

Original article

FEATURES OF CHINESE SOCIO-ECOLOGICAL-ECONOMIC POLICY TO STIMULATE SUSTAINABLE URBAN DEVELOPMENT: THE CASE OF HANGZHOU CITY

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Abstract. Scientific and technological progress, accompanied by the rapid process of urbanization, has caused a significant change in the socio-ecological-economic environment, which is particularly reflected in the state of the environment of modern cities. Big cities are a striking example of anthropogenic change in the socio-natural environment, and not always intentional. The article uses the example of Hangzhou to analyze in detail the current situation in the social, environmental and economic spheres of the urban system, assessing the degree of their sustainability. The characteristics of socio-environmental-economic policies of the People's Republic of China aimed at promoting sustainable urban development are revealed and systematically analyzed. It analyzes the influence that current fluctuations in the global economic situation have on socio-economic policy. It is demonstrated that the development of socio-eco-economic policies to promote sustainable urban development will lead to an improvement in the quality of the urban environment, and, as a consequence, an improvement in the quality of life in Chinese megacities.

Keywords: socio-ecological-economic policy, sustainable urban development, stimulation, urban system, economic policy

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Проблемы экономики

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ОСОБЕННОСТИ СОЦИО-ЭКОЛОГО-ЭКОНОМИЧЕСКОЙ ПОЛИТИКИ КИТАЯ ПО СТИМУЛИРОВАНИЮ УСТОЙЧИВОГО РАЗВИТИЯ ГОРОДОВ: КЕЙС ГОРОДА ХАНЧЖОУ

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Аннотация. Научно-технический прогресс, сопровождающийся бурным процессом урбанизации, вызвал значительное изменение социо-эколого-экономической среды, что особенно отразилось на состоянии окружающей среды современных городов. Большие города являются ярким примером антропогенного изменения социоприродной среды, причем не всегда преднамеренного. В статье на примере города Ханчжоу детально анализируется современная ситуация в социальной, экологической и экономической сферах городской системы, дается оценка степени их устойчивости. Выявляются и системно анализируются характеристики социо-эколого-экономической политики Китайской Народной Республики, нацеленной на стимулирование

устойчивого развития городов. Анализируется влияние, которое оказывают на социо-эколого-экономическую политику современные флуктуации глобальной экономической ситуации. Демонстрируется, что развитие социо-эколого-экономической политики по стимулированию устойчивого развития городов приведет к повышению качества городской среды, и, как следствие, к повышению качества жизни в китайских мегаполисах.

Ключевые слова: социо-эколого-экономическая политика, устойчивое развитие городов, стимулирование, городская система, экономическая политика

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Three dimensions of sustainable urban development

In 1987, sustainable development was proposed for the first time. According to Brundtland Report, sustainable development is defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs [1]. The balance of social, ecological and economic sustainable development is the central idea of the sustainable development concept [2-4]. Urban sustainable development is an important concept in the sphere of sustainable development for the major role the city plays in human society. Therefore, urban sustainable development is the basis of national sustainable development.

Urban sustainable development mainly focuses on the sustainable development of cities from the perspective of resources, environment, economy and society. W. Betal, Y. Pan and Q. Wang with co-authors hold that a city should make rational use of its own resources, pay attention to the using efficiency for the benefit of contemporary people and future generations in order to achieve sustainable development [5-7]. From the perspective of environment, W. F Tjallingii deems that the environmental problems cannot be left to the future generations and regards the sustainable city as the city of responsibility and obligation. Who proposes that the sustainable development of cities should make the urban economy evolve towards the more efficient, stable and innovative direction based on the minimum utilization of resources. According to O. Yiftachel, in the aspect of society, the sustainable development of cities should pursue a city with great development of culture, human communication, social welfare and information dissemination, featured by stability, vitality and fairness [8].

As the center of electronic commerce, Hangzhou is an emerging city in China recently. From an ordinary tourist city, it has developed into an Internet city which aims to build “the first city of digital economy” in China. In the end of 2017, Hangzhou’s GDP accounted for 1.5% of China’s total, 0.7 percentage points higher than that in 1978, ranking the tenth among all the cities in China.

