

A Comparative Analysis of Industrial Development of Five Cities of Design in China

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Abstract: This dissertation conducts comparative analysis into recent design industry development of the five Cities of Design from five perspectives: fundamentals of design industry, urban design space, projects, policies & institutions and impact of the industry. Building upon the analysis, the authors give three suggestions for development of the Cities of Design in a more scientific and efficient manner. The research results are of great significance to the development of the Cities of Design, innovative development of urban design in China and sustainable development of culture & design industry.

Keywords: City of Design; Design Industry; Design Innovation; China

1. Introduction

In the context of globalization, the design industry, as a critical engine of urban innovation and cultural development, has become an important indicator of strengths of cities. The boom of design industry in China facilitated economic transformation and made cities more charming and vibrant. The five Cities of Design - Beijing, Shanghai, Shenzhen, Wuhan and Chongqing have made their presence in design industry development, thanks to their industrial foundation, cultural background and innovation spirit.

This dissertation conducts analysis into the status quo and achievements of the design industry foundation, urban space, projects, policies and impact of the industry in the five Cities of Design. Based on comparison of industrial scale, talent development, category of enterprises, organizational structure and education support system, the authors reveal advantages and uniqueness of the cities. Statistical methods are adopted to

calculate industrial growth rate and therefore discuss efficiency and potential of their growth. Different in development paradigms, the Cities of Design jointly showed the promising trend of design industry growth. This dissertation aims to provide reference to development of Cities of Design, facilitate sustainable development of urban design innovation and culture industry, and contribute to national rejuvenation.

2. Fundamentals of Design Industry

The data of the statistical analysis into recent development of Cities of Design come from relevant governmental and culture industry entities, namely Beijing City of Design Development Co. Ltd, Shanghai Economy and Information Technology Commission, Shenzhen Industrial Design Association, National Research Center of Cultural Industries and statistical bureaus of the cities. Official data released from 2019 to 2023 have been collected, while that of the year 2022 has been used for analysis and other data for reference.

The fundamentals of culture and design industry today can illustrate industrial development of a city from a macro perspective. After their designation, the five Cities of Design entered into the phase of construction, but they differ from one another in terms of fundamentals, orientation and theme of development. Therefore, besides comparing industrial development of the cities, this section also analyzes data concerning industrial scale, talent, enterprise, institution and education over the years since their designation as City of Design, so as to summarize their respective culture design industry development.

2.1 Industrial Layout

The category of culture and design industry of the five Cities of Design were different. Beijing had a relatively comprehensive range of categories. As stated in 2019 Report on Design Industry Development in Beijing, there were three main categories, namely product design including industrial design, costume/fashion design and arts & craft, construction and environment design including construction design, engineering design and planning & design, as well as visual communication design including graphic design, animation design and display design [1]. Shanghai boasted a creative design industry featuring solid foundation, diversity and integration. Industrial design and construction design are the dominant industries, while film and TV news media industry was the advantageous industry. Generally speaking, its culture industry led the country and enjoyed huge potential. The market share of industrial design accounted for around 50% of that of the Yangtze River Delta market and 72% of the high-end market [2]. In Shenzhen and Chongqing, industrial design was the core industry. With sound manufacturing foundation, both cities were upgrading and transforming traditional manufacturing industry into advanced and intelligent manufacturing. Industrial design and graphic design were the core culture industries in Shenzhen. The city gave great prominence to industrial design, as it played a crucial role in transforming its manufacturing industry based on factory building, large scale and automation into high-end, precise and advanced manufacturing industry featuring Created in China and Intelligent Manufacturing in China. In 2022, Shenzhen's total output of industrial design stood at 45 billion yuan. Industrial design has driven forward the growth of upstream and downstream industries totaling a value of over one trillion yuan, markedly improved the quality and efficiency of manufacturing industry and facilitated massive expansion of the industry. Chongqing attached importance to advancing design industry with distinct features in industrial design, engineering design and fashion design, with industrial design as the mainstay [3]. In Shanghai and Beijing where cultural heritages abound, industries are mature and culture design industry development diversified.

Compared with the other four cities, Wuhan has relatively higher concentration of cultural design industries. With focus on engineering design, Wuhan aimed to build itself into city of engineering design since it applied for the honor of City of Design. As an advantageous industry, the total output of engineering design accounted for more than 80% of the cultural industry. Over the years, Wuhan was not building a diversified design industry system. Apart from engineering design, Wuhan was capable of developing costume design, jewelry design and animation design, but the efficiency of developing those industries was low. Moreover, the structure of creative design professionals was not reasonable, and consequently engineering design industry was strong but the ability to create was weak [4].

2.2 Industrial Scale

The culture and design industry output (Table 1), industrial scale in the year of application for City of Design (Table 2), industrial increment (Table 3) and industrial growth rate (Table 4) in 2022 of the five cities of design are studied, as shown in the following tables. Released by local government statistics bureau, the data relate to cultural industry development in 2022 of the cities.

In 2022, the added value of culture and related industries in Shenzhen exceeded 260 billion yuan, accounting for 8% of the city's GDP, up by 7.7% compared with last year. There were 3,134 cultural enterprises above designated scale whose turnover reached 969.146 billion yuan. The annual output of creative design industry exceeded 100 billion yuan, driving development of relevant industries valuing hundreds of billions of yuan and accounting for about 10.3% [5].

