

ORIGINAL RESEARCH ARTICLE

Countermeasures and prospects for the development of urban design in China in the period of new urbanization

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ABSTRACT

According to the requirements of China's new urbanization development strategy, this paper puts forward the important role of urban design in urban development and construction. This paper discusses the disputes on the evaluation standards of urban design, summarizes the typical modes of urban design in the field of local practice and exploration, expounds the problems and countermeasures in the legal environment and market environment of urban design, and finally puts forward the main research contents and technical system of ecological urban design, and points out that ecological urban design will become the direction of sustainable development of cities in the future.

Keywords: evaluation criteria; pattern; regulatory environment; market environment; eco city design

1. Introduction

The discipline of urban design originates from architecture and gradually extends from architecture to urban planning, landscape architecture, and other disciplines. Since it was introduced from abroad in the early 1980s, it has gone through more than 30 years in China, experienced the understanding and exploration of basic concepts and theories, integrated application of practical and legal planning, and basically realized the localization of urban design. With the rapid urbanization process, the multi-level and extensive influence of urban design in urban construction practice is unprecedented and has been highly valued by government management departments and various academic institutions.

According to the statistical data from CNKI,

the number of papers related to urban design has been growing steadily in recent years, which shows the importance of academic circles in urban design research (**Figure 1**). As a connecting discipline, urban design links the fields of urban and rural planning, architecture, landscape architecture, and so on. Scholars from different disciplines contribute to the long and complex research process of the development and evolution of urban space on the collaborative platform of multi-disciplinary clusters. Individuals bring in certain special knowledge to complement and integrate each other into a systematic research process. Urban designers play the role of coordinators, promote the integration and transformation of various disciplines, and gradually grow the discipline system of urban design. It can be seen from the position of various disciplines in urban design in the future.

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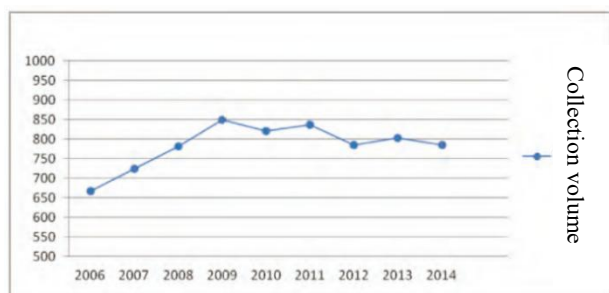


Figure 1. Papers on urban design from 2006 to 2015 according to CNKI statistics.

In the development process of domestic urban design, urban design has achieved fruitful results in academic research and gradually played an important role in urban construction practice, but there are inevitable problems. At the level of theoretical research, there is still a problem of confusion in the main evaluation criteria for urban design. At the level of development and construction, urban design is often regarded as the foreshadowing of planning and design in the early stages of architectural design. At the level of planning management, urban design is in an awkward position and can not effectively connect with the legal planning system. In terms of technical methods, the emergence of a large number of new technologies has gradually weakened the ontological goal of urban design (public space shaping) and increased the debate on its executable evaluation standards. In the face of the current rapid development of urban design, the above problems must be clarified in time to ensure the healthy and sustainable development of urban design.

2. Disputes on urban design evaluation standards in academic and practical fields

Decades of practice have proved that urban design is not only a science of shaping the physical environment but also a process of social practice. Only through institutionalized construction can it really play a role in the practice of urban construction. One of the key preconditions and bases of institutionalization is to establish the value norms of urban design practice, that is, the evaluation standards. To formulate the evaluation standard for

urban design, we should first clarify the evaluation subject and object of urban design.

2.1. Subject and object of urban design evaluation

The evaluation subjects of urban design generally include users such as the public, developers, and the government. Based on the interest subjects, the evaluation standards can meet the interests of these three parties at the same time. However, China has not yet formed a perfect urban design evaluation mechanism and system, and the evaluation is often spontaneously formed by people in the urban design industry. Therefore, the evaluation standard is mainly related to the professional tendency of evaluators, and those who focus on technology tend to evaluate urban design with function and efficiency. Those who focus on art tend to evaluate the achievements of urban design from the perspective of artistic design. Managers tend to evaluate urban design based on the operability and effect of implementation procedures. These tendencies can be classified into three types: technical index type, aesthetic perception type, and management performance type respectively. These types have their own rationality and one-sidedness, and can not achieve urban design results that meet the needs of various stakeholders^[1].

