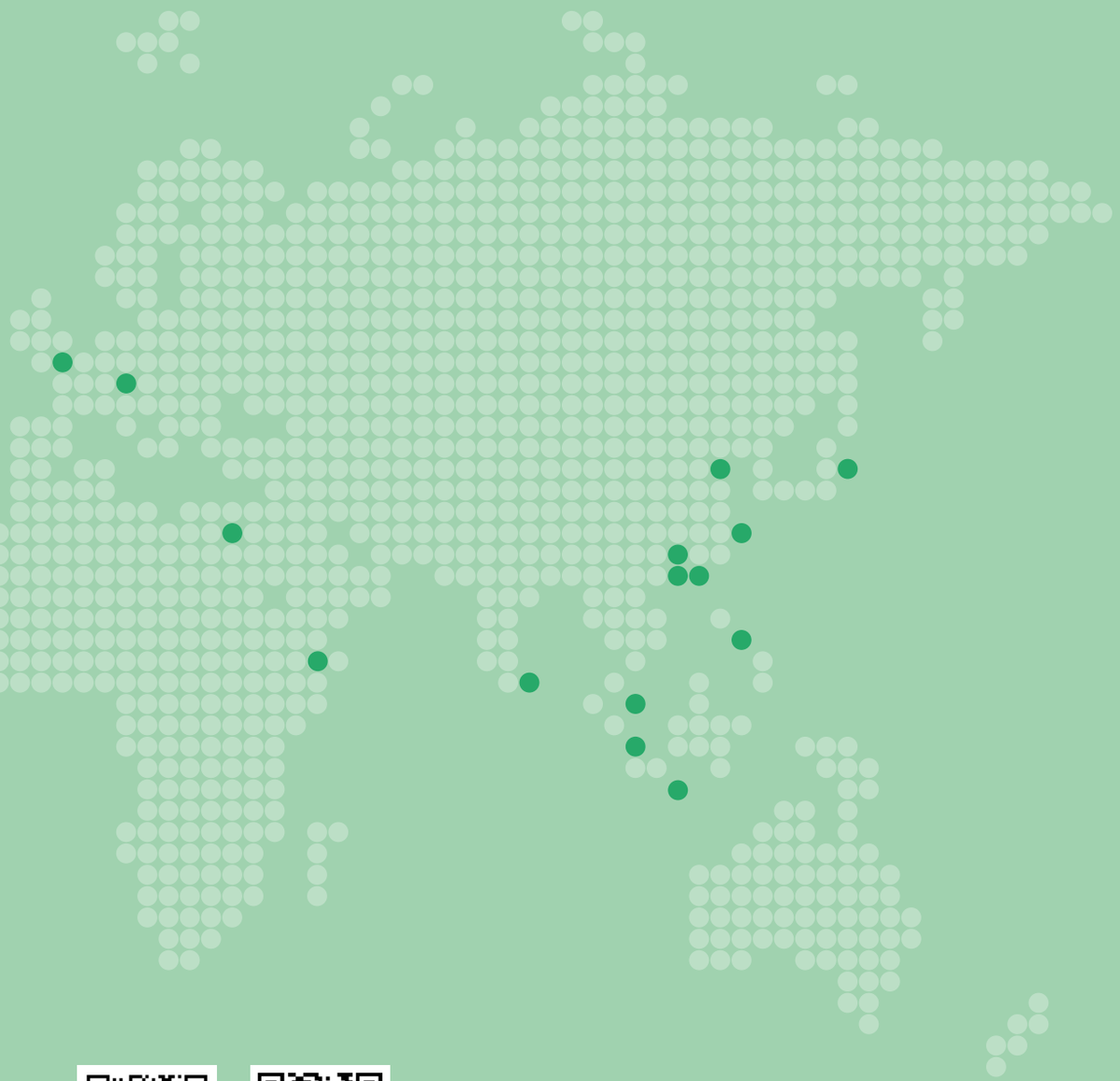


URBAN INDEX OF SHENZHEN

UIS City Observation Report: Aesthetics

Research Center of Territorial Spatial Planning, Ministry of Natural Resources
Shenzhen Urban Planning and Land Development Research Center





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Since the 18th CPC National Congress, the CPC Central Committee has strategically advanced the major reform of integrating multiple spatial plans into one unified framework. By fully integrating various types of spatial planning, including planning for functional zones, land-use planning, and urban and rural planning, China has established a unified, authoritative, and efficient territorial spatial planning system. As traditional urban planning has been deeply integrated and iteratively upgraded together with planning for functional zones and land-use planning, urban planning in the new era has become an integral part of territorial spatial planning. Guided by the broader vision of Chinese modernization, territorial spatial planning is shaping the future development of cities.

Over the past eight years of reform implementation, Shenzhen has followed the guidance of its territorial spatial master plan, upheld the bottom line of safety and security, and continuously promoted high-quality urban development while responding to the people's aspirations for a better life. Building on this practice, Shenzhen has developed the Urban Index of Shenzhen (UIS), structured around six dimensions — Innovation, Livability, Aesthetics, Resilience, Humanism and Intelligence. Through the "6+20+50+X" indicator framework, UIS connects urban evaluation, knowledge transformation and international exchange, creating an open platform for global cities to learn from each other and collaborate on future urban development.Developed under the continuous guidance of the Territorial Spatial Planning Bureau of the Ministry of Natural Resources, UIS is an international public good jointly created by the Research Center of Territorial Spatial Planning, Ministry of Natural Resources and the Shenzhen Urban Planning & Land Development Research Center. The initiative has received support from UN-Habitat and the United Nations Development Programme (UNDP).

This report is one of the thematic outputs of the six UIS dimensions, focusing on the Aesthetics dimension. It responds to the Central Urban Work Conference's call to build green, low-carbon, and aesthetic cities, and connects with key territorial spatial planning tasks in ecological protection and spatial-quality enhancement. It examines both systemic ecological governance and all-domain resource conservation, as well as residents' perceptible experience of urban aesthetic character, taking harmonious coexistence between humanity and nature as its core theme. On this basis, the report uses 'Natural Harmony - Green Progress - Spatial Resonance' as its basic logic and builds an evaluation framework from three levels: ecological-base control, transformation of development behavior, and transmission of aesthetic value. It deeply incorporates core concepts of territorial spatial planning, including resource and environmental carrying-capacity assessment, all-domain and all-factor control, and spatial-quality shaping. By assessing 20 representative sample cities, the report systematically presents structural features, strengths, shortcomings, and common issues in aesthetic city development. As the Aesthetics volume of the UIS, it is both a thematic deepening of six core dimensions and a concrete application of the overall UIS framework in international comparison, providing support for future dimension studies, index iteration, and global communication.