In 2022, the turnover of industrial and other related industrial legal person entities above designated scale in Beijing totaled 1799.71 billion yuan, a year-on-year increase of 0.2%. The added value of cultural industry reached 470.03 billion yuan, 13% of GDP, up by 13.6% compared with last year. The turnover of creative design service stood at 346.5 billion yuan, accounting for 19.25% [6].

In 2022, the total output of cultural other related industries in Shanghai totaled 2188.4 billion yuan. The added value stood at 582.52 billion yuan, 13% of GDP, up by 1.17% compared with last year. The added value of

creative design service was 61.426 billion yuan, accounting for 10.54%.

In 2022, the turnover of Wuhan totaled 264.6 billion yuan. The added value of creative design industry reached 169.794 billion yuan, accounting for over 9%, up by 11.6% compared with last year. In 16 industries of new business format including digital creativity, there were 267 cultural companies above designated scale, which realized a total turnover of 67.12 billion yuan, accounting for 50.7% of the cultural industry turnover above designated scale. In 2021, the design service industry had a turnover of 107.2 billion yuan, accounting for 52.9% of that of the total

industrial and other related industries [7].

By the end of 2022, cultural and other related industry enterprises above designated scale in Chongqing had a turnover of 212.9 billion yuan, up by 1.5% compared with last year, and the growth rate was 0.6% higher than national industrial average. The added value of cultural industry stood at 113.5 billion yuan, accounting for 4% of GDP and rising by 6.6% compared with last year. As the creative design service industry was still growing, the added value was no more than 10 billion yuan, accounting for less than 10% of the added value of cultural and other related industries [8].

Table 1. Scale of Culture and Design Industry of Five Cities of Design in China (2022)

City	Cultural industry output/100 million yuan	Added value of cultural industry/100 million yuan	Proportion in GDP/%	Increased percentage year-on-year/%	Added value of creative design industry/100 million yuan	Proportion of Added value of creative design industry/%
Shenzhen	9691.46	2600	8%	7.7	1000	10.3
Shanghai	21884	5825.2	13.00%	1.17%	614.25	10.54
Beijing	17997.1	4700.3	11.30%	13.60%	3465	19.25%
Wuhan	2646	1697.94	9%	11.6%	1072	52.90%
Chongqing	2129	1135	4%	6.60%	<100	<10%

Table 2. Scale of Culture and Design Industry of Five Cities of Design in China
(The year of application for City of Design)

City	Year of application for City of Design	Cultural industry output/100 million yuan	Added value of cultural industry/100 million yuan	Proportion in GDP/%
Shenzhen	2008	110	550	7%
Shanghai	2010	5499	1673	9.75%
Beijing	2012	9000	2189.2	12.30%
Wuhan	2017	1000	619.1	7.40%

Table 3. Increment of Industrial Scale of Five Cities of Design in China
(From the year of application of City of Design to 2022)

City	Duration/year	Cultural industry output/100 million yuan	Added value of cultural industry/100 million yuan	Proportion in GDP/%
Shenzhen	14	9691.46	2600	8%
Shanghai	12	21884	5825.2	13.00%
Beijing	10	17997.1	4700.3	11.30%
Wuhan	5	2646	1697.94	9%
Chongqing	0	2129	1135	4%

Table 4. Growth Rate of Industrial Scale of Five Cities of Design in China
(From the year of application of City of Design to 2022)

City	Annual growth rate of cultural industry output	Growth rate of cultural industry increment	Growth rate of proportion in GDP
Shenzhen	37.70%	11.73%	0.96%
Shanghai	10.37%	9.32%	2.08%
Beijing	5.07%	5.61%	-0.60%
Wuhan	7.20%	7.47%	1.41%

In terms of total industrial output value, Beijing and Shanghai were among first tier in

cultural industry. They outperform other cities regarding comprehensive strengths and

competitiveness, so the output value of cultural industry, the core of third industry, was rather high. The added value accounted for over 10% of GDP, which demonstrated that the cultural industry played a critical role in advancing urban economic growth. The added value of cultural industry of Beijing witnessed a year-on-year growth of 13.6%, much higher than that of Shanghai.

However, comparing industrial competitiveness of the five cities from only the perspective of industrial scale is not enough, as they differ in comprehensive strengths, previous cultural industry development and duration as City of Design. Therefore, statistical methods have been introduced to calculate the annual growth rate for illustrating the growth efficiency of the five cities. As Chongqing was designated as City of Design in 2023, the data is inadequate for calculation. Thus we conduct comparison of Shenzhen, Shanghai, Beijing and Wuhan only.