Urban design focuses on the material space environment of the city. Therefore, urban design focuses on the shaping of urban material space, urban planning focuses on comprehensive layout and land use, the architectural design focuses on single-building design, and environmental design focuses on the design of microenvironment elements. On the one hand, the four fields are different, and the evaluation criteria should be distinguished. On the other hand, the subject knowledge systems of the four are interrelated and cross-related, so the evaluation criteria overlap. With the continuous promotion of the concept of smart city and ecological city, the confusion of the evaluation criteria of the four is becoming more and more obvious. For example, the evaluation criteria of

urban ecological evaluation can be understood as perceived comfort at the level of urban design, land-intensive at the level of urban planning, the ecological performance of buildings at the level of architectural design, biological diversity at the level of landscape, etc. In the complex urban construction practice environment, the proliferation of various special standards in the construction field, the wide application of many new technologies, and even the change in design ethics all promote the process of reintegrating urban design standards.

2.2. Urban design evaluation standard

Looking at the development process of urban design, its evaluation standard has developed from traditional aesthetics to the stage of modern economy, efficiency, and aesthetic standards. Its evaluation standard can be divided into quantitative standards and qualitative standards (Table 1). In 1981, Hamid Shirvani integrated three qualitative evaluation criteria in his book *Urban Design Process* and put forward six comprehensive evaluation criteria: Accessibility; harmony and consistency; view; identifiability; feeling; and habitability.

The scientific and rationality of the above standards are beyond doubt, but it is difficult to apply them to the technical implementation level. It is very difficult to connect the technical preparation of planning, architecture, and landscape design with the above standards. People in academia and engineering design have also made a lot of explorations for a long time, but it is very difficult to convert them into technical specifications and management tools that are systematic, concise, clear, easy to operate, and easy to implement. If an evaluation standard is to be applicable to all projects and different environmental conditions, it is bound to be too large and cumbersome, and the information contained in it is too extensive to fully explain the problem. Therefore, it is a very complicated process to determine the scientific and operational evaluation criteria for urban design. Based on the differences in evaluation projects and stages, the formulation of evaluation criteria should take into account the differences and key points, so as to achieve “adaptation to local conditions, flexibility and organicity.”

Table 1. Urban design evaluation criteria

Category	Quantitative standard	Qualitative criteria
Natural factors	Such as climate, sunshine, geography, water, etc	San Francisco urban design scheme (1970)
Three-dimensional measurement of form	Plot ratio, height, building red line, volume, open space ratio, building density, etc	American urban system research and Engineering Corporation (1977) (usre)
Technical parameters of non-three-dimensional measurement	Traffic analysis, function ratio analysis and construction cost analysis involved in urban design	Evaluation criteria proposed by Kevin Lynch
		Comfort, visual interest, activity, clarity and convenience, uniqueness, spatial certainty, visual standard, diversity/contrast, coordination, scale and pattern
		Adaptation to the environment, recognizable expression, accessibility and orientation, behavior support, visual scene, natural elements, visual comfort, maintenance and management
		Vitality, feeling, fit, accessibility, control, efficiency, justice

3. Representative model of urban design driven by local practice and exploration

Since the 1980s, with the rapid development of the domestic economy, the influence of urban design on the construction practices of local cities has been

increasing.

Urban design is generally characterized by “cold at the top and hot at the bottom”. One is “official coldness”, which is mainly reflected in the lack of positioning of urban design at the level of national laws and regulations. Looking at the urban planning law of 1989 and its subsequent revisions,

the full text does not involve the provisions of “urban design”. The second is “local fever”, which is mainly manifested in the active practice and exploration of local government management departments and non-governmental organizations. Looking back on the urban development process of more than 30 years of reform and opening up, the value of urban design is constantly highlighted, especially in cities with rapid development and construction in coastal areas. Its urban construction achievements are inseparable from many urban design practices and explorations. Among them, the practices of Shenzhen, Shanghai, and Tianjin, which have different characteristics, can be listed as the most representative experimental areas of urban design in China.