01 UNDERSTANDING AESTHETICS: CONCEPT AND FRAMEWORK

Human understanding of urban aesthetics has always evolved through paradigm shifts and has been continuously reshaped by the deepening of ecological civilization. In essence, this exploration is the process through which cities reposition the relationship between humanity and nature in the course of civilization. In the era of industrial civilization, urban aesthetics celebrated the 'conquest of nature' and pursued grand artificial order, while natural elements were reduced to decoration. This one-dimensional form of aesthetics led to significant ecosystem degradation. With the spread of ecological crises and the rise of sustainable development, cities entered a phase of 'integrating nature', introducing greenways, parks, and similar elements. Yet nature was still more often treated as a tool for raising asset value or improving mood, and its intrinsic agency was not fully respected. In the 21st century, 'coexistence and co-prosperity' has become the new paradigm. Drawing on Eastern ideas such as the 'unity of heaven and humanity' and Western theories such as Genius Loci and sustainable

	18th Century – Mid-20th Century	1970s – Late 20th Century	21st Century – Present
Evolutionary Stages			
	Industrial Civilization: Conquering Nature	**Ecological Awakening: Landscape Restoration**	**Ecological Civilization: Community of Life**
Development Context	Driven by industrialization Focused on material production and spatial expansion	Global spread of ecological crises Rise of environmental protection ethos	Entry into the knowledge economy era Widespread acceptance of harmonious coexistence between humanity and nature
Global Theoretical Perspectives	Mechanistic view of nature Formalist urban aesthetics Howard's Garden City	Modern environmentalism Landscape urbanism Green infrastructure theory	Ecological civilization thought Nature-based Solutions (NbS) Genius loci and environmental cognitive aesthetics
Connotation of Urban Aesthetics	Pursuit of grand artificial order Nature perceived as a subordinate landscape of cities	Remediation of industrial trauma through landscape approaches Residential experience enhancement via natural environment improvement	Pursuit of an organic system integrating humanity, city and nature A comprehensive manifestation of ecological security, metabolic compatibility and cultural identity

aesthetics, it regards the city as an organic component of the natural ecosystem. Since then, aesthetics has no longer been visual consumption, but a living condition in which humanity and nature coexist in harmony. This paradigm shift calls for an evaluation framework that integrates scientific rationality with humanistic experience.

The theory of Coupled Human and Natural Systems (CHANS) shows that cities are co-evolving systems in which humans and nature continuously exchange energy, materials, and information. Aesthetics first means ecological health, stability, and resilience. The urban sustainability framework jointly advanced by UN-Habitat and UNEP further translates this scientific understanding into the language of global governance, extending urban aesthetics into a multidimensional expression of ecological security, environmental governance, and spatial quality. If science provides the rational skeleton of an aesthetic city, humanistic experience gives it spirit and texture. Spatial cognition is not a purely geometric relationship; it is a construction filled with emotion, memory, and meaning. An aesthetic city should enable people to move from simply 'living' to truly 'dwelling', becoming a home that is perceptible, memorable, and capable of fostering belonging. Therefore, the evaluation framework for aesthetic cities must use ecological health, system coupling, and humanistic resonance as a unified measure: it should assess not only the physical quality of space, but also the emotional resonance, cultural identity, and spiritual belonging that space evokes.



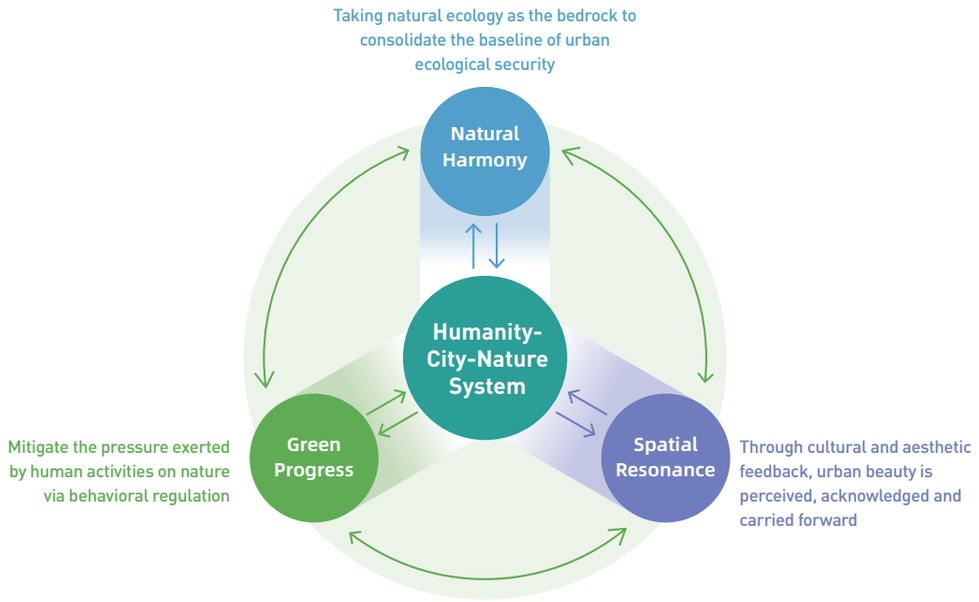
Secondary Dimension	Indicator	Definition
Natural Harmony	Protected Area to City Territory Ratio	Proportion of protected areas such as nature reserves within the city's jurisdiction, measuring ecological conservation effort and the guarantee level of the ecological-security bottom line.
	Green-blue Coverage in Built-up Area	Proportion of various green spaces and water bodies in built-up areas, reflecting the ecological-space foundation and the permeability of the natural environment.
	Native Biodiversity in Built-up Area	Share of native bird species found in built-up areas among all native bird species, reflecting ecosystem health and biodiversity conservation outcomes.
Green Progress	Low-Carbon Level	Annual per capita CO_2 emissions, measuring the city's low-carbon development level.
	Annual Average Air Quality	Annual average PM2.5 concentration, reflecting air-environment quality and pollution-control performance.
	GDP Density	GDP generated per unit of urban construction land, reflecting land-use efficiency.
Spatial Resonance	City Image Favorability	Public recognition of popular urban attractions, reflecting public evaluation of the city's overall image and spatial imagery.
	Destination Appeal Intensity	Intensity of visits by international and domestic tourists, measuring the city's attractiveness as a major travel destination.
	Streetscape Visual Quality	Aesthetic quality of street-level landscapes and interfaces, measuring visual aesthetics and public perception quality in street public spaces.

Based on the dual consideration of scientific thought and humanistic experience, we construct a three-dimensional evaluation framework of 'Natural Harmony - Green Progress - Spatial Resonance'. The three dimensions follow the systems logic of 'foundation-layer constraint - regulatory-layer optimization - feedback-layer reinforcement', together forming a complete picture of an aesthetic city.