In 2001, Hangzhou government issued *Construction planning of Hangzhou ecological city*, in which the economic structure, industrial system, ecological system and social management system that meet the requirement of sustainable development would be completed by the year of 2020 according to plan. In 2016, the global working conference of ISO Technical Committee on urban sustainable development standardization (ISO/tc268) was held in Boston. Hangzhou was officially awarded as the world’s first pilot city of international standard for urban sustainable development (ISO37101). Hangzhou has thus become the world’s first standardization leader of urban sustainable development. In 2019, Jianggan District (Hangzhou central business district) has made a comprehensive and significant improvement in the six major aspects of attraction, happiness, resilience, social cohesion, rational utilization of resources and environmental protection after three years’ experiments. Through the test results, Jianggan District has finally become the world’s first international standard demonstration district for urban sustainable development.

Methodology for socio-ecological-economic policy to stimulate sustainable urban development assessing

The methodological basis of the author's approach was the innovation-cyclical paradigm of urban systems’ sustainable development. According to this methodology, the achievement of a particular level of well-being by present and future generations depends steadily on the quality of the accumulated resources – not only productive, but also human, social, and environmental [9, 10].

In the framework of this methodology, the model of comprehensive assessment of socio-environmental and economic policies to stimulate sustainable urban development should be based on the criteria of social, environmental and economic efficiency. Social criteria include employment, quality of life, social security, availability of social infrastructure. To environmental criteria – indicators of environmental safety and justice, biodiversity conservation, public health, water quality, environmental pollution. The components of the group of economic criteria are capitalized income, economic security, innovative activity, preservation of human and natural capital.

Results and suggestions

As part of the study, the prospects of using the methodology of sustainable development of urban systems were demonstrated. The analysis of the socio-economic policy of Hangzhou allowed the authors to identify the key factors that shape the strategy of sustainable development of Chinese urban systems.

Speaking of the social aspects of Hangzhou's policy of promoting sustainable development, the following achievements should be noted.

Hangzhou, as the only city selected as one of “China’s happiest cities” for 13 consecutive years, was awarded the honor of “happiness model city” by the organizing committee in 2019. Hangzhou’s permanent resident population increased by 554000 in 2020, with the growing rate ranking first in China.

In 2011, the public bicycle system was evaluated as one of the eight cities that provided the best public bicycle service in the world by BBC. In 2017, Hangzhou had 85,800 bicycles, and these bicycles had been rented for more than 700 million times, of which 96% are free. At the same time, it has introduced concepts and technology to more than 200 cities (regions) in China. It effectively reduced urban congestion in a low-carbon way and has become the largest public bicycle system in the world. These bicycles were called as “the red bike” by the citizens of Hangzhou. As the integral component of the public transportation of Hangzhou, “the red bike” is the important hallmark of Hangzhou.

In 2014, Hangzhou published the “Nursing service standard of care facility for the disabled”, which is the first local standard in China. It includes basic nursing service, rehabilitation training system, security guard service, medical system and social welfare system. It vividly explains the standards of service, management and supervision of the care facility. The satisfaction rate of the family of the disabled has reached 90%. By the end of 2020, Hangzhou has established 188 care homes for the disabled people. The measures of Hangzhou government have outpaced the other provinces of China.

The Spring Breeze Action Plan in Hangzhou has raised a total of 2.225 billion yuan (\$0.34 billion) of social funds, 659 million yuan (\$101.81 million) of supplementary funds from all levels of finance, and more than 52,800 units and 3.15 million people have donated to the “spring breeze action plan” since 2000. The donation is used to help the poor and disabled people, to provide better employment services for female graduates and medical care to those people who cannot afford it. The “spring breeze action” is deeply rooted and widely praised in Hangzhou.

From the beginning of 2020, each new college graduate in Hangzhou could receive a housing subsidy of 10000 yuan (\$1544.88) for three consecutive years. Each enterprise employee who rented a house could receive a housing subsidy of 500 yuan (\$77.24) per month during the epidemic period. In the end of 2020, people were encouraged to spend Spring Festival which is the most important traditional festival in China at where they lived this year in order to curb the spread of the novel coronavirus. Hangzhou government offered 1,000 yuan (\$154.49) to those people who chose to spend Spring Festival in Hangzhou.