3.1. Shenzhen mode

The technical standard and management practice of urban design in Shenzhen is a relatively successful “bottom-up” model. The first edition of urban design was compiled in the Luohu District of Shenzhen in 1987. In 1994, the first “urban design office” with specialized functions among China’s urban local planning management departments was established, and in 2010, it was renamed “Shenzhen Urban Design Promotion Center”, which is responsible for the formulation of urban design policies and standards within the city and the preparation of urban design in key areas. In 1998, Shenzhen promulgated the regulations of Shenzhen on urban planning, which established the legal status of urban design for the first time in China and formally formed the “two-track system” operation mechanism^[2]. Its urban design practice mainly shows the following characteristics:

(1) Urban design of “flexible adaptation” of space control and management technology.

Shenzhen has maintained the concept, idea, and design intention of urban design in its previous master plan. For example, the 1986 edition of the master plan for Shenzhen Special Economic Zone has the urban design idea of forming a banded cluster city with a green isolation belt. The master plans of

1996 and 2000 specially prepared the chapter on overall urban design. In addition, Shenzhen has made clear the principle of giving priority to urban design in key areas and taking precedence over the preparation of legal plans in advance. The urban design of the Futian central area is one of the earliest CBD urban designs prepared in China. Through international consultation on urban design and repeated in-depth design of the overall layout, central area axis, and individual plots, most of the results have been transformed into control conditions, which have played an important role in the implementation of urban design in the central area. Since the promulgation of the regulations of Shenzhen on urban planning in 1998, the planning department of Shenzhen has compiled a series of legal norms and technical standards based on reality and combined with local characteristics, which has strengthened the operability and enforceability of urban design (**Table 2**). The organic connection and coordination between urban design and statutory plans are established through various laws and regulations, which provide a legal basis and ideas for the implementation and operation of urban design achievements^[3].

(2) Promoting urban vitality and encouraging “bottom-up” urban design.

Shenzhen’s urban design, from a spatial control tool to an urban development strategy, to a series of specific and subtle urban design implementation actions^[4]. The task of urban design always focuses on the core goal of promoting urban development, and the form of urban design gradually encourages the form of “bottom-up” public participation. In 2010, Shenzhen established the “Urban Design Promotion Center” to decentralize the power of government planning management and design control, and created a relatively open technical and management service platform, so as to reduce excessive government intervention and keep the regulation of urban design in a rational and appropriate environment.

Table 2. Legal norms and technical standards related to urban design in Shenzhen

Time of promulgation	Name of legal norms	Contents related to urban design
1998	Regulations of Shenzhen Municipality on Urban Planning	It is proposed that urban design should run through all stages of urban planning
1998	Technical regulations for the preparation of statutory plans and measures for the approval of statutory plans	Propose the preparation and approval procedures of statutory plans
2004	Shenzhen city planning and standards	Put forward the general principles of urban design
2008	Establish a platform for “statutory drawing preparation and warehousing system”	Realize “one picture” management
2009	Shenzhen urban design standards and guidelines	It is the first time to try the urban design system and system management
2013	Revised version of Shenzhen Urban Planning Standards and guidelines	As a government regulation with mandatory legal effect, urban design chapters are specially set up for control

Although there are few urban construction land resources left in Shenzhen after more than 30 years of rapid development, urban design, as a unique place design method, can still continue to activate the vitality of urban areas through mixed functions, activity implantation, and other means. Based on the scientific-technical specifications for urban design preparation, Shenzhen has carried out a large number of urban designs dedicated to promoting urban development and vitality, such as Bao’an central area, Guangming New Town, Dayun Village, Pingshan New Town, and Longhua New Town. In particular, the urban designs of the “Qianhai Shenzhen Hong Kong modern service industry demonstration area” and “Shenzhen Bay super headquarters base” are the most typical. Through different urban design concepts such as stitching, connection, and activation, combined with other planning and design methods, it has created a good urban public space and improved the vitality of the city. Another example is “OCT-LOFT”, an OCT creative cultural and creative park that embeds multiple functions and activities into the old industrial zone through the “urban filling” strategy, making it the most dynamic public space in Shenzhen. At the same time, in the context of relatively mature market-oriented development, in addition to the implementation of urban design by Shenzhen Municipal Government, many enterprises have also become the implementation subjects of urban projects, such as Happy Coast (OCT Group), Shekou Nanhai Yiku

(China Merchants Real Estate), which has laid the foundation for promoting public participation in urban design in the future.

