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The Chief Urban Designer System for Urban Management in Smart City

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Abstract

In recent years, the concept, technology and management of urban design are changing from the "ultimate blueprint" urban design consulting service to the "dynamic update" smart urban planning and building management, under the background of the increasingly development of smart city, big data and new media. This paper reviewed the same tendency emerging in terms of urban govern in smart city era, and took the urban design practice in Pazhou West District in Guangzhou as an example to analyze the development background, work context and implementation of the "regional chief urban designer system". Based on this experience, a digital information management platform has been built, which concluded the work process of the system. On the basis of practice, we discuss the role, responsibilities and purpose of the future urban designers in the context of smart city, pointing out that the urban design team is moving from a single technical team to a diverse social public platform, from the "ultimate blueprint" image design to the "dynamic planning" development framework, from extensive urban control to smart urban building.

1 Introduction

The emerging concept of smart cities brings new possibilities in the design and management of cities by promoting the incorporation of big data and new media through the Information and Communication Technology (ICT). Big Data generation is believed to be extensive in almost each individual in the community in daily life. It is safe to say that big data would be very helpful in maximum the resource

utilization while making effective decisions (Alam J R 2014). With the increasing number of new media user in urban cities, a rich source of information about every events happened in this city would be feedback to the social media platforms. Such a new media platform with abundant information could be harnessed as an effective mechanism for the management of cities. Indeed, many cities are employing ICT to create a "smarter" city in various aspects of urban operation and management, such as transportation, public services, quality of life, and environment (Li X 2017).

In terms of urban govern, the development of ICT technology promotes the progress of the new generation of urban governance information technology, and provides a foundation for the innovation of urban planning and design management system. In the last decade, it is very important to recognize two-development tendency with significant implications for understanding the smartness of governments. One is the government provides urban management opportunities for citizens and other stakeholders through websites, mobile devices and other data channels. Individual citizens and community groups, as an urban force, are participating in urban management through the new ways, such as a new generation of tools and applications (e.g., social media, visualizations, mash-ups, and more), called Government 2.0. (de Mello Miranda P R 2016, Sandoval-Almazán R 2016). The other one is the promotion of information integration among government agencies, including organizational collaboration and information integration within government agencies, as well as information communication between government agencies and other branches of government, private firms and not-for-profit organizations. Therefore, in the future, smart city management is likely to combine these two trends and develop into a model for coordinating all governmental and non-governmental actions by ICT, to achieve common goals.

The same tendency happened in China. In one hand, smart city promotes the urban planning information through the GIS-based urban planning information platform to realize the information integration among the government department, including the development and reform department, land resource department and urban planning department (Cao T 2016). Recently, the planning compilation of national spatial planning is begun. In the other hand, smart city promotes the achievement of public participation. The emerging internet platform of the "public planning in Wuhan" provides a formal and open interactive platform for public participation. Furthermore, smart city also promotes the integration of urban design and urban management, and explores how to make a stronger connection between planning, design vision, and urban building management, which is a significant topic discussed through the urban management practice in Guangzhou, to achieve sustainable urban growth. The design management of Zhujiang New Town has worked through the overall regional guidance to the special refinement design. The entire Zhujiang New Town has become a typical case of the urban-centered area, which almost realized the government's design vision (J. 2015). In the urban design management of Guangzhou Higher Education Mega Center, on the basis of the implementation of the overall urban design framework, the designer team transformed the design control into administrative requirements to make the control more accurately and carried out the administrative guidance actively to clarify the design control requirement in the planning condition (Li M 2012). The urban design management of Baiyun New Town attached great importance to the coordination relationship with the surrounding area, and the "design review" method was adopted to examine urban design control rules for some individual key plots (J. 2015). In the urban design of Guangzhou International Financial Center, the designer team has creatively explored the multi-level urban design guidelines of south China regional characteristics and adopted the regional planner system, for the purpose of reviewing the individual key block to ensure to continue regional architecture characteristic for future development (Z. 2018). In general, in terms of urban management, smart city not only promotes the integration of information and collaborative work among government departments, non-governmental organizations, enterprises, the public and community organizations, but also explores a way to manage a city by combining communication information and urban design concepts.

In this paper, based on Guangzhou urban design practice experience, we have developed "regional chief urban designer system", which took the chief urban designer as the core and built the chief urban

designer management platform. In the system, the chief designer team aimed to integrated and coordinated of various information, to improve the quality of refinement of urban management, and to promote the implementation of urban design and regulatory detailed planning.