Innovative management tools are constantly used in the city management system. The City Brain system of Hangzhou, was a system established by Hangzhou government and Alibaba. It was dubbed as “Hangzhou’s gift to the world”. It originated from 2016 and has been applied in 13 spheres including transportation, medical care, police work, tourism, city governance and 48 platforms such as parking, renting, hotel accommodation, food safety supervision, domestic violence prevention and traffic jam warning. As for the citizens, they could solve the problems of eating, transportation, travel and shopping with ease with a mobile phone. As to the government, the appearance of the City Brain system brings fundamental change to the governance of Hangzhou with a mobile phone. By using the City Brain, patients were able to pay only once for the entire medical consultation at 252 medical institutes. More than 22 million Hangzhou residents have benefited from this at the hospital.

The City Brain uses artificial intelligence to gather information around Hangzhou, such as video of GPS data and intersection cameras on the location of the vehicles on the road. At the same time, the platform analyzes different information as it coordinates thousands of traffic lights in the city with the purpose of preventing or reducing traffic jam. After two years of testing, the City Brain system appears to be working. The City Brain shortened commutes and also helped first responders by enabling fire trucks and ambulances to halve the amount of time it takes to get to the scene of emergencies. By 2025, cities using such systems could cut commutes by an average of 15% to 20%. Alibaba's platform has been applied by many other Chinese cities and was introduced to Kuala Lumpur in 2018, the capital of Malaysia [11].

In the process of COVID-19 epidemic control and prevention, the City Brain system helped the government to tackle with the threat of the pandemic by using big data and artificial intelligence. After the outbreak of the pandemic in 2020, Hangzhou's City Brain rapidly changed from daily operation to "wartime" state. The outbreak of the pandemic coincided with the Spring Festival, which leads to the world's largest migration. After the festival, millions of people would go back to their workplace, which was a challenge to the control of the pandemic. In this situation, a color-based health QR code to indicate personal health status was first developed by Alibaba and first applied in Hangzhou. Then the health QR code was rolled out around the country. The City Brain provides a new perspective to control the pandemic and meets the challenge of the epidemic. It ensures the safety and health of the common people and the social sustainable development.

The tools of environmental sustainability also receive considerable attention in Hangzhou's urban management.

Hangzhou is the capital city of southeast China's Zhejiang province, with a history of more than 2,000 years. Dubbed the "Paradise under Heaven", the city is well known across the globe for its splendid natural scenery, numerous historical relics, fine silk and Longjing tea.

Hangzhou also continuously deepened the construction of ecological system, paced the whole nation in establishing ecological compensation mechanism, explored the establishment of pay-offs and strategies for pollution reduction, developed the regulation system and issued policies and regulations such as "Regulations on promoting ecological development in Hangzhou".

Hangzhou has two world natural and cultural heritages, two national scenic spots, two national nature reserves and eight national forest parks. In 2018, the city's forest coverage rate is 66.83% while the green coverage rate is 40.2%. Meanwhile, the city's Green Park area is 8,950.48 hectares. Altogether these figures make the city more ecological and habitable.

Hangzhou is noteworthy for its rich resource of lake and river as a tourist destination. However, there were different degrees of water pollution in the six major water systems of Hangzhou in recent years. All kinds of garbage were poured to the rivers.

Since 2017, Hangzhou government has shut down 70 paper-making enterprises with a capacity of more than 5 million tons, and reduced wastewater discharge by 60 million tons a year. Hangzhou government checked the water quality every month and issued "red, yellow and orange" warning according to the result. The relevant warning was passed to the local government of the districts in time.

Garbage sorting has been enforced in Hangzhou since 2010. Different measures are taken to encourage the citizens to sort the garbage. In some supermarkets in Hangzhou, some kinds of waste could be exchanged for daily necessities. Construction waste is processed into bricks, and the recycling rate has reached 97%. Silt from river dredging is used as the fertilizer for flowers. Altogether after the cleanup it has renovated 480 heavy polluting enterprises and 402 water-related industries, eliminated 1,421 backward capacity enterprises. People's satisfaction with water control increased from 60% in 2014 to 92.5% in 2019 [6].

Just like other cities in China, smog began to shroud Hangzhou from 2013. Hangzhou government issued a series of measures to control pollution and pledged to crack down on polluters and negligent officials.