As shown from the data, Beijing and Shanghai, where total industrial value of cultural industry far exceeded those of Wuhan and Chongqing, remained top of the five cities. In recent years, the output value of cultural industry of Shenzhen soared from 11 billion yuan to 969.146 billion yuan within 14 years, with an annual growth rate of 37.7%, way higher than other Cities of Design. The industrial growth rate of Shenzhen was also higher than that of other cities, but the share of its cultural industry in GDP dropped rapidly. This showed that Shenzhen has developed into a

comprehensive metropolitan from a manufacturing-based city lacking cultural industry and relying on processing business and compensation trade. Though the share of cultural industry increased modestly, the output value of the industry skyrocketed to parallel culture-centered cities such as Shanghai and Beijing. For Beijing, the cultural center of China, the growth rate of output value of cultural industry and added value has almost been the lowest among the five cities in recent years, while the growth rate of the share of cultural industry in GDP was -0.6%. The main reason behind it was not the lowered output value of design industry, but the trend of advancing integration between design industry and high-end, precise and cutting-edge industries. The index score of National Science and Technology Innovation Center has been rising rapidly. In 2018, the score stood at 322.9, almost twofold of that in 2014, with an annual average growth rate of over 18%, apparently higher than 11.8% from 2010 to 2013. More industry design companies transformed themselves into high and new-tech ones, or companies had high output value and added value of high and new-tech industries due to improved industrial design. As a result, it seemed that the share of cultural industry was lowering, but actually cross-disciplinary systemic design has become the development orientation, specifically diversified, personalized and systemic development.

2.3 Enterprises and Talent

Table 5. Design Companies and Employees of Five Cities of Design in China

(The year of application for City of Design)

City	Number of design companies	Number of design employees	Number of design colleges
Shenzhen	6000	100000	1
Shanghai	3876	1089400	35
Beijing	13609	250000	112
Wuhan	497	72800	65

Table 6. Design Employees/Colleges of Five Cities of Design in China (2022)

City	Number of design companies	Number of design employees	Number of design colleges
Shenzhen	33000	220000	3
Shanghai	65224	400000	23
Beijing	16220	250000	82
Wuhan	1860	460000	89

Table 7. Growth Rate of Companies/Employees/Colleges of Five Cities of Design in China

City	Duration/year	Growth rate of design companies	Growth rate of design employees	Growth rate of design colleges
Shenzhen	14	12.95%	5.79%	8.16%
Shanghai	12	22.34%	-6.91%	-2.95%

Beijing	10	1.26%	0.00%	-2.20%
Wuhan	5	9.89%	14.07%	3.23%

The data related to design companies, employees and colleges (Table 5, 6 and 7) shows the vigor of culture & design industry, since the vitality of industry lies in people. First, City of Design should have well-established design colleges, which serve as incubation of talents as well as base of frontier academic research. Design colleges were of small scale in Shenzhen. When applying for City of Design, Shenzhen had only one college - Shenzhen University dedicated teaching of design. By 2022, Shenzhen had three colleges that teach design - Harbin Institute of Technology, Shenzhen, Shenzhen University and Shenzhen Technology University as well as two research institutes - Institute of Arts & Design, Graduate School of Tsinghua University and Institute of Arts & Design, Shenzhen Graduate School of The Chinese University of Hong Kong. They were the results of Shenzhen government's leading efforts in collaborating with renowned universities nationwide or inviting research institutes to join. It is fair to say that lack of great academic atmosphere and production of talents has long been impeding cultural industry development in Shenzhen. However, there were 220,000 design employees in Shenzhen, only slightly fewer than the 250,000 people in Beijing. Moreover, there were more than 6,000 design companies in Shenzhen, contributing to nearly 70% of the market share in China. This achievement was closely associated with the government's efforts in talent introduction. To attract high-end design talents across the country, Shenzhen government has constantly rolled out a number of favorable policies and measures since 2013. For example, according to the Measures on Accelerating Development of Industrial Design Industry, designers who win international design awards such as German If Product Design Award and Red Dot can earn a bonus of 50,000 yuan and those who win the golden awards 500,000 yuan.

Beijing was the best among the five cities in talent production environment and academic atmosphere, and the high-quality talents were constantly produced and joined relevant enterprises. Beijing is home to a number of renowned industrial design universities such as Academy of Arts & Design of Tsinghua

University, Central Academy of Fine Arts, Beijing Institute of Technology and Beijing Institute of Fashion Technology. Moreover, there were top-notch talents including Professor Liu Guanzhong from Academy of Arts & Design of Tsinghua University, Liu De from Xiaomi, Yao Yingjia from Lenovo and Jia Wei from LKK [2]. The number of culture and art companies decreased year-on-year by 30.65% in 2019, dropped by 10.48% in 2020, increased by 28.48% in 2021 and declined by 168.25% in 2022. The total number of such companies reached 11,287 from 2018 to 2022. The number of specialized design service companies dropped year-on-year by 33.56% in 2019, increased by 9.40% in 2020, rose by 28.32% in 2021 and decreased by 126.13% in 2022. From 2018 to 2022, there were 16, 220 such companies, among which 900 were above designated scale.

In Shanghai, the number of cultural enterprises increased year-on-year by 12.45% in 2019, dropped by 5.08% in 2020, rose by 12.45% in 2021 and decreased by 40.02% in 2022. There were 76,862 such companies from 2018 to 2022. The number of specialized design service companies increased year-on-year by 29.75% in 2019, rose by 88.11% in 2020, increased by 37.26% in 2021 and decreased by 35.50% in 2022. The number of such companies totaled 65,224 from 2018 to 2022. the number of industrial design companies in Shanghai was 580, more than one third of the 1,506 such companies in Zhejiang Province.

