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RESEARCH ARTICLE

RESEARCH ON SPATIAL DEVELOPMENT STRATEGIES OF INTERNET-FAMOUS CITIES FROM THE PERSPECTIVE OF SPATIAL GENES AND MULTIPLE INTELLIGENCES

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ABSTRACT

Against the background of digital media being deeply embedded in urban life and the continuous iteration of cultural and tourism consumption, “internet-famous cities” have evolved from an occasional communication phenomenon into a universal urban development form. How can a city be not only “photographable” but also “touching”? To address this practical issue, this paper starts by systematically elaborating on the integration mode of technical methods of the “Collaborative Theory of Spatial Genes and Multiple Intelligences” (hereinafter referred to as the “Dual Theories”) at home and abroad. It selects typical internet-famous cities of three spatial gene types—historical and cultural, mountainous three-dimensional, and urban life-oriented—and analyzes them, identifies their core spatial genes, dissects the internal logic of the Dual Theories collaboratively empowering the spatial development of internet-famous cities, and puts forward development suggestions for different types of internet-famous cities. This study provides practical references for scenic spots to transform from “short-lived popularity” to “sustained prosperity”, improves the theoretical system of cultural and tourism development of internet-famous cities, and promotes the high-quality development of the cultural and tourism industry in internet-famous cities.

KEYWORDS

Internet-famous Cities, Spatial Gene Theory, Multiple Intelligences Theory, Urban Spatial Development, Transformation to Sustainable Long-term Prosperity

1. INTRODUCTION

According to the 57th Statistical Report on China’s Internet Development released by the China Internet Network Information Center (CNNIC), as of December 2025, the number of internet users in China reached 1.125 billion, and the internet penetration rate exceeded 80% ①. “Internet-famous cities” have shifted from a niche cultural and tourism phenomenon to a nationwide hotspot of urban development, and have become an important window for conveying urban culture and highlighting urban characteristics. Driven by the rapid iteration of digital communication technology and the upgrading of cultural and tourism consumption demand, the abbreviation “internet-famous” has been used more frequently than “online celebrity” since 2015, and has been widely combined with spatial concepts such as “check-in,” “tourism,” and “landmark,” marking the migration of “internet-famous” from a personal label to a spatial attribute (Yu et al., 2024). Meanwhile, “short-lived internet-famous cities” have emerged. For example, the popularity of Zibo Barbecue lasted nearly two months, while the peak search index of Tianshui Spicy Hot Pot lasted only about 10 days. Scholars including Li Mingde summarized their characteristics as “three highs, two lows and one imbalance”: high concentration of traffic dependence, high homogeneity of content design, high load of resource reception; low cultural density, low commercial resilience; and the gap between

tourists’ expectations and actual experience leads to an imbalance in the supply-demand structure of urban development ②.

How to break through the development bottleneck of “check-in economy” and realize the transformation from short-term traffic popularity to long-term high-quality development has become a core issue to be solved urgently in the cultural and tourism development of internet-famous cities. Therefore, this paper attempts to introduce spatial gene theory and multiple intelligences theory to construct a collaborative analysis framework of the Dual Theories, providing a new theoretical perspective and practical path for the spatial development of internet-famous cities. While embracing the dividends of digital communication, it avoids spatial homogeneity and cultural hollowing, enabling internet-famous cities to shift from “traffic-driven” to “value-driven” and from “check-in” to “touching”.

2. THEORETICAL BASIS AND CONCEPT DEFINITION

2.1 Practical Review and Research Value of Internet-Famous Cities Development

“Internet-famous city” is the value extension and image projection of

the concept of “internet-famous” in the field of urban communication, specifically referring to the phenomenon of cities gaining widespread attention and sharply rising popularity with the help of social media communication (Cui, 2024). In recent years, with the rapid development of the internet and social media, the popularity of topics related to “internet-famous cities” on major online platforms has continued to rise, and academic research on “internet-famous cities” has also increased day by day (see Figure 1). Scholars such as Morris named this phenomenon “Wanghong Urbanism” (3), describing the circular interaction between media spectacles and urban space: sharing behaviors on social media create spatial popularity, which in turn attracts more people to visit, shoot and share, forming a self-reinforcing cycle. The core of this phenomenon lies in the participation of the “audience”—internet-famous status is not unilaterally created, but generated in the spontaneous selection and communication of the audience, with the core being the two-way empowerment of spatial characteristics and traffic communication.