In 2014, Hangzhou government listed smog control as the top priority of the government's agenda and lost no time in publishing "Regulations on the prevention and control of air pollution". It established the joint prevention and control mechanism of air pollution with Jiangsu province, Zhejiang province, Anhui province and Shanghai.

Over the past few years, Hangzhou has built a "coal-free area" in the main urban area, gradually phasing coal-fired enterprises out. It strengthened the management of vehicle exhaust pollution, abandoned more than 300,000 old cars, and actively promoted new energy vehicles. Now, in the streets of Hangzhou, clean energy and new energy buses account for 97.7%. At the end of 2015, Hangzhou took the lead in transforming into a city without iron and steel production enterprises and coal-fired thermal motor units. In Table 1, it is evident that the smog has been controlled by the government.

Таблица 1 – Ежегодное количество дней в Ханчжоу с высоким уровнем загрязнения атмосферы¹

Table 1 – The statistics of days that are polluted with smog in Hangzhou

Item \ Years	2013	2014	2015	2016	2017	2018
Days that are polluted with smog	239	154	106	75	68	59

The next important area of urban management in China is the management of tea plantations. West Lake Longjing tea is well-known to the world. West Lake scenic spot is the major production area and first-class protection area of West Lake Longjing tea, covering seven Longjing tea bases, with an area of more than 6,000 mu (about 400 hectare). The project team collected 83 technical standards, management standards, work standards and operation standards related to West Lake Longjing tea, including 30 newly formulated and revised standards and additional relevant management systems. Combined with the promotion and implementation of the standard, the scenic area invested tens of millions of funds in the construction of large-scale ecological infrastructure, such as beautiful tea garden trail, tea garden reservoir, tea garden sprinkler irrigation facilities, and tea garden ecological multiple cropping, which greatly improved the ecological environment of tea garden.

In 2016, the pilot project of "mutual recognition and mutual protection between China and Europe" was launched. "China-EU mutual recognition and mutual insurance project" was jointly promoted by Administration of Quality Supervision, Inspection and Quarantine in China and the European Commission. The project specifies that 10 products designated by China can be approved to use the official marks of EU geographical indication products, and are protected by 28 EU member states. The pilot project means that West Lake Longjing tea has obtained the EU passport, which opens the door for West Lake Longjing tea to the world.

The economic aspect of sustainability remains a key policy vector for promoting sustainable urban systems in China.

Hangzhou is the perfect combination of efficient market and efficient government. As a tourist destination, Hangzhou began to develop industry at the beginning of 21st century. The development of Hangzhou could be divided into four periods: the period of industry, the period of electronic commerce, the period of digital economy and the period of livestreaming industry. In Table 2, it is obvious that the flourishing of the tertiary industry makes the urban economy evolve towards the more efficient, stable and innovative direction based on the minimum utilization of resources.

As an old member of the trillions club, Hangzhou's GDP reached 1537.3 billion yuan (\$237.5 billion) in 2019, with a real growth rate of 3.9%, 1.6 and 0.3 percentage points higher than that of the whole country and the whole province respectively. Its total economic volume exceeded 1.6 trillion yuan (\$0.25 trillion) for the first time, and its comprehensive strength reached a new level.

¹ <http://epb.hangzhou.gov.cn/col/col1692934/index.html>: Hangzhou Municipal Ecology and Environment Bureau

Таблица 2 - Основные показатели национальной экономики КНР¹

Table 2 – Major indicators of National Economy of the PRC

Items \ Years	2000	2005	2010	2015	2019
GDP (\$100 million)	215.61	459.41	934.58	1621.39	2374.95
Primary Industry (\$100 million)	16.06	21.67	31.72	43.10	50.32
Secondary Industry (\$100 million)	110.90	235.48	442.06	638.64	753.14
Tertiary Industry (\$100 million)	88.65	202.26	460.80	939.65	1571.49

In 2002, Hangzhou implemented the policy of “prospering the city through industry”. The government focused on the construction of five industrial bases: machinery, textile and clothing, food, electronic communication and medicine. This policy was controversial at that time for the industry was synonymous with pollution to most citizens. They thought Hangzhou should not develop industry because it was a tourism city.