Like Beijing, Shanghai is also home to a great number of culture and design industry colleges which produce a huge quantity of outstanding graduates for enterprises each year. 23 universities have set up design-related disciplines. There were leading talents including Yang Mingjie from YANG DESIGN, Ding Wei from MOMA and Jiang Qionger, co-founder and board director of SHANG XIA. Shanghai has always been an international metropolitan pooling brilliant designers across the world and conducting international exchanges for design. In College of Design and Innovation of Tongji University, Sino-Finnish Centre, a joint studio was established by China and Finland and Shanghai International College of Design and Innovation was founded together with Aalto University of

Finland in 2015.

In Wuhan, the 89 universities recruited more than one million students, among whom about 130,000 majored in artistic design and engineering design. And there were 72,800 employees in the dominant design industry, namely engineering design. Wuhan had a large number of design colleges and similar amount

of employees compared with Shanghai, but there were fewer design companies. That's because the large amount of employees worked in engineering design institutes instead of in creation-related SMEs.

2.4 Institutions

Table 8. Cultural Industry Scale of Five Cities of Design - Institutions

City	National industrial design center	Provincial industrial design center
Shenzhen	13	101
Shanghai	14	48
Beijing	17	64
Wuhan	10	101
Chongqing	10	165

By 2023, there were 17 national industrial design centers and 64 municipal design centers of high-end, precise and advanced industries in Beijing. Among them, Beijing high-end, precise and advanced industry design center will be renamed as Beijing Industrial Design Center. Shanghai had 21 national industrial design centers and 57 municipal industrial design centers. Shenzhen set up a total of 13 national industrial design centers and 123 provincial industrial design centers and 98 municipal industrial design centers. Wuhan had eight national innovation centers and design centers and seven national industrial design centers. Chongqing has put in place 10 national industrial design centers and 101 municipal industrial design centers, branches of 22 national industrial design centers and one national industrial design research institutes. The above data can be found in Table 8.

3. Urban Design Space

In Beijing, design companies are mainly located in core regions of Xicheng, Haidian and Chaoyang as well as emerging areas of Shunyi and Yizhuang. To advance sustainable development of design industry, Beijing has gradually established a number of industrial clusters, such as Beijing DRC Industrial Design Base, 751 D-Park, 768 Creativity Park and design clusters in Shunyi and Yizhuang. Resembling location of satellites, these bases and clusters not only provided a sound ecosystem of development, but also furthered the overall improvement of design industry in Beijing.

In Shanghai, the creative design industry has shown a spatial layout of “one axis, two rivers

and multiple circles”. In the Yan'an Road Urban Development Axis, major projects including Jing'an Fashion Creativity Park, Zhangjiang National Demonstration Base of Culture and S&T Integration and Bridge 8 Creativity Park have become increasingly influential. Along Huangpu river and Suzhou River, important creative design areas such as International Fashion Industry Park, Jiangnan Smart Manufacturing and Yangpu Binjiang Industrial Design have shown unique charm. The establishment of design creativity industry clusters such as design clusters around Tongji University, International Advertisement Creativity Industry Park and Fudan Software Park has expedited the process of city-industry integration. Particularly, with reliance on advantageous education and scientific resources, Yangpu District constantly carried forward the development philosophies of coordination between universities, science parks and communities as well as of integration between academic, industrial and entrepreneurial cities, fully released the potential of society in innovation and entrepreneurship, and facilitate innovative and entrepreneurial activities in wider scope, higher level and greater depth.

In Shenzhen, the design industry is characterized by its close integration with the Guangdong-HK-Macau Greater Bay Area. A community of design has, therefore, been put in place in the area. Since 2015, industrial associations, institutions and relevant non-governmental organizations of Shenzhen and HK have signed cooperation agreements to facilitate integration of design resources and hold more innovation-related activities.

Moreover, Shenzhen and HK governments took turns in holding Biennale of Urbanism/Architecture, boosting in-depth cooperation in design creativity. According to relevant policies, Shenzhen is exploring establishment of Shenzhen-HK-Macau Creative Design Alliance, so as to build a community of creative design cooperation in the Greater Bay Area and put in place complete industry and innovation chains connecting China with the world.

In recent years, Wuhan accelerated the clustered development of its culture & design industry, establishing a systemic cultural industry development platform. With Donghu Demonstration Base of Culture and S&T Integration as the core, the platform integrates national cultural industry parks, enterprises, provincial cultural industry demonstration parks and municipal demonstration parks of culture and S&T integration. Moreover, Wuhan has given great prominence to renewal of old city and industrial sites, building Sanyang Design Capital, core demonstration area of City of Design and world-level creative city area. As for industrial design, Chuchuanggu design park, Red T fashion creativity street and D+M Creative Haus by AG have contributed to clustered development of industrial design industry.

While bettering the overall city image, Chongqing also valued the development of design industry. The municipality has built over 300 entities of design industry, including Chongqing Design Park, Chongqing Industrial Design City, ECOOL industrial park, maker spaces and incubation bases. In addition, Chongqing set up over 200 community-based stations for designers, offering creative design training programs. For closer international cooperation, Chongqing put in place 14 international design exchange and cooperation centers and worked with many foreign cities in experience sharing, talent cultivation and industrial cooperation concerning design, film, literature and music.