The research value of the internet-famous city phenomenon can be summarized as follows: first, it reflects the reconstruction of human-land relations in the digital era, that is, the value of urban space is directly determined by its visibility and communicability in the digital network. Scholars such as Yu Yidong conducted solid empirical analysis with Shanghai as a case, clarifying the relationship between the distribution of internet-famous check-in spots on Xiaohongshu and the characteristics of the built environment, and explicitly demonstrating the explanatory power of indicators such as green view rate, spatial color richness and functional mixing degree on the internet-famous potential of blocks (Yu et al., 2024); second, the internet-famous phenomenon itself is a new driving force for urban renewal and cultural-tourism integration. Successful internet-famous blocks can activate idle spaces, drive surrounding business formats, and enhance urban brand awareness. However, homogeneous competition and the dilemma of “short-lived popularity” also send a clear and profound warning: without truly exploring and maintaining the deep value of the city, traffic will eventually ebb, leaving only “background boards with empty buildings”.

Therefore, shifting from superficial internet-famous manufacturing to connotative “sustained prosperity creation” is a major issue for the high-quality development of urban space. To solve this problem, it is necessary to first clarify the surface mechanism of the internet-famous phenomenon, and then grasp the deep laws of urban spatial development accordingly.

2.2 Research Status and Applicability Analysis of the Dual Theories

2.2.1 Research Status of Spatial Gene Theory

Spatial gene theory was first systematically proposed and its core connotation defined by Academician Duan Jin’s team in 2019: a unique, stable and inheritable spatial combination pattern formed by the long-term coupling of urban space with natural geographical environment and historical and cultural context, carrying regional exclusive cultural genes and spatial memories, and serving as the core element to shape urban identification and avoid “thousand cities with the same appearance” (Shao et al., 2020). The current research progress is systematically sorted out from the dimension of research fields below.

Scholars such as Duan Jin and Jiang Ying clarified that the self-organization, hierarchy and openness of the urban complex system form the basic connotation of spatial genes (Duan et al., 2022). Subsequently, it was proposed that the core of identifying and extracting spatial genes lies in clarifying the “space-nature-humanities” interaction model contained in specific spatial characteristics, which can be completed through five specific steps: sorting out characteristic spaces, obtaining public cognition of characteristic spaces, clustering and screening spatial cognitive characteristics, extracting the configuration relationship of spatial elements, and combining spatial organization rule sets (Jiang et al., 2025). Later, scholars such as Miao Siyu and Zhang Yu further expanded the theoretical connotation, integrated spatial gene theory with urban characteristic shaping and stock renewal, clarified its core role in solving the problem of urban homogeneity, and further consolidated the theoretical foundation (Miao et al., 2025). Second, the most widely applied field of spatial genes is in historical ancient cities, historical blocks, cultural relic protection units, emerging spatial carriers and other spatial fields, with research focusing on the extraction and inheritance of core genes such as historical spatial texture, street pattern and architectural scale. For example, it has been applied in the planning of cultural relic protection spaces such as Xi’an Ancient City and Pingjiang Historical Block in Suzhou, effectively avoiding the damage of excessive commercialization to the historical context (Duan, 2023). Then, scholars such as Shao Dian, Yang Junyan and Cai Jiyao, aiming at the pain point of spatial homogeneity under the traffic orientation of internet-famous cities, focused on the extraction of urban characteristic spatial genes to help cities build exclusive spatial business cards, adapting to the characteristic creation needs of different types of internet-famous cities, with extremely strong theoretical adaptability (Shao et al., 2025).