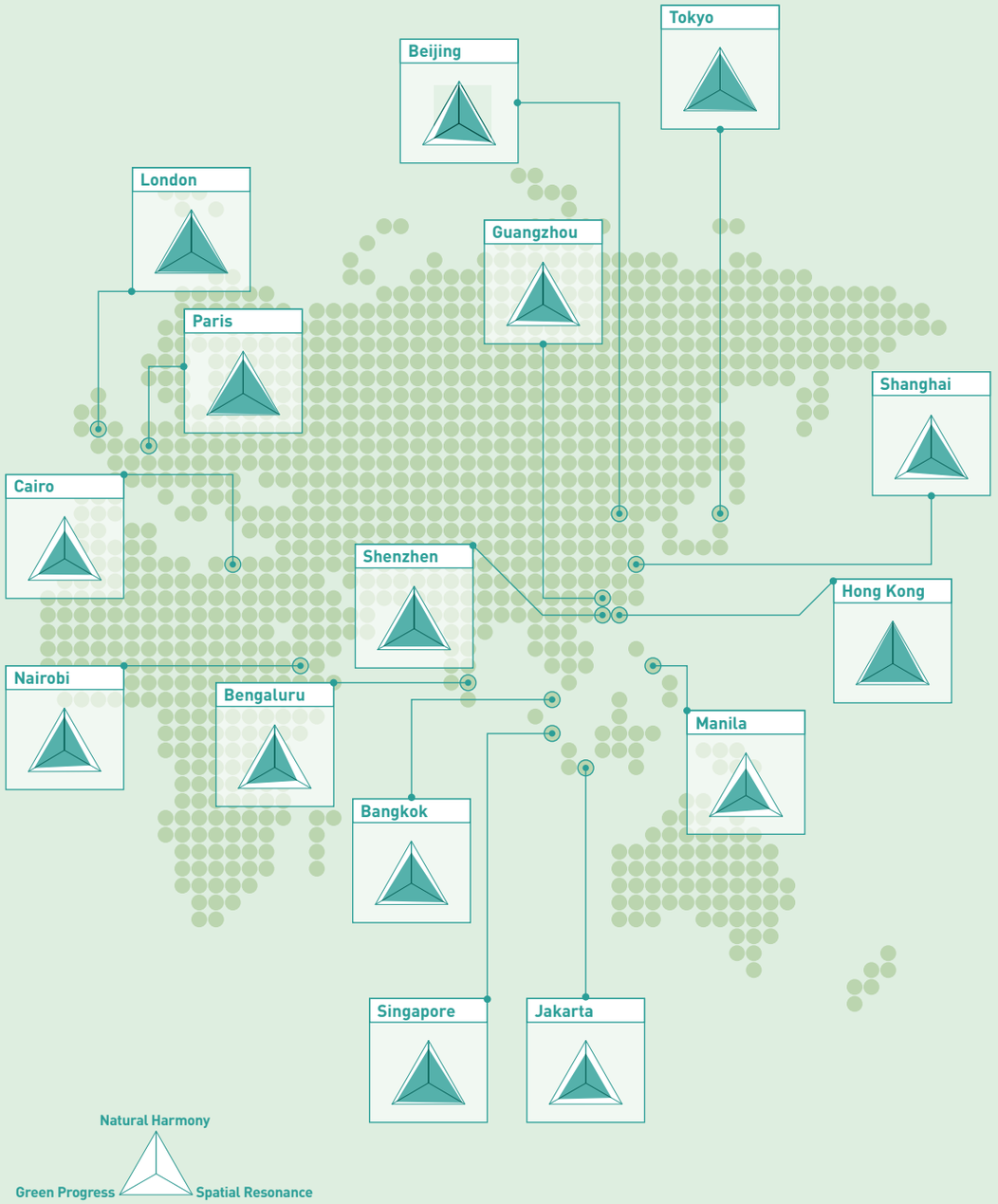
Natural Harmony: With natural ecology as the foundation, this dimension secures the basis of urban aesthetics and the bottom line of ecological security.
It is the prerequisite for all forms of urban aesthetics, determining whether a city has the confidence for long-term development and giving urban aesthetics its most authentic grounding in harmonious coexistence between humanity and nature.

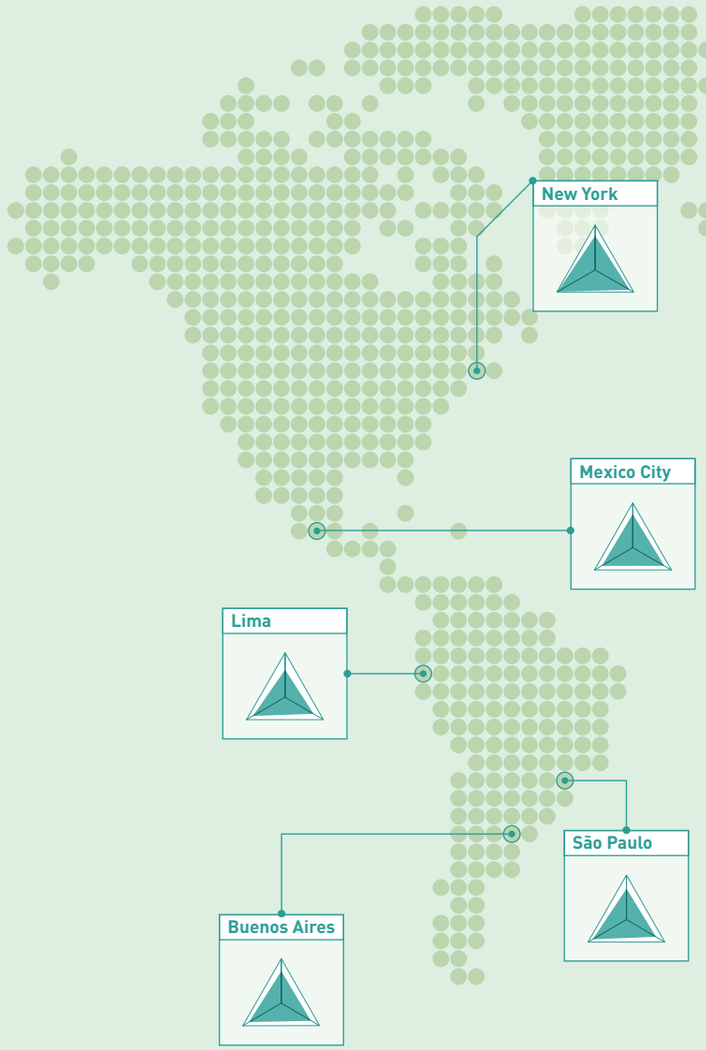
Green Progress: Through behavioral regulation, this dimension reduces the pressure that human activities place on nature and builds a bridge between human systems and ecosystems.
It safeguards the long-term continuity of urban aesthetics, prevents development from overdrawing nature, and makes green development the enduring keynote of the city.

Spatial Resonance: With culture and aesthetics as value feedback, this dimension sustains the harmony and stability of the urban spatial system.
It enables urban aesthetics to be genuinely perceived by residents, broadly recognized by society, and consolidated over time into the city's distinctive cultural identity and humanistic character.



02 OVERALL ASSESSMENT OF URBAN AESTHETICS





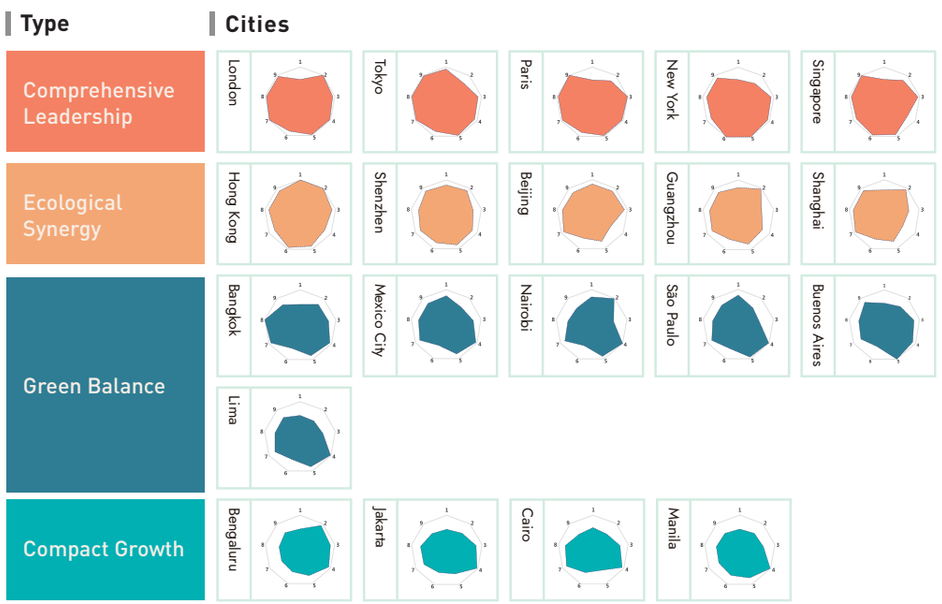
Based on the indicator system of 'Natural Harmony - Green Progress - Spatial Resonance', this report selects 20 representative global cities for assessment, comparison, and observation. The sample selection considers development stages, geographic distribution, and city types, aiming to reveal structural differences and evolutionary features in urban aesthetics across the world. The sample includes three categories: first, mature global cities such as London, Tokyo, New York, Singapore, Paris, and Hong Kong; second, four Chinese first-tier cities, namely Beijing, Shanghai, Guangzhou, and Shenzhen, with a focus on structural differences under similar development stages and high-intensity development conditions; and third, cities in the Global South and rapidly developing cities, such as Jakarta, Manila, Bangkok, Nairobi, and Lima, reflecting common challenges and practical explorations in ecological protection, environmental governance, and urban-quality enhancement during rapid urbanization.