4. Projects of Design Industry

4.1 International Development of Design Industry in Beijing

The planning and achievements of design R&D and innovation in Beijing, the capital of China and international metropolitan, has not

only manifested the cultural soft power but also determination and strengths in advancing design industry development in the region and the world at large. The status quo and trend of design industry development are analyzed in an in-depth manner from four perspectives, namely founding of design R&D and innovation platform, advancement of cross-regional and international cooperation projects, holding of design activities & enhancement of international influence as well as creation of design awards & introduction of international evaluation system.

4.1.1 Found design R&D and innovation platforms

In terms of R&D of design, Beijing was home to nearly 200 key labs and engineering technology centers, which covered multiple frontier areas of human engineering, virtual reality, simulation testing, green building design and 3D printing. In the meantime, Beijing Design Innovation Center set up 12 generic technology platforms on application of new material in product design, digital design of equipment manufacturing and PNT product design etc. Thanks to the platforms, technology support and services have been provided to nearly 3,000 SMEs. The platforms and centers serve as concrete technical support of design R&D in Beijing, promoting sustainable development of design innovation.

4.1.2 Advance cross-regional and international cooperation projects

Beijing implemented various cooperation projects in the area of design, including over 2,700 projects of Beijing-Tianjin-Hebei cooperation on average each year, more than 11,000 projects of assistance and regional cooperation, and 370 Belt and Road projects for over 50 countries. Thanks to the establishment of creative design industry service alliance for ethnic minority regions, Beijing-Tianjin-Hebei design industry alliance and brand creativity and innovation center, Beijing integrated its advantageous design resources with distinct resources from Yunnan, Guizhou and Xizang, thus propelling cross-regional development of the industry.

4.1.3 Hold design activities & enhance international influence

Beijing has made remarkable achievements in holding design activities, including UNESCO Creative Cities Beijing Summit, Beijing International Design Week and ICCIE. During

Beijing International Design Week, a total of over eight million people have been involved and their consumption volume exceeded three billion yuan.

4.1.4 Create design awards & introduce international evaluation system

To better advertise the value of design and enhance its international influence, Beijing set up the Red Star Design Award. The award aims to let more people be aware of the value of design, evaluate the quality of design and guide the development of design. International peer review has been included through call for projects globally, so that the world will know the quality and value of Chinese design.

4.2 Shenzhen Government and Associations Jointly Facilitate Industrial Development

4.2.1 Leading role of government in industrial development

The prosperity and development of cultural design industry in Shenzhen is impossible without the leading role of Shenzhen government. Shenzhen municipal government and publicity department set up an office of creative design development, which took charge of founding the School of Design, including its preparation, application, talent introduction, disciplinary planning and campus construction. This is meant to cultivate highly educated talents, offer undergraduate and postgraduate education, set up a system for cultivation of talents with bachelor's, master's and doctor's degree, and constantly inject new impetus into the cultural design industry of Shenzhen.

4.2.2 Objectives of the school of design

To meet the needs for innovation in Guangdong-HK-Macau Greater Bay Area, the School of Design aims to produce future-oriented design talents, building up a world-class academy featuring international engagement, high-level academic research, innovation and focus on practices. The school has provided not only important human and intellectual support for innovation and creativity development in the Greater Bay Area, but also new example of cultural design industry in Shenzhen and the country.

4.2.3 Priorities of office of creative design development

Shenzhen office of creative design development plays a critical role in facilitating development of the cultural design industry.

The office worked to hold such activities as Shenzhen Design Week and Shenzhen Global Design Award, building an international and cross-sector professional platform for the design industry. For example, events like Shenzhen Design Week and Shenzhen Global Design Award have facilitated the concentration and integration of design resources and discovery of outstanding talents, thus further facilitating the innovative development of design industry in Shenzhen.

4.2.4 Role of design industry associations

Design industry associations in Shenzhen has also played an important role in boosting industrial growth. For example, since its inception, the industrial design association has always been facilitating development of the industry. Through close cooperation with design companies, the association has collaborated with design companies in holding a series of influential and fruitful design activities, such as Shenzhen Design Innovation Exhibition, China (Shenzhen) International Industrial Design Week.

4.3 Design Industry in Shanghai is Diverse and International

4.3.1 Cultural activities and cultural industries tend to be integrated in multiple dimensions

In recent years, Shanghai has been highly active in holding cultural activities, as it not only promoted the multi-dimensional integration of cultural industries, but also exerted remarkable international influence. This section deals with the active presence of cultural activities, international influence of design industry and tendency of multi-dimensional integration of cultural industry.

4.3.2 International influence of cultural activities and design

Shanghai has successfully held international design exhibitions and activities such as Frankfurt Interior Exhibition, London Design Festival, First Yangtze River Delta International Cultural Industries Expo and First Cultural Device Expo. All these have not only manifested the strengths of its design industry, but also enhanced its international influence. Moreover, Shanghai has disseminated its design culture and innovation concepts by holding "Charming Shanghai" at UNESCO headquarters in Paris and at innovation design dialogues in New York.