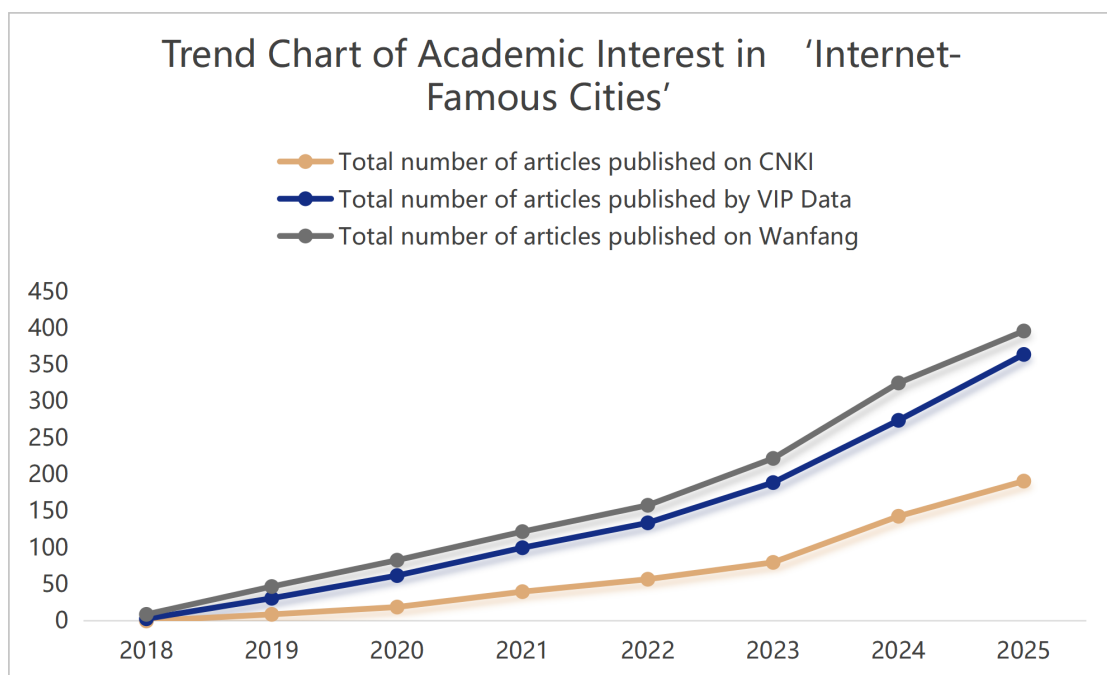


Figure 1 Trend Chart of Academic Attention to Internet-Famous Cities

2.2.2 Research Status of Multiple Intelligences Theory

Multiple intelligences theory was first systematically and explicitly proposed by the famous American psychologist Howard Gardner in his 1983 work *Frames of Mind*. Fundamentally breaking through the traditional single intelligence evaluation model, it puts forward that human beings have multiple intelligences, including logical-mathematical, spatial, bodily-kinesthetic, interpersonal and naturalistic intelligences. Different groups and individuals have different intelligence combinations and advantages, so the core viewpoint of the theory—the diversification of intelligence and scenario adaptability—has been fully supported by empirical evidence for decades, and has become a classic theory widely accepted and highly applied in pedagogy, sociology, design and other fields.

The application of multiple intelligences theory in the fields of urban and rural planning and urban design has been clearly and hierarchically expanded: starting from the design of educational spaces and child-friendly spaces, it has naturally extended to various scenarios such as urban public spaces, cultural and tourism blocks, and commercial complexes, and can transform abstract crowd needs into specific and operable spatial design languages, thus shifting spatial supply from “standardized” to “diversified”.

2.2.3 Internal Connection Between the Collaboration of the Dual Theories and the Development of Internet-Famous Cities

Although spatial gene theory belongs to urban and rural planning and multiple intelligences theory belongs to psychology, both have an excellent collaborative effect on the spatial development of internet-famous cities, so the complementary logic of “characteristic base + people-oriented orientation” can be naturally summarized.

It is very clear to analyze from the complementarity of “stability + imaginability”: spatial gene theory studies the relatively stable spatial combination patterns formed in long-term evolution, thus naturally pointing to the “genes” of urban characteristics, namely the deep structure of regional identification; while multiple intelligences theory examines how the wisdom of different subjects (community residents, natural systems) is integrated into spatial production, thus directly involving the comprehensibility, participation and communicability of space.

