

POLITECNICO DI TORINO

College of Architecture and Design

Master of Science Course

in Architecture Construction City

Master of Science Thesis

**A COMPARATIVE STUDY OF ARCADE TYPOLOGIES: THE CASES OF
TURIN PORTICOES AND GUANGZHOU QILOU**



Supervised by:

Prof. Marco Trisciuoglio (DAD)

Prof. Zhang Tong

Candidate

Yunshu Yang

July 2026

Abstract

As important transitional spaces between buildings and streets, arcades accommodate movement, staying, commerce, and public interaction, and have developed distinctive spatial types in different urban and cultural contexts. Porticoes of Turin and the Qilu of Guangzhou are two representative examples in Italy and South China. Although both are characterized by continuous semi-enclosed interfaces, they differ significantly in formation background, spatial organization, facade expression, and environmental adaptation. These differences reflect not only different processes of urban development, but also the evolution of arcade types under different historical, cultural, and climatic conditions.

This study takes Porticoes of Turin and the Qilu of Guangzhou as its objects and compares them from four dimensions: historical evolution, publicness, function, and climatic adaptability. The aim is to explain the internal reasons for their typological differences and, on this basis, summarize their typological characteristics and evolutionary logic.

The paper first reviews the formative context and developmental course of Turin's Porticoes and Guangzhou's Qilu respectively, exploring how urban development stages and historical circumstances in distinct regions shape the morphological features of arcade streets. In the next chapter, the research focuses on publicness factors, comparing the public spatial characteristics of arcade streets in two cities, alongside their interactive ties with streets, plazas and daily social activities. The fourth chapter focuses on functional attributes, summarizes and categorizes the core practical roles undertaken by urban arcades in both regions. With graphic analysis, it examines the spatial dimension and typological traits of arcade streets with diverse functions, to clarify the internal correlation between architectural function and classification patterns. From the dimension of climatic adaptability, the fifth chapter combines the differentiated meteorological environments of the two areas, analyzes the functional gaps between Porticoes and Qilu in sun shading, air ventilation and microclimate regulation, and clarifies the formative mechanism of climatic factors in the shaping of covered street architectures. The final chapter concludes and compares arcade street bases on the architectural typology perspective, conducting analysis from spatial patterns and facade forms, establishing a typological sample database of arcades in two cities. Through comparative research on specific Porticoes and Qilu cases, it ultimately summarizes the overall typological traits and core distinctions between Turin arcades and Guangzhou verandas.

Through the comparative analysis of Turin's Porticoes and Guangzhou's Qilu's typology, this study attempts to make up for the deficiencies in the research on arcade street types under different cultural and climatic contexts, providing theoretical reference for urban renewal, historic district protection and climate-adaptive street design. In the context of the coexistence of globalization and regionalism, the re-recognition of traditional arcade street types is conducive to promoting the continuation of urban culture and the localized expression of contemporary urban space.

Keywords: Turin Porticoes; Guangzhou Qilu; Arcade Street; Typology; Publicness; Climatic adaptability

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Chapter1 Introduction

1.1 Research Background and Significance

1.1.1 Research Background

As a transitional space between building interiors and urban streets, the formation and development of the colonnaded street have always been jointly influenced by urban historical evolution and socio-culture. As a continuous spatial form, it both responds to the practical needs of daily transit and carries the functions of public activities and social interaction. This architectural type is known as Turin Porticoes in Italian cities and Guangzhou Qilou in Chinese cities.

In the European context, the origin of Porticoes can be traced back to the colonnade systems of the Ancient Greek and Ancient Roman periods. This spatial prototype served both public life and commercial exchange from an early stage and is an important component of urban space. Entering the Renaissance and Baroque periods, Porticoes no longer existed merely as an attached space of a single building but was gradually integrated into overall urban planning. Continuous Porticoes spaces established clearer and more orderly spatial connections between streets, squares, and major public buildings. During the Savoy Dynasty, in the process of urban construction dominated by state power, Porticoes became an important spatial means of reflecting the overall image of the capital through unified scale control and the shaping of continuous interfaces. Subsequently, with the advancement of urban expansion in the 19th century and continuous construction in the 20th century, Porticoes system was constantly extended and supplemented, gradually forming a continuous network covering major public space nodes. In this long-term evolutionary process, Porticoes developed alongside changes in urban form, architectural styles, and social lifestyles, reflecting the emphasis on public life in European cities and the continuation of traditional types and the pursuit of order in spatial organization.

In contrast, Guangzhou Qilou possess stronger functional attributes and climate adaptation characteristics. Guangzhou Qilou gradually formed at the intersection of traditional Chinese veranda architectural types and the influence of Western colonial architecture, presenting characteristics of Chinese-Western integration; their generation was driven jointly by regional environment, climatic conditions, and commercial development. Against the backdrop of the long-term hot and rainy climate of the Lingnan region, Guangzhou Qilou constructed sheltered spaces through continuous corridors on the first floor, responding to the practical needs of pedestrians for sun shading and rain protection. The spatial organization logic directly reflects the adaptation and regulation of the climate by this architectural space. Meanwhile, along with the rapid development of modern commercial activities in Guangzhou, this type was continuously promoted and improved, gradually becoming the main component of street interfaces. It played a key role in the formation process of urban space and revealed the generation mechanism of the interaction between architectural types and urban development.

Despite the obvious differences between Turin Porticoes and Guangzhou Qilou in terms of cultural background, climatic conditions, and social functions, both have always occupied an irreplaceable position in the public space systems of their respective cities. By analyzing the historical development context, public characteristics, functional attributes, and environmental adaptation

methods, the formation paths of architectural types under different cultural contexts can be more clearly grasped. This aids in the in-depth study of the colonnaded street types in both locations and enables a differential comparative analysis of their underlying causes.

1.1.2 Research Significance

Existing research on colonnaded architecture mostly focuses on a single region or individual type, and systematic comparisons of the evolution of colonnaded street types under different cultural backgrounds and climatic conditions remain relatively insufficient. Based on this, this paper selects Turin Porticoes and Guangzhou Qilou as typical cases to conduct a comprehensive analysis surrounding multiple dimensions such as historical development, public characteristics, functional attributes, climate adaptation, and architectural types. By comparing spatial forms and evolutionary processes in different contexts, it explores the intrinsic factors and development paths affecting the differences in colonnaded street types. On this basis, it summarizes the typical characteristics of colonnaded streets in different cities and establishes a typological sample database for both locations, using diagrams to intuitively reflect the architectural differences and compensate for the lack of comparative research on architectural types from a cross-cultural perspective.

This study not only focuses on the characteristics of colonnaded architectural types but also attempts to discuss them from the perspective of the relationship between colonnaded streets and urban space. It strives to deepen the understanding of the interaction mechanism between architectural types and urban structures and provides theoretical support for urban renewal, historical district protection, and climate-adaptive street design. Under the background of the parallel development of globalization and regionality, re-examining the spatial value of traditional colonnaded street types not only helps continue the urban cultural context but also provides paths and inspirations that can be drawn upon for contemporary urban design.

1.2 Differentiation of Core Concepts

1.2.1 Architectural Typology

Architectural typology is a research method that categorizes, compares, and induces architectural phenomena based on relatively stable characteristics in form, space, structure, and historical evolution. It focuses on recurring and continuous organizational principles between different buildings, such as planar composition, spatial order, structural relationships, and their intrinsic links with function, environment, and social context. Therefore, a type is not a simple copy of existing architectural forms, but a deep structure that can be continuously inherited, adjusted, and transformed throughout history. Architectural typology possesses a profound theoretical system and complete research logic, emphasizing the discovery of cultural connotations and spatial logic behind forms by starting from the internal laws of the architectural body. From a methodological perspective, it helps identify commonalities and differences in architectural forms while revealing historical logic and evolutionary mechanisms, providing a theoretical basis for comparative studies and urban morphological analysis.

1.2.2 Guangzhou Qilou

The Guangzhou Qilou is a representative type of street-front commercial-residential building in modern Lingnan cities. Its basic characteristic involves the ground floor of the building receding from

the street, with upper floors supported by columns, creating a space where the ground floor is mostly for commercial use and upper floors serve residential functions. The continuous corridor space formed by this ground-floor recession expands the interface for street commercial activities and creates a transitional zone between the building and the street that functions for transit, lingering, shading, and rain protection. Typologically, Guangzhou Qilou are understood as a Lingnan-specific architectural form resulting from the long-term integration and evolution of foreign vaulted-colonnade styles with local Guangdong construction methods. Thus, it is not just an architectural form, but a city building type that was gradually institutionalized and promoted during modern Guangzhou's processes of road construction, commercial development, and urban governance.

1.2.3 Turin Porticoes

The term Turin Porticoes (Porticoes) originates from the Latin *Porticus* (porch), referring to a roofed, colonnaded walkway spanning one or more sides of a building, or a standalone walkway. Its historical roots trace back to the *Stoa* (colonnade space) of Ancient Greece, which initially served religious, assembly, and public social purposes. During the Roman period, the quantity, scale, and function of Porticoes expanded, gradually becoming a vital public building type for commerce, law, politics, and daily life. The core formal feature of Porticoes lies in its use of continuous covered corridors to connect buildings with urban public spaces, creating a unique intermediary attribute between public use and building attachment.

1.2.4 Arcade

While Turin Porticoes and Guangzhou Qilou have unique names, they can generally be unified under the English term "Arcade." However, since there is no unified term in the Chinese context to encompass both, this paper introduces and uses "Arcade" as a specific term for the purpose of research and expression. It refers specifically to the semi-open transitional public space generated between the ground floor and the street—supported by columns through a ground-floor recession—providing functions for transit, lingering, and climate protection in both Western and Chinese contexts.

1.2.5 Publicness

Publicness refers to the extent to which architectural and urban spaces are open to the public and support public entry, lingering, and use, reflecting the accessibility relationship between space and society. The judgment of publicness usually revolves around accessibility, inclusiveness, management methods, and property rights attributes; thus, it manifests as both a spatial morphological feature and the influence of institutional rules on public participation. In this paper, publicness specifically refers to the arcade's role as a semi-open interface that supports common accessibility, shared use, and continuous social interaction, as well as its spatial connection to typical public nodes such as squares, historical buildings, and churches.

1.3 Related Theories and Research Status

1.3.1 Research Summary of Turin Porticoes

Turin Porticoes (Porticoes) is a core urban architectural type spanning Italian architectural history. Theoretical research began during the Renaissance, when architects elevated it from

functional sheltered space to a theoretical issue combining aesthetics and publicness. In *De Re Aedificatoria*, Alberti defined Porticoes as a "harmonizer" between buildings and the city, emphasizing that its proportions follow classical modules and serve to connect public and private spaces. In *The Four Books of Architecture*, Palladio used the Basilica Palladiana as a model to develop Porticoes into a typological compositional core, creating the "Palladian Motif" and establishing a classic modular system. Brunelleschi established the Renaissance Porticoes prototype with the Ospedale degli Innocenti, using it as a "modular unit" of urban space.

In the 20th century, Aldo Rossi provided a systematic modern interpretation of Porticoes in *The Architecture of the City*, elevating it to a core gene of urban generation. Rossi believed Porticoes is an "eternal urban type" originating from the needs of human public life, with organizational principles transcending the limitations of eras. Simultaneously, it serves as a carrier of collective memory; Porticoes districts in cities like Milan and Turin are "living archives" of urban history. Furthermore, Rossi interpreted Porticoes as a "threshold space" whose semi-public and semi-private attributes are core to the flexibility and richness of urban life.

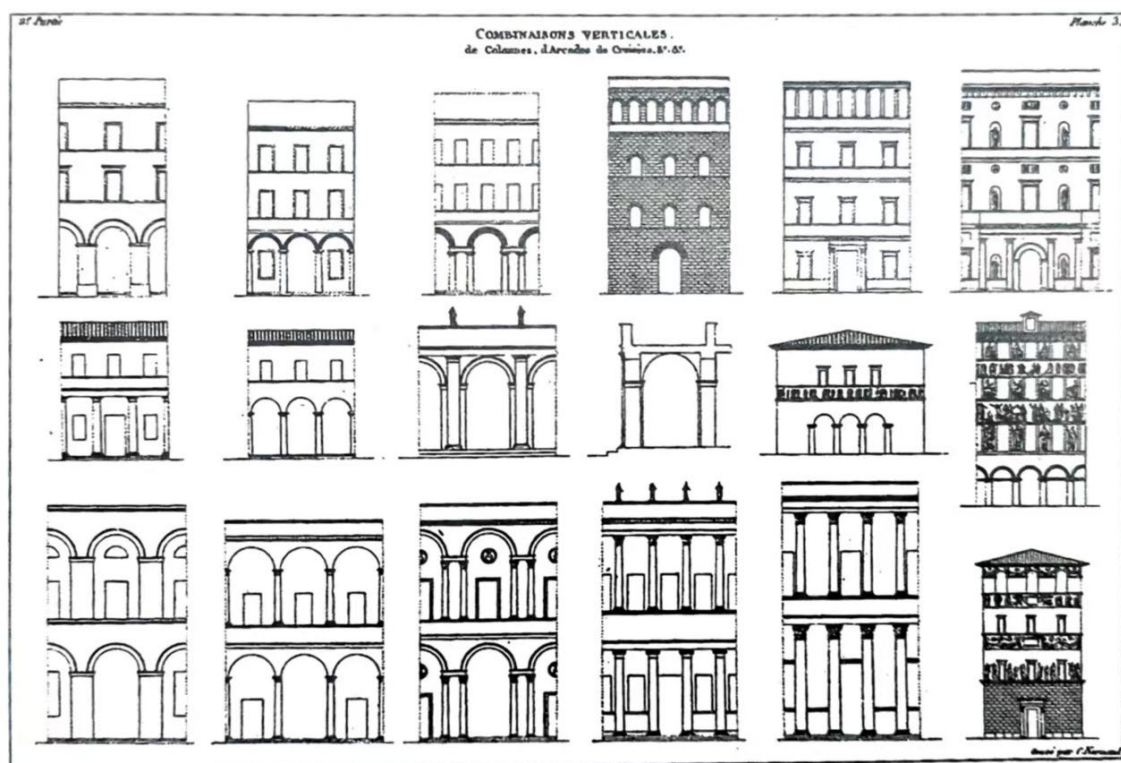


Fig 1-1 Porticoes Façade Combinations

Rossi's theories echoed among Neo-Rationalist architects of the same period. Giorgio Grassi focused on the geometric purity and tectonic logic of Porticoes, strengthening its essence as a structural type. Carlo Aymonino combined traditional Porticoes with modern blocks, using Porticoes as a clue to link historical fabric with modern functions. Generally, the Italian academic community views Porticoes as an urban morphological prototype that maintains typological structural stability.

Focusing on Turin Porticoes in Turin, Italy, Marco Trisciuglio systematically reviewed their evolution from the Baroque period to the Modernist stage in *La malinconia di una bella giornata: Appunti sui Porticoes a Torino*. He argues that these Porticoes create an orderly street interface through precise proportional control and rhythmic facades. Ton Hins, in *The Morphology of the*

Times, discussed how Porticoes, as a spatial type attached to building facades, interlocks with the axial street system to constitute the skeleton of urban spatial structure.

In the study of spatial scale and typological characteristics, Roberta Spallone and Marco Vitali, in *Il Disegno dei Porticoes a Torino*, conducted detailed research from the perspective of typological diagrams. However, a limitation is that while they detailed each Porticoes type, they lacked a multi-dimensional typological comparison—including plans, elevations, and sections—across different periods and spatial distributions within Turin. Current research also leaves a gap regarding the analysis of climate regulation and publicness characteristics of Porticoes spaces. .