In terms of data sources, the report combines international comparability with multi-source cross-validation. It uses globally available, relatively consistent, public, and authoritative data wherever possible, supplemented and checked with city statistical materials and spatial data. The data mainly come from the IUCN, WHO, global websites, city statistical yearbooks, government bulletins, and thematic reports, and are supplemented by EU GHSL datasets and remote-sensing imagery for comprehensive indicator calculation. Methodologically, raw data are standardized and weighted to calculate dimension scores and composite scores for the 20 sample cities. The purpose is not to produce a single city ranking, but to compare and observe the structural characteristics of urban aesthetics across cities.

Overall, the 20 sample cities show a strong gradient in aesthetic quality. Developed cities in Europe, North America, and East Asia, such as London, Tokyo, and Paris, perform strongly across all three dimensions, reflecting a high degree of synergy between economic development and ecological quality. Cities transitioning from scale expansion to quality upgrading, such as Shenzhen, Beijing, Guangzhou, and Shanghai, generally perform well but still have certain shortcomings. Developing cities in South America, Africa, and Southeast Asia face multiple challenges in ecological protection, environmental governance, and spatial-quality enhancement.

Based on the structural performance of each city across three dimensions and nine indicators, the 20 cities mainly fall into four typical patterns: Comprehensive Leadership, Ecological Synergy, Green Balance, and Compact Growth. Each corresponds to a different pathway for advancing urban aesthetics.

The value of this typology lies in identifying each city's strengths and development direction, providing a reference for selecting an improvement pathway suited to local conditions. Comprehensive Leadership cities achieve multidimensional synergy through long-term institutional accumulation; Ecological Synergy cities demonstrate the capacity to balance high-density development with natural-space protection; Green Balance cities form distinctive appeal through local culture and natural endowments; and Compact Growth cities show the potential for leapfrog improvement through targeted breakthroughs. As cities develop, these types are not fixed, but evolve with industrial upgrading, governance improvement, and spatial renewal.

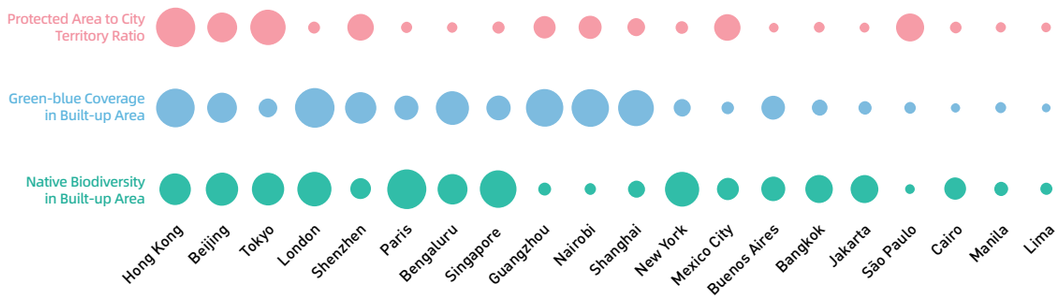


Type	Cities	Characteristics
Comprehensive Leadership	**London, Tokyo, Paris, New York, Singapore**	This type brings together international metropolises with mature global governance systems and outstanding overall competitiveness. Long-term planning accumulation, industrial upgrading, mature market mechanisms, and multi-stakeholder co-governance keep them at a high level in ecological protection, environmental quality, spatial economic efficiency, cultural branding, and street quality, forming a multidimensional pattern of coordinated urban development. Their core logic is to continuously improve urban quality through stock renewal and refined governance, promoting mutual reinforcement among environmental improvement, cultural appeal, and global resource agglomeration, while moving further toward deep decarbonization, resilient renewal, and inclusive sharing.
Ecological Synergy	**Hong Kong, Shenzhen, Beijing, Guangzhou, Shanghai**	This type consists mainly of high-density East Asian metropolises. It performs strongly in Natural Harmony and has achieved significant environmental-infrastructure outcomes. Relying on strong planning implementation and public investment, these cities embed mountain-water ecological space deeply into high-intensity built environments, forming continuous blue-green networks and high-level environmental infrastructure, while low-carbon transition and city-image communication still need further breakthroughs. Their development direction is to strengthen mutual empowerment among ecological space, low-carbon operation, public life, and urban culture, moving from ecological-space protection toward comprehensive quality upgrading.
Green Balance	**Bangkok, Mexico City, Nairobi, São Paulo, Buenos Aires, Lima**	This type consists mostly of international metropolises in middle-income countries. They show clear strengths in low-carbon level, air quality, tourism appeal, and their image favorability benefits from historical, cultural, and tourism endowments. However, they have not yet formed stable and balanced competitiveness in urban aesthetics. The key is to convert local advantages into systemic capacity through ecological protection, infrastructure improvement, and public-space renewal, turning distinctive strengths into more stable and balanced overall quality.
Compact Growth	**Bengaluru, Jakarta, Cairo, Manila**	This type consists mostly of developing megacities with rapid population and economic growth. Their low-carbon advantage partly stems from lower industrialization and consumption levels. Compact urban form, active population structures, and expanding service sectors provide a basis for public transport development and infrastructure sharing. The key is to leverage high density and scale agglomeration, concentrate breakthroughs in transport, energy, environmental infrastructure, and public space, strictly control disorderly sprawl, and move from 'passive low carbon' to 'active greening', and from scale growth to efficient, inclusive quality upgrading.

03 ASSESSING AESTHETICS BY OBJECTIVES

[1] NATURAL HARMONY

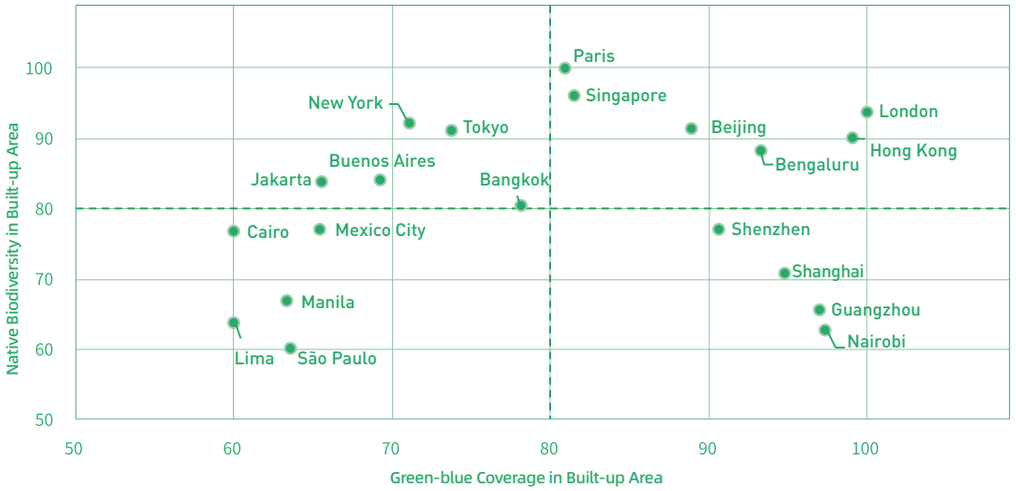
The Natural Harmony dimension measures the harmonious relationship between cities and natural ecosystems. It is not only the green foundation of urban aesthetics, but also a resilience guarantee for long-term urban sustainability. Through three indicators - protected area to city territory ratio, green-blue coverage in built-up area, and native biodiversity in built-up area - this dimension comprehensively assesses a city's ability to respect and sustain its natural base. It observes how cities handle the relationships between protection and development, natural foundations and built environments, and spatial quantity and ecological quality. The results show low consistency among the three Natural Harmony indicators: a high ratio of blue-green space in built-up areas mainly reflects spatial coverage, and does not necessarily indicate sufficient habitat-support capacity. As cities expand urban blue-green space, they must also pay attention to actual biodiversity improvement.