This paper systematically and hierarchically sorts out the mutual construction of “original law + spatial representation”: spatial gene theory directly faces the original law of spatial development, and systematically investigates the regional combination pattern of spatial elements and its internal generation mechanism, thus naturally deriving design methods for morphological organization and place creation (Ji et al., 2023). More importantly, the collaborative application of the two theories provides a truly holistic perspective for the sustained prosperity of internet-famous cities: spatial gene theory answers the question of “where do urban characteristics come from”, and multiple intelligences theory answers the question of “how to activate urban wisdom”. The former corresponds to “what to preserve”, and the latter corresponds to “how to co-create”. Therefore, the combination of the two can naturally and appropriately guide internet-famous cities to shift from “chasing traffic” to “activating genes” and from “single narrative” to “diversified co-creation”.

3. RESEARCH METHODS AND PATHS

This study comprehensively uses a combination of qualitative and quantitative research methods to construct a methodological system of “theoretical construction—case analysis—technical integration”, specifically including the following levels:

3.1 Literature Research and Theoretical Construction Method

By systematically sorting out the domestic and international research progress of spatial gene theory and multiple intelligences theory, this paper clarifies the basic essentials and collaborative logic of the Dual

Theories. Then, based on the framework of “identification + extraction + guidance and control” of spatial genes proposed by Duan Jin’s team, the core viewpoints of collective knowledge production and local wisdom inheritance in multiple intelligences theory are introduced, thus naturally constructing a collaborative framework of the Dual Theories applicable to the analysis of the spatial development of internet-famous cities.

3.2 Multi-case Comparative Analysis Method

Taking three representative internet-famous cities—Changsha, Chongqing and Xi’an—as cases, this paper carries out a systematic and hierarchical horizontal comparative study along the analysis path of “spatial gene characteristic identification + multiple intelligences activation path analysis + Dual Theories strategy refinement”. The selected cases have obvious differences in urban types and development paths, so the applicability and optimization direction of the Dual Theories strategies in different situations are obtained.

3.3 “Spatial Element Evaluation + Spatial Gene Extraction” Method

Referring to the spatial gene identification framework proposed by scholars such as Huang Longyan, the key spatial elements of case cities are doubly judged from two dimensions: “stability” (spatiotemporal continuity characteristics) and “imaginability” (subjective perception potential) (see Figure 2).

4. EMPIRICAL ANALYSIS ON THE APPLICATION FEASIBILITY OF THE DUAL THEORIES

4.1 Historical and Cultural Internet-Famous City-Xi’an

This paper takes the provincial capitals among the 135 national historical and cultural cities announced by the National Cultural Heritage Administration as research samples, and conducts a systematic comparative analysis using topic popularity data on Douyin before March 10, 2026. The conclusion is drawn that Xi’an ranks first in topic popularity among these cities. As an ancient capital of thirteen dynasties, Xi’an is one of the first batch of national historical and cultural cities in China, and can be called a typical historical and cultural internet-famous city. In 2023, the city’s GDP reached 1,390.267 billion yuan, and the cultural and tourism industry made an obvious contribution to the city’s economy. It received more than 320 million domestic and foreign tourists throughout the year, with total tourism revenue exceeding 380 billion yuan, and cultural and tourism consumption accounting for 42% of the total retail sales of consumer goods ④.

Therefore, historical and cultural spaces are the most prominent and powerful traffic carriers of Xi’an. Nevertheless, Xi’an’s internet-famous traffic is highly concentrated in historical and cultural spaces such as the Tang Dynasty Everbright City, Xi’an City Wall, Muslim Quarter and Daming Palace, which is accompanied by problems such as excessive commercialization of historical spaces, superficial inheritance of cultural context, spatial conflicts between local residents and tourists, and uneven distribution of spatial vitality.

According to the digital extraction method of spatial genes, Xi’an’s core spatial genes are mainly divided into four categories: first, macro-pattern genes, namely the square and symmetrical, central-axis symmetric and lifang system ancient city pattern of Sui and Tang Chang’an City, and the complete city texture of Ming Xi’an City, which are the core identifiers distinguishing Xi’an from other internet-famous cities; second, meso-street genes, the historical street scales, pedestrian road network density and street interface texture represented by the Muslim Quarter, North Courtyard Gate and Academy Gate, carrying urban life culture and historical context; third, micro-style genes, the Tang Dynasty architectural style, Ming and Qing residential texture, and the spatial sequence of city wall-city gate-moat, forming Xi’an’s exclusive visual spatial genes; fourth, cultural scene genes, the combination pattern of historical ritual spaces, folk custom experience spaces and intangible cultural heritage display spaces, which are the core connotation of Xi’an’s internet-famous attraction (see Figure 3).

