in a holistic manner, structured and functionalised, combined with an indicator system to effectively characterise and evaluate them. The ultimate goal is the efficient integration of the fundamental elements of social, economic and natural systems, their comprehensiveness, structure and functionality, and their effective characterisation and evaluation in the context of a system of indicators.

3. The key to sustainable urban development lies in the establishment of an effective and comprehensive system of evaluation indicators, whose management model and structure will continue to take various forms and levels through policy frameworks, laws and regulations, reforms and innovations, and the building of civilization, in combination with top-down political guarantees, bottom-up public participation and in-depth community-based active dialogue, so as to ultimately achieve the goal of sustainable urban development.

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