3.2. Shanghai model

In 1989, Huang Fuxiang and other older-generation Shanghai planners translated and published the book “*Design of Cities*” by the famous American urban designer E. Bacon, which comprehensively and completely introduced the theory and practice of American modern urban design to China, and had a long-term impact on domestic academic circles. Since the 2000s, local universities and scientific research institutions represented by Tongji University have actively participated in the cooperation and exchange between Shanghai and domestic and international academic and educational institutions in the field of urban design, which has promoted the diversification and internationalization of the academic environment of urban design. Since then, Shanghai has continuously absorbed the latest international urban design ideas, concepts, and design techniques into Shanghai’s urban design scheme by organizing international scheme competitions and solicitations, realizing the combination of localization and internationalization of urban design. In recent years, relying on the advantages of technological resources and the urban culture of an international metropolis, Shanghai has always been a leader in urban design through important urban public projects, the

implementation of major events and activities, the introduction of advanced technology in urban construction, front-end academic exchange activities, etc. Its urban design practice mainly shows the following characteristics:

(1) Urban design with important urban construction projects as the core.

The urban design of Shanghai began in Lujiazui, Pudong, and Shanghai in the 1990s. Since then, a series of major urban construction projects and transportation infrastructure projects have been planned and implemented. During this period, the competent department of urban planning in Shanghai carried out a series of urban design explorations and practices, including the North Bund area along the Huangpu River, Shanghai Shipyard area, Dongjiadu area, Jing'an Temple area, Wujiaochang area, etc.^[5]. At the same time, in order to promote the development of urban space and the supporting level of overall public space services, Shanghai has started the construction of large-scale urban transportation infrastructure, including Pudong Airport, Hongqiao Comprehensive Transportation Hub, and urban rail transit network. So far, a systematic and perfect urban comprehensive transportation network system has been formed, and the connection capacity, carrying capacity, and service level of all kinds of transportation have reached the international advanced level.

(2) Urban design with international public activities and “major events” as the catalyst.

As an international metropolis, Shanghai has undertaken many major activities and construction projects. Relying on major construction projects such as the Shanghai World Expo, Disneyland, and the development of later World Expo areas, Shanghai has carried out a lot of urban design scheme solicitation, invited multinational architects, planners, and world-class companies to carry out planning and design together with Chinese local architects and planners, and put forward many new planning ideas. Urban design in each stage takes “big events” as the catalyst, and through high-level planning design and academic exploration, the goal of building and improving urban high-quality public

space has been realized. Urban design has maximized the value of the activities of these “big events”.

(3) Management and control of urban design based on the combination of management tools and legal planning.

Based on a large number of urban design practices, Shanghai has actively explored the legalization methods and contents of urban design in the regulatory detailed planning stage and made great progress. In 2011, Shanghai issued the technical guidelines for regulatory detailed planning, put forward the concept of “additional plans”, established the legal status and mandatory control content requirements of additional plans, and promoted the legalization of urban design. In the process of future urban construction, the research and preparation of urban design are still important. Bringing urban design into the legal planning system and transforming it into a planning management policy is an important measure conducive to the implementation effect of urban construction^[6].

3.3. Tianjin mode

The practice of urban design compilation and management in Tianjin is a typical “top-down” model, and its urban design compilation has distinct characteristics of management, control, and inclusiveness. First of all, since the reform and opening up, successive leaders in charge of Tianjin have paid more attention to the construction of urban style and image, so that the management and technical implementation of urban planning and urban design has always had a clear “executive power”. Secondly, local universities and scientific research and design institutions represented by Tianjin University are also actively involved in the urban construction of Tianjin, and the integration and interaction of design, research, and practice are formed. The scholars trained by the Department of Architecture of Tianjin University, represented by Peng Yigang and Cui Kai, have made positive contributions to the regional exploration of Tianjin urban design and architectural design. In recent years,

Tianjin's urban construction achievements have been eye-catching. It relies on its own development conditions, integrates urban resources and regional advantages, and takes a series of major urban construction and renewal projects as an opportunity to integrate international advanced urban design concepts. The method, management, and implementation technology have successfully summed up a set of technical routes with local characteristics. Its urban design practice is mainly manifested in the following characteristics:

(1) Moderately “top-down” innovative management and control urban design.