1.3.2 Research Summary of Guangzhou Qilou

As a representative architectural type in the Lingnan region, Guangzhou Qilou's development is closely related to local climatic conditions, commercial activities, and cultural integration, and thus has long received attention from the academic community, gradually forming multi-perspective research paths. Regarding the historical development and cultural meaning of the Qilou, Gao Haipeng, in his master's thesis "Research on the Protection and Development of Qilou and Qilou Districts in Guangzhou", sorted through the historical process of the development of Guangzhou Qilou, discussed the reasons for the emergence of Guangzhou Qilou, the paths of their development and evolution, and the relevant laws and regulations for the management and renovation of Guangzhou Qilou, providing a perspective and theoretical support for the historical and cultural factors of the generation and evolution of the Qilou type. Chen Lixin discussed the direct relationship between the formation of Guangzhou Qilou and the modern colonial background from the perspective of cultural exchange and dissemination; after foreign architectural forms entered the local environment, they merged with traditional Lingnan construction methods and formed a stable relationship with actual use, becoming an important carrier of regional culture. Jun Zhang, in "The Morphological Evolution and Socio-Cultural Connotation of Cantonese Arcade Houses," divided the development stages of Guangzhou Qilou and simultaneously conducted analysis in combination with the social background of each stage period, exploring the relationship between typological development changes and social structure; the research showed that there is a close connection between the evolution of Guangzhou Qilou and social development as well as cultural continuity.

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Regarding the research on the climate regulation of Qilou, Yin Shi, in the "Study on Microclimate Adaptability of Traditional Lingnan Qilou Streets", analyzed the influence mechanisms of street scale, orientation, and corridor cross-sections on the microclimate through a combination of field measurements and simulations, revealing the coupling relationship between spatial scale and climate adaptability. In the article "Research on Summer Indoor Thermal Environment Testing of Traditional Qilou in Haikou", the authors analyzed the thermal comfort performance of Qilou under high temperature and high humidity conditions from the perspective of the indoor thermal environment. They concluded that Guangzhou Qilou possess certain advantages in ventilation and shading and proposed enhancing climate adaptability by optimizing spatial depth and strengthening the performance of the building envelope. Existing research on the climate regulation of Qilou mostly unfolds across three levels: street scale, corridor spatial scale, and colonnaded street orientation, collectively revealing the environmental regulation mechanism of the Qilou as a buffer space in hot and humid climates.

It is evident that existing Chinese scholars' research on Guangzhou Qilou mostly focuses on historical evolution and climate regulation, but there remains a significant gap in the typological study of the corridor space itself within the Qilou. For instance, there is a lack of corresponding classification, summarization, and typological sorting regarding the corridor's scale, facade, and spatial types. Based on this, typological research on the space under the corridors of Guangzhou Qilou will help fill the gaps in existing research and deepen the exploration, protection, and inheritance of the value of Guangzhou Qilou.

1.3.3 Research Summary of Climate Adaptability

The research on the climate adaptability of buildings, Victor Olgyay, in *Design with Climate: Bioclimatic Approach to Architectural Regionalism*, established a systematic relationship between climatic elements, human thermal comfort, and architectural design. He proposed the "Bioclimatic Chart" as an analytical tool, shifting climate-adaptive design from empirical judgment to a quantifiable methodological system. This theory became an important foundation for subsequent climate-responsive design research. Baruch Givoni, in *Man, Climate and Architecture*, explored the physical mechanisms of architectural environmental regulation from the perspective of human thermal comfort. He further refined the passive design strategy system—including methods such as natural ventilation, thermal inertia, and solar control—thereby advancing the technical path of climate adaptability based on Olgyay's theory.

On the level of specific climate zones and case studies, Richard Hyde, in *Climate Responsive Design*, summarized spatial organization and construction strategies under different climatic conditions through extensive case analysis of buildings in temperate and humid-heat climates. He emphasized the role of spatial elements such as courtyards, external corridors, and shading interfaces

in environmental regulation, further verifying the effectiveness of passive design in practical buildings. G. Z. Brown and Mark DeKay, in *Sun, Wind & Light: Architectural Design Strategies*, summarized the application methods of solar radiation, wind environment, and light environment in architectural design through diagrams and case analysis, proposing a design strategy system based on natural elements.

In research on the climate adaptability of buildings in China, relevant achievements have generally expanded from the perspective of targeted spatial strategy research in multi-climatic zones and humid-heat regions. At the theoretical level of architectural climate regulation in multi-climatic zones, research has gradually shifted from environmental control dependent on equipment to a regulation mechanism centered on architectural space. Zhang Tong, in *Architectural Autonomy of Environmental Regulation and Spatial Regulation Design Strategies* and *Spatial Regulation: Demand-side Regulation of Green Buildings*, proposed that architectural environmental regulation should return to the architectural ontology. This involves achieving an active response to the climate through spatial form, interface organization, and demand-side regulation, thereby constructing an environmental regulation system with space as the medium. Yang Liu, in *Research on Architectural Climate Analysis and Design Strategies*, systematically analyzed the influence of climatic elements on architectural spatial organization and morphological generation from the perspective of architectural climatology, further explaining the formation mechanism of climate-adaptive design at a methodological level. Together, the aforementioned studies have elevated climate adaptability from empirical understanding to a theoretical framework centered on "spatial regulation".

In research on architectural climate regulation in humid-heat regions, the focus of existing studies has concentrated on the collaborative relationship between spatial system organization and passive strategies, with the research path gradually shifting from single technologies toward holistic spatial optimization. Xiao Yiqiang, in *Reflections on Architectural Space Design Based on Energy-Saving Strategies*, proposed that rational and effective internal spatial organization is a crucial entry point for climate-adaptive design. By optimizing spatial organization, design can effectively reduce energy consumption and achieve a unified relationship with environmental regulation.

Centering on the climatic characteristics of high temperature, high humidity, and heavy rainfall in humid-heat regions, related research further regards ventilation, dehumidification, shading, and spatial organization as core elements, constructing a design path based on passive strategies. Research on *Design Strategies for Architectural Climate-Spatial Systems in Humid-Heat Regions* takes the construction of a climate-spatial system as a starting point to analyze the synergistic mechanisms between spatial elements. It also proposes operable combination methods, enabling architectural space itself to possess stronger environmental regulation capabilities. Design methods based on bioclimatic principles reduce building energy consumption while improving the indoor thermal environment, demonstrating the stable applicability of passive spatial regulation strategies.

Existing research has already introduced climate regulation and climate adaptability theories into the architectural analysis of Guangzhou Qilou, completing the transition from the theoretical level to practical case analysis and interpretation. Relevant studies particularly focus on spatial regulation mechanisms under humid-heat climate conditions, primarily centered on Qilou in the Lingnan region; this provides support for comparative research between colonnaded buildings in different regions.

However, the existing research gap lies in the relative lack of studies on climate-adaptive buildings in other cross-national climate zones (such as Mediterranean climate regions). This study also attempts to conduct a comparative study on the commonalities and differences in climate adaptability between Guangzhou Qilou in the Lingnan region (subtropical monsoon climate) and Turin portici (Mediterranean climate) under different climate zones. By doing so, it aims to derive the commonalities and differences of architectural climate regulation across different climate regions, filling the gaps and deficiencies in existing research.

1.4 Research Methods and Technical Path

1.4.1 Literature Review

This paper adopts the literature research method as the primary approach, systematically collecting and organizing academic works, journal articles, historical documents, and planning data related to Turin portici and Guangzhou Qilou. The literature is classified and summarized based on dimensions such as historical evolution, publicness characteristics, functional organization, climate adaptation strategies, and typological features to ensure identical comparative analysis dimensions for both regions.

Given that this study involves Turin portici in Italy, the literature review is not limited to Chinese materials but also includes extensive study and analysis of English and Italian works. During the author's studies in Italy, numerous historical documents on Turin portici were consulted at the library of the Polytechnic University of Turin (Politecnico di Torino). This effort was made to gain a profound understanding of the historical evolution and typological characteristics of arcades under different cultural backgrounds, facilitating a thorough and penetrating comparative study with Guangzhou Qilou.

1.4.2 Comparative Research Method

This paper adopts the comparative research method, taking Turin portici and Guangzhou Qilou as the research objects to conduct a comparative study under a unified analytical framework. A systematic comparison is carried out across four aspects: historical evolution, publicness, functional characteristics, and climate adaptability. By ensuring the unification of comparative dimensions and the alignment of granularity, this approach can more clearly reveal the formation mechanisms of typological differences in arcades under different cultural backgrounds and analyze the degree of influence that various factors exert on the outcomes.

1.4.3 Typological Diagram Method

This paper adopts the typological diagram method to summarize and express the spatial characteristic types of Turin portici and Guangzhou Qilou. Based on the distribution characteristics of colonnaded streets in the city, data collection and redrawing of typical cases are conducted from the perspectives of plan, elevation, and section, as well as the scale and style of internal structures. Through a unified diagrammatic language and a typological classification framework, different types of colonnaded streets are categorized and comparatively analyzed. This unified dimension of diagrammatic representation more intuitively presents the differences and connections in the types of

colonnaded streets between the two locations, thereby strengthening the logic and comparability of the typological analysis.

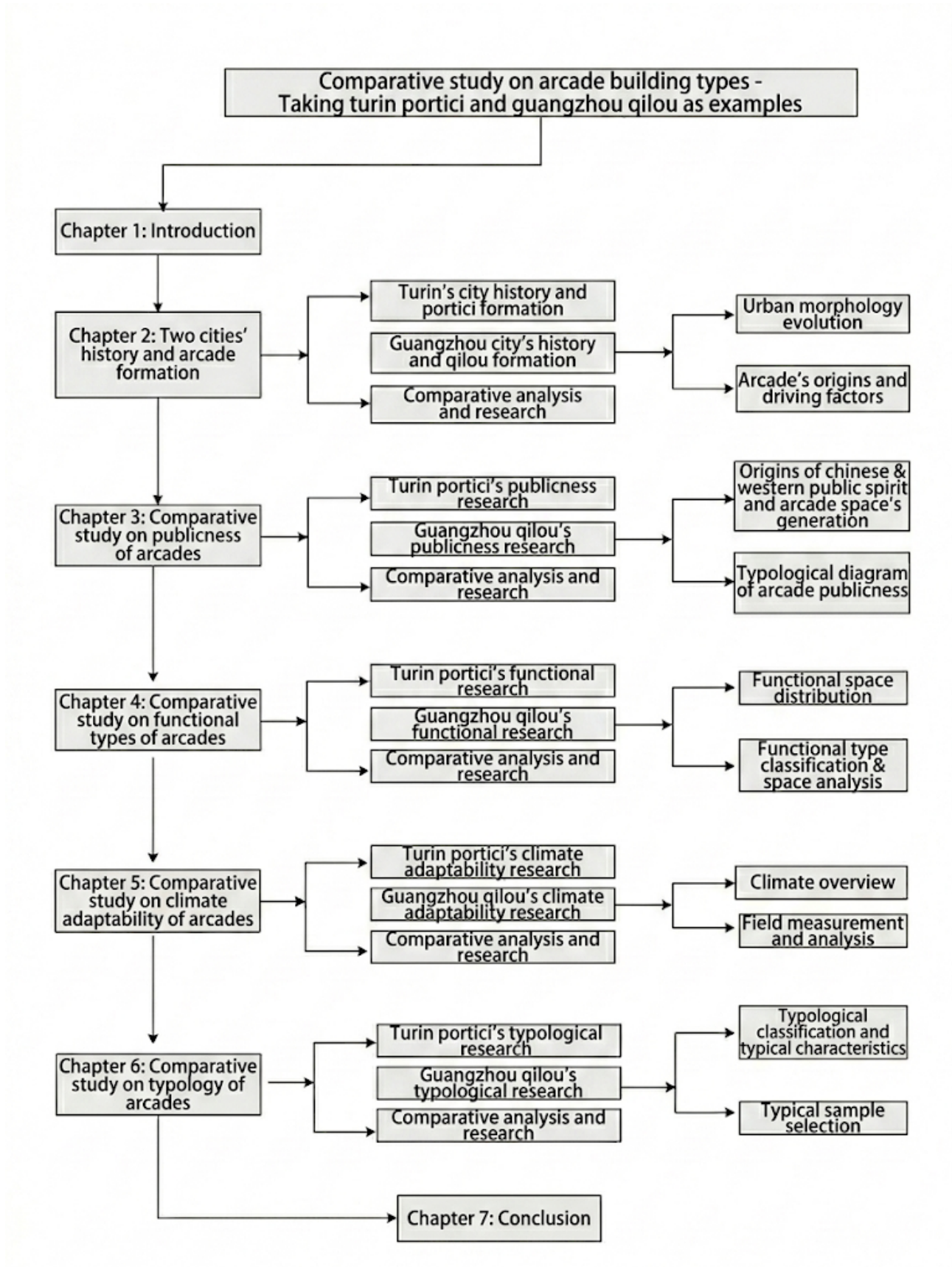
1.4.4 Field Investigation and Data Measurement

The research adopts a combination of field investigation and quantitative data measurement to conduct a comprehensive and in-depth study of Turin portici and Guangzhou Qilou. First, through on-site surveys, the spatial morphology, tectonic details, facade styles, and pedestrian activity patterns of typical colonnaded streets in both locations are documented via photography, detailed measurement, sketching, and note-taking. This process aims to obtain first-hand data on the actual usage status of the colonnaded spaces during the research years (2025 to 2026), providing an intuitive basis for subsequent analysis.

Building on this, environmental data measurement tools are introduced to conduct a quantitative analysis of the climate adaptability of the colonnaded spaces. Representative streets and reasonable measurement points are selected to perform on-site measurements of key environmental indicators—such as wind speed, air temperature, and relative humidity—at various points within both the Turin portici and Guangzhou Qilou. Combined with thermal imaging technology, the thermal distribution characteristics within the spaces are recorded and analyzed. Multiple measurements are taken across different time periods (e.g., morning, noon, and evening) to minimize the interference of accidental factors and enhance the reliability and scientific validity of the data.

Finally, the collected data is organized and summarized, utilizing diagrams and visualization analysis tools (such as line charts, bar charts, and heatmaps) to intuitively illustrate the differences in microclimate regulation characteristics and trends between the two types of colonnaded spaces. By comparing environmental performance across different spatial forms, street orientations, and climate zones, the study further reveals the differentiated adaptation strategies formed by the spatial morphology and climatic conditions of Turin portici and Guangzhou Qilou.

1.5 Research Framework



Chapter2 Urban History and Origins of Arcades

2.1 Historical Development of Turin and the Origins of Its Porticoes

2.1.1 Evolution of Turin's Urban Morphology

2.1.1.1 Roman Period:

The urban development of Turin can be traced back to the Roman period, when it initially existed as a military camp. Shortly after 25 BCE, the Romans established a new military colony on the site of the original Taurini settlement. The pre-existing settlement pattern was systematically erased, and the new city was entirely rebuilt according to the Roman urban planning model. The city adopted a typical orthogonal grid layout, with the north-south and east-west axes forming its structural framework, thereby creating a rational, homogeneous, and clearly ordered rectangular urban form. At the center of the city was the forum (today's Piazza della Repubblica), around which public facilities such as baths and theaters were arranged, giving the city a complete functional system. At the same time, the orthogonal grid established during this period defined the rational and regular spatial structure of Turin, and subsequent urban expansion was carried out on this basis.



Figure 2-1 Map of Turin in the Roman Period (Source: Self-painted)

2.1.1.2 The Three Phases of Urban Expansion

From the 16th to the 18th century, Turin entered a phase of continuous Baroque urban expansion under the court planning of the House of Savoy. More specifically, while maintaining the Roman orthogonal grid as its foundation, the city gradually developed an overall urban structure characterized by axial streets, squares, and unified façades. This expansion was organized around Piazza Castello as the central core, from which new streets extended southward, eastward, and westward along major axes, forming principal urban routes such as Via Roma and Via Po. These axes linked a series of important squares, including Piazza San Carlo and Piazza Vittorio Veneto, and created an ordered urban spatial sequence through the use of unified façades and Porticoes systems.