2 Case study - Regional Chief Urban Designer System

2.1 Definition

"The regional chief urban designer system" in Pazhou West District is different from the traditional regional planner system. It refers to urban designers who are employed by government departments and have high professional competencies in urban design with high social prestige. This designer team protect the public interest, by tracking the dynamic work of the responsible areas in the whole process of urban planning, design and implementation, and play multiple roles such as designers, managers, coordinators and consultants in the urban design practice process of key areas (Z. 2018). They take a directly responsibility to the land planning department, guide the government land consolidation and banking, and give urban design results legal status through the planning committee. At the same time, they provide consulting services to investment enterprises and land developers, to promote land leasing work and construction examination and approval projects (see Figure 1).

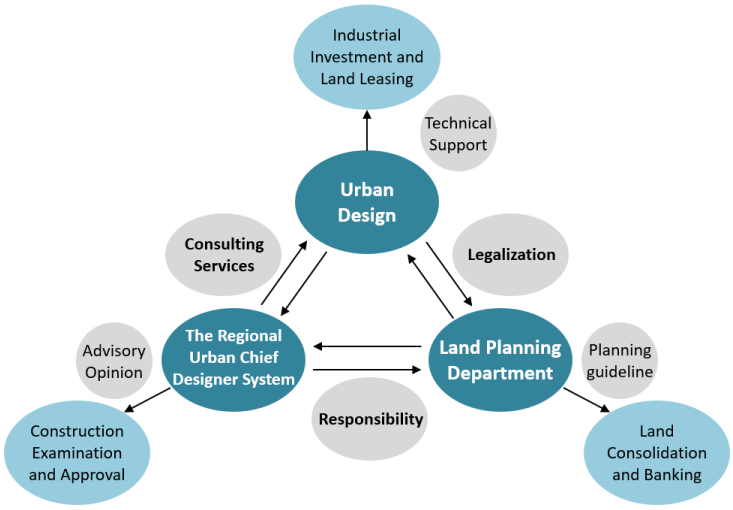

Figure 1: The framework of the regional chief urban designer system in Pazhou West District

2.2 Work content

The main work of "regional chief urban designer system" in Pazhou West District includes three aspects:

1. To develop an urban design optimization vision and carry out a number of special studies on integrated transportation, underground space, green infrastructure, regional architecture characteristics, environmental landscape, etc., and compile urban design plan and guidance documents, which serve as the basis for a regional digital information platform;
2. To build a communication and coordination platform, in order to provide the planning management department with technical assistance for administrative decision-making and

design review, and the review opinions from the chief urban designers will be one of the basis for the administrative approval of the department. The platform also can coordinate land holders, proprietors and design teams to integrate the interests of all parties and achieve the goal of integrating the space environment;

3. To construct design information feedback loop, to optimize design. The chief designer team will provide expert consultation for land developers before the construction implementation stage, and make sure the urban design plan and guidance to be fully implemented in the regulatory detailed planning, site plan and building project. At the same time, the reasonable conception of the land developers on the building project would feed back to the chief urban designer team, so the team can make a balance on all developers. By this way, the team can promote the overall construction between different land developers of adjacent plots, which aimed to reduce the overall project cost and to achieve efficient development of the area.

The work organization of the regional chief urban designer management system in Pazhou West District (see Figure 2) mainly involves the chief urban designer team, land developers, and Guangzhou Urban Planning and Land Resources Committee, which is the main responsible department for this platform. The chief urban designer team creates a communication and coordination digital platform among the three institutions, establishes consultation, review, examination, approval workflow for construction projects, and formulates consultation forms, materials lists, report document templates. Through this platform, the designer team can hold construction site design coordination meetings or chief designer review meetings, and participates the coordination meeting organized by the government.

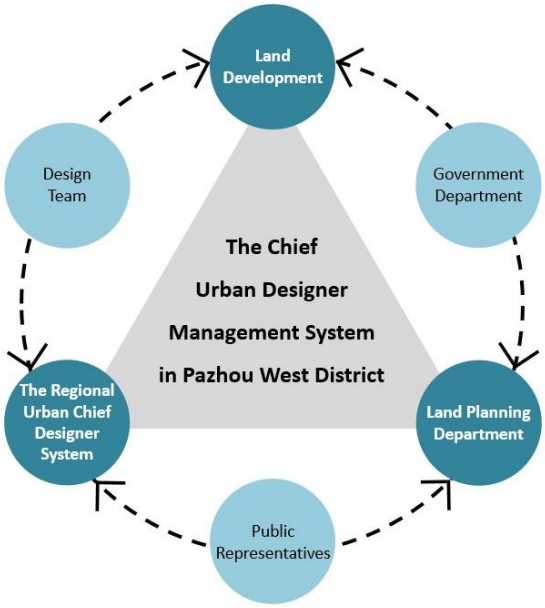

Figure 2: The institutional organization of the chief regional urban designer management system in Pazhou West District

The work process of "regional chief urban designer system" in Pazhou West District (see Figure 3) includes four stages: 1) design compilation; 2) design consultation; 3) planning examination and approval; 4) construction implementation.