Securing the natural base is the basic prerequisite for symbiotic urban development. Cities with a high protected area to city territory ratio are valuable not only because of resource endowments, but because they use systems such as statutory protected areas and ecological protection redlines to curb disorderly expansion and reserve stable ecological space for long-term development. Hong Kong places about 40% of its land under statutory protection through the Country Parks Ordinance, achieving 'concentrated development and sufficient wilderness' under high-density conditions. Beijing was among the first to prepare a special ecological-security-pattern plan, forming a 'point-corridor-area-network' protection system. Shenzhen designated its basic ecological control line in 2005 to institutionally protect its mountains, sea, forests, farmland, lakes, and grassland. Nairobi National Park sits next to the capital, uses elevated bridges to secure animal migration routes, and applies drones and infrared cameras for digital management. These practices show that high-density development does not necessarily require sacrificing nature; the key is to define inviolable ecological boundaries early, so that natural space becomes infrastructure supporting urban resilience and public well-being.

Bringing nature into the built-up area is an important shift for high-density cities. Peripheral protected space alone is not enough for residents to encounter nature in daily life or for urban species to survive. The green-blue coverage in built-up area reflects whether nature can permeate the city through parks,

rivers, and green corridors. Singapore is weaving an ecological network through 380 kilometers of park connectors and a planned 300 kilometers of Nature Ways by 2030; Guangzhou's 'New Six Veins' ecological corridors encourage wildlife-friendly coexistence; and Shenzhen's 'Mountain-Sea Vistas' links fragmented patches into living corridors, providing migration routes for species while bringing nature within residents' everyday reach. In the face of highly fragmented landscapes, Bengaluru has adopted a 'point-based restoration that drives wider improvement' approach: citizens and government have jointly restored dozens of lakes, making them habitats for more than 120 bird species. These practices transform blue-green space ratios from static statistics into dynamic ecological effectiveness, allowing dispersed ecological elements to regain system functions.



Moving from increasing greenery to creating habitats is the deepening stage of Natural Harmony. Indicator performance shows that some cities have a high ratio of blue-green space, yet biodiversity does not improve accordingly, suggesting that homogeneous and isolated green spaces are insufficient to support species survival. Tokyo's multi-scale practices, from regional mountain forests to neighborhood microhabitats, embed biodiversity into the entire planning and construction process. Paris has transformed the highly impervious Place de Catalogne into an urban forest, improving the local thermal environment and creating urban habitats. These cases show that Natural Harmony must move beyond landscape greening toward habitat creation by increasing native plants, restoring riparian wetlands, and reducing human disturbance, thereby improving the ecological quality of blue-green space.

Institutional innovation can drive the return of nature and make ecology an intrinsic variable of development. Rigidly embedding ecological goals into development systems is a key pathway to coexistence between cities and nature. London requires development projects to achieve a 10% Biodiversity Net Gain and uses the Urban Greening Factor to incorporate roof greening, rain gardens, and other elements into design. Singapore embeds ecological goals throughout planning and construction through its Biophilic Town Framework and 'City in Nature' vision. Such practices redefine the underlying logic of urban development and land management, making Natural Harmony not an add-on task but a baseline condition for all construction activities.

Case 1 | Hong Kong: A Statutory Conservation Network as a Model of Natural Harmony in High-Density Cities

Hong Kong secures its large-scale ecological foundation through the Country Parks Ordinance, placing about 40% of its land under statutory protection. Relying on country parks, special areas, wetlands, coasts, and reservoir catchments, it has built a continuous and stable territory-wide conservation network. Under a highly intensive development pattern, Hong Kong has not isolated nature from the city; instead, through trail systems such as the MacLehose Trail, it closely connects mountain-sea ecology, countryside recreation, and residents' everyday life. Combined with wetland conservation, eco-friendly farming, nature education, ecological shorelines, and NbS practices, Hong Kong converts ecosystem services into public well-being, climate resilience, and livability, reflecting a symbiotic pathway of 'concentrated development, sufficient wilderness, and allowing nature to deliver benefits back to the city '.



Case 2 | Tokyo: Full-Scale Habitat Creation Embedding Nature Throughout the Urban System

Tokyo integrates biodiversity conservation into the entire process of planning, construction, renewal, and management, forming a refined habitat-creation system from regional ecological patterns to neighborhood microhabitats. At the macro scale, it relies on the Okutama Mountains, Tama Hills, and satoyama conservation areas to continue a traditional symbiotic landscape combining agroforestry use, woodland management, and community participation, sustaining peri-urban composite ecosystems. At the meso scale, parks, river corridors, street greening, and public spaces mend ecological networks and improve the connectivity and habitat quality of fragmented patches. At the micro scale, Tokyo creates multi-layered plant communities, food-source plants, and ecological ecotones, allowing highly built-up metropolitan spaces to become living oases where birds, insects, and other wildlife can inhabit and reproduce.



Case 3 | London: Embedding Nature Recovery into High-Density Urban Renewal

London regards green infrastructure as a fundamental support for urban development. The London Environment Strategy sets a target for more than half of the city to be green by 2050 and aims to build London as a National Park City. Through Local Nature Recovery Strategies (LNRS), the city identifies ecological spaces in urgent need of restoration and clarifies priority areas and actions. At the planning level, the London Green Infrastructure Framework (LGIF) integrates green space, blue networks, and ecological data to support project siting and investment prioritization. At the same time, the Urban Greening Factor (UGF) requires major developments to incorporate roof greening, rain gardens, tree planting, and other elements into site and building design. In recent years, the Rewild London Fund has continued to support habitat restoration and community co-creation projects. These initiatives have not only brought wildlife back to the city, but also helped residents perceive nature again in everyday life.