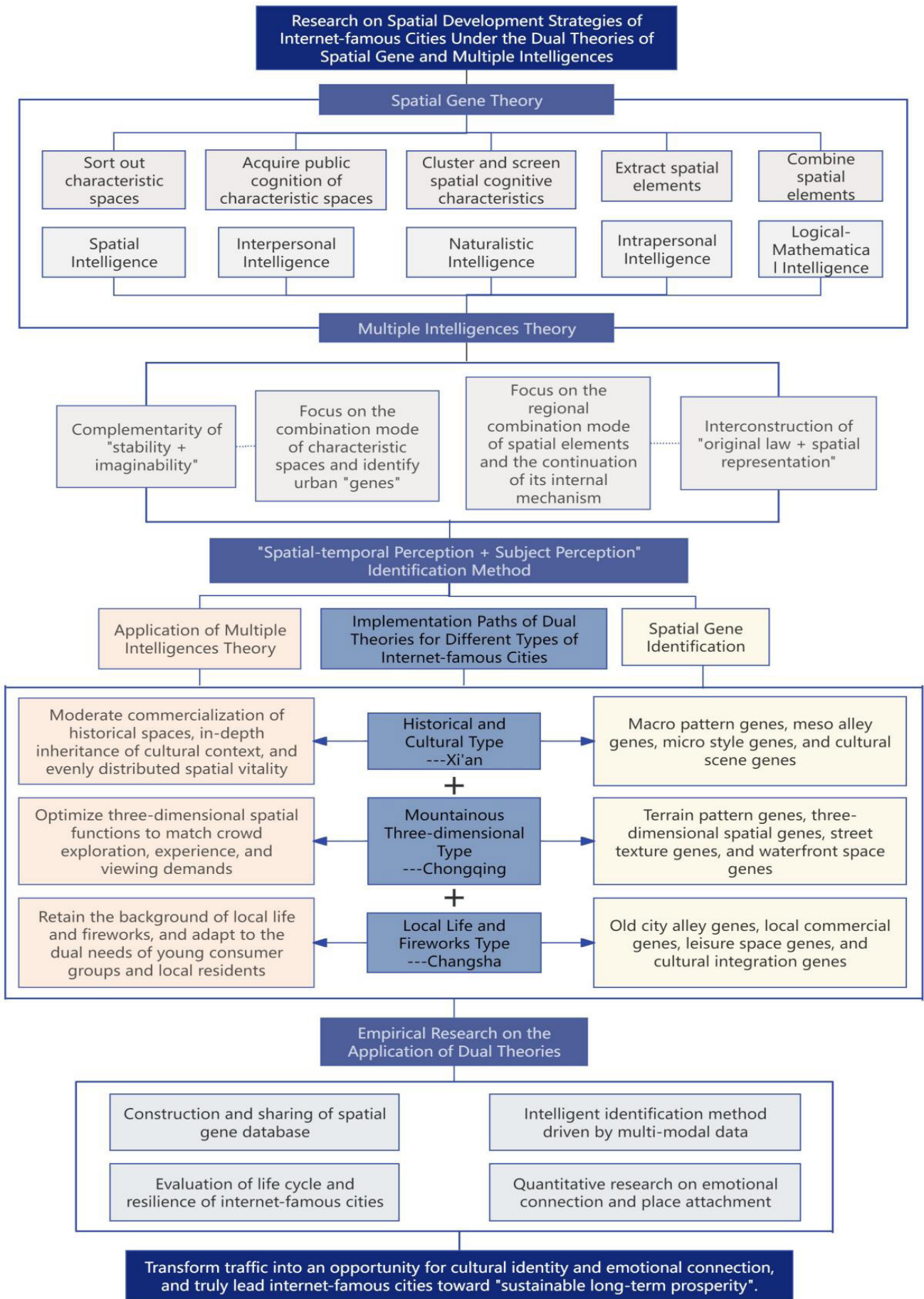


Figure 2 Technical Route Map of the Dual Theories

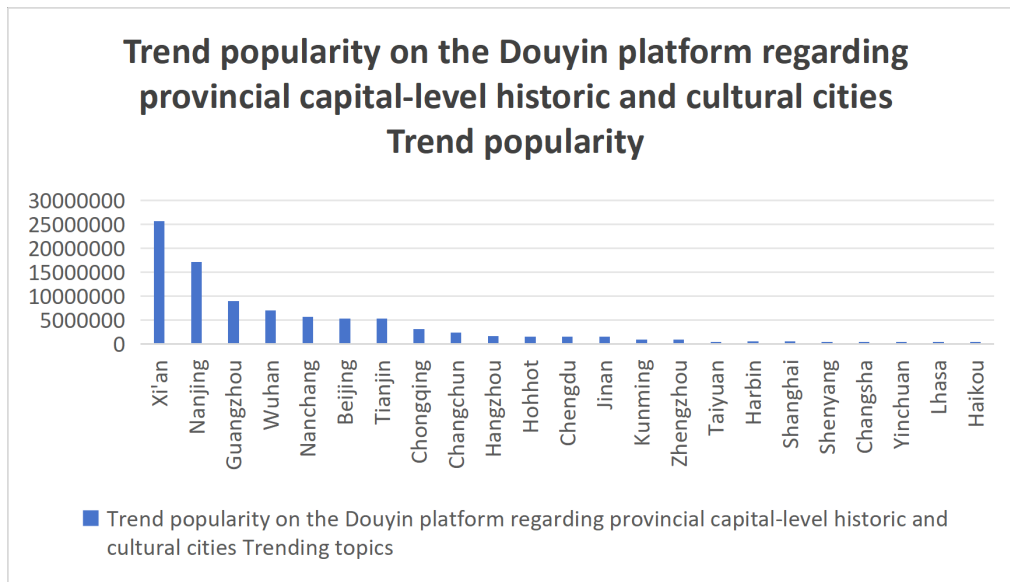


Figure 3 Topic Popularity Map of Provincial Capital-Level National Historical and Cultural Cities on Douyin

4.2 Mountainous Three-Dimensional Internet-Famous City-Chongqing

Located in the eastern part of the Sichuan Basin, Chongqing has a typical mountainous landform, forming a rare three-dimensional urban space in the world, and is also a benchmark internet-famous city with a high integration of natural landforms and urban space. In 2024, the city received 473 million domestic tourists, a year-on-year increase of 13.4%, achieving domestic tourist spending of 503.19 billion yuan, a year-on-year increase of 17.4%, and received 1.2767 million inbound tourists, a year-on-year increase of 183.6% (5). Three-dimensional spaces such as Hongyadong, Liziba Light Rail, Yangtze River Cableway and Shancheng Alley are top internet-famous check-in spots, and the mountainous space identification is unique in China. However, at present, Chongqing's mountainous space resources are fragmented, the connection between three-dimensional transportation and pedestrian spaces is not smooth, and the carrying capacity of viewing spaces still has obvious room for improvement. Therefore, it is advisable to protect mountainous characteristics with spatial gene theory and optimize three-dimensional spatial functions with multiple intelligences theory to effectively meet people's needs for exploration, experience and viewing.

At present, Chongqing's spatial genes revolve around mountainous three-dimensional characteristics: first, landform pattern genes, the landscape pattern surrounded by two rivers and four mountains, and the mountainous terrain base with undulating height differences, forming the natural genes of Chongqing's urban space; second, three-dimensional spatial genes, multi-layer three-dimensional transportation, stilted building texture, riverside height difference spaces and Shancheng trail system, which are Chongqing's core internet-famous spatial genes; third, street texture genes, the street scales and vertical spatial layout of climbing streets such as Shancheng Alley and Shibati, different from the planar texture of plain cities; fourth, riverside spatial genes, the integration sequence of the Yangtze River and Jialing River riverside interfaces, cross-river bridges and urban spaces, forming Chongqing's unique riverside spatial genes.