Fig 2-2 Map of Turin in the 18th and 19th Centuries

2.1.1.1 The Napoleonic Era

In the early 19th century, Piedmont was incorporated into the French Empire, and the Napoleonic regime issued decrees for the systematic demolition of city walls and most defensive fortifications, allowing the city to break free from its spatial form as a "fortress city" for the first time. At the same time, newly built streets such as Via Pietro Micca broke the original orthogonal system; their non-orthogonal alignments reinforced the centripetal characteristics of the Baroque urban layout, further highlighting a street layout pattern where streets connect squares and point toward the same center, with the urban planning reflecting the characteristics of "absolute monarchy."

In summary, the evolution of Turin's urban form began with the Roman military camp, starting from an orthogonal road system and public spaces. Subsequently, during the brief period when it served as the capital of the unified Kingdom of Italy, its urban appearance as the capital of a unified republican system saw its form gradually transform from a single orthogonal grid into an urban layout characterized by streets, squares, and uniform facades. This presented a capital city appearance of unified street facades, distinct order, and a sense of ritual, which also provided the structural foundation for arcades as a continuous street type.

2.1.2 Origins and Motivations of Turin Porticoes

2.1.2.1 Origins of Turin Porticoes

From the perspective of the cultural background of the origin of Porticoes, Turin Porticoes did not arise in isolation; on the one hand, they continue the historical tradition of Western colonnade spaces, and on the other hand, they are closely related to the urban development of Turin. The history of Turin Porticoes can be traced back to the Ancient Greek and Ancient Roman periods. The Stoa near squares, markets, and temples during the Ancient Greek period, as well as the colonnades arranged around public buildings such as baths and theaters during the Ancient Roman period, established the basic form of arcade spaces, serving as functional spaces for shelter, passage, and lingering, as well as social spaces.

By the late Renaissance and Baroque periods, colonnades were no longer only attached to single buildings but gradually penetrated into street and square interfaces, forming continuous pedestrian spaces. Represented by the continuous Porticoes of Bologna, Italy, during the Renaissance period—of which the longest is Porticoes of San Luca, with a length of approximately 3.8 kilometers, making it the longest arcade in the world—continuous arcades represented by it are important elements that constitute urban space. Influenced by this, most of Porticoes in Turin were widely incorporated into the layout of streets and squares during the Baroque expansion phase following this period, forming continuous and unified urban public space interfaces with strong recognizable spatial characteristics.



Fig 2-3 Porticoes of Bologna

In the 20th-century urban layout of Turin, the distribution characteristics of Porticoes clearly reflect a logic organized outward with the city center as the core. Porticoes primarily unfold continuously along the perimeter of Piazza Castello and key urban axes such as Via Roma and Via Po, forming a highly centralized Baroque urban planning system. The geographical location of the Piedmont region, where the city of Turin is situated, gives it a dual cultural orientation: the west leans toward the French cultural sphere, while the east is closer to the Italian cultural sphere. These two urban traditions were fused in Turin's urban construction—the form of the orthogonal squares originates from the French "Place Royale," characterized by high formality and symmetry; while the enclosed application of Porticoes is closer to the Italian tradition.



Fig 2-4 Map of Turin City Center (20th Century to Present)

2.1.2.2 Historical Evolution of Turin Porticoes

Following the macro-level review of the historical origins of Turin Porticoes and their general distribution logic within the urban space in the previous section, this section will further focus on the construction processes of Porticoes in specific streets and squares across different historical periods, as well as the evolution of their corresponding spatial morphological characteristics and functional attributes.

The Piazza Castello, Piazza San Carlo, and Via Po, formed in the 17th century, constitute the earliest Porticoes system in Turin; Porticoes of this historical stage were primarily attached to urban main axes and core squares dominated by royal power, possessing distinct order and monumentality. In the mid-to-late 19th century, with the Italian Unification movement and the continued expansion of Turin, the construction of Porticoes further detached from purely symbolic functions of royal power, participating more in the organization of new urban districts, the shaping of commemorative spaces, and road expansion. Porticoes around Piazza Carlo Felice and Corso Vittorio Emanuele II reflect the connection between Porticoes, railway stations, squares, and parks. Meanwhile, Via Pietro Micca stands as a model of modern urban renovation; it was part of the 1885 urban sanitation and renovation plan, and its construction was accompanied by the demolition of old blocks and significant improvements in urban transportation and sanitary conditions.

By the 20th century, especially during the interwar period, Porticoes along the new axis of Via Roma and around Piazza CLN exhibited stronger rational order and modernization characteristics, where classical and complex decorative lines were discarded in favor of more rationalized Porticoes with minimalist lines. However, during this period, the spaces still maintained a large scale and retained a certain commemorative significance. The additions in the post-war phase served more as supplements and improvements to the existing system, with a lower scale and gradually weakening commemorative significance, presenting more functional characteristics.

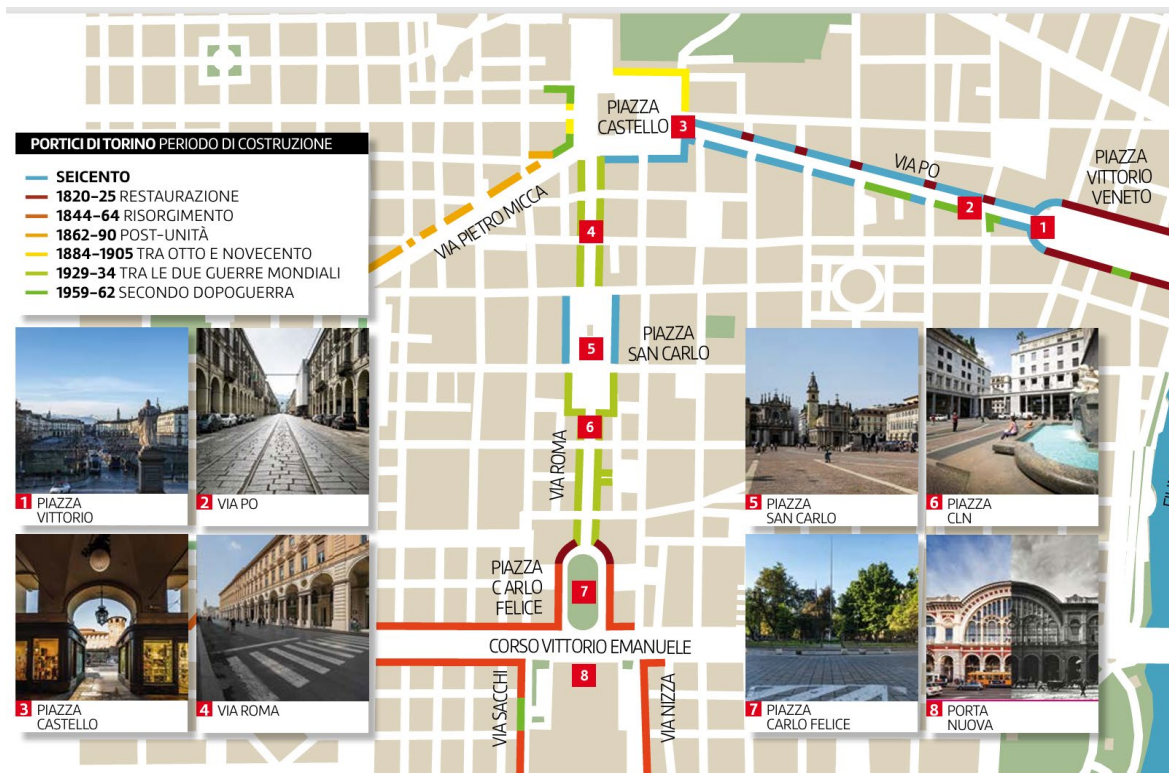


Fig 2-5 Distribution map of construction periods for Turin Porticoes

Table 2-1 Statistical table of construction periods for Turin Porticoes

Time Period	Porticoes Type	Corresponding Streets / Squares	Construction Era	Description
17th Century	Early Court Style	Piazza Castello, Piazza San Carlo, Via Po	1606–1769, 1642 / 1749, 1675	Blue marked segments, represent the early court Porticoes system
1820–25 Restoration Period	Neoclassical	Piazza Vittorio Veneto	1825	Red marked
1844–64 Italian Unification Movement Period	Urban Commemorative Expansion	Piazza Carlo Felice, Piazza Vittorio Emanuele	1844–1864	Orange marked
1862–90 Post-Unification Period	Urban Expansion	Via Pietro Micca	1862–1890	Green marked
1884–1905 Turn of the Century Period	Turn-of-the-Century Transitional	Piazza Castello (Partial)	1884–1905	Yellow marked
1929–34 Interwar Period	Rationalist	Via Roma New Axis, Piazza CLN	1929–1934	Dark green marked
1959–62 Second Post-WWII Phase	Post-war Functional Supplement	Piazza Castello (Partial)	1959–1962	Light green marked

2.1.2.3 Motivations Behind the Formation of Turin Porticoes

Beyond its cultural background, the emergence of Turin Porticoes can be further analyzed through political policies, socio-economic levels, and funding mechanisms to gain a deeper understanding of the social conditions during their construction and the internal logic of their formation.

From the perspective of political policies, the political background for the formation of Turin Porticoes was the relocation of the capital and the construction of an absolute monarchy. After Emanuele Filiberto moved the capital to Turin in 1563, the House of Savoy began to systematically reshape the city. UNESCO's description of the Residences of the Royal House of Savoy mentions that these buildings and urban planning together reflect the spatial expression of absolute monarchy, organized around the central district of Turin. Therefore, the primary policy logic behind building Porticoes was to construct a capital representing dynastic order and to shape the image of a court city with unified streets and continuous interfaces, while reinforcing axes, perspective, a sense of order, and the centrality of royal power through Baroque planning.

Regarding socio-economic levels, the period when Turin Porticoes were formed and finalized on a large scale coincided with the city's transition from a local town to a dynastic capital. Population growth and industrial development indicated that Turin possessed the foundation to sustain continuous urban construction. In 1510, Turin's population was approximately 8,400; by the siege of 1705, existing census materials recorded a population exceeding 33,000, demonstrating a significant trend of population concentration during the process of becoming a capital. During the same period, the Piedmont region had developed silk production and exports for the European market, and the city established a public debt financing mechanism guaranteed by excise taxes, indicating that it did not

rely solely on court symbolism but possessed the financial and economic conditions to support large-scale urban engineering.

In terms of funding mechanisms, the formation of Turin Porticoes did not stem from a single financial source; rather, it was a composite mechanism led by the state and the royal family, coordinated with city finances, and involving the participation of street-front property owners. By the end of the 17th century, Turin already possessed financing tools guaranteed by city excise taxes, enabling municipal finances to participate in large-scale public construction, while a portion of the street-side construction costs was borne by property owners. Due to the long-term impact of war and commercial decline in the 17th century, Turin Porticoes were consistently under economic and financial pressure during their construction and were not built during a period of great wealth.

2.2 History Development of Guangzhou and the origin of its Qilou

2.2.1 Evolution of Guangzhou's Urban Morphology

2.2.1.1 Ming and Qing Dynasties:

During the Ming and Qing Dynasties, Guangzhou utilized its city walls as clear boundaries, forming a highly inward-looking, defensive urban structure. The internal streets and alleys developed based on natural terrain and water systems, overall presenting an orthogonal road system with main streets as the skeleton and dense branch alleys. The Pearl River and its tributaries constituted the city's important transportation and commercial foundation, with commercial activities mostly distributed along the waterfronts and streets leading to wharves. Public spaces were primarily composed of functional nodes such as street markets, temples, and areas around city gates. For example, the Temple of the Five Immortals (Wuxian Guan), which was listed as one of the "Eight Sights of Ram City" during the Ming and Qing Dynasties, served as a public venue for people to worship, pray for blessings, and participate in local activities.

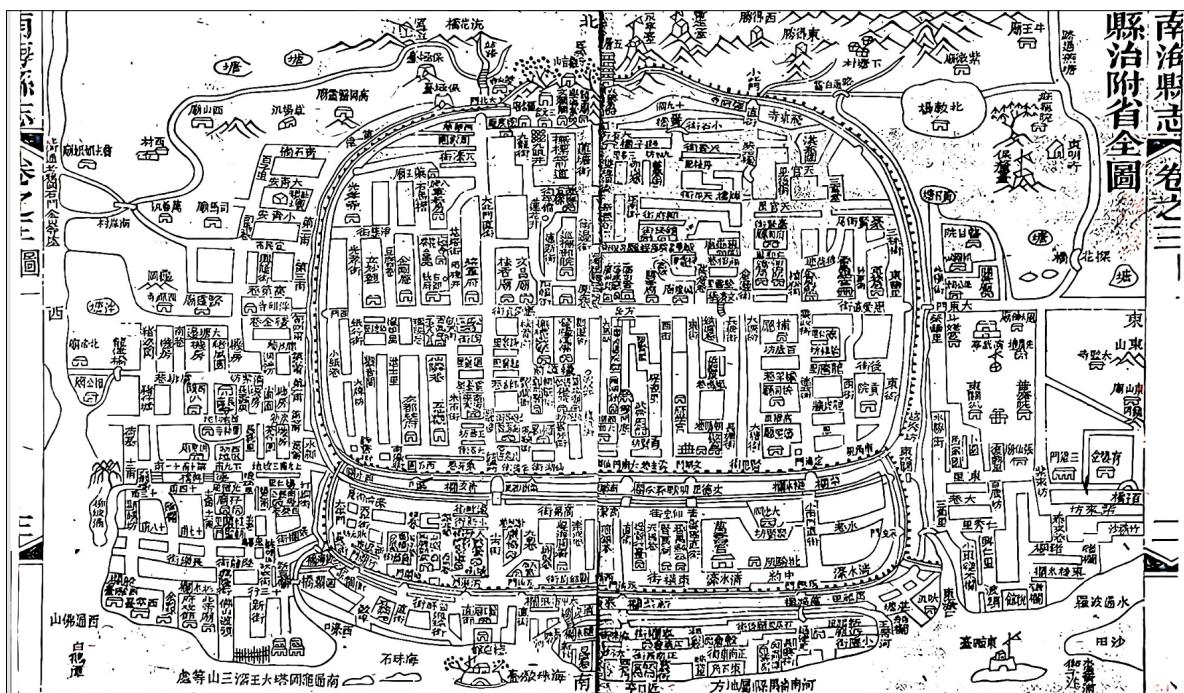


Fig 2-6 Map of Guangzhou in the Qing Dynasty (Source: Guangzhou Municipal Archives)

2.2.1.2 Modern Treaty Port Period:

Entering the modern treaty port period, city space began to expand beyond the walls due to the development of foreign trade and the weakening of city defense functions. The urban form shifted from a closed structure constrained by city walls to a more open linear growth model, with the city gradually forming a spatial organization centered on streets. The traditional street market functions overlapped with modern commercial and service facilities, causing street spaces to transform from purely transit functions into composite spaces. During this stage, many new religious sites appeared: the red portions shown on the map represent new religious spaces such as Protestant chapels, Roman Catholic Cathedrals, and Mohamedan Mosques. This signifies that Guangzhou's urban spatial functions were influenced by foreign trade and cross-cultural exchange, exhibiting characteristics of cross-cultural spatial typology reorganization.



Fig 2-7 Map of Guangzhou City and the Pearl River Waterfront in the Late Qing Dynasty

2.2.1.3 After the Republic of China:

During the Republic of China period, the city walls were systematically demolished, breaking the original closed spatial structure centered on the inner city and gates, and transforming the city boundary from a defensive line into a sustainably expandable open interface. On this basis, a new urban axis was established, connecting the Sun Yat-sen Memorial Hall, the Sun Yat-sen Monument, the Municipal Government, and the Central Garden through a north-south urban central axis. The construction of the new Haizhu Bridge allowed this axis to continue extending southward, organizing the districts on the opposite side of the Pearl River and forming an important urban central axis in modern Guangzhou.