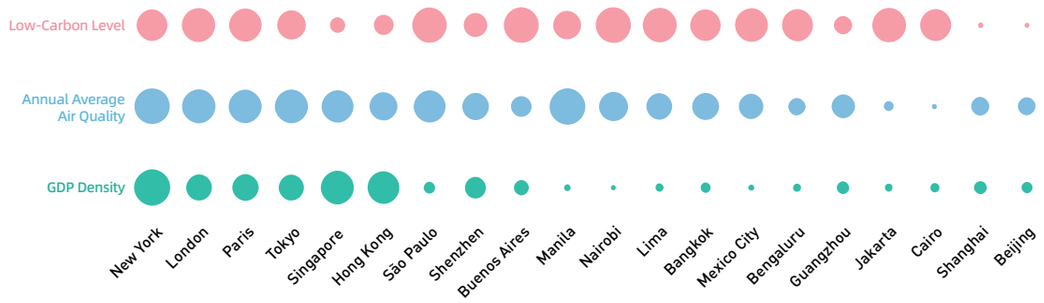
Case 4 | Shenzhen: A Pathway Toward Harmonious Coexistence Between Humanity and Nature

In 2005, Shenzhen became the first city in China to propose and designate a basic ecological control line, using an institutional approach to protect ecological foundations such as mountains, sea, forests, farmland, lakes, and grassland, and reserving stable living space for high-intensity urban development. On this basis, Shenzhen has expanded wildlife protection from single-species rescue to territory-wide systemic governance through mangrove wetland restoration, migratory-bird corridor protection, Kunpeng Trail ecological bridges, dark-sky protection pilots, bird-friendly design, smart monitoring, and nature education. Shenzhen continues to weave the city's living network. By building the International Mangrove Center, the city is also transforming its local mangrove conservation and restoration experience into a global platform for exchange and cooperation on coastal wetland governance, helping high-density cities move from being 'sources of pressure on nature' to places where all life can coexist.



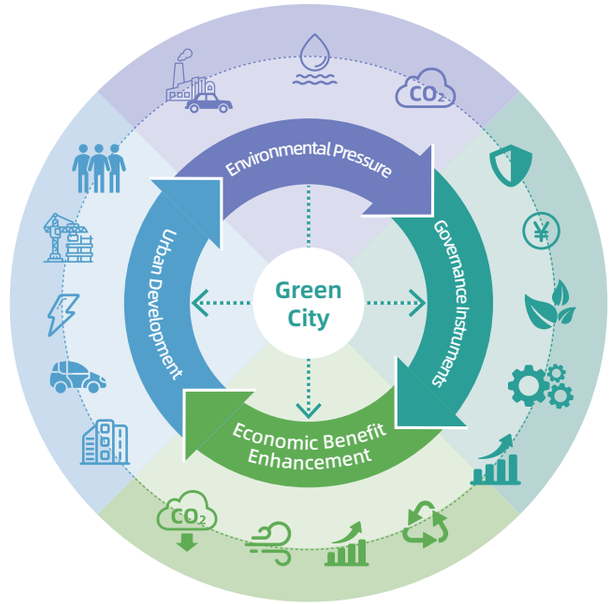
[2] GREEN PROGRESS

The Green Progress dimension focuses on the pressure feedback and governance responses between urban human activities and the natural environment. It is a key yardstick for assessing whether urban development is moving toward a green, low-carbon, environmentally friendly, and resource-efficient pathway. Through three indicators - low-carbon level, annual average air quality, and GDP density - it reflects carbon-reduction progress, pollution-control effectiveness, and spatial economic efficiency. It is a key lens for observing how cities with different development characteristics and governance priorities control environmental pressure while improving the efficiency of energy, land, and infrastructure use. The results show low consistency among low-carbon level, annual average air quality, and GDP density; the three indicators are significantly affected by development stage, industrial structure, and spatial use, while deeply industrialized cities in developing countries face substantial carbon-reduction pressure.



From pollution control to systemic decarbonization. The green and low-carbon advantages of mature global cities are not formed by a single project, but by the long-term accumulation of industrial upgrading, energy substitution, transport transition, and environmental regulation. Their governance focus has shifted from reducing local pollution to full-chain decarbonization across buildings, transport, energy, and consumption, and has been translated into institutional constraints through fees, regulations, technical standards, and performance evaluation. London promotes cleaner transport through the Ultra Low Emission Zone; New York uses building-emission caps to compel retrofits of existing buildings; and Paris coordinates energy, buildings, mobility, and public space through its climate plan. Together, these cases reflect the common trend from single-point governance to systemic transition.

High-intensity developing cities catch up through coordinated governance. Compared with mature cities, late-developing cities face a different question: the former ask 'how to become better', while the latter ask 'how to catch up'. For cities with large industrial scales and highly concentrated populations, green transition cannot wait for energy-intensive activities to exit naturally; pollution reduction, carbon reduction, and efficiency improvement must advance simultaneously during development. Shenzhen has formed cross-sector synergy through transport electrification, near-zero-carbon scenarios, and integrated green technologies. Beijing has continuously advanced comprehensive governance of energy, motor vehicles, industry, and dust, reducing annual average PM2.5 concentrations. Shanghai has used green-building regulations to promote ultra-low-energy and zero-carbon buildings, turning stock renewal into a decarbonization tool. These practices show that temporarily modest indicator performance does not mean that their practices offer no valuable



lessons; the key is whether a city can develop sustained governance capacity around its own industrial structure and main emission sources.

Improving economic intensity through stock renewal. Raising land-use efficiency not only creates greater economic value from limited space, but also helps reduce per-capita infrastructure costs and improve public-service efficiency. London transformed inefficient industrial land into clusters for technology and creative industries, increasing land output without expanding construction land. Shenzhen's Nanshan District contributes more than one quarter of the city's economic output on less than one tenth of its land; this depends not only on high-value-added industrial clustering, but also on transport electrification, green buildings, and near-zero-carbon parks developed in parallel with industrial upgrading. The two cities show that 'stock renewal' and 'industry-space synergy' can advance intensification and green transition together. But higher intensity alone is not a universal answer: excessive concentration can create new imbalances if accompanied by severe congestion, concentrated energy use, and environmental overload. Green Progress does not seek unlimited increases in development intensity; under carrying-capacity constraints, it synchronizes land benefits and green goals through transit-oriented development, inefficient-land renewal, and functional mixing.

Correctly understanding development differences behind low emissions. Some cities perform well on low-carbon indicators, but this may be related to lower industrialization and insufficient energy consumption rather than active green transition. For such cities, Green Progress should not come at the cost of restricting basic development needs. Instead, public transport, distributed clean energy, compact development, and resource recycling should be used to control additional emissions while improving housing, mobility, and energy services. Cities with relatively low economic intensity should pay greater attention to coordination among land use, infrastructure layout, and job concentration, avoiding longer commutes, higher public-service costs, and additional carbon emissions caused by low-density sprawl.

Case 5 | London: A Market-Leverage Mechanism for Closed-Loop Emission Reduction Across Sectors

London internalizes the external costs of pollution through market mechanisms rather than relying solely on administrative traffic restrictions. Its Ultra Low Emission Zone (ULEZ), the largest of its kind in the world, imposes high charges on high-polluting vehicles, using economic leverage to accelerate the transition to cleaner vehicle fleets while legally reinvesting revenues into public transport and walking-cycling systems. After the policy was implemented, official assessments indicate that nitrogen dioxide concentrations in central London are expected to be reduced by about 54% compared with a scenario without ULEZ. Meanwhile, the share of vehicles citywide meeting emission standards has jumped from 39% in 2017 to nearly 97%. This practice provides a replicable, root-cause solution for emission reduction in urban transport worldwide.



Case 6 | New York: A Legally Mandated Breakthrough in a Key Emission Sector

New York targets the key source of urban carbon emissions by making the building sector a breakthrough point for low-carbon transition. Buildings account for about two thirds of the city's carbon emissions. Local Law 97 sets annual greenhouse-gas emission caps for large buildings over 25,000 square feet and tightens them in five-year cycles, aiming for a 40% reduction by 2030 and net zero by 2050. Buildings that exceed the cap are fined USD 268 per metric ton of CO2 equivalent, converting emission-reduction responsibility into a calculable and accountable economic constraint. This mandatory system compels owners to carry out energy retrofits, equipment upgrades, clean-energy supply, and building-operation optimization, turning low-carbon transition from an initiative into a hard constraint.