Since the city entered the stage of rapid development in the early 21st century, Tianjin has tried to explore the integration of statutory planning and urban design through the reform of planning preparation technology and management. In 2008, Tianjin began the research on urban design guidelines by taking the opportunity to compile the overall urban design of central urban areas, districts, and counties, as well as the urban design of key areas. Finally, the implementation and management mechanism of “one control regulation and two guidelines” is innovatively put forward, “one control regulation” is the regulatory detailed planning, and “two guidelines” are the land subdivision guidelines and urban design guidelines (**Figure 2**).

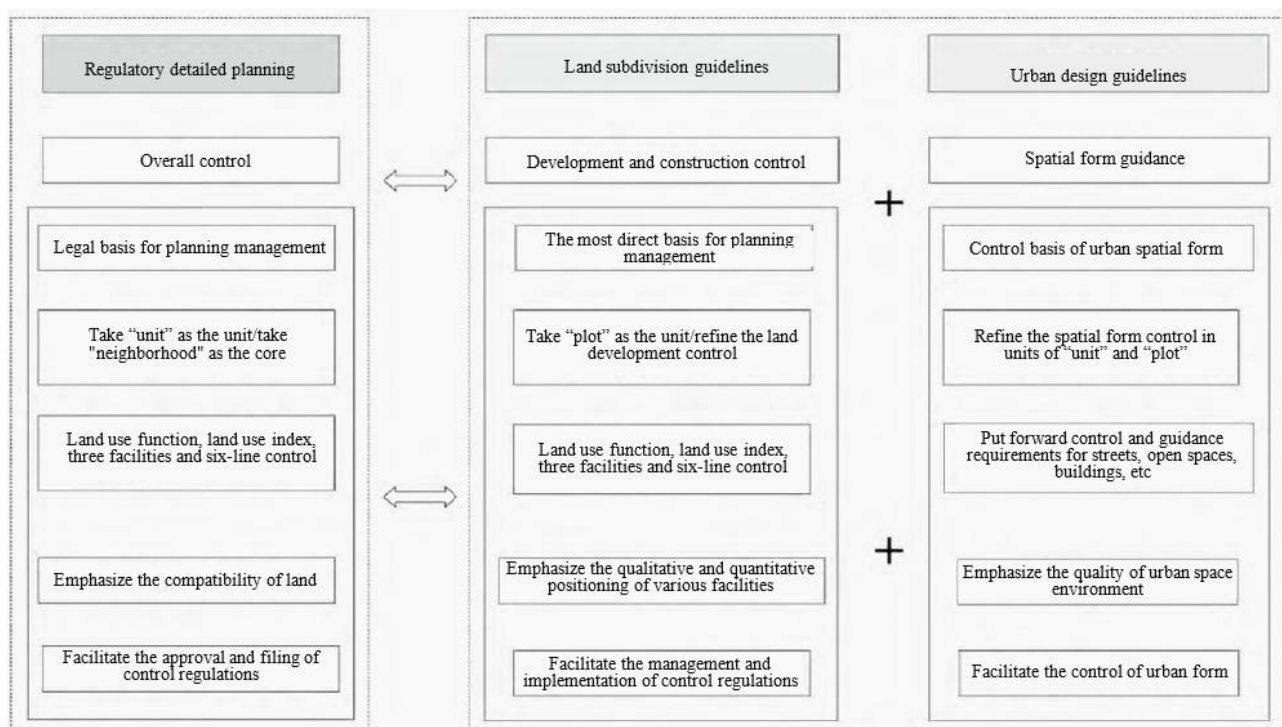


Figure 2. Diagram of the relationship between “one control regulation and two guidelines”.

In 2011, the Tianjin Municipal Planning Bureau issued the “Interim Regulations on the Administration of Tianjin Urban Design Guidelines” to determine the preparation and approval subjects and to guide and standardize the formulation, implementation, and revision of urban design guidelines. Since then, based on “one regulation and two guidelines”, Tianjin has moderately reduced the content of regulation in its urban construction practice, and enhanced the flexibility and

adaptability of regulation, thereby effectively implementing the intention of urban design. Promote the organic integration of urban design and planning management through appropriate “top-down” management and control.

(2) Introduction of urban design combined with the idea of “openness and inclusiveness” into major urban construction projects.