4.3.3 Exchanges on design and innovative

development of industrial design between China and Italy

For greater design exchanges between China and Italy, UNESCO Creative Cities Shanghai Office and Florence government jointly founded Sino-Italian Design Exchange Center. In the area of industrial design, with the support of China Industrial Design Institute (CIDI), Shanghai successfully held 2019 IEID Emerging Industries Development Empowered by Innovative Design and 2019 China International Industrial Design Innovation Fair, and introduced the CIDI award. All these have effectively driven forward development and innovation of industrial design.

4.3.4 Operation management of cultural industry and establishment of industrial chain

The management and promotion of design activities and projects were taken care of mainly by CIDI (Shanghai) Co., Ltd and Shanghai Design Week Investment & Management Co., Ltd. By building up service platforms such as digital labs, these institutions have facilitated the in-depth integration of design industry and science & technology industries, forming a new-type industrial chain covering new design, new material, new process, new product, new energy and new market.

4.3.5 Diverse cultural industry eco-system

Besides design, Shanghai has also made outstanding achievements in film, animation, electronic sport and advertising. A series of activities such as International Film Festival, International Art Festival, International Cartoon & Game Expo, Shanghai International Advertising Festival, Global Esports Games, enriched the ecosystem of cultural industry and contributed to a trend of diversified development.

4.3.6 Implementation and results of favorable policies for cultural industry

Shanghai government has concretely underpinned the growth of cultural industry. In 2018, the government supported 405 cultural and creative projects. 84% of them were private ones, winning municipal subsidy of 378 million yuan and district-level subsidy of 238 million yuan and attracting social investment of over 4.26 billion yuan. To increase the efficiency of fund use, Shanghai integrated the supporting funds from the then municipal culture and broadcasting bureau and

press and publication bureau and revised the municipal method on cultural and creative funding management, thus realizing unified release, application, review and management of special funds.

In summary, Shanghai, a very active player in holding cultural activities, will work for cultural industry integration in multiple dimensions. By holding international design exhibitions and strengthening cultural exchange and cooperation with other countries and regions, Shanghai has not only enhanced its design industry strengths and international impact but also injected new impetus into cultural industry development. In the future, Shanghai should further its efforts in multi-dimensional integration of culture industry, so as to facilitate its high-quality development.

4.4 Wuhan: A Growing City of Design Featuring Industrial Integration and Steady Development

In Wuhan, An Emerging City of Design, the design creative industry is not as great as that of Beijing, Shanghai and Shenzhen, but the work on industrial integration and steady development is unique, dynamic and promising.

4.4.1 Meticulously build design industry clusters

Based on its unique resources, cultural heritage and development history & pattern, the districts worked proactively for planning and constructing cultural industry parks with local characteristics. Wuhan has put in place a cultural industry park system where Donghu Demonstration Base of Culture and S&T Integration serves as the core and national, provincial and municipal cultural industry demonstration parks as important players. With targeted and systemic approaches, these parks facilitated the clustered development of cultural industry and brought about a new pattern of innovative development of the industry.

4.4.2 Successfully hold design activities

Wuhan has also achieved a great deal in holding design activities. In Red T fashion creativity street, a variety of thematic activities such as Red T Designers' Night China International Industrial Design Exhibition, attracting a huge number of designers and figures in the field. Moreover, Wuhan held high-level forums such as 2018 First Wuhan

Digital Creative Industry Innovation and Development Forum, inviting elites from digital creative industry, experts and scholars from universities and professional investors to explore on development of the industry. This further enhanced the international influence of design industry in Wuhan.

4.4.3 Enrich and improve cultural lives in the city

Wuhan has not only made remarkable achievements in boosting design industry growth, but also explored on improving people's cultural lives. For example, 2018 Simple Life Wuhan enriched residents' cultural lives and demonstrated outcomes of cultural creativity. In the exhibition area reserved for Wuhan, local brands and products were showcased to bring new cultural experience for citizens.

4.4.4 Implement the work of cultural industry development at grass-root level

With regard to the work of cultural industry at grass-root level, Wuhan has also made tangible progress. Government officials from publicity department of relevant districts led teams to pay site visits to enterprises. Having gained in-depth understanding of their problems, the officials took measures and made adjustment on specific issues. The documents such as Statistical Report on Cultural Industry were issued to summarize what has been done and how to do better. Efforts have been made to improve working mechanisms, add more human resources, strengthen policy publicity and ultimately offer necessary support and long-term services to enterprises. Those measures have effectively facilitated the implementation of the work on cultural industry.

4.5 Strategy of Systemic Development of Design Industry

4.5.1 Brand building

To build up brand of the city and improve reputation of its design industry, Chongqing organized a series of activities including Peak Design Award, Smart Expo Cup Industrial Design Competition, Industrial Design Innovation Achievement Exhibition, Chengdu-Chongqing Economic Circle Industry Design Empowerment Conference, China Manufacturing Design Conference, Sichuan-Chongqing Industrial Design Festival etc. These activities have formed a brand system of

“one award, one competition, one exhibition, one conference and one festival”, which served as platforms for designers to show their talent and facilitated exchange and communication of design culture.