4.3 Urban Life and Vitality Internet-Famous City-Changsha

Changsha has become popular in recent years with its "low consumption, high sense of happiness and urban life atmosphere", and has naturally become an excellent example of an urban livelihood-oriented internet-famous city. The data from Changsha Municipal Bureau of Culture, Tourism, Radio, Television and Sports clearly confirms this: in 2023, Changsha received 195 million tourists, a year-on-year increase of

43.99%, and achieved tourism revenue of 219.305 billion yuan, a year-on-year increase of 51.21% (6). More importantly, as a typical "non-resource-endowed city", Changsha has neither the port location advantage of coastal cities nor the policy-favored resource-rich area, but it can take the initiative to fully tap limited resources, thus successfully breaking through from an "internet-famous city" to a "city strong in talents", and then rising to a "major industrial city". In 2025, it won the title of "China's Dynamic City" for five consecutive years. Wuyi Square, Taiping Street, Pozi Street, Chaozong Street and other places are the core traffic entrances of Changsha's urban life spaces, and young tourists accounted for more than 70% of the total annual visitors (7). However, its existing main pain points are overloaded passenger flow in core business districts, commercial erosion of urban life spaces, weakening of characteristic urban life genes, and excessive concentration of spatial vitality in core business districts. Therefore, it is necessary to rely on spatial genes to retain the background of urban life atmosphere, and systematically and prudently meet the dual needs of young consumer groups and local residents.

At present, the core of Changsha's spatial genes focuses on urban life atmosphere: first, old city street genes, the narrow streets, dense road network and small-scale spatial pattern of Taiping Street, Pozi Street and Chaozong Street, retaining the original texture of Changsha's old city; second, urban life commercial genes, the layout pattern of street-side small shops, characteristic food blocks and convenient commercial outlets, carrying Changsha's life atmosphere; third, leisure space genes, the convenient rest spaces on both sides of the Xiangjiang River leisure belt and at the foot of Yuelu Mountain, forming Changsha's livelihood spatial genes; fourth, cultural integration genes, the integrated layout of historical and cultural spaces such as Yuelu Academy and urban life commercial spaces, realizing the symbiosis of culture and life atmosphere (see Table 1).

4.4 Application Suggestions of the Dual Theories

4.4.1 Xi'an

Xi'an, Based on spatial gene theory, a path of "gene identification + hierarchical protection + living inheritance" can be established to guide the multiple intelligences optimization of traffic connection inside and outside the ancient city. At the meso level, extract historical street spatial genes, retain the original scale and texture, and appropriately insert immersive cultural experience nodes and slow-traffic trails. At the micro level, inheriting Tang Dynasty architectural style genes, create scenes such as intangible cultural heritage interaction, research study

Table 1 Overview of Spatial Genes

City	Spatial Gene Type	Spatial Genes
Xi'an	The Broader Picture	The Urban Layout of Chang'an during the Sui and Tang Dynasties The Urban Fabric of the Ming-era Xi'an City Walls Hui Muslim Street, Beiyuanmen,
	The Streets and Alleys of Zhongguan	Shuyuanmen
	Micro-landscapes	Architectural character, the fabric of Ming and Qing-era dwellings, and the spatial sequence of city walls, gate towers and moats
	Cultural Settings	Historical ceremonial spaces, folk culture experience areas, and intangible cultural heritage exhibition spaces
	Landform Patterns	A landscape embraced by two rivers and surrounded by four mountains A mountainous terrain characterised by significant variations in elevation
Chongqing	Spatial Genes	Multi-level, three-dimensional transport network; the architectural texture of stilted houses; the varied elevations along the riverfront; the mountain city's network of footpaths
	Street and Alleyway Fabric	Shancheng Alley, Shibati
	Waterfront Spaces	Riverside areas along the Yangtze and Jialing Rivers, and bridges spanning the rivers
	The Streets and Alleys of the Old Town	Taiping Street, Pozi Street, Chaozong Street
Changsha	High Street Retail	High-street shops, specialty food districts, and local convenience stores
	Leisure Area	The Xiangjiang River Riverside Leisure Belt and public rest areas at the foot of Yuelu Mountain
	Cultural Integration	The integrated layout of historical and cultural spaces such as Yuelu Academy alongside urban commercial spaces

experience and folk custom display, so as to truly solve the problems of homogeneity and symbolization of historical spaces.