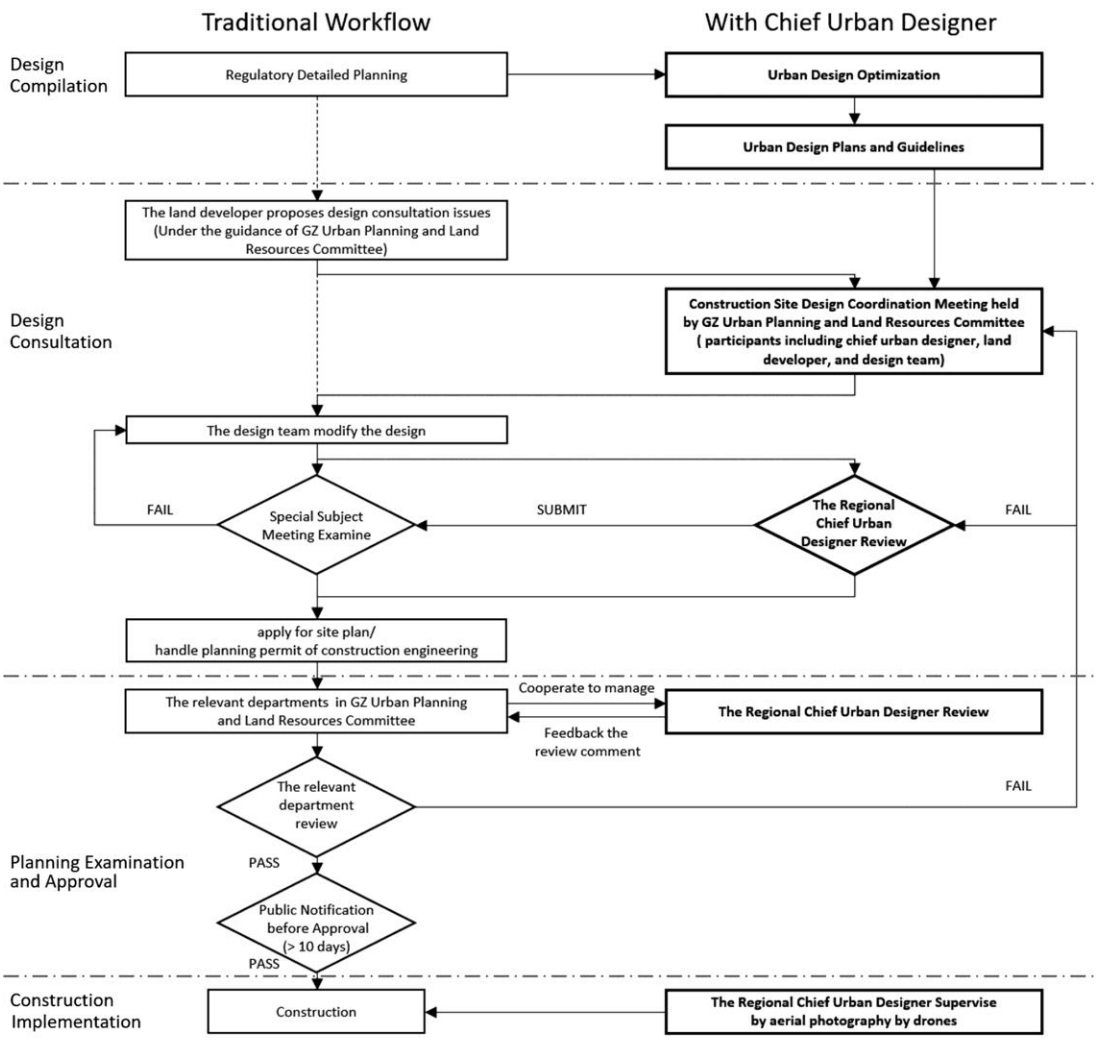

Figure 3: The workflow of regional chief urban designer system in Pazhou West District

In the design compilation stage, the chief urban designer led the team to carry out urban design optimization work, which was based on the results of the regulatory detailed planning, and to coordinate with various systematic plans such as transportation, environment and water conservancy; aimed to provide a series of comprehensive results system including urban design plans and guidelines.