As the largest coastal open city in northern China, Tianjin's own cultural heritage and open spirit enable it to absorb and accept foreign innovative ideas in urban design, so as to better serve the urban construction of Tianjin. In 2007, Tianjin started the construction of Sino Singapore Tianjin ecocity, and China officially entered the era of "eco city", which triggered a nationwide upsurge of urban design aiming at ecology^[7]. At the same time, Tianjin began to promote the preparation of a series of internationally renowned major urban design projects such as the central urban area, Yujiapu financial district, and Xiangluowan business district, such as the protection planning of "five roads" and the renewal and reconstruction design of "five courtyards", which attracted many scientific research institutions and design institutions at home and abroad, formed a significant urban design exploration and promoted the improvement of Tianjin's urban design level. With the implementation of urban renewal and reconstruction projects such as Tianjin Cultural Center and Xinbadali, the role of urban design is increasing. Tianjin also began to explore how to integrate urban design into the legal planning system, so as to effectively connect with urban planning management and construction implementation.

4. Thoughts on the legal environment and market environment of urban design

As mentioned above, urban design in China has generally been characterized by "cold at the top and hot at the bottom" for a long time in the past, which makes a great contrast between the practical environment of urban design and the regulatory environment in China. Objectively, it leads to great differences in style and quality among cities with different construction, design, and management levels, and the prosperity of local sections can not hide the mediocrity and loss of the whole city. The urban design market is easy to touch multiple interests and causes disputes, especially with the many rigid control tools, regulations, and guidelines.

Taking into account the interests of all parties in the specific development environment and creating sufficient flexibility for secondary design requires the government and urban design technology makers to explore more adaptive ways.

4.1. Thoughts on urban design regulations and environment

Firstly, urban design lacks the support of national trunk law and has been in a fuzzy position in the current urban and rural planning legal system in China. From the urban planning law in 1989 to the urban and rural planning law in 2008 and the urban and rural planning law revised in 2015, there is a lack of relevant content for urban design, resulting in unclear legal status for urban design and a lack of subject basis for relevant laws and regulations of lower-level urban design. In this context, some cities represented by Shenzhen began to explore local urban design regulations, such as Shenzhen urban planning regulations, Shenzhen urban design standards and guidelines, and other effective urban design regulations. However, for most cities, there is often a lack of regional and implementing urban design regulations, while the local regulations of specific cities have little impact on other cities and are not easy to promote. In addition, the level and stage division of urban design is not clear, and the planning and design preparation contents and results of each stage lack urban design specifications connected with them. As a result, the results of urban design schemes pursue more graphic effects and have weak operability. The authority and legitimacy of urban design cannot be guaranteed, which directly affects the management and implementation efficiency of achievements.

Therefore, in the future development process of urban design, we should establish a multi-level urban design laws and regulations guarantee system, actively promote the establishment of national urban design laws and regulations, encourage local governments to formulate relevant local urban design laws and regulations, and formulate relevant economic and social laws and regulations so as to

clarify the relationship between urban design compilation and urban planning compilation, and divide the levels and specific contents of urban design. Try to learn from the implementation and management mechanism of “one control and two guidelines” in Tianjin and establish a flexible control index system to effectively guide the management and implementation on the one hand and give the city flexible development space on the other. At the same time, establish urban design management and review organization, study and formulate urban design decisions and regulations, effectively control the implementation of the plan, give play to the functions of management, supervision, and review, and ensure the effectiveness of urban design achievements through the technicalization of legal means.

4.2. Thoughts on the market environment of urban design

As early as 1776, the economist Adam Smith proposed to the *wealth of nations* that the market, as an “invisible hand”, could more effectively regulate economic development spontaneously. Modern urban design is just produced in the environment of the market economy. Therefore, urban design must find ways conducive to its development under the law of market economy. A good regulatory environment provides a guarantee for urban design, enabling it to effectively coordinate the interests of the government, developers, and the public, and create a good urban space environment from the technical level. The establishment and implementation of the American modern urban design system largely depend on its mature market environment. As a powerful means to promote technology trading, the mature market has become the lubricant and nutrient for urban design.