Fig 2-8 Map of Guangzhou during the Republic of China Period

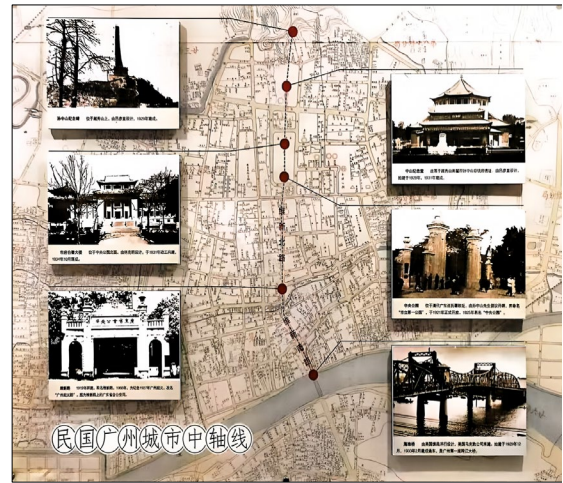


Fig 2-9 Urban Central Axis of Guangzhou during the Republic of China Period

2.2.2 Origins and Motivations of Guangzhou Qilou

2.2.2.1 Origins of Guangzhou Qilou

Chinese Qilou is not a direct continuation of local traditional architectural forms, but rather a composite street architectural type formed under the influence of Sino-foreign exchanges and the trade system since the 19th century. It first appeared in colonial cities in India and Southeast Asia, subsequently spreading to coastal cities in southern China via maritime trade networks and treaty port systems; its dissemination path highly coincides with modern commercial expansion.

In the Chinese context, the earliest appearance of Qilou was concentrated in the Thirteen Factories area of Guangzhou. As the only trade port in China that remained open to the outside world for a long period since the Qing Dynasty, the veranda style adopted in the Thirteen Factories area was closely related to the spatial organization of the trade houses, street usage requirements, and the trade system, marking the origin of modern China's veranda-style street spaces. With the development of modern commercial streets in Guangzhou, this originally localized veranda form gradually transformed into a continuous Qilou interface along the streets. The formation and development of Guangzhou Qilou was not the transplantation of a single architectural form, but rather the result of local adjustment and continuation based on external spatial elements.



Fig 2-10 The "Thirteen Factories" Period of the Qing Dynasty

In modern Guangzhou, the layout and orientation of Qilou unfold along two primary axes: at the urban peripheral level, peripheral Qilou streets formed along the contours of the old city walls. At the urban internal level, main Qilou streets developed along the river usually align with the direction of the river, undertaking the function of connecting wharves with the city's commercial core; meanwhile, longitudinal Qilou streets extending perpendicular to the river serve to extend commercial activities from the waterfront into inland blocks, forming a clear hierarchy of primary and secondary streets. This forms a Qilou layout system that progresses from core commercial districts to residential neighborhoods.

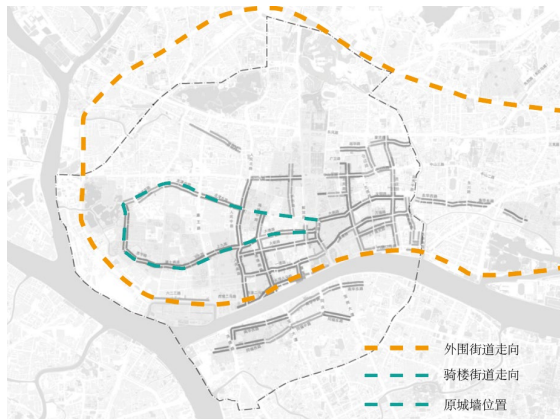


Fig 2-11 Map of peripheral Qilou distribution

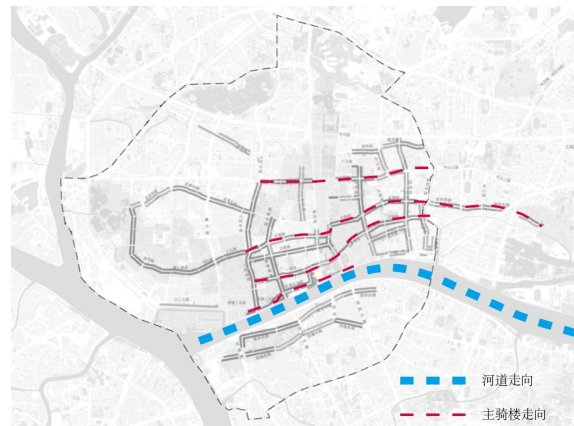


Fig 2-12 Map of internal Qilou distribution

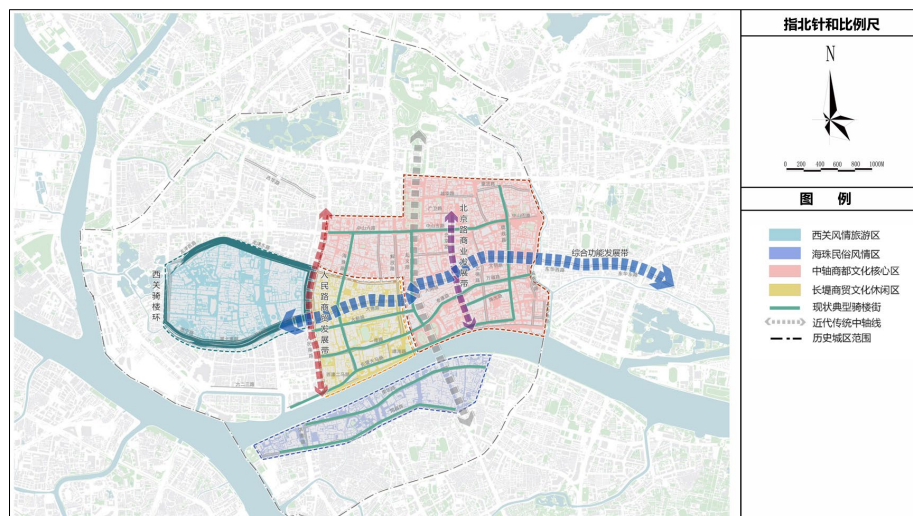


Fig 2-13 Spatial Structure Map of Modern Guangzhou Qilou Districts

2.2.2.2 Historical Evolution of Guangzhou Qilou

The formation and evolution process of Guangzhou Qilou is different from that of Turin Porticoes: Turin Porticoes gradually evolved across several centuries, while the concentrated construction period of Guangzhou Qilou was shorter, with its main body basically formed in the early 20th century, particularly concentrated in the 1920s. Consequently, Guangzhou Qilou is more reflected as a process of generation, expansion, and supplementary construction of Qilou streets within urban commercial roads. According to the Guangzhou Municipal Chronicles, the term "Qilou" was first proposed in the 1912 Guangzhou Building Regulations; after the demolition of city walls for road construction in 1918, specialized regulations were passed in 1921 to promote the construction of Qilou along the roads, after which it entered a concentrated construction period for ten years; within

approximately twenty years after the beginning of the 20th century, Guangzhou Qilou had basically taken its shape.

Guangzhou Qilou can be roughly divided into four stages: before 1920 was the riverside port-style continuous Qilou, which mainly unfolded along the banks of the Pearl River and the southward passages of the old city; 1920–1930 was the commercial main street-style continuous Qilou, which was the most concentrated stage of Guangzhou Qilou construction and also the stage when the main street network was formed; 1930–1960 was the outward expansion Qilou in the Xiguan area, mainly manifesting as the extension and completion based on the existing main street system; after the Liberation, it was mainly peripheral supplementary construction, with a small quantity and significantly weakened continuity.

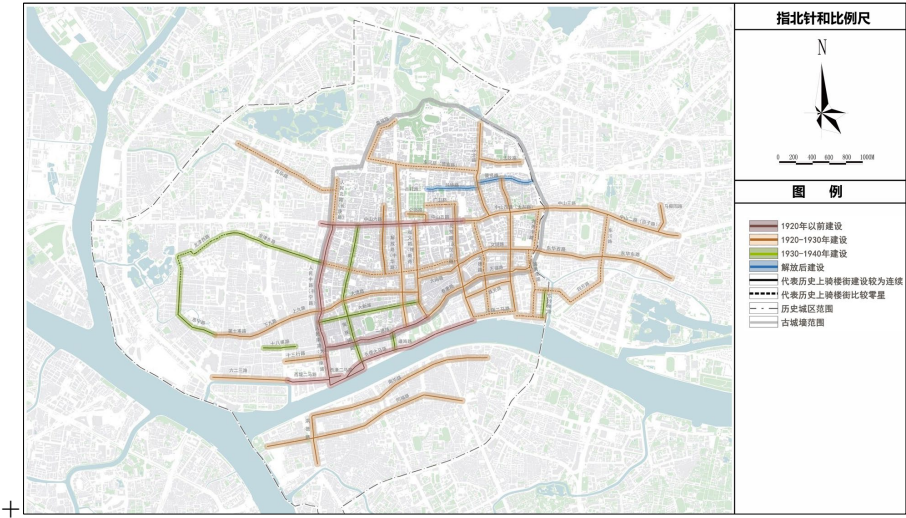


Fig 2-14 Map of Guangzhou Qilou Construction Time Distribution

Table 2-2 Statistical Table of Guangzhou Qilou Construction Time

Time Period	Qilou Type	Corresponding Streets	Description
Before 1920	Riverside port-style continuous Qilou	Changdi Damalu, Yide Road, Renmin South Road, Zhongshan 6th Road	Purple; early Qilou, concentrated along the riverside and the southward connection passages of the old city.
1920–1930	Commercial main street-style continuous Qilou	"Main street network" as shown in yellow	Orange-yellow; has the largest coverage area.
1930–1960	Outward expansion Qilou in the Xiguan area	Haizhu South Road, Daxin Road, Longjin East Road, Longjin West Road	Green; completes the continuous Qilou interface of Xiguan and its surroundings.
Post-Liberation	Peripheral supplementary construction	Yuehua Road, Haoxian Road	Blue; located at the urban periphery, mainly consisting of supplementary construction.

2.2.2.3 Motivations Behind the Formation of Guangzhou Qilou

The formation of Guangzhou Qilou was not simply an architectural form created for shade and rain protection; rather, it developed gradually under the combined background of modern urban transformation, commercial prosperity, and street governance.

From the perspective of policies and regulations, Guangzhou's local chronicles and historical materials both point out that the 1912 *Regulations and Implementing Rules for the Restriction of Construction* explicitly required that when building new shops along embankments and roads, an eight-foot space must be reserved to construct "pillared Qilou" to serve as footpaths; after 1918, the municipal authorities continued to promote Qilou construction through regulations such as the *Guangzhou Municipal Regulations for Promoting Qilou Construction on Vacant Lands Along Roads*, the 1923 *Measures for Urging Property Owners to Build Qilou in Guangzhou*, and the *Measures for Collecting Fees from Recipients of Qilou Land on Newly Opened Roads in This City*. It is evident that Qilou was not a scattered style formed spontaneously by the public, but rather a spatial form integrated into modern municipal regulations and road construction systems. Its policy objectives primarily included improving pedestrian traffic, remediating sanitary conditions of the old city, expanding the commercial street interface, and coordinating with road construction and urban renewal.

From the perspective of economic levels, relying on a strong foundation as a modern commercial and trade city, Guangzhou Qilou spread rapidly in the early 20th century. According to data, the number of teahouses in Guangzhou was 380 in 1921 and increased to 416 by 1928, reflecting the continuous growth of the consumer service industry and commercial activities; meanwhile, from after 1918 to around 1930, Guangzhou built nearly 40 kilometers of Qilou streets within approximately 10 years, among which the length of Qilou streets in the densest old city area reached 25,500 meters, accounting for more than 60% of the total length of Qilou streets in the city. This indicates that Guangzhou during the formation period of Qilou already possessed strong commercial vitality, consumer demand, and real estate development momentum, and it was against this background of commercial prosperity and urban expansion that Qilou became the most suitable spatial form for street-side business operations and daily walking.

From the perspective of funding mechanisms, the construction of Guangzhou Qilou was not uniformly funded and built as a whole by the government. Relevant historical materials indicate that the land price for Guangzhou Qilou was divided into seven grades according to different roads, with prices ranging from approximately 250 to 700 yuan; meanwhile, the municipal authorities allowed shop tenants or others to claim Qilou land and integrated Qilou construction into the road construction financial system through the method of "collecting fees from recipients of Qilou land." That is to say, the government was mainly responsible for formulating rules, organizing road opening, and the fee collection system, while the benefiting property owners along the streets bore the actual architectural investment.

2.3 Comparative Analysis

2.3.1 Comparative Study of Urban Evolution

The city of Turin originated from a Roman military camp, characterized by a clear orthogonal grid and public spaces, resulting in an extremely regular and rational layout. Subsequently, under the rule of the House of Savoy and within the political context of establishing a capital, the city's development expanded upon the Roman structure using unified interfaces of axes and squares as key elements. This ultimately formed a centripetal power structure that is highly monumental, with a unified and orderly urban interface that reflects the national strength and wealth of its capital image.

In contrast, the evolution of Guangzhou's urban morphology shares a similar starting point with Turin, utilizing an orthogonal road grid and city walls as primary elements. However, in its later stages of expansion, road development followed the context of the city walls and waterways. Deeply influenced by its history as a treaty port, Guangzhou's urban development presents morphological characteristics dominated by thriving commercial culture and civic trade.

2.3.2 Comparative Analysis of the Causes of Arcade Streets

From the perspective of cultural origins, Turin Porticoes continue the historical tradition of ancient Greek and Roman colonnade spaces, and gradually developed from auxiliary spaces of individual buildings into a continuous urban interface embedded in the system of streets and squares during the late Renaissance and Baroque periods. In contrast, Guangzhou Qilou is not a direct continuation of Chinese traditional architectural forms, but is a street type gradually formed through the localized adjustment of veranda-style spaces under the influence of the modern maritime trade and treaty port systems. The former reflects a strong historical continuity, while the latter more prominently features the characteristics of foreign input and local transformation.

From the analysis of the historical evolution, the evolution of their types is closely related to urban expansion, the shaping of axes, and the construction of the square system, possessing a strong diachronic nature and continuity. In comparison, the main body of Guangzhou Qilou was formed in a relatively concentrated time, primarily built from the early 20th century, especially most densely in the 1920s. Its temporal stages do not reflect long-term stylistic transitions, but rather manifest as the rapid generation and stabilization within a short period alongside urban road construction, commercial expansion, and municipal transformation.



Fig 2-15 Via Roma, Turin



Fig 2-16 Guangzhou Qilou

From the perspective of policies and construction motivations, the formation of Turin Porticoes first served the urban reshaping following the capital relocation of the Savoy dynasty; its core objective lay in shaping the dynastic order and capital image by unifying street interfaces and strengthening the relationships between axes and squares. Guangzhou Qilou, on the other hand, originated more from practical urban needs driven by modern municipal regulations; its construction was directly linked to road building, traffic improvement, sanitation remediation, commercial expansion, and old city renewal. Turin Porticoes leaned more toward a top-down construction of capital space, while Guangzhou Qilou leaned more toward being a product of urban renewal driven jointly by modern municipal governance and commercial development.

From the perspective of economic foundations, Turin Porticoes formed during the phase when the city transitioned from a local city to a dynastic capital; population growth, silk manufacturing,

and the development of urban financial mechanisms provided support for its continuous construction, though its construction was simultaneously accompanied by pressures from war, fiscal tension, and famine. Guangzhou Qilou formed during a period of rapid expansion for the modern commercial and trade city; the growth in the number of teahouses, the rapid increase in the length of Qilou streets, and the development of commercial districts indicate that it possessed more direct market demand and real estate development momentum behind it.