4.5.2 Development of platforms

To optimize the development pattern of design industry, Chongqing favored clustered development of the industry, putting in place the “1+N” pattern of industrial coordination and development. An industrial eco-system of design has been jointly built, with Yuelai zone of Liang Jiang New Area as the core and Shapingba District, Yuzhong District and Banan District as the pillars. In the meantime, Chongqing prioritized development of clusters including Chongqing Design Park, Chongqing Industrial Design City and Industrial Design Headquarters Base. The industrial parks have provided favorable environment for growth of designers and enterprises alike.

4.5.3 Construction of design ecosystem

Chongqing dedicated itself to building “industry+” ecosystem, facilitating in-depth integration between industrial design and rural rejuvenation, urban renewal, culture & art and utilization of industrial heritage. Based on the “industry design +” pilot demonstration projects, the municipality explored on the application value of design in all areas, thus injecting new vitality into urban development.

4.5.4 Production and invitation of professionals

Regarding production and invitation of professionals, Chongqing has conducted the appraisal of professional title in industrial design, formulated new incentive mechanisms for talent growth, included industrial designers in cultivation and selection of high-level talent and offer them favorable policy treatment. In the meantime, a larger number of top-notch design talents have been invited and designers at home and abroad encouraged to start businesses or establish design institutions in Chongqing. Design studies have been strengthened in universities and CDIO engineering education model has been promoted. Industry-education integration and university-enterprise cooperation have been boosted to set up modern industrial design vocational education system. In addition, Chongqing provided concrete support for talent production by supporting national and municipal industrial design centers, research

institutes as well as various kinds of design parks (platforms) and training bases.

4.5.5 Establishment of three-tier design service system

To coordinate the work on promoting cultural creativity industry development, Chongqing took the lead in setting up a three-tier design service system featuring “headquarters+sub centers in districts and counties+work stations in towns and streets”. Specifically, Chongqing City of Design Promotion Center served as the base, and sub-centers were built in Dazu and Xiushan and work stations in townships. This system not only effectively integrated design resources, but also facilitate the penetration of “design consciousness” at grass-root level, adding new vitality to cultural creativity development in the city.

5. Suggestions

Based on the above in-depth analysis into status quo of design industry development in the five Cities of Design (Beijing, Shanghai, Shenzhen, Chongqing and Wuhan), it can be explicitly noted that each city has made incredible achievements in all areas of design industry, but has been faced with different challenges and opportunities. To facilitate scientific and efficient development of Cities of Design, this section offers detailed suggestions concerning policy guidance, talent cultivation, industrial integration, international exchange and cultural atmosphere.

5.1 Policy Guidance: Set Up a Well-Established Support System

5.1.1 Formulate industrial policies in an accurate manner

First and foremost, each City of Design should map out more accurate and detailed industrial policies according to their own characteristics and strengths. The policies should cover all aspects of the design industry, including but not limited to financial subsidy, tax preference, land use preference and funding of innovation projects. For example, as industrial design plays a key role in transformation and upgrading of manufacturing, special funds should be set up to underpin R&D and innovation of industrial design and encourage enterprises to invest more in design.

5.1.2 Optimize business environment

A better business environment holds the key to attracting design companies and talents. The

government should streamline the application process, increase administration efficiency and lower the operation cost of enterprises. Meanwhile, the government should strengthen IPR protection, crack down upon infringement, safeguard the legitimate interests of design enterprises and stimulate innovation vitality.

5.1.3 Strengthen industrial planning

Long-term development plan of the design industry should be mapped out to identify the goals, approaches and priorities. Market needs, technology trend and future development orientation should be fully considered to ensure coordination between design industry and economic and social development of a city.

5.2 Talent Cultivation: Build Multi-tiered Talent System

5.2.1 Strengthen higher education and vocational education

Higher learning institutions should open up design-related majors, optimize the curriculum, introduce international advanced education philosophies and methodologies, and cultivate talents with international vision and innovation capability. At the same time, cities should enhance matching of vocational education with industrial needs, facilitate university-enterprise cooperation and work-study integration, and produce skilled professionals with the ability to put ideas into practice and occupational quality.

5.2.2 Implement talent introduction programs

To address shortage of high-end design talents, Cities of Design should implement proactive programs of talent invitation. They should work to attract outstanding talents at home and abroad by providing them with preferential treatment, good working environment and broad development space. Meanwhile, incentive mechanisms should be built to award individuals and teams realizing outstanding achievements in the area of design.

5.2.3 Set up talent training system

The cities should set up a training system of various levels and forms, providing opportunities of continued study and improvement. Industrial experts, scholars and designers can be invited to exchange and share experience at forums, workshops and seminars. Meanwhile, design companies should be encouraged to conduct internal training for improving their expertise and overall quality.

5.3 Industrial Integration: Facilitate Cross-Sector Cooperation and innovation

5.3.1 Facilitate in-depth integration of design and manufacturing industry

Integrating design industry with manufacturing industry in an in-depth manner represents an important approach to the transformation and upgrading of manufacturing industry. The Cities of Design should encourage closer ties between enterprises in design and manufacturing, supporting product R&D, design innovation and market development. The added value and market competitiveness can be improved through designing.