In the design consultation stage, under the guidance of Guangzhou Urban Planning and Land Resources Committee, the land developers sought design advice from the chief urban designer. The chief urban designer communicates with the land developers and their design team through construction site design coordination meetings, which mainly includes the interpretation of the urban design plan, the discussion of the individual design plan, and the coordination of the design of each construction project. The chief urban designer team aimed to guide the construction plan to meet the various planning requirements before planning examination and approval, based on meeting the public interest and environmental benefits of the region.

In the planning examination and approval stage, the planning examination and approving department of Guangzhou Urban Planning and Land Resources Committee will conduct a conformity review of the historical review consistency of the case with the chief urban designer, and issue a review comment within the working day required by the department. This opinion serves as an important support for planning examination and approval.

In the construction implementation stage, the chief urban designer team tracked the building progress of various projects in the base, took aerial photography on the site regularly, maintained the physical design model of the area, comprehensively developed an intelligent interactive display and management platforms to provide innovative support for the achievement display and urban design management.

2.3 Implementation

Design compilation

In the design compilation stage, the chief urban designer team carried out urban design optimization for Pazhou West District, and introduced typical urban design principles such as "small block and dense network", "advocate public transportation" and "pedestrian friendly". The team drew a general plan of urban design, and compiled urban design plans and guidelines (see Figure 4) for each individual plot in Pazhou West District, which is the basis documents for the planning and building management of the area, and for the digital information management platform.

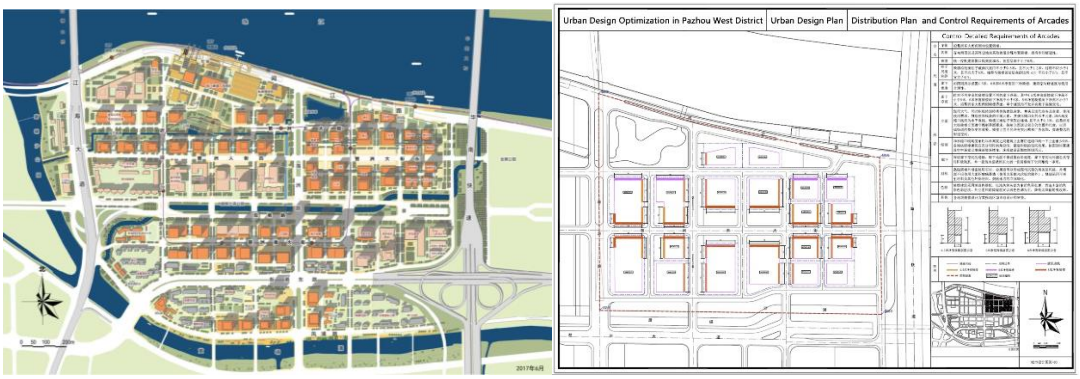

Figure 4: Master plan and urban design guideline of Pazhou West District Urban Design

Design consultation

In the Design consultation stage, the chief urban designer guided and guaranteed a complete and efficient public space system within the plots through the public interest priority guidance system. Taking the sample area of 300,000m^2 in the Internet Innovation Zone as an example, the urban design plans and guidelines require three typical scales of arcade space (see Figure 5) of 4.5m, 6m and 8m along the street. The total length of the arcade is over 2000m and the area is over 12,000m^2. Under the guidance and assistance of the chief urban designer team, the arcade in the plot has been gradually designed by the owner of the plots. This way will not only ensure the public space quality, but also add the regional architectural characteristic to individual building.

The urban design plan required the arrangement of air corridors (see Figure 5) between the blocks, and corridors and vertical public transportation modules in the blocks. This part of work is collaborated by the chief urban designer management platform. There will be 15 air corridors (more than 1600m in length) set up in the Internet Innovation Zone in Pazhou, combined with the planned Waterfront Park Platform (contacting Tencent, Ali and Vipshop, with a total area of approximately 13,500m^2). Those

would connect the second and first floors, the ground floor and underground public space (generally to the subway station or public transit station) of each plot through the public vertical traffic module, for the purpose of the interconnection of public space in the area.