In 2007, the development of industry in Hangzhou was featured by the upgrading and developing traditional advantageous industries, moderately developing new heavy chemical industries and vigorously developing high-tech industries. Hangzhou government tried to find a new way of industrialization with high scientific and technological innovation, good economic benefits, low resource consumption and less environmental pollution.

In 2004, Hangzhou government implemented policies to encourage people to start a business. In that situation, many people chose to start their own business rather than work in the traditional industries. Supported by Hangzhou government, Alibaba Group gradually grew into a company that is known to the world several years later. The government provided a platform to Alibaba, which took advantage of the Internet and grew from a 159-square-meter building to the biggest electronic commerce in the world.

Influenced by Alibaba which is regarded as the giant of electronic commerce in China, Hangzhou government caught the opportunity of electronic commerce and aimed to build a city of electronic commerce. In 2018, Hangzhou proposed to build the first city of digital economy in China. In 2019, Hangzhou’s online retail sales reached 727.77 billion yuan (\$112.43 billion), an increase of 37.2% over 2018, accounting for 36.8% of the total online retail sales in Zhejiang province [12].

With the development of electronic commerce, many new industries such as the digital economy and other Internet-based industries appear. These industries are environment friendly. As Table 3 shows, from the city of mobile payment, Paradise Silicon Valley and Internet finance, to the first city of digital economy and the global city of cross-border e-commerce, the tertiary industry of Hangzhou is developing rapidly, which deepens the supply-side reform of Hangzhou.

In recent years, Hangzhou’s digital economy has achieved considerable success in e-commerce, financial technology, mobile payment, sharing economy, urban governance and other application fields, and some of them are leading the world. However, Hangzhou still lacks core technology in artificial intelligence, high-end chips, big data, cloud computing, and other industries for traditional enterprises.

¹ Hangzhou Statistical Yearbook-2020. Available at: <http://zjjcmspublic.oss-cn-hangzhou-zwynet-d01a.internet.cloud.zj.gov.cn/> (accessed on February 25th, 2022).

Таблица 3 – Цифровая экономика КНР (2018-2019гг.¹)

Table 3 – Digital Economy of the PRC (2018-2019)

Item	Revenue from Principal Business in 2018 (\$100 million)	Revenue from Principal Business in 2019 (\$100 million)
E-commerce	429	494
Cloud Computing and Big Data	380	455
Internet of Things	265	315
Digital Content	942	1170
Software and Information Service	1111	1375
Electronic Information Products	483	562
Manufacturing Industry		
Integrate Circuit Industry	30	44
Robot Industry	13	15

The development of livestreaming industry is also the element of sustainable urban development policy. Nowadays, Livestreaming refers to an e-commerce format and marketing and sales method. It combines live product demonstrations, time-limited pricing promotions, live negotiations, and instant ordering through online streaming services hosted by the online store. It originated in Hangzhou and Hangzhou also ranked first in China with live broadcast in the last four years. By 2022, the city's livestreaming turnover will reach 100 billion yuan (\$15.49 billion), with an annual contribution rate of 20% to the consumption growth.

The rapid development of livestreaming industry provides a large number of cheap and high-quality products to the society. Livestreaming is the fastest growing form of e-commerce in the world in recent three years.

Conclusion

According to the requirements of the international standards for urban sustainable development, the "PDCA" method is used by Hangzhou government to comprehensively promote the pilot work of international cities. The "PDCA" method was proposed by Walter A. Shewhart [13]. It could be represented by four words: plan, do, check and act. "Plan" refers to analyze the current development situation of Hangzhou and clarify the urban development goals and vision. "Do" aims to formulate the implementation plan, key points, division of labor and promotion measures according to the development priorities. "Check" is used to carry out review and performance evaluation according to the six sustainable development goals. "Act" tries to analyze and summarize the problems in order to make further progress.

Each city has a distinct development idea. Hangzhou has always attached great importance to urban sustainable development. As early as a few years ago, Hangzhou introduced the first universal urban sustainable development standard, and actively explored the standardization of social management and public services, and achieved fruitful results. In other words, Hangzhou is gradually bearing fruit on the road of seeking the "standard" of urban sustainable development.

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¹ Digital Cities Index 2022: A Global Benchmark for Urban Technology. 2022; The Economist Group, London, New York, Geneva, Hong Kong, Singapore.

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