5.3.2 Advance integration between design and service industry

The design industry can also drive the development of the service industry through in-depth integration. For example, design can be incorporated in tourism, culture and education industries, so as to develop service brands and experience programs with local characteristics. This will not only enhance the quality and appeal of the service industries, but also boost the development of relevant industries.

5.3.3 Strengthen integration between design and S&T

With constant science and technology development, the integration between design and S&T has become an inevitable trend. The Cities of Design should encourage design enterprises to strengthen cooperation with research institutes, universities and hi-tech enterprises in R&D of new technology, new material and new technique, thus advancing innovative development of the design industry. The cities should encourage enterprises to explore on service models and forms, such as personalized, smart and Internet-based design. The quality and efficiency of design services can be bettered through service model innovation.

5.4 International Exchange: Open Up Greater Cooperation Space

5.4.1 Hold international design activities

The Cities of Design should be active in holding international design exhibitions, forums and competitions to attract participants across the world. The achievements and strengths of local design industries can be shown and their international influence enhanced. In the meantime, the cities should

consolidate cooperation and dialogues with foreign design institutions, importing international advanced design philosophies and expertise.

5.4.2 Develop international market

The Cities of Design should encourage enterprises in developing international market and competing with international peers. The government can offer policy support and service guarantee for overseas market expansion, including tax reimbursement for export, financing assurance and legal assistance. In the meantime, the government should strengthen cooperation with international design organizations, setting up international exchange platforms for enterprises.

5.4.3 Invite international design resources

The cities should work proactively in inviting international renowned design institutes, designers and brands, injecting new vitality to local design industry. The overall quality and competitiveness of local industry can be enhanced through inviting international design resources.

5.5 Cultivate Design Culture Atmosphere

5.5.1 Open up innovative urban space

To boost urban innovation capacity, the cities should be active in opening up innovative urban space, such as innovative community lab and innovation incubators. These spaces will not only provide sites for innovative enterprises and individuals, but also accelerates translation and application of innovative outcomes through resource sharing, technical support and market partnering. An innovative community labs can serve as open platform for cooperation between innovators of different areas and joint exploration of new technologies and business models. The innovation incubators should concentrate on incubation and growth of start-ups, providing whole-chain services from incubation to market promotion and helping entrepreneurs start from scratch.

5.5.2 Strengthen design education

Design education should be incorporated into national education system and students should be guided to have design awareness and innovation capacity since elementary school. Relevant departments should offer design courses, hold competitions and establish training bases to arouse the students' interest in

and passion for design. In the meantime, schools should invite greater teaching staff for improving quality of teaching.

5.5.3 Hold design culture activities

The government and people from all social walks of life should jointly hold design culture activities such as design exhibitions, lectures and salons etc. These activities will not only showcase the achievements and strengths of design industry, but also help people gain better understanding. These activities will stimulate the innovation spirit and passion for design of the whole society, thus creating a sound social atmosphere for development of the Cities of Design.

5.5.4 Strengthen publicity of design culture

Design culture can be better promoted through news media and online activities. Relevant departments can shoot videos and print brochures to introduce the charm and value of design industry. In the meantime, the cities should conduct closer cooperation with the design community at home and abroad for greater international impact of the local design culture.

In summary, the development of Cities of Design in China requires concerted efforts of government, enterprise, university and social walks of life. Thanks to measures of policy guidance, talent cultivation, industrial integration, international exchange, driving force of innovation and cultivation of design culture, the development of Cities of Design can be more scientific and efficient and the design industries can develop in a more sustainable manner.

In the future of globalization and rapid S&T development, the design industry will face more opportunities and challenges. In upholding the innovation-driven development strategy, the Chinese Cities of Design should strengthen exchange and cooperation with the international design community and constantly enhance its competitiveness and impact. Moreover, the cities should give priority to the inheritance and innovation of design culture and create design brands with distinct feature and ethnic styles. We are convinced that in the near future, the Cities of Design will become greater shining stars in the world.

6. Analysis Conclusion

This study provides an in-depth analysis of the industrial development of China's five "design

cities" and demonstrates the remarkable achievements of these cities in design innovation, industrial integration and internationalization. The results show that cities play an important role in design-driven economic growth and promote the rapid development of China's design industry.

However, the research also revealed some shortcomings, such as limitations in data timeliness, research depth, and method diversity. To overcome these shortcomings, it is recommended to strengthen the timeliness of data monitoring, deepen research on micro-levels, such as corporate cases and designer experience, and promote cross-border integration and international exchanges to stimulate new ideas and growth points.

Looking to the future, China's "design capital" has broad prospects for development. As the global design industry continues to prosper and digital transformation accelerates, these cities are expected to achieve greater breakthroughs in design innovation, industrial upgrading and international expansion. The government should continue to optimize the policy environment and provide strong support, such as tax incentives, financial support and talent training, to promote the sustainable and healthy development of the design industry. Cities also need to continuously iterate and design industrial development paths based on the city's advantageous industries and distinctive culture, so as to achieve leap-forward development of the overall economy through design.

In short, the industrial development of China's five "design cities" requires the joint efforts of all parties, continuous investment of resources, optimization of policies and services, in order to promote the comprehensive upgrade and internationalization process of the design industry, and contribute more to the development of China and the global design industry strength.

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