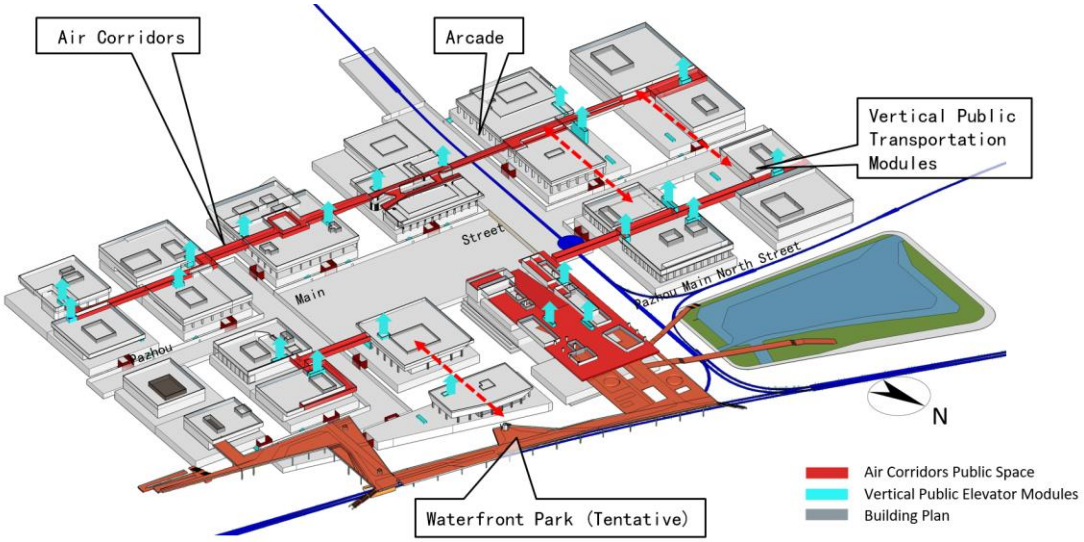

Figure 5: The pedestrian system in Internet Innovation Zone

The urban design plan required to set up an underground public space (see) in the Internet Innovation Zone, including a public commercial space on the ground floor and a public garage space on the second ground floor. The length of the public commercial space on the basement floor is 970m and the walking width is 7.2-11.2m, which connects more than 10,000m^2 of commercial space for land developers. The garage space on the second ground floor is 580m in length and 15m in width. The public space on the basement level connects to the No. 18 subway line in the west, and connects to the No. 19 subway line, the tram station, the tourist boat pier and the bus station in the south.

In the process of consulting services, through the chief urban designer management platform, the land developers and the chief urban designer team work together on the shared platform to realize the precise implementation of the urban arcade, the air corridors and the underground public space, ensuring that the public interest and the traffic organization of the urban design can be fully completed.

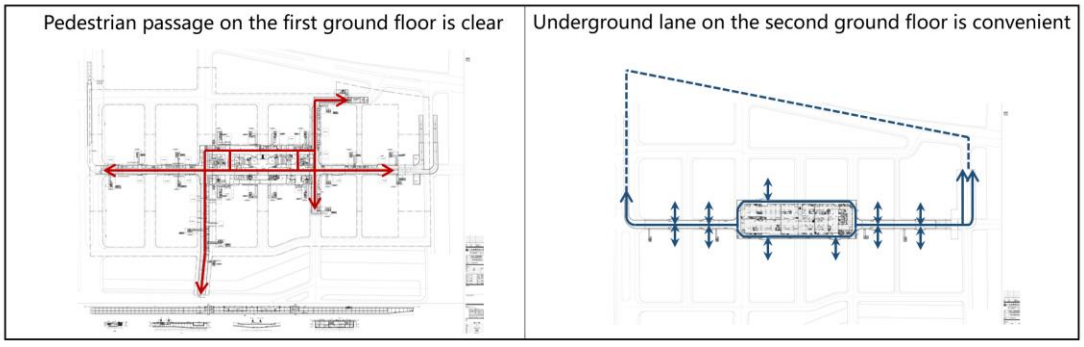

Figure 6: The underground public space in Internet Innovation Zone

In 2016, the total number of the chief urban designer team in the meeting and reply formal document reached 267 times, including more than 95 construction site design coordination meetings, more than 44 coordination meetings organized by the government, and over 69 formal documents.

In 2017, the total number of the team participating in the meeting and reply formal document reached 302 times, including more than 123 construction site design coordination meetings, over 28 coordination meetings organized by the government, and over 90 formal documents.

	2015	2016	2017
Building management meeting	0	2	0
Management committee meeting	0	0	2
Landscape meeting	0	20	15
Haizhu planning government meeting	0	8	23
Chief designer review meetings	6	16	18
Construction site design coordination meeting	5	95	123
Coordination meeting held by government	42	44	28
Other meetings	0	13	3
Reply formal document	0	69	90
Total	53	267	302

Table 1: the work of chief designer team in 2015, 2016 & 2017

In addition, the team also participated in the Landscape Meeting organized by Guangzhou Urban Planning and Land Resources Committee and the Haizhu District Bureau meetings, and actively sent formal documents to the land developers, playing an important role in coordinating communication, technical review, and promoting better urban space.