2.3.3 Summary

In summary, the core of the comparative study in this chapter lies in clarifying that the difference between Turin Porticoes and Guangzhou Qilou is not a simple difference in architectural form, but the essence of their typological difference is the result of the combined action of the two cities' different historical evolution paths, cultural backgrounds, political needs, and socio-economic levels. Specifically, the city of Turin formed a spatial structure of rational order on the basis of the Roman military camp, and under the leadership of the unified Kingdom of Italy, shaped a capital spatial morphology that was power-center-oriented, with a unified interface and monumentality; accordingly, its Porticoes, as part of the overall urban spatial order, were gradually embedded into the street and square system during a long historical evolution, forming a continuous and unified urban interface. In contrast, although Guangzhou similarly originated from a regular grid, its later development relied more on the boundaries of city walls and the context of water systems, and the urban morphology reflects the characteristics of openness and growth dominated by commercial activities; its Qilou did not originate from local traditions either, but was formed through the localized transformation of foreign forms under the background of modern trade, and was rapidly generated within a short period along with road construction and commercial expansion.

Further looking from the causes of the gallery streets, the development of Turin Porticoes possesses a significant constructive logic of historical continuity, and its formation is closely related to the urban expansion, capital image shaping, and spatial order control dominated by the unified Kingdom of Italy, being a long-term result of the combined action of political power, urban planning, and economic foundations; while Guangzhou Qilou reflects an obvious staged and reality-oriented nature, its generation being mainly driven by modern municipal regulations, traffic improvement, and commercial interests, being a spatial type rapidly formed under the promotion of urban renewal and market mechanisms.

Therefore, the two gallery street types present fundamental differences in their generation mechanisms: the former manifests as a spatial type dominated by political power and characterized by diachronic, gradual evolution, while the latter appears as a spatial type driven by commercial demand and municipal governance and rapidly finalized within a short period. This difference not only determines the distinction between the two in spatial morphology and interface organization, but also provides a key explanatory framework for the subsequent comparative analysis of types from dimensions such as publicity, functional complexity, and climate adaptability.

Chapter3 Comparative Study of the Publicness of Arcade Streets

3.1 Study on the Publicness of Turin Porticoes

3.1.1 The Origins of the Western Public Spirit and the Formation of Porticoes

From the perspective of the history of civilization rather than mere architectural history, looking back at Western cities, publicity is not an attribute naturally possessed by a specific spatial form, but is first and foremost a civilizational consciousness regarding "how common life is possible." It means that individuals no longer merely attach themselves to bloodlines, households, and the private sphere, but begin to enter a world of common visibility, common discussion, and common judgment in the name of "citizens." This public consciousness, centered on manifestation, discussion, and collective judgment, is one of the most important spiritual starting points of Western urban civilization. For example, the importance of the "Agora" in ancient Greek cities is not just because it is a market or an open space, but because it simultaneously undertakes daily activities such as religion, politics, justice, society, and commerce, serving as the gathering place for civic life. More importantly, the term "Agora" itself refers to both the assembly of the people and the physical place where the assembly occurs; "public affairs" and "public space" were originally generated as one. That is to say, publicity did not first have an abstract concept and then search for a physical container, but rather, through the continuous practice of common life, it gradually solidified into spatial order, urban morphology, and architectural types.



Fig 3-1 Ancient Greek Agora: An Open Public Space and Assembly Place

If it can be said that the "Agora" provided the original prototype for urban civilization, then the colonnades, open galleries, and convergent buildings that unfolded around it during the Greek period further translated this public consciousness into space. The Greek "Stoa," as a continuous row of columns and a roofed walkway surrounding the periphery of such public buildings, was not merely a functional sheltering facility; it was a liminal place for citizens to stay, converse, observe, and move within the city—a continuation and extension of public space.

This means that spatial publicity was not accomplished solely by individual buildings that carried public activities, such as squares, temples, or baths; it always required a transitional structure positioned between the indoor and outdoor, and between private and collective activities, to maintain

the continuity of public life. Such arcade spaces appeared extensively in later paintings: whether in the discussion scenes unfolding around arcades in *The School of Athens*, or the recurring backgrounds of colonnades, open galleries, and porches in religious themed paintings like the *Annunciation*, they serve not just as architectural backgrounds, but as carriers of a public spirit and symbols of the continuity of social public life and public thought.



Fig 3-2 Raphael's *The School of Athens*:



Fig 3-3 Michelangelo's *The Annunciation*:

Entering the period of Roman Imperial rule, the civilization of publicity further expanded into daily life, while the Greek-style public life of "citizens' presence" was gradually reorganized by imperial governance, legal order, and urban routines. Arcades carrying public space appeared on a large scale in public buildings and spaces (such as the Roman Forum, the Colosseum, the Pantheon, etc.). Their publicity and civilization reached a peak during the flourishing period of Rome and became institutionalized within complex urban morphologies. In Roman law and urban management texts, it was mentioned that "public spaces and public colonnades" should remain unobstructed and must not be occupied by private individuals, thereby guaranteeing the public's right to "free entry and free use". The colonnade transformed from being viewed as a decorative edge subordinate to a building to being directly incorporated into the legal category of "public space," making its existence a landmark symbol of the Roman Empire, symbolizing national unity and the order of the rule of law.



Fig 3-4 Restoration Painting of Trajan's Forum in the Roman Period



Fig 3-5 Current State of the Roman Forum

But the origin of Western publicity is not equivalent to the origin of universal equality; whether it is the Greek city-state (Polis) or the later public sphere, its "publicness" historically carried clear boundaries: women, slaves, foreigners, and even the propertyless were often excluded from full public participation. Therefore, the value of Western public civilization does not lie in its realization of universal democracy from the very beginning, but in its first establishing that "public affairs should be jointly discussed, jointly seen, and jointly judged" as a sustainable civilizational principle.

In defining this space of the arcade, from a civilizational perspective, it is the spatial sediment of the long-term evolution of Western public civilization: from Greek assembly and public deliberation, to Roman expansion and legal intervention, to the strolling, socializing, displaying, and viewing in modern cities, the arcade has always undertaken the intermediary role of introducing individuals into a common world. As Mumford stated, the city is essentially a "theater of social action," and the arcade precisely constitutes the most stable, most everyday, and most sustainable stage edge of this theater. Publicity does not always occur in the center of grand squares; it more often is produced, perceived, and repeated in such boundary spaces in a gentle yet continuous manner.

3.1.2 Typological Diagram of the Publicity of Turin's Porticoes

Returning to the perspective of the city of Turin, the spatial form of Porticoes is a continuation of the Western spirit of publicity and civilization. The carrier of this public spirit has also become an important element constituting urban space. This subsection will explore the characteristics of the layout of Turin's Porticoes from the urban level, discussing how its layout reflects the characteristics of publicity in Western urban planning, and how the architectural type of Porticoes responds to this issue of publicity.

3.1.2.1 Diagram of the Relationship Between Porticoes and Urban Hierarchy

Viewing the layout of Porticoes from the overall urban scale, Turin's Porticoes system presents a structural characteristic centered on the core urban square (Piazza Castello) and extending in multiple directions along main streets—extending south along Via Roma, connecting with the main urban transportation hub and the direction of the Turin Porta Nuova railway station; connecting southeast through Via Po with Piazza Vittorio Veneto adjacent to the Po River, forming an important passage linking the urban landscape belt and public open spaces; and connecting west via Via Pietro Micca and Via Cernaia to the Porta Susa transportation hub. This gives Turin Porticoes distribution system clear directionality and hierarchy. When diagramming the distribution of Porticoes, it can also be found that the distribution of Porticoes can be roughly classified into two forms—distributed around squares and connecting squares; public activities occur in the squares as well as under the surrounding Porticoes. This spatial logic strengthens the publicity characteristics of Porticoes.



Fig 3-6 Distribution of Turin Porticoes

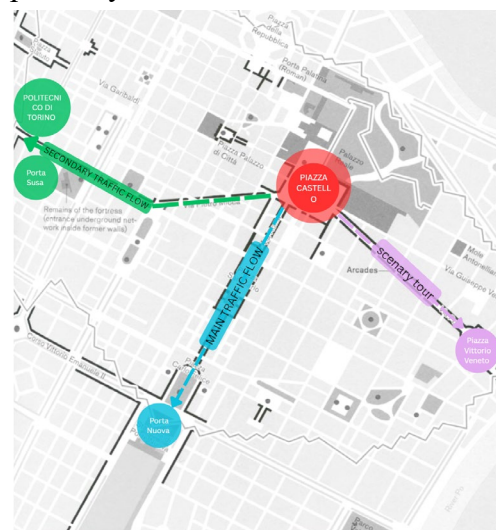


Fig 3-7 Hierarchical Directional Relationships of Turin Porticoes

In the overall layout, Porticoes is mostly distributed continuously along major roads, but interruptions occur at most intersections. However, on the north side of Via Po and the east side of Via Roma, Porticoes remains continuous at the intersections, forming a complete interface that spans the nodes. The reason for this difference is that in the 17th century, the side facing royal use emphasized the continuity and comfort of passage more, while ordinary citizens used the space on the other side; it is a spatial manifestation of royal privilege and class hierarchy. In the urban center and along the two main axes toward the south and west, Porticoes is laid out along both sides of the streets, while in non-core areas, it mostly appears on a single side. The spatial distribution method of Porticoes also explains the hierarchy and the grade differences of Porticoes within the urban system.



Fig 3-8 Continuous Porticoes (Via Roma)



Fig 3-9 Layout plan of Porticoes distribution—

3.1.2.2 Enclosure Relationship Between Porticoes and Core Public Spaces

In the central urban area of Turin, there exist a total of 35 squares of various sizes. Among them, the squares located on the main axes of the city, with the royal squares Piazza Castello, Piazza San Carlo, Piazza Carlo Felice, and Piazza Vittorio Veneto as the main representatives, have Porticoes distributed around these main urban squares. It responds to publicity in a form of enclosure rather than occupation. Porticoes has not intruded into the internal space of the squares (except for Piazza CLN) but is stably attached to their boundary positions, forming a clear public edge. While maintaining the openness of the squares, it provides a continuously accessible interface for public activities.

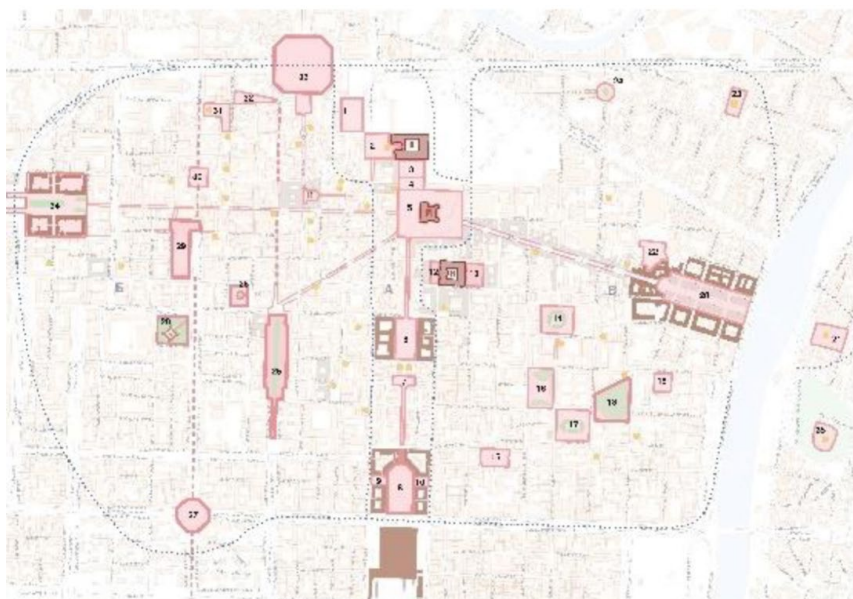


Fig 3-10 Distribution Map of Turin's Squares

Porticoes surrounding the squares presents a clear symmetry and sense of spatial enclosure in its spatial distribution. Porticoes mainly appears in pairs along two sides or all four sides of the squares, giving the public space a stronger sense of order and identifiability. For example, in Piazza San Carlo, the enclosing and uniformly styled Porticoes strengthens the sense of enclosure and unity of the square space, highlighting the equestrian sculpture in the center symbolizing victorious triumph, making the space possess more of a sense of sanctity and monumentality.

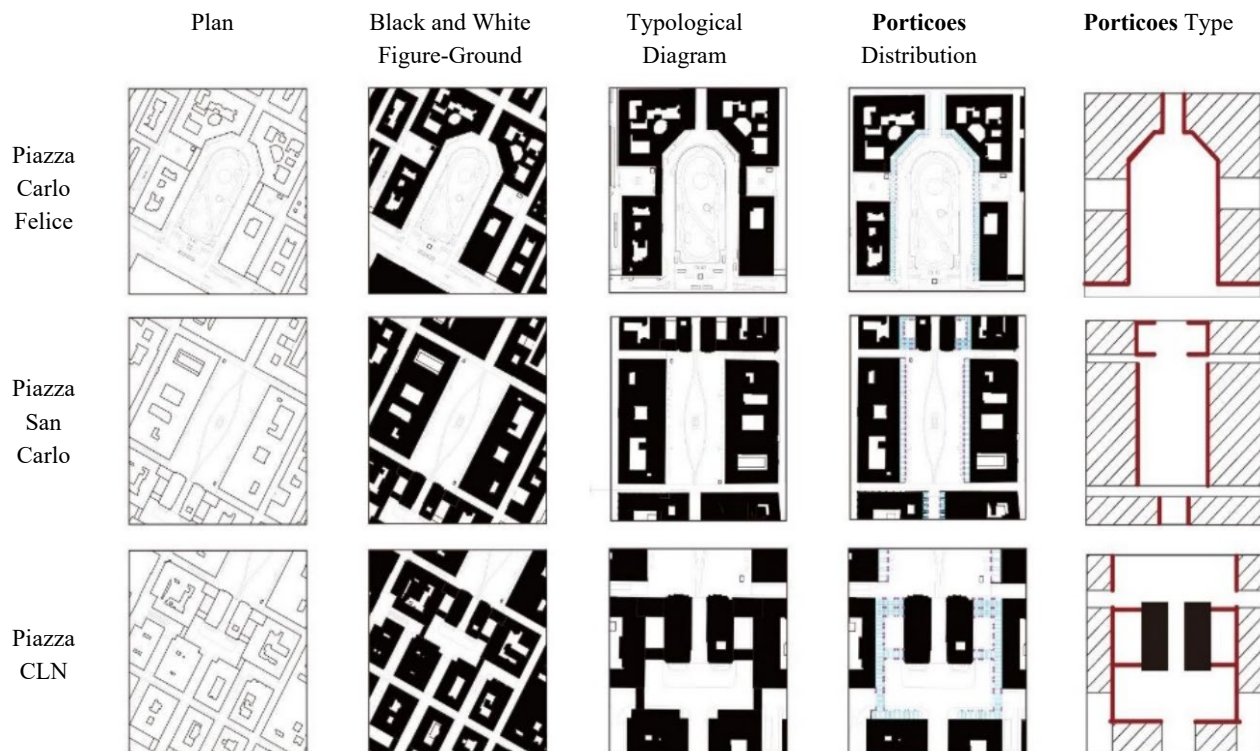


Fig 3-11 Spatial Enclosure of Porticoes



Fig 3-12 Spatial Symmetry of Porticoes

The distribution of Porticoes also often forms a continuous interface on the long sides or dominant directions of the squares, while on secondary boundaries, it may be interrupted or weakened. In the figure below, the author has decomposed the distribution of Porticoes in and around Piazza Castello, Piazza San Carlo, Piazza Carlo Felice, Piazza Vittorio Veneto, and Piazza Palazzo di Città, clearly demonstrating the spatial relationship between Porticoes and the squares; the two together support the occurrence of public life in Turin.