Case 7 | Singapore: Supporting Intensive Development Through High-Value Industries and Three-Dimensional Space

Singapore's high GDP per unit of land is mainly supported by industrial upgrading and intensive spatial use. On the one hand, the city continuously promotes a shift toward knowledge-intensive and high-value-added sectors such as international finance, advanced manufacturing, semiconductors, and biomedicine, creating higher economic output with less land input and achieving 'vertical growth' from land expansion to value enhancement. On the other hand, Singapore improves spatial carrying capacity through compact layout, functional mixing, and three-dimensional development, not only clustering housing, employment, commerce, and public services around rail stations, but also systematically developing underground transport, utility pipelines, warehousing, and oil-storage facilities, moving some infrastructure underground to release more surface space for development and public use.



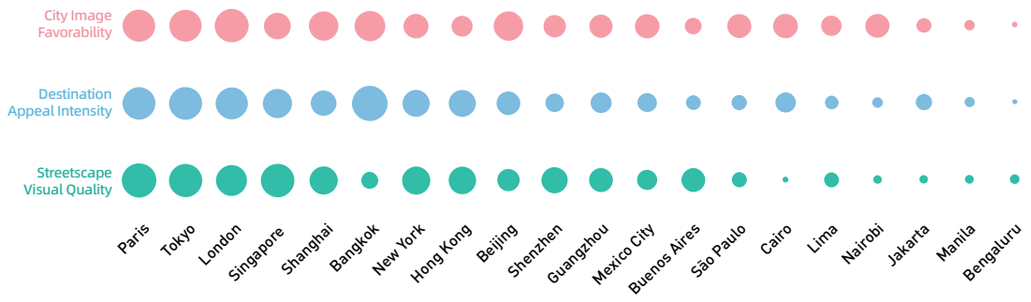
Case 8 | Shenzhen: An Innovation-Driven Full-Chain Green and Low-Carbon Transition Mechanism

Guided by its national carbon-peaking pilot, Shenzhen has explored an urban green and low-carbon transition pathway driven by the synergy of 'technological innovation - scenario demonstration - institutional support'. It embeds carbon-reduction requirements into energy, buildings, transport, industry, and urban governance. In the energy sector, Shenzhen promotes distributed photovoltaics, offshore wind power, and other renewable-energy applications, and explores new building energy systems such as photovoltaic-storage-direct-current-flexibility. In the building sector, it advances building-integrated photovoltaics, electrification of public buildings, and energy-saving retrofits of existing buildings, creating low-carbon building demonstrations. In transport, it leverages its new-energy vehicle industry to continue the clean transition of buses, logistics vehicles, sanitation vehicles, and other fleets. Through near-zero-carbon pilot zones, Shenzhen uses parks, communities, campuses, and buildings as integrated application scenarios for green and low-carbon technologies, forming replicable and scalable urban decarbonization models.



[3] SPATIAL RESONANCE

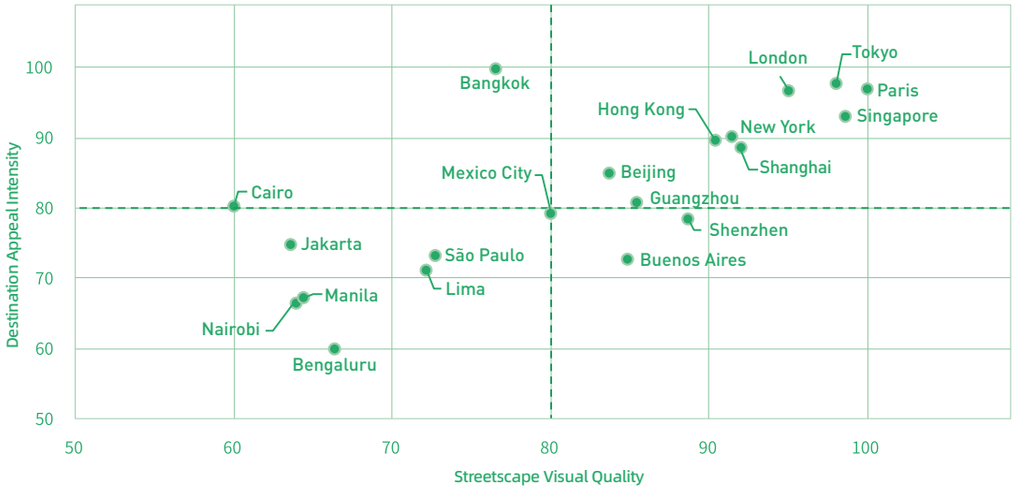
The Spatial Resonance dimension is a higher-order expression of aesthetic city development moving from environmental quality toward cultural identity and emotional experience. It focuses on whether space can be perceived, remembered, identified with, and continuously communicated. Through three indicators - city image favorability, destination appeal intensity, and streetscape visual quality - it reflects a city's overall image, external appeal, and the everyday spatial experience of residents and visitors. The results show a generally strong positive association among the three indicators, yet streetscape visual quality is not completely aligned with city image favorability. To gain broad external recognition, a city needs not only sound planning and design and refined management, but also sustained cultural expression and the programming and management of urban spaces.



Shaping irreplaceable city imagery through local identity. Cities that perform well in Spatial Resonance can usually extract stable and distinctive symbols from history, culture, natural patterns, or the spirit of the times. Paris integrates historic districts, the Seine riverbanks, and contemporary public life. London continues urban memory through the revival of the Thames waterfront and the adaptive reuse of industrial heritage. Tokyo organizes historic green spaces, waterfronts, and urban life into a continuous experience. Shenzhen, drawing on its mountain-sea pattern and reform-and-opening culture, forms a spatial label unique to a young city. The European-style blocks of Buenos Aires and Nairobi's unique landscape of 'nature and metropolis in the same frame' likewise show that Spatial Resonance does not depend only on historical depth, but on whether a city can translate its most recognizable cultural and natural genes into a perceptible and communicable urban narrative.

Building stable and continuous spatial quality through refined design. City image is ultimately perceived through streets, building interfaces, pedestrian spaces, and public facilities. The data show a significant positive association between streetscape visual quality and destination appeal intensity. Tokyo and Singapore implement quality control down to details such as building setbacks, facade materials, pedestrian corridors, greening, lighting, and signage. Through long-term and systematic design management, they create clean, orderly, and continuous urban experiences. The experiences of these two cities show that Spatial Resonance is not only generated by landmarks, but by the consistent feelings accumulated at street scale, through walking rhythm, and spatial details.

Stimulating urban vitality and destination appeal through diverse scenes. Resonant cities do not merely offer landscapes to be viewed; they also provide rich scenes for participation, consumption, and interaction. Scenes matter because they break the one-way relationship of 'viewing and being viewed' in traditional urban making, turning residents and visitors from passive spectators into active co-creators, and transforming the city from a backdrop into a place where stories happen. Shanghai creates an urban experience where tradition and modernity intertwine through waterfront spaces, historic districts, and commercial-cultural activities. Bangkok builds a distinctive local appeal through waterfronts, markets, street food, and nightlife. Paris turns the Seine riverbanks, school streets, and community public spaces into places for rest, reading, and neighborhood interaction. These practices show that truly vibrant cities allow everyone to find their place in the city through settings that support participation, consumption, and social interaction, becoming part of the urban narrative.