Planning examination and approval

In the planning examination and approval stage, it is essential to make a great communication and coordination with the land developers. The team took the protection of the regional public interest and ecological benefits as the starting point, and coordinated the rights and interests between the land developers, their design teams and planning management department through a specialized contact platform. With the help of new social media such as WeChat, the team would coordinate with the builders to ensure that the public interest is not reduced, the interests of the land can be guaranteed, and the land is encouraged to contribute to the public space.

In the communication and coordination of the Fosun block (see column 1, Figure 7), in order to enhance the regional social interests and ecological environment, the Fosun north and south blocks each cut a 1000 m^2 square to the public. As a compensation, the team allowed the small tower to be lowered from 100m to 60m. The design provided an open public space with various activities and formed a unique three-dimensional green public communication platform for the entire Pazhou E-commerce District by the building sinking square, the open space on the ground and the outdoor multi-level landscape platform of the podium. Thus, this design made the project became the core of cultural activities in the region.

In the communication and coordination of the Vipshop site (see column 2, Figure 7),, in order to create a unique architectural outward, the design layed across one of the three towers in the L-shaped layout. This creative approach provided a better river view for behind plots and a better urban space experience. Therefore, the Vipshop site was allowed to change from three towers to two towers and one tower across, and the horizontal tower was connected to the other two towers through the air connection. In order to promote the interconnection of the second-floor pedestrian system in Pazhou E-commerce District, the Vipshop Club would give up part of the space on the second floor of the building, and connect the north air platform, the west and south side corridors, so as to contribute to the high quality pedestrian space of the area.

In the communication and coordination of the Huangju blocks (see column 3, Figure 7), in order to inherit the regional architectural space culture and shape the urban interface of Pazhou Eastern Avenue, the blocks provided a large underlying overhead space with a net height of 10m and an area of 1300 m2, to form an urban public space and making a stronger connection between the Fosun block and the Huangju block. As a result, the team permitted the small towers to be lowered from 100m to 52m.

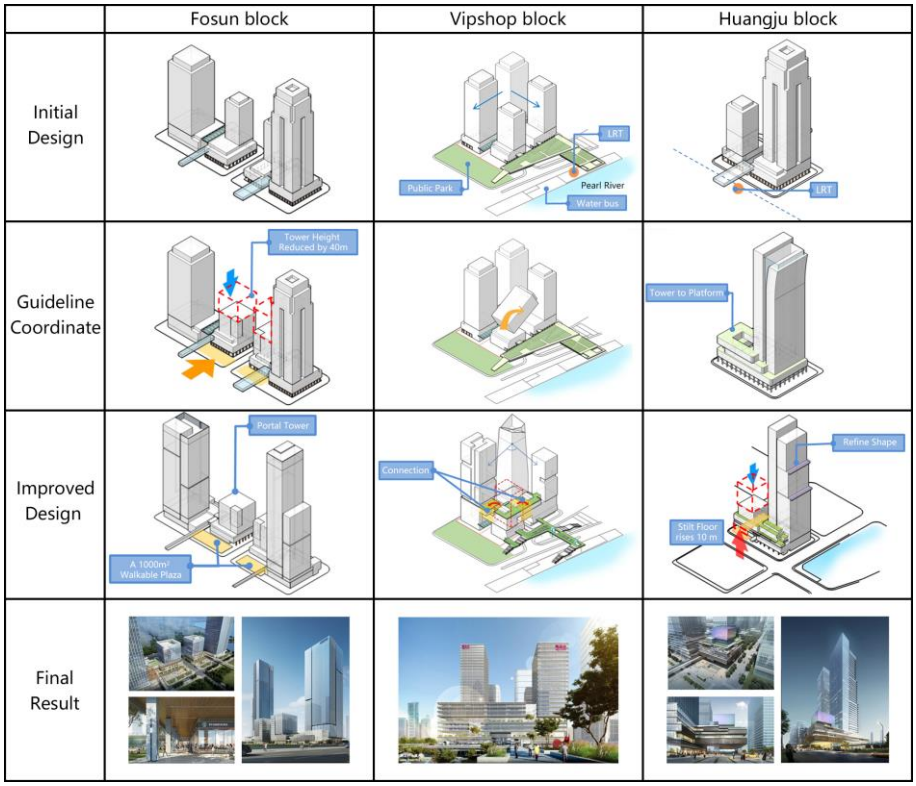

Figure 7: The design development of individual plot through the communication and coordination

Construction implementation

The team tracked the whole process of each construction project in Pazhou West District (see Figure 9), and recorded the progress of the construction of Pazhou West District through regular aerial photography (see Figure 8) in the past three years. Furthermore, we also updated the design physical model in real time, and published the Pazhou West District Work Weekly.