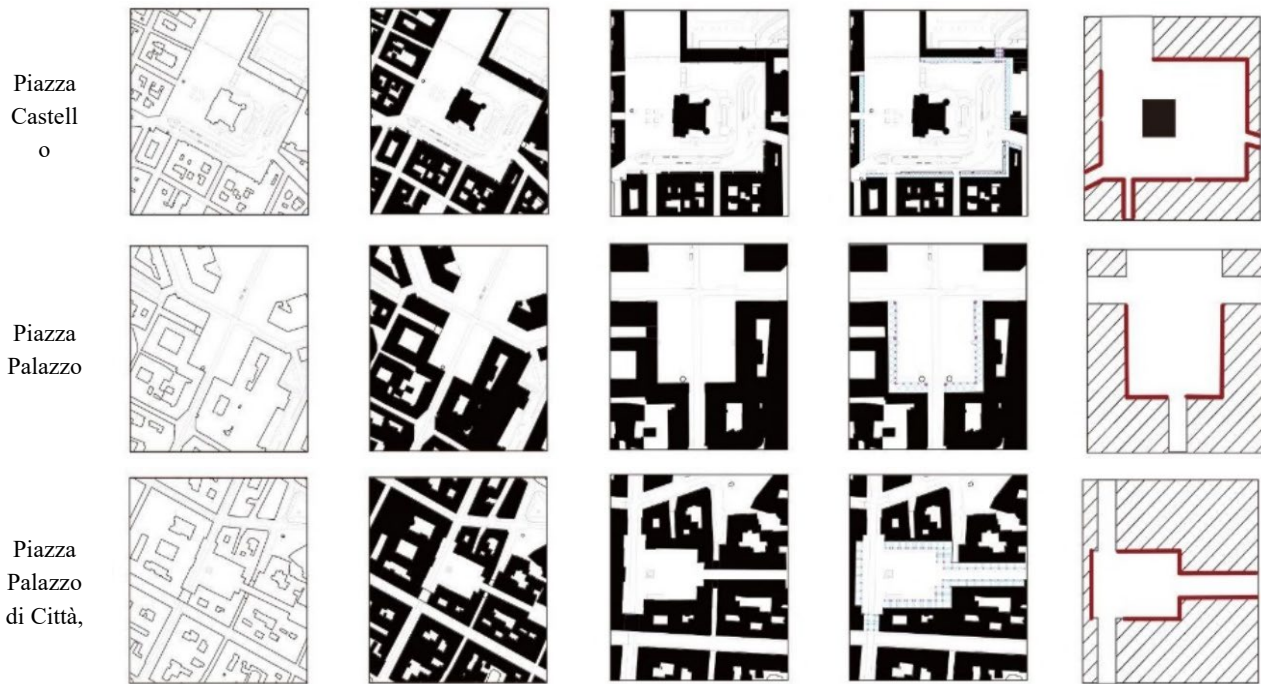


Fig 3-13 Spatial layout of the enclosing **Porticoes** Source: (Self-drawn by the author)

3.1.2.3 The Attachment Relationship Between Porticoes and Main Urban Axes

The second characteristic of the distribution of Turin Porticoes is its distribution along the streets, connecting and organizing the square spaces scattered throughout the city, so that the originally dispersed public nodes are incorporated into a continuous spatial sequence. Representative Porticoes include Via Roma, which connects the royal square Piazza Castello and Piazza San Carlo, and Via Po, which connects the royal square Piazza Castello and Piazza Vittorio Veneto. Unlike Porticoes enclosing squares, the connecting-type Porticoes possesses clear directionality rather than enclosure. This type of Porticoes appears in a linear form extending in a single direction, emphasizing the guidance from one public space to another public space. The unity of the height and form of Porticoes possesses strong visual continuity, further strengthening the guidance of its space. Porticoes represented by red lines in the diagram often appears as "passages" or "corridors"; its spatial logic is closer to continuous passage and guidance, rather than staying and enclosure.



Fig 3-14 Via Roma



Fig 3-15 Via Po

PORTICO BETWEEN

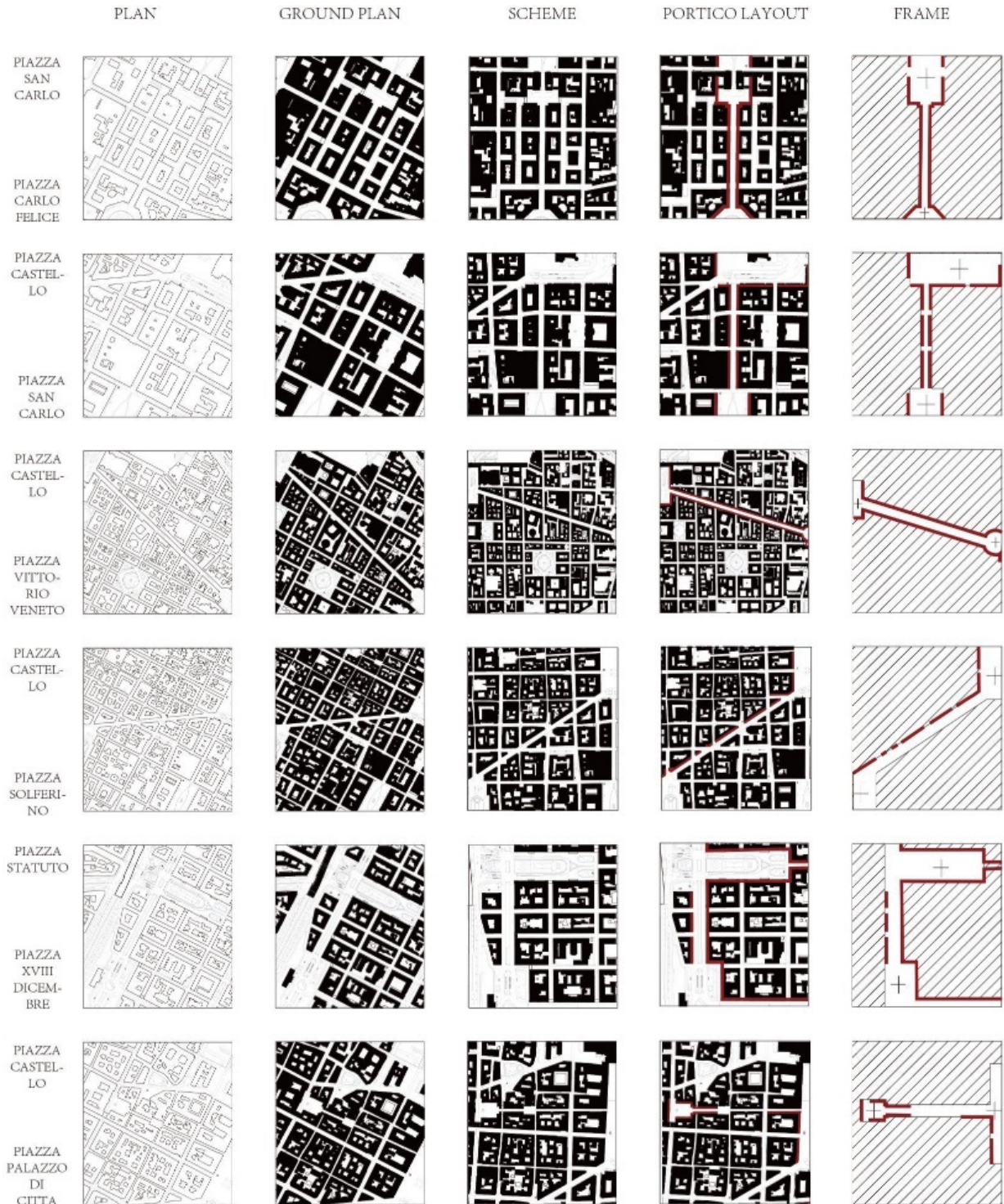


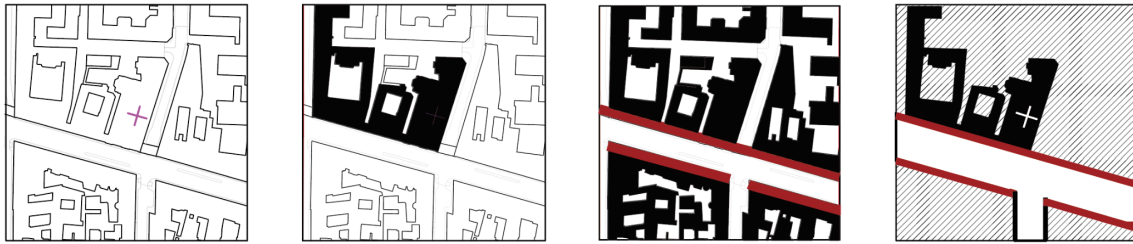
Fig 3-16 Spatial layout of the connecting **Porticoes** (Self-drawn by the author)

3.1.2.4 Diagram of the Relationship Between Porticoes and Important Urban Nodes

In Turin, Porticoes does not appear as a single secondary architectural element, but rather as a spatial tool serving different public buildings. Historically, although public buildings for religion, royal power, culture, and education differed in function, as the former capital, under the premise of emphasizing a unified and orderly urban appearance, they needed to be integrated into a unified and orderly urban public space system. It is precisely against this background that Porticoes, through

different layout methods, establishes a spatial transition between ritual, the expression of power, and daily public life. The author depicts and attempts to find the spatial organizational relationship between Porticoes and public buildings through the method of diagrams.

Porticoes and church

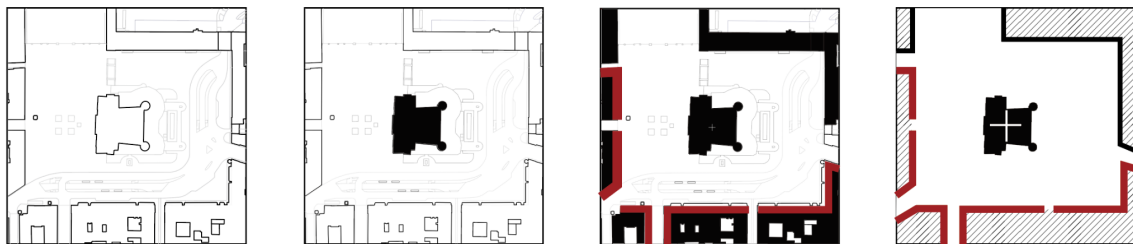


PORTICO AND CHURCH_Piazza San Carlo



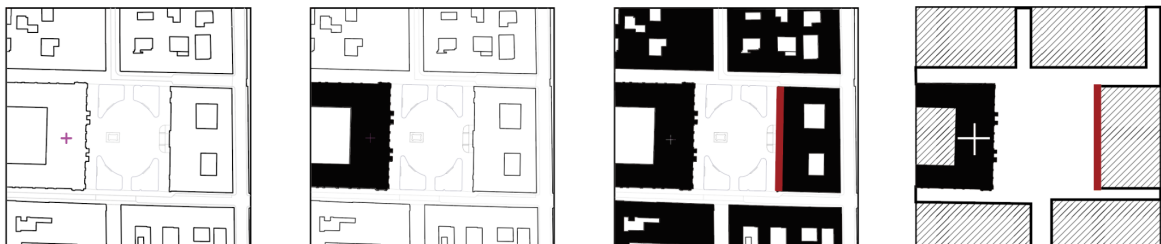
PORTICO AND CHURCH_Via Po

Porticoes and palace



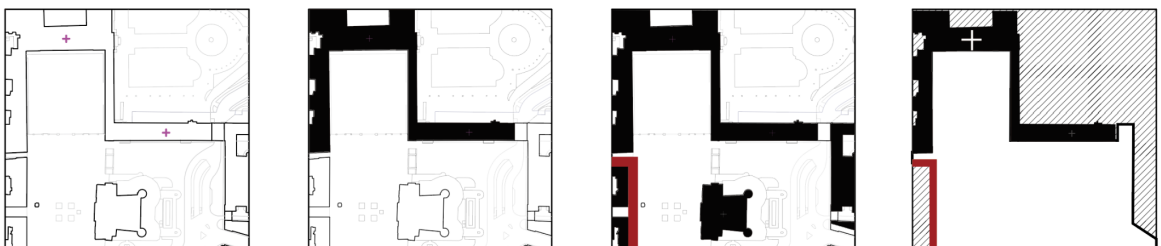
PORTICO AND PALACE_Piazza Madama

Porticoes and library



PORTICO AND LIBRARY_Piazza Carlo Alberto

Porticoes and museum



PORTICO AND MUSEUM_Piazza Madama

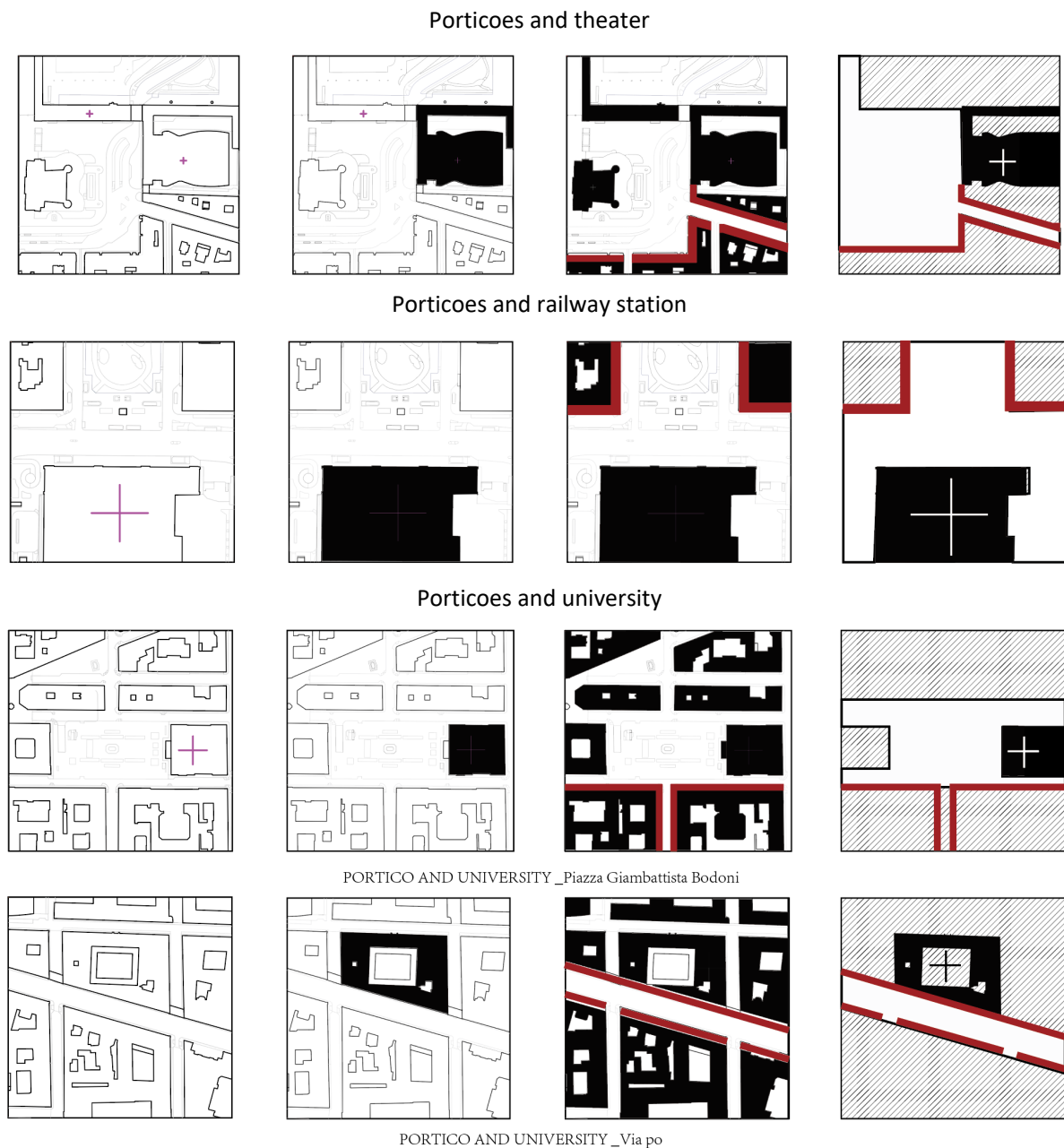


Fig 3-17 Spatial relationship between Porticoes and public buildings Source: (Self-drawn by the author)

Through the diagrams, it can be seen that Porticoes does not appear as a single dominant architectural accessory element, but rather as a spatial tool serving different public buildings. In history, although public buildings such as those for religion, royal power, culture, and education differed in function, as the former capital, under the premise of emphasizing a unified and orderly urban appearance, they needed to be integrated into a unified and orderly urban public space system. It is precisely in this context that Porticoes, through different arrangement methods, establishes a spatial transition between ritual, the expression of power, and daily public life. The author depicts and attempts to find the spatial organizational relationship between Porticoes and public buildings through the method of diagrams.