Converting spatial experience into urban identity through inclusive sharing. The ultimate value of Spatial Resonance is not only to attract tourists, but to bring urban aesthetics into everyday life. Walkable streets, open waterfronts, community parks, and public cultural facilities allow people of different ages, occupations, and social groups to conveniently approach, use, and participate in urban space. The global rise of Citywalk in recent years reflects a shared demand for spaces that are walkable, stayable, and sociable. When cultural landscapes are no longer limited to a few scenic spots and public spaces are no longer merely passageways, urban experience shifts from brief viewing to continuous use. This accumulates familiarity, belonging, and pride among residents, and forms an urban reputation in which visitor perception and citizen identity reinforce each other. Such identity, built from everyday experience, is often more durable and authentic than any marketing campaign.

Case 9 | Paris: The 15-Minute City Centered on Spatial Resonance



The Paris government permanently transformed the right-bank expressway along the Seine into a riverside park. Roaring traffic gave way to conversation, reading, and impromptu music, turning an alienating transport facility into a warm urban living room. More than 200 'school streets' across the city restrict motor vehicles during school arrival and departure times and use playful paving patterns, transforming cold roads into gentle boundaries that protect childhood and rebuild neighborhood trust. Since 2020, Paris has removed more than 10,000 on-street parking spaces, replacing released corners with micro-gardens, shared book kiosks, and citizen pavilions that create dramatic nodes for everyday strolling, encounters, and contemplation. These spatial interventions transform commuting routes that people 'must pass through' into emotional places where people 'want to stay', elevating time once consumed by traffic into scene-based experience that nourishes community identity.

Case 10 | Singapore: A Refined Urban Design Control Mechanism

Singapore relies on urban design guidelines to refine spatial-quality control down to the level of building components. All new construction, reconstruction, and renovation projects must follow the guidelines for their specific areas, with mandatory requirements for building setbacks, facade materials, pedestrian links, outdoor signage, and even lighting systems. At the same time, through systematic policies such as the Landscaping for Urban Spaces and High-Rises (LUSH) programme, Singapore uses tools such as greenery replacement requirements and vertical-greening incentives to embed the Garden City concept throughout the entire urban construction process, achieving simultaneous growth in green space under the pressure of a doubled population. Its underlying logic lies in 'Urban aesthetics comes from refined control across the full process and at every scale.' Through standardized design guidelines and a governance mechanism combining firmness and flexibility, Singapore ensures the stability and consistency of spatial quality and thereby shapes a globally recognizable city brand.



Case 11 | Tokyo: Evoking Urban Resonance Through Green Space and Waterfronts

Tokyo does not treat green space merely as an ecological-restoration tool; it embeds greenery into civic memory, daily walking, and urban renewal. In 2023, the Tokyo Metropolitan Government officially launched the Tokyo Green Biz project. Looking toward the next 100 years and working with citizens and enterprises, the project seeks to further enhance the value of urban greenery, making green space not only a public asset that brings comfort and ease to daily life, but also a means to expand parks and enrich waterfront spaces, building Tokyo into a sustainable city in harmony with nature. The renewal of Hibiya Park, for example, allows nature, history, and urban life to form a continuous experience in one place, demonstrating the resonance between spatial memory and ecological perception in a high-density city.



Case 12 | Shenzhen: Exploration of ' Mountain-Sea Vistas'

Shenzhen uses' Mountain-Sea Vistas' as its core spatial brand, moving from simple ecological connection toward the integrated creation of ecological, living, and aesthetic experiences. By linking mountains, sea, city, parks, commerce, and communities, Shenzhen transforms natural experience into frequently used settings of everyday life. In Futian's 'Five-Park Connectivity', for example, skybridges cross urban roads and organically stitch together parks, commercial complexes, and public spaces, turning 'walking through parks, entering malls, and climbing hills to view the city' into a continuous experience. Its value lies in upgrading ecological connectivity into Spatial Resonance, allowing the green network to carry recreation, consumption, social interaction, exercise, and urban memory at the same time, and forming a perceptible interface for Shenzhen's mountain-sea urban aesthetics.



04 INSIGHTS AND RECOMMENDATIONS

The essence of aesthetics is an enduring dialectic between order and uniqueness. The pursuit of ecological quality and humanistic spirit is the shared value core of all aesthetic cities, forming the universal order and underlying logic of urban aesthetics. Yet differences in natural endowment, development stage, and cultural roots give urban aesthetics richly varied forms of expression. Just as natural evolution never repeats the same path, there is no universally applicable template for urban aesthetics. The core of aesthetic city development is to follow universal principles while exploring distinctive pathways based on local endowments and development stages: expressing individuality within commonality, upholding consensus amid difference, and ultimately realizing a condition in which each city has its own aesthetics and all aesthetics flourish together.

First, aesthetic-city development should grasp the dynamics of three-dimensional co-evolution and build a unified governance logic.

Global sample cities show that aesthetic cities with sustained competitiveness are not formed through ecological protection alone, partial greening, or environmental remediation. They are formed by a stable positive cycle among Natural Harmony, Green Progress, and Spatial Resonance. Natural Harmony is the base of urban aesthetics, determining whether a city can protect ecological foundations such as mountains, water, forests, farmland, lakes, and grassland. Green Progress is the operating mode of urban aesthetics, determining whether the city can reduce continuous pressure on nature through energy, transport, industry, buildings, and water-environment governance. Spatial Resonance is the key through which urban aesthetics is perceived, recognized, and communicated, determining whether ecological and environmental improvements can be converted into residents' everyday experience and the city's spiritual character. Therefore, aesthetics should not be understood as an add-on objective of planning and construction. It should become a comprehensive governance framework coordinating space, ecology, industry, transport, culture, and public services, using three-dimensional synergy to move cities from physical-environment improvement toward an integrated upgrading of ecological value, development mode, and humanistic experience.

Second, pathways to aesthetic cities should not simply copy benchmarks; cities should adopt differentiated strategies according to their own conditions.

Among the 20 sample cities, Comprehensive Leadership cities rely on long-term institutional accumulation, industrial transition, and cultural capital to form stable balance among ecology, environment, and spatial quality. Ecological Synergy cities embed nature under high-intensity development through rigid ecological control, public investment, and refined governance. Green Balance cities have local strengths, but still need to convert low-carbon performance, air quality, tourism, or cultural highlights into systemic capacity. Compact Growth cities should first make up for shortcomings in ecological boundaries, environmental infrastructure, and basic public-space supply. There is no single optimal solution for aesthetic-city development. Cities differ in their three-dimensional evolutionary stages and core contradictions; simply transplanting benchmark practices can easily lead to fragmented governance and misallocated resources. Each city therefore needs to understand its true position within the three-dimensional coordinates of Natural Harmony, Green Progress, and Spatial Resonance, choose a development rhythm suited to its resource endowments and governance capacity, achieve context-specific organic growth, and form a closed loop with long-term institutional development.

Third, aesthetic-city development requires long-term perspective and durable institutions to support organic urban growth.

Comparisons among the global samples show that aesthetic cities are not the result of short-term, high-intensity investment, but of long-term and stable planning laws, multi-stakeholder governance, and deep cultural accumulation. For example, designating nature reserves can quickly raise the protected-area ratio, but cannot rapidly improve biodiversity. Landmark buildings can increase short-term visibility, but cannot change the city's underlying aesthetic character. The true core of an aesthetic city lies in integrating ecological value into every level of urban planning and construction. Only through long-term institutional development and practice from the macro to the micro scale can ecological advantages be transformed into perceptible, recognizable, and communicable urban appeal, allowing urban aesthetics to return from grand narratives to residents' everyday experience and truly become a source of lasting competitiveness for sustainable urban development.