Figure 8: The aerial record in Innovation Internet Zone from 2016 to 2018

Figure 9: The information record of each individual plot in Innovation Internet Zone

3 Information System - Chief Urban Designer Management Platform

In the process of urban design and regional chief urban designer system practice in Pazhou West District, we gradually summed up practical experience and built a platform for regional chief urban designer to manage and control the region development for future smart cities, achieving smart urban design, fine space control, precise information integration, as well as accurate review and approval.

According to the architecture theory of computer software system, we built a smart city urban design management platform with four layer, including the infrastructure layer, data layer, core operating layer and application platform layer. The role of each layer is explained in more detail below:

Infrastructure layer: This layer provides the operating environment, which is necessary for the daily operation of the platform system. The system is deployed in the chief urban designer studio, with the information infrastructure including hardware, software and network. The system adopts virtualization deployment.

Data layer: This layer is mainly responsible for the translation, organization and integration of relevant city data, as well as the construction, maintenance and access of city database. The main data includes basic data (basic geospatial information, urban status factor data), professional data (related urban planning results data, urban design results data), management data (urban design plan and guidelines data, land developer Data), etc. The main data types include geographic vector data and 3D model data. Through the unified data standards, big data covering the entire process of urban design management is formed. This layer is the basis for the operation of the chief urban designer management platform and requires the support of computer professionals.

Core operation layer: This layer takes a serious responsibility for the daily design and control work of the chief urban designer team. It is mainly used for docking and providing data related to urban design and architectural design. The software can be used to extract the data about the city, the urban planning and design, the management and control requirements of various plots, and the analysis result

of the economic, land, transportation, hydrology and landscape related to urban design. At the same time, the interface of the application platform layer is included, which is used to accept feedback information from each design team. The feedback helps the chief urban design team to process relevant management and control requirements. This layer is the core of the total platform and requires the daily maintenance of urban and architecture related professionals.

Application platform layer: This layer divides the functions of the platform into three modules from the service object: the consulting coordination module for developers, the decision support module for urban managers, and the display feedback module for the public. The consultation and coordination module includes design plan explanation, single program discussion, adjacent block coordination, construction plan approval; decision support module includes meeting preparation, meeting minutes, review opinions; display feedback module includes model display, construction progress, questionnaire survey, Information inquiry.

Based on this system architecture, we reconstructed the workflow of urban design management, and tried to develop in a GIS-based system (see Figure 10). The running result showed that integrating the work about chief urban designer team into an information platform could highly improve the work efficiency. The data layer is mainly responsible for data collection and cleaning to ensure the data accuracy of the geographic information platform, which can be completed in the ArcGIS database. The core operation layer is mainly for city specific analysis, control requirement modification and development progress record, which can be carried out on Arcmap platform. Application platform layer mainly displays and communicates information based on relevant information, and can publish by WebGIS which based on ArcGIS platform. In this way, the informationization of the work about chief urban designer team is realized, which provides a strong guarantee for the refined and highly quality planning and management.

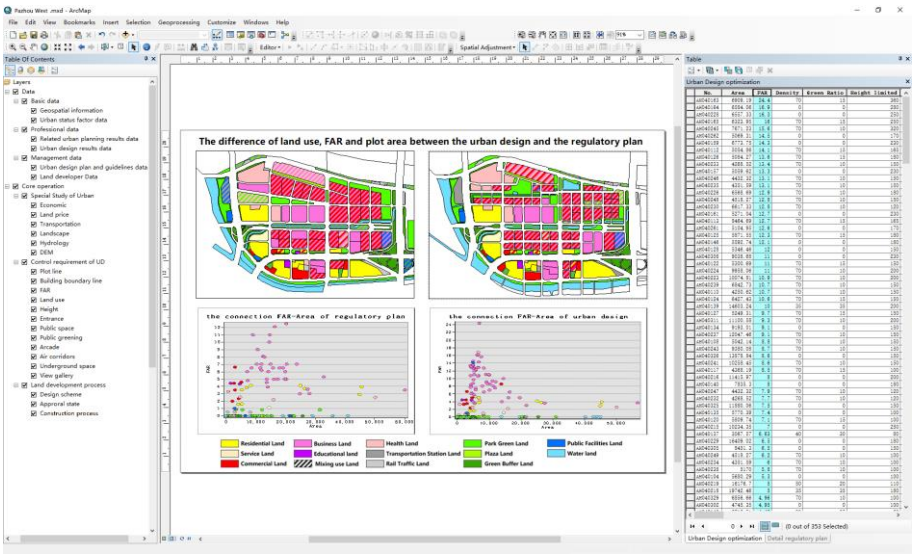

Figure 10: the chief urban designer management platform works in ArcGIS

4 Discussion

4.1 From “regional planning” to “regional chief designer”

With the continuous improvement of urban design in China, the implementation and management of urban design has become the key to urban construction. From “regional planner” to “regional chief designer”, we can see that the concept of urban design is gradually being combined with urban planning management. We discuss the differences between the two systems below from three aspects: work content, work purpose and urban significance:

From the perspective of work content, as an urban planner hired by the government department, the “Regional Planner” undertakes pre-consultation and aesthetic review of urban planning and establishes a communication platform between urban planners, designers and architects. As a work team employed, “regional chief designer team” not only maintains frequently contact with architects, but also establishes a communication and negotiation platform with government department. Therefore, the work field of “regional chief designer” is broader than that of “regional planning”, and keeping close contact with government departments is an important factor for effective implementation of control.

From the perspective of work purpose, “regional planner” provides technical support for the planning and implementation of the area, while “regional chief designer” is committed to promoting the implementation of high quality urban spaces. So we can see that the “regional planners” are more likely to assist the government in making planning decision to ensure the rationality and scientific of the decision, while “regional chief designer” focus on the public interests of the city and influence the decisions on behalf of the public interests.

From the perspective of urban significance, “regional planner” actually creates a bottom-up channel for pushing the implementation of the planning within the planning system. However, the “regional chief designer” provides a multi-participation platform for the coordination of urban interests outside the planning system. The significance of “regional chief designer” is to ensure the comprehensive management of design compilation, design consultation, planning examination and approval, construction implementation. There is an obvious tendency that the urban design is moving from “design for you” to “design with you” and the role of the designer is moving from a single technical team to a diverse social public platform.

4.2 From “ultimate blueprint” to “dynamic planning”

With the continuous progress of information technology, urban design are moving from “ultimate blueprint” to “dynamic planning”. In this process, the role of urban designers and the significance of urban design are changing.

Urban design is no longer a single design activity. With the information integration providing real-time data updates, the chief designer can be very easy to grasp the urban state in order to coordinate the urban public interest and others in urban management and building design phase. With public information, the citizens can realize the approval process readily, so they will be able to understand and evaluate the design scheme, to fight for their own interests in the city. With such multi-participation, urban design has become a platform to discuss urban interests with design as the clue. Such a process of discussing and coordinating between public interest and private interest is more important and significant than the final results.

Urban designers no longer provides finite and buildable designs, but identify a set of parameters that guide urban development and build an open framework. Designers would abandon the paternalistic style of the traditional design process, and demand an even broader responsibility for creating activity programs and determine how they could be integrated to be a city. Designers would pay more attention to the relationship between architecture and the city, which is expected to activate the social space. Therefore, the regional chief designer system is such a dynamic design ecosystem (Ratti C 2015).

4.3 From “extensive” to “smart”

The concept of function division from modernism urban planning seems reasonable but as a result, the large-scale urban development also cause many urban problems. For the city, urban planning provides the strategy to guide urban development, and control the spread of cities. However, it is not enough to achieve urban sustainable growth and a dynamic state just by urban planning. Therefore, urban design, which is a way to reflect, optimize, adjust, and gradually search the optimal state of the urban space, is required to carry out the refined management of the city. The chief urban designer system of Pazhou West District is such a mechanism to carefully manage and build for the city. By strengthening the connection of planning compilation and planning management, we extend the regional architectural characteristic of the new era, optimize the architecture design and improve the efficiency of building implementation. In a word urban planning and building needs to move from “extensive” to “smart” and take the “smart design” approach.

5 Conclusion

In the context of “smart city”, the concepts, technology and management of urban design are changing to a “dynamic updated” smart urban planning and building management model. Through the urban design practice in Pazhou West District, we explored a new way for urban design management, and established the “regional chief urban designer system” based on the “community planner” and “regional planner” system before. This is a new study and discussion on the urban design management system in the “smart city”. Because of summarizing the practical experience, we have constructed a chief urban designer management platform, which is suitable for the actual situation of The Greater Bay Area and the development of “smart city” in the future. We hope to maintain the sustainable growth of the city through refined urban design. At the same time, the roles, responsibilities, and purposes of architects, urban planners, and designers have been changing, moving from a single technical team to a diverse social public platform which coordinates government, developers, and citizens, from providing a “ultimate blueprint” image design to building a “dynamic planning” development framework, from “extensive” control of urban construction to “smart” building of urban public spaces.

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