3.2 Study on the Publicness of Guangzhou Qilou

3.2.1 The Origin of Oriental Publicness Spirit and the Formation of Guangzhou Qilou

Western publicity emphasizes individuals entering spaces for joint discussion and deliberation as citizens, whereas publicity in the Oriental world, especially within the Chinese context, is rooted more in ethical communities. It is not first established upon the manifestation of the rights of independent individuals, but is built within the structures of relationships, responsibilities, ritual order, and group harmony. The "Public" (*Gong*) in traditional China not only means transcending individual selfishness but also contains the ethical implications of "commonality," "co-existence," and "the world is for the public"; therefore, its publicity more often manifests as a social openness of co-existing within order and negotiating within daily life, rather than a political space centered on public debate.



Fig 3-18 Yan Liben of the Tang Dynasty, *Emperor Taizong Receiving the Tibetan Envoy*: distinct host and guest, diplomatic ritual order

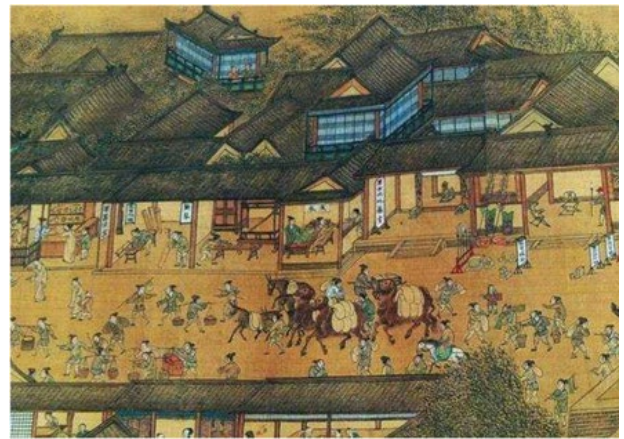


Fig 3-19 Street appearance under the Fang-Shi system of the Song Dynasty

Consequently, the generation path of Oriental publicity is also different from that of the West. It did not differentiate a completely independent public sphere from the private sphere, but was more embedded in street markets, neighborhoods, guild halls, temples, and daily interactions. Publicity in traditional Chinese cities was often not explicitly proclaimed, but was maintained and practiced within social relationships and daily order.

Qilou is such a transitional public space, unfolding along the street interface, and is a typical spatial type carrying Oriental daily publicity. The interior of the Qilou belongs to the shop yet is open to pedestrians; it undertakes the function of passage and also accommodates staying, sheltering from rain, conversing, and viewing. Shi Youyu [1] mentioned in *A Study on the Legal System of Qilou* that although the property rights of Qilou mostly belong to individuals, its public use attribute has long been recognized at the levels of social practice and systems. The publicity embodied by the Chinese Qilou allows public life to occur in a gentler and denser manner through the continuous interface under the corridor. Vending operations, neighborhood greetings, passers-by walking through, and temporary stops—these daily behaviors jointly constitute a continuously existing public world. Therefore, the Qilou carries not "publicness" (*Gong*) in the sense of an abstract system, but a "commonality" (*Gong*) within the lifeworld—a publicity that unfolds within relationship networks and is maintained within shared spaces.



Fig 3-20 Life scenes occurring under the Qilou

3.2.2 Typological Diagram of the Publicity of Guangzhou Qilou

3.2.2.1 Diagram of the Relationship Between the Qilou and Urban Hierarchy

The distribution of Guangzhou Qilou within the urban hierarchy presents the characteristic of spreading out in clusters along commercial and residential streets. From the perspective of the overall spatial structure, the Qilou does not exist as a small number of symbolic urban spaces, but is extensively embedded within the old city and modern commercial districts, covering large areas of daily living space. The orientation of the Qilou forms three forms based on the direction of the streets: extending horizontally along the river, unfolding vertically perpendicular to the river course, and distributing along the direction of the old city walls; they are mainly concentrated in the central area on the north bank of the Pearl River, with a small number of Qilou also implanted in residential areas on the south side of the Pearl River.

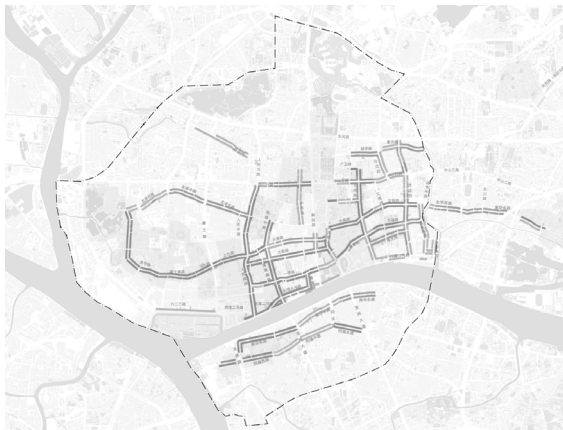


Fig 3-21 Distribution Map of Modern Guangzhou
Qilou

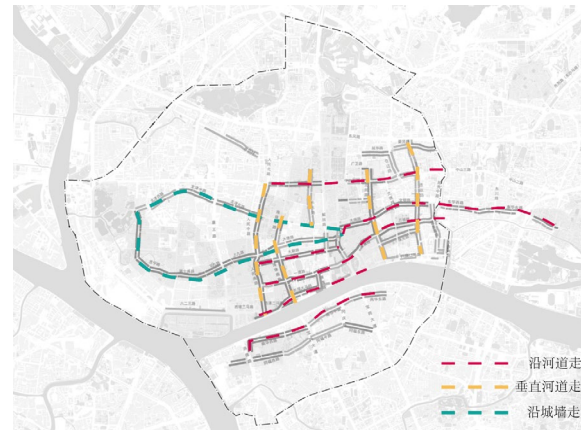


Fig 3-22 Analysis Map of Guangzhou Qilou
Orientations

3.2.2.2 Qilou and the Public Interface of Streets

The publicity of Guangzhou Qilou is manifested as a linear public space unfolding along the street interface; through the arcade space formed by the setback of the ground floor, the Qilou creates a semi-open transitional space between the building and the street, allowing passage, staying, consumption, and interaction to unfold, serving as an important carrier of public life.

Double-sided extended Qilou form a relatively complete interface enclosure on both sides of the street, thus endowing the street space with stronger integrity and continuity, and the publicity is also the most complete. Single-sided extended Qilou mainly form a continuous interface on one side of the street, with public and commercial activities more concentrated on that single side, while the other side, due to the lack of corresponding interface support, finds it difficult to form an equivalent spatial response, and the integrity of the overall street interface is weaker than that of double-sided extension. Discontinuous Qilou have fractured interfaces, manifesting a more fragmented characteristic of public space, where public activities in the street tend to concentrate at local nodes rather than along a continuous interface, representing a fragmented local activation. In summary, the more complete the interface, the more easily the publicity of the street is stably maintained; when the Qilou interface tends toward being single-sided, the publicity consequently exhibits characteristics of discretization.

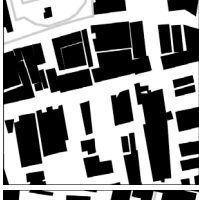
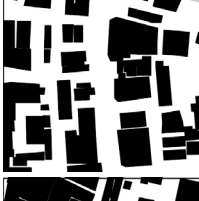
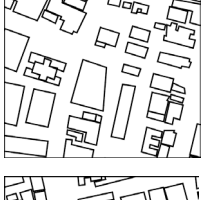
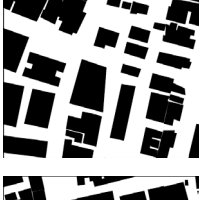
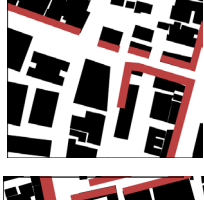
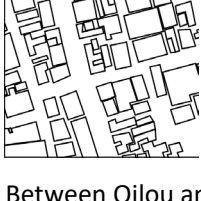
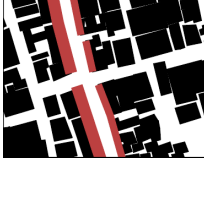
Type	Location	Picture	Plan	Figure-Ground Relationship	Qilou Distribution
Double-sided extended Qilou	Dixiaopu Road				
	Shangjiu Road Pedestrian Street				
Single-sided extended Qilou	Yide Road				
	Renmin South Road				
Discontinuous Qilou	Longjin East Road				
	Southern section of Renmin South Road				

Fig 3-23 The Relationship Between Qilou and Public Interface

3.2.2.3 Qilou and Urban Intersection Nodes

Street nodes are the convergence points of pedestrian flow, sightlines, and traffic circulation, thus possessing high openness and accessibility; when Qilou streets coincide with these nodes, their public attributes are further amplified. However, when Guangzhou Qilou meet public nodes, a fragmented and discontinuous state often occurs. For example, at corner intersections, Qilou are not distributed regularly or homogeneously across the four corners; the nodes where they terminate are often unpredictable, frequently stopping abruptly without obvious patterns. Nevertheless, at certain nodes, such as the intersection of Xiajiu Road and Dixiaopu Road, or the junction of Beijing Road and Zhongshan 5th Road, the Qilou interfaces are relatively continuous, and the public attributes of the space are strong. The Qilou at the plaza space where Shangjiu Road and Xiajiu Road meet also possess strong public attributes; the plaza space here serves as an enlargement of the intersection node. Although the corridors distributed along the plaza are not highly symmetrical or orderly, this layout of arcades surrounding a public space is one of the few such instances in the city of Guangzhou.

Type	Location	Picture	Plan	Figure-Ground Relationship	Qilou Distribution
Cross-intersection type Qilou	Xiajiu Road - Dixiaopu Road				
T-junction node type Qilou	Beijing Road - Zhongshan 5th Road				
Corner street segment type Qilou	Shangjiu Road - Renmin South Road				
Plaza space node typ	Shangjiu Road - Xiajiu Road				

Fig 3-24 Qilou and Urban Intersection Nodes

3.2.2.4 Qilou and Public Facility Nodes

From the perspective of overall spatial layout, the distribution of Guangzhou Qilou and public facility nodes has not formed a highly concentrated or clearly dependent spatial relationship; their distribution does not aim to strengthen a specific public facility node, but relies on the natural extension of the urban street grid to form a continuous public interface within daily street spaces. However, when Qilou are adjacent to or overlap with public facility nodes—for example, the Qilou in front of the Bahe Guild Hall forms a stable pedestrian passage and embeds the hall's entrance directly into the street's public interface—the public connection between the building and the street

is strengthened. Overall, although the arcade spaces are not organized with nodes as their core, these arcade spaces can strengthen the accessibility and usage vitality of these nodes, guiding pedestrian flow into public buildings or open spaces, thereby enhancing the publicity of the nodes.



Fig 3-25 Qilou and Public Facility Nodes

3.3 Comparative Analysis

3.3.1 Differences in the Civilizational Origins

Although the Turin arcades and the Guangzhou Qilou both manifest formally as semi-open spaces unfolding along the street and serve as spatial carriers for citizens' public life, their public attributes and civilizational origins are different, with significant intrinsic distinctions. From the perspective of civilizational origins, publicity in the Western world is a civilizational consciousness of public life, an open and democratic ideology that encourages citizens to participate in political deliberation and collective discussion. Publicity in the Chinese context is a system of clan relationships based on ethics, responsibilities, and rituals established upon an ethical community, emphasizing collective collaboration and production on this basis. It is precisely these differences in civilizational foundations and definitions of publicity that lead Turin Porticoes and Guangzhou Qilou, though both being arcade spaces, to exhibit different spatial temperaments and typological characteristics: Turin Porticoes embody more of an ordered nature for public deliberation and social interaction; the Guangzhou Qilou, meanwhile, reflect a secularized and transitional scene of daily life.

3.3.2 Typological Differences in the Publicity aspect

From the perspective of the overall urban scale, although Turin Porticoes and the Guangzhou Qilou both form continuous street arcade spaces, the spatial structures of their publicity exhibit distinct differences. Turin Porticoes is established upon a clear urban planning system; its spatial organization revolves around core urban plazas and extends outward along urban main axes to connect these plazas. The unified height of Porticoes facades strengthens the order of the plaza as a public space, forming an urban public space network with clear directionality and hierarchical order. In contrast, Guangzhou Qilou primarily rely on the commercial and residential street systems, unfolding continuously within the old city districts. Their spatial distribution emphasizes the supplementation of daily life street interfaces rather than forming an integrated structure around core urban nodes. Although Qilou streets exhibit continuity on a macro scale—with a total length of 26.5 kilometers across 60 streets—on a micro scale, the Qilou interfaces frequently suffer from interruptions and missing segments; this fragmented distribution and loose spatial order result in weaker overall publicity and continuity.

Regarding the relationship with urban nodes and public buildings, the two also present different spatial strategies. Turin Porticoes forms stable spatial relationships with important public buildings such as churches, palaces, theaters, universities, and transportation hubs, integrating these diverse public facilities into a unified urban public space system, where Porticoes plays the roles of connection, transition, and organization. By comparison, Guangzhou Qilou have not formed a clear spatial organizational relationship with public facility nodes; their distribution depends more on the streets themselves rather than revolving around specific public buildings. However, when Qilou are adjacent to public facility nodes, the continuous arcade spaces can still strengthen the accessibility of the nodes and naturally guide pedestrian flow into public buildings or open spaces through the street interface, thereby enhancing the public vitality of these nodes to a certain extent.

3.3.3 Summary

The differences in the publicity of the arcades in the two locations are among the core factors driving the differentiation of arcade architectural types. By comparing the connotation of publicity and its spatial expression, this chapter reveals the intrinsic connection between publicity characteristics and arcade types, thereby providing a key explanatory path for understanding the differences in typological evolution and morphological characteristics between Turin Porticoes and the Guangzhou Qilou.

From an overall perspective, the publicity of Turin Porticoes is manifested as a continuous and orderly public space structure formed by relying on the integrated urban planning system. Through the integration of axes, plazas, and important public buildings, it constructs an urban public space network with clear hierarchy and directionality. In contrast, Guangzhou Qilou are more deeply embedded in the daily street system, serving commercial and residential activities, and exhibiting characteristics of strong dependence and weak integrity in spatial organization. This difference essentially reflects two different modes of expressing publicity: the former leans toward order and social interaction, while the latter emphasizes the secular and daily life.

Furthermore, the underlying cause of this difference lies in the varying perceptions of publicity and typological continuity within different cultural traditions. In the city of Turin, even during the

construction of Porticoes in different periods, the basic principle has always been the continuation and development based on existing styles and spatial orders. Although local innovations exist, the emphasis remains on typological continuity and interface unity; its publicity is maintained and strengthened by relying on this ordered and holistic macro-vision. By comparison, in the Chinese context, Guangzhou Qilou lack a stable typological inheritance, and their styles show obvious diversity and differentiation. Their public attributes are relatively weak; in other words, the Qilou do not constitute, nor do they participate in, the shaping of public space within the city.