At present, the competition in China’s urban design market is fierce. Under the situation that local governments generally regard it as a grasp and tool for the implementation of urban planning and construction objectives, its situation is very worrying. On the one hand, the rapid urbanization process has

boosted the upsurge of all kinds of urban construction and development, resulting in the long-term hunger of the market demand for urban design. Whether it is the market at the development and implementation level or the market at the construction and management level, there is a long-term demand for the technology and policy of urban design, while the product level of urban design is not high, and the implementation effect is greater than the gain. On the other hand, urban design is a comprehensive technology, from overall urban planning, and detailed planning, to the construction and implementation of specific development projects, and even the treatment of individual forms of buildings. It has the characteristics of multi-disciplinary and multi-disciplinary integration. Urban design needs the cooperation of technical groups with a multi-disciplinary background and professional ability. However, there are few enterprises or institutions with the ability to comprehensively deal with urban design technology in the domestic market, the overall level is average, which can not meet the needs of urban construction, and a few excellent design institutions can not effectively make up for the low overall technical service level.

Combined with the current situation, experience, and problems of the urban design market at home and abroad, domestic scholars have also made beneficial explorations on how to comply with the market law of urban design. The more representative are the concepts of “predesign” and “market-friendly” urban design. The concept of “predesign” mainly makes the guiding ideology and principles of urban planning be implemented and operated in urban design through the predesign of urban design spatial form and environment, and also makes urban design more organically combined with urban economic construction^[8]. “Market friendly” urban design is mainly guided by the market mechanism, analyzes the power boundary between the market and urban design, forms a flexible mechanism of “rigidity and flexibility” in urban design, and pays attention to the role of “secondary design”, so that urban design can be understood by

stakeholders^[9]. “Pre design” needs to systematically analyze the economic and social development trend of the city or region, obtain accurate conclusions, and formulate urban design strategies. However, in practice, future market development is often unpredictable. Therefore, “pre design” cannot meet the market demand at all stages of urban construction. Combined with the current situation of the urban design market, urban design effectively combined with the market can have a better effect and achieve urban design objectives more effectively^[10].

To sum up, the environment in which urban design plays a role should be based on the combination of market competition and government management and regulation, and reasonably use the two tools of market and government management based on the different conditions of urban development to guide the technical orientation and value orientation of urban design. For cities with mature market environments, more diversified competition modes will be promoted, and the system construction will focus on flexibility, allowing stakeholders to choose independently, encouraging design innovation, and driving space shaping. For cities with immature market environments, the government needs to introduce appropriate management mechanisms, or even force special mechanisms and technical models to be implanted into the urban design market, establish special systems and norms, and encourage high-quality urban design to serve urban construction through the combination of market and plan.

5. Eco city design—Sustainable development direction of future cities

Combined with the requirements of the new urbanization development strategy and the new normal economic development strategy, future urban construction will take ecological city design as the core development direction. Based on ecology and sustainable development, eco city design is a comprehensive planning and design method covering nature, society, economy, culture, and other

aspects. From macro eco city system to meso green urban area, green block system, and micro green building design, eco city design takes different levels of the city as the research object, forms a technical system combining macro, meso, and micro, and puts forward effective eco city design strategies according to the characteristics and requirements of urban space at different levels^[11].

The research on eco city system mainly explores the urban design method of green town scale, including not only the scale, density, intensity, and structure of urban material spaces such as green blocks, green buildings, green space systems, green infrastructure, and green transportation but also the rational layout of green low-carbon industry in urban space and the comprehensive utilization of green energy.

The research on green urban area systems mainly focuses on large-scale urban-specific functional areas, such as urban living areas, large communities, higher education parks, industrial parks, high-tech parks, cultural tourism areas, etc., such urban functional areas have many distribution types and large-scale differences. They need to meet the green needs of certain people for living, work, and life while making intensive use of resources and energy through reasonable planning, layout, and design, combined with the support of the green industry and green transportation modes.

The research on green block systems mainly takes small and medium-sized urban blocks as the research object, mainly including land use and spatial form design, transportation system organization, and open space system design, focusing on the spatial environment design and control of the block. At the same time, information technology and energy-saving technology are combined in the physical space design to effectively implement the green concept in the daily life, transportation, and cultural construction of the block.

Green building design is the basic unit of ecological city design. It mainly studies green buildings and their related energy-saving design

methods under the guidance of green buildings. Combined with traditional passive design, explore the comprehensive energy-saving and environmental protection technology application of new materials, new technologies, and new equipment to realize the efficient utilization of resources and energy. With the development of the times, green building has become a sustainable architectural theory and ecological value. The research and application of green buildings are also increasingly extensive, covering many ecological urban design contents such as ecological environmental protection, building energy conservation, and application of new technologies, which have sustainable economic, social, and cultural research value.

Conflict of interest

The authors declare no conflict of interest.

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