4.4.2 Chongqing

Chongqing, according to the extracted spatial genes combined with multiple intelligences theory, solutions are proposed from three levels for the dilemmas faced in the development of Chongqing as an internet-famous city: at the macro level, rely on landscape pattern genes to optimize urban spatial layout and avoid contiguous development damaging landforms; at the meso level, extract three-dimensional transportation and Shancheng trail genes, improve the slow-traffic system, connect internet-famous nodes such as Hongyadong, Shancheng Alley and Liziba based on bodily-kinesthetic and spatial intelligence needs, and create a global three-dimensional tour route; at the micro level, inherit stilted building and riverside spatial genes, expand viewing platforms and create ecological leisure spaces based on naturalistic intelligence, taking into account tourist experience and daily travel of local residents.

4.4.3 Changsha

The Dual Theories can be applied to solve the current development dilemmas of Changsha as an internet-famous city from three aspects. At the macro level: extract old city street genes and urban commercial genes to divert passenger flow in core business districts and avoid excessive commercialization. At the meso level: inherit the street genes of Taiping Street and Chaozong Street, retain the original scale and local business formats, optimize pedestrian spaces and introduce characteristic local business formats based on the needs of interpersonal and bodily-kinesthetic intelligences. At the micro level: retain the original style of urban life spaces, create people-friendly and life-oriented spatial scenarios based on leisure experience needs, put an end to high-end and homogeneous transformation, and continue Changsha's urban life culture to the greatest extent.

5. RESEARCH IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

At present, many cities regard "manufacturing internet-famous spots" as a short-term marketing task, so they invest a lot in building internet-famous blocks, light shows and glass plank roads, but the actual result is that "the average daily passenger flow is less than 100 people half a year later". Therefore, the practical implication of this paper is very clear: to change the thinking from "manufacturing internet-famous spots" to "cultivating soil", which can be implemented at three levels specifically.

First, taking cultural soil as a metaphor, it explains the excavation, protection and activation of urban cultural genes, making space have stories to tell and temperature to perceive. The experience of "sustained prosperity cities" such as Xi'an and Chongqing clearly confirms that the real charm of a city comes from "the perceptibility, shareability and renewability of culture".

Second, taking technical soil as a metaphor, it naturally explains that the purpose of building data infrastructure is to facilitate the convergence, analysis and application of multimodal information, so that the internet-famous phenomenon can grow naturally, more tenaciously and durably.

Third, taking institutional soil as a metaphor, it clearly explains the need to establish a decision-making mechanism with the participation of multiple subjects, so that the wisdom of residents, merchants, tourists and other groups can be input into the spatial optimization process, thus truly promoting the "sustained prosperity" of the city. Wu Bihu made an excellent summary of this: "Only when citizens truly participate can the city have sustainable emotional stickiness" ②.

6. PROSPECTS

This paper clarifies the complementarity and collaboration of spatial gene theory and multiple intelligences theory, so their combination can

transcend binary oppositions such as “protection and development” and “tradition and modernity”, thus providing a truly integrated analysis framework for the complexity of urban space. Therefore, future research on internet-famous cities should be carried out from four aspects.

Direction 1: As clearly and hierarchically expounded by Professor Duan Jin, the goal of constructing and sharing a spatial gene bank is to summarize the general methods of spatial gene research and establish a standardized spatial gene expression language based on more and more “detailed” studies in different regions.

Direction 2: From the perspective of the life cycle and resilience of internet-famous cities, in view of the frequent occurrence of the “short-lived popularity” phenomenon, systematically and hierarchically establish an evaluation framework for the life cycle of internet-famous cities, clarify the main factors affecting the sustainability of popularity, and then provide early warning and intervention tools.

Direction 3: For the quantitative research on emotional connection and place attachment, in the future, systematically and hierarchically investigate the relationship between different types of spatial genes and emotional connections of different groups and their differences in effects, thus naturally deriving the scientific basis for collective emotional connection in design creation.

In the future, when responding to the spatial development dilemmas of internet-famous cities, urban planning can neither blindly reject digital communication nor blindly chase traffic at the expense of spatial quality.

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NOTES

① Data Source: The 57th *Statistical Report on China's Internet Development* by China Internet Network Information Center(CNNIC), <https://www.cnnic.cn/n4/2026/0304/c88-11549.html>

② Data Source: The Beijing News, Short-lived Popular Cities Emerge Frequently: Why Does the Popularity of Internet-Famous Cities Last Shorter?, <https://www.bjnews.com.cn/detail/1745378702168035.html>

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