Therefore, the publicity characteristics of the arcade types in the two locations can be summarized as follows: the former is a public space form based on cultural tradition and spatial order, emphasizing typological continuity and holistic unity; the latter is a functional space generated on the basis of original streets, a street space type guided by commercial economic development with weak public attributes. Although corridor spaces with orderly characteristics, such as the "Thousand-Step Corridor" (Qianbulang) in Beijing, once existed in Chinese history—whose symbolic publicity and spatial order could be compared to Turin Porticoes—they have long since ceased to exist. In summary, starting from the perspective of publicity, this chapter explains the logic behind the formation of differences between the two arcades at the levels of cultural roots and typological mechanisms, further supporting the in-depth analysis of arcade architectural typology and laying the foundation for constructing a more explanatory framework for typological research.

Chapter4 Comparative Study on the Functional Types of Arcades

4.1 Functional Study of Turin Porticoes

4.1.1 Functional Distribution

The distribution of Turin Porticoes at the functional spatial level exhibits characteristics of composite use, with its spatial content encompassing commercial activities, public life services, and cultural functions. The commercial attributes are manifested in the physical space as retail shops distributed along the streets, as well as historic cafés and small dining spaces. These venues rely on the sheltered conditions provided by Porticoes, allowing interior consumption behaviors to extend outward into the open space. Consequently, Porticoes space establishes a direct connection with public activities, further strengthening its attributes of daily utility.

In the core administrative areas of the city, Porticoes also serves public buildings such as government offices, theaters, and museums, often acting as the precursor or entrance space to these public realms. The role of transitional space it undertakes allows for a buffer layer between large-scale public buildings and daily life. Simultaneously, the continuous arcade system serves to guide pedestrian flow, enabling citizens to gradually enter the city's significant cultural and administrative nodes during their daily routines.

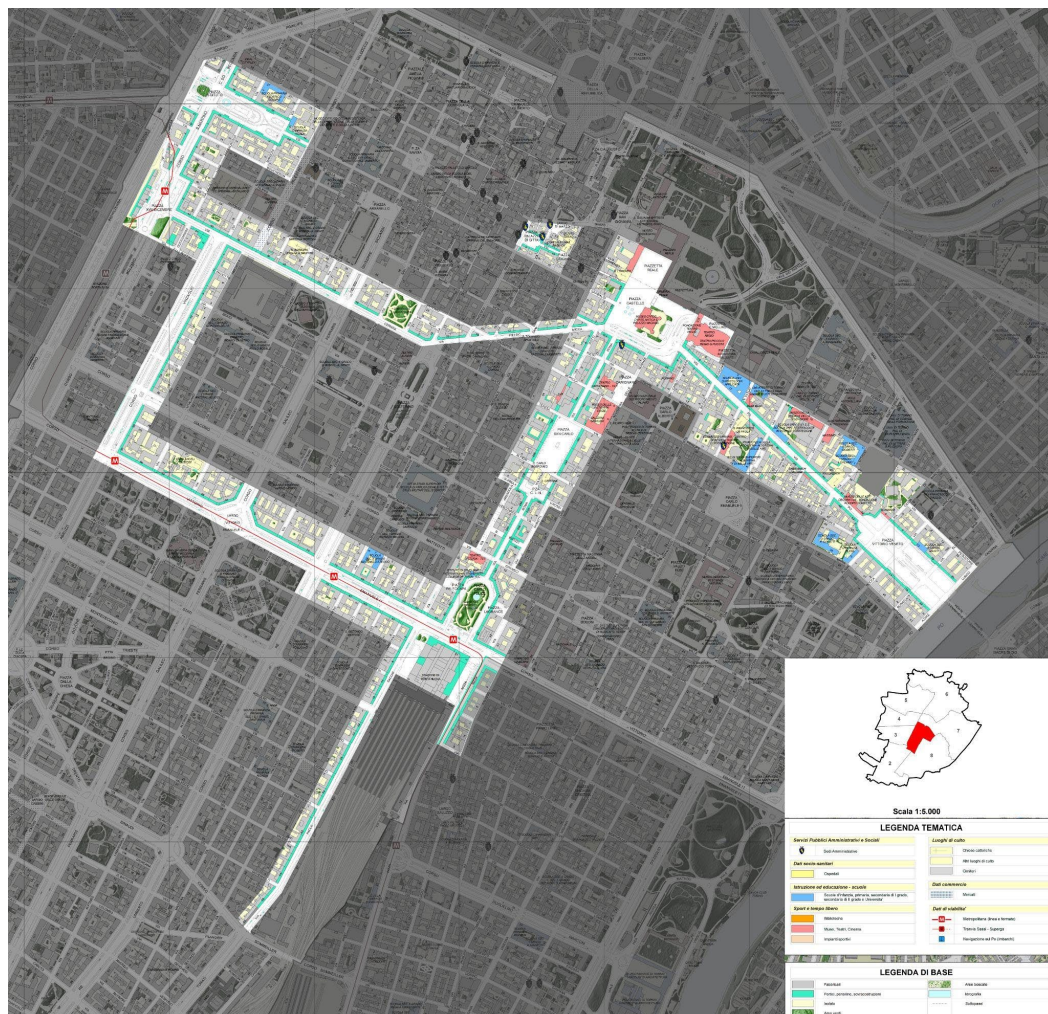
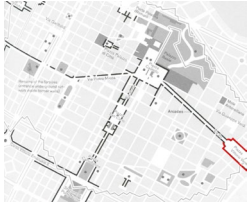


Fig 4-1 Functional Distribution of Porticoes in Turin

Table 4-1 Functional Distribution Statistics of Turin Porticoes

Image	Location	Street	District	Function	Functional Characteristics
		Piazza Castello	Historic al Center Core	Cultural Display	Porticoes tightly encloses the plaza, surrounded by palaces and museums; it is a core area where history, politics, and culture overlap.
		Via Roma	North-South Main Axis	High-end Retail	Porticoes possesses a strong spatial order, hosting luxury commerce along the city's primary axis.
		Piazza Carlo Felice	Via Roma South	Daily Trade	Porticoes is closely integrated with the railway station, primarily handling pedestrian organization, transition, and distribution.
		Piazza San Carlo	Baroque Plaza District	Daily Trade	Enclosing the twin-church plaza, Porticoes is lined with cafes and shops, serving as a social hub with high dwell time.
		Via Pietro Micca	Historic al Center West	Office / Daily Retail	Porticoes scale is restrained, serving the high-frequency commuting needs of financial and office workers.
		Via Cernaia	Historic al Center West Edge	Daily Retail	Primarily serves administrative and office functions, with space focused on transit and supplemented by staying.

		Piazza Palazzo di Città	Historic al Center	Daily Catering	This section connects the central plaza and the City Hall plaza, hosting daily consumption and dining activities.
		Via Po	Historic al Center	Cultural Tourism Commer ce	One of the most continuous streets in Turin Porticoes system, featuring many souvenir shops.
		Piazza Vittorio Veneto	Po River Bank	Leisure Culture / Tourism	Porticoes encloses a large-scale plaza and connects to the riverbank, highlighting its openness and scenic attributes.

4.1.2 Classification and Spatial Analysis of Turin Porticoes Functional Types

Based on the investigation into the functions of Turin Porticoes in the previous section, they can be classified into four functional types::

Table 4-2 functional types of Porticoes

Cultural & Social Porticoes	Core Commercial Porticoes	Transit & Office Porticoes
		
Piazza Castello, Piazza San Carlo	Via Roma, Via Po	Via Pietro Micca, Via Cernaia

4.1.2.1 Cultural & Social Plaza Type

Turin Porticoes in the historical center radiates from Piazza Castello and extends south to Piazza San Carlo. This area acts as the city's core, where museums, palaces, and other cultural facilities are highly concentrated. Porticoes here integrate historical, political, and cultural functions into a unified public realm, serving as both a ceremonial path and a "city gallery" for daily social interaction.



Fig 4-2 Piazza Castello

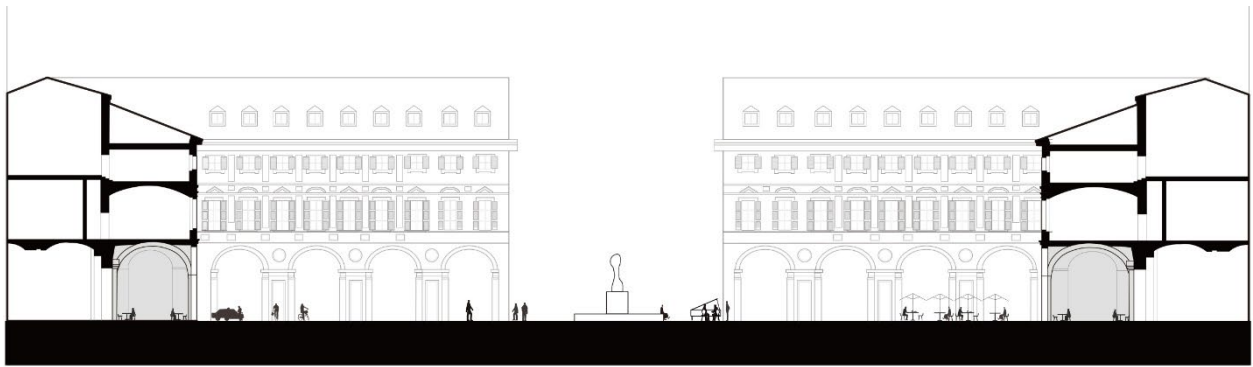


Fig 4-3 Piazza San Carlo



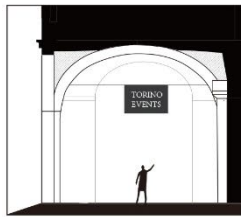
Fig 4-4 Piazza PLN

The functional spatial relationships of the cultural and public social Porticoes space, represented by Piazza Castello, can be summarized into the following points: In terms of the overall spatial structure, a large-scale central plaza typically serves as the core (approximately 15–150m in width). The space is open and possesses a strong capacity to host public activities. The center of the plaza often features monumental sculptures or buildings, which elevates the space beyond a simple social or public area into a display of urban culture and identity. Within the internal space of Turin Porticoes surrounding the plaza, the functions are primarily focused on leisure café culture, sightseeing, and window shopping. Compared to other Porticoes, these are more spacious in scale, with a more prominent emphasis on dwell time and experiential quality, serving as a continuation of the plaza's space and social life.



拱廊功能——Piazza San Carlo

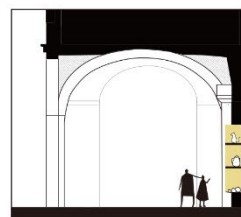
拱廊内部



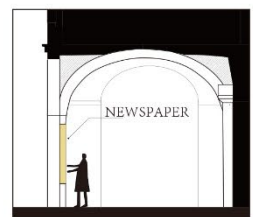
宣传



咖啡



购物观光



新闻宣传



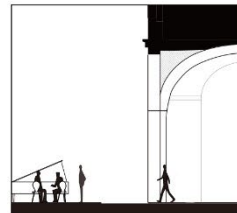
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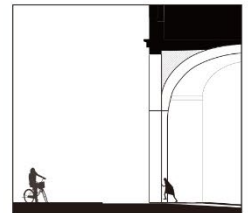
商业外摆



停车



表演



骑行

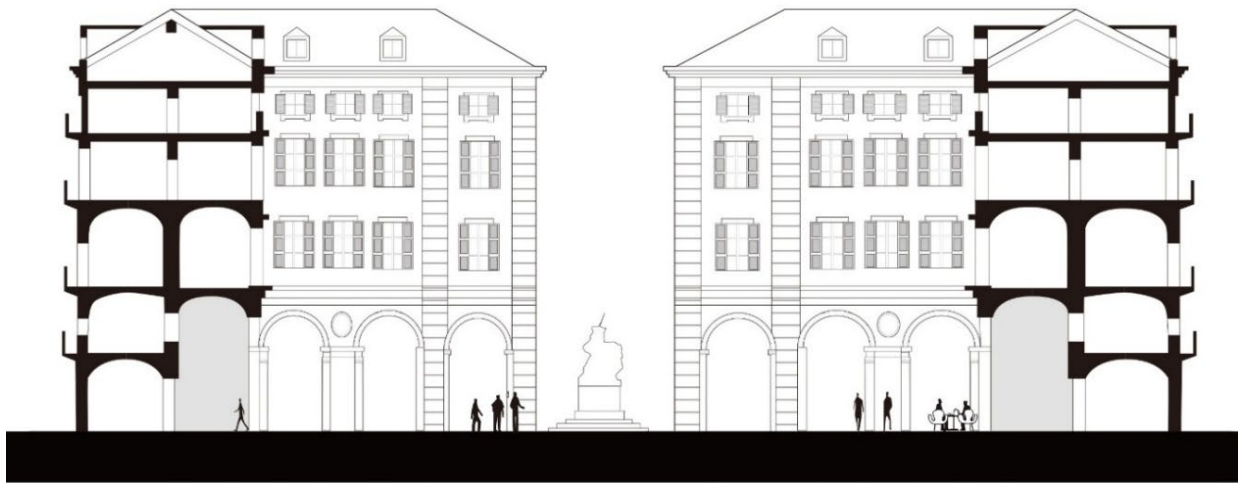


Fig 4-5 Functional Diagram of Cultural & Social Porticoes — Piazza San Carlo

Piazza Palazzo di Città represents another type of cultural and social plaza. Its functional services, in addition to cultural display and public social interaction, also serve the City Hall with its administrative office attributes. Beneath Turin Porticoes on both sides of the plaza, functions such as transit and daily café catering are hosted.

Regarding the spatial characteristics of Porticoes, the height and width scales are relatively large (7.67m high, 4.5m wide), satisfying municipal office and transit functions, as well as the spatial

monumentality formed around the plaza. Piazza Palazzo di Città already existed during the Roman military camp period, and its spatial scale is relatively small compared to other plazas because such dimensions were adapted to the plaza scales of the Roman military camp era; however, Porticoes were constructed during the 19th century alongside urban renewal and renovation, so the dimensions of Porticoes do not differ much from other Porticoes in the city, distinguishing it from other functional spatial types where Porticoes surround a plaza.



拱廊功能—— Piazza Palazzo di Città

拱廊内部

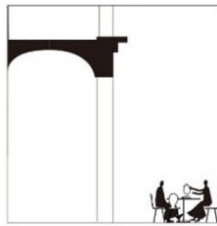


餐饮

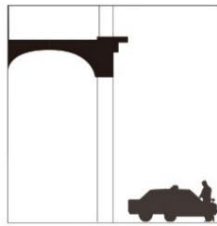


行政

拱廊外侧



商业外摆



停车

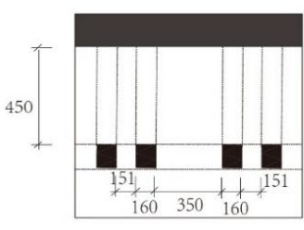
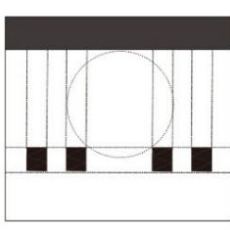
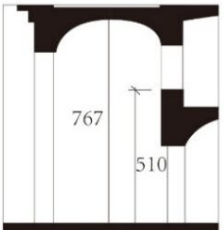
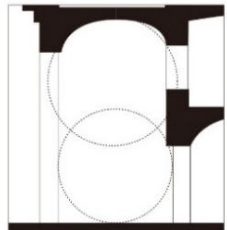


Fig 4-6 Functional Diagram of Cultural & Social Porticoes——Piazza Palazzo di Città

4.1.2.2 Core Commercial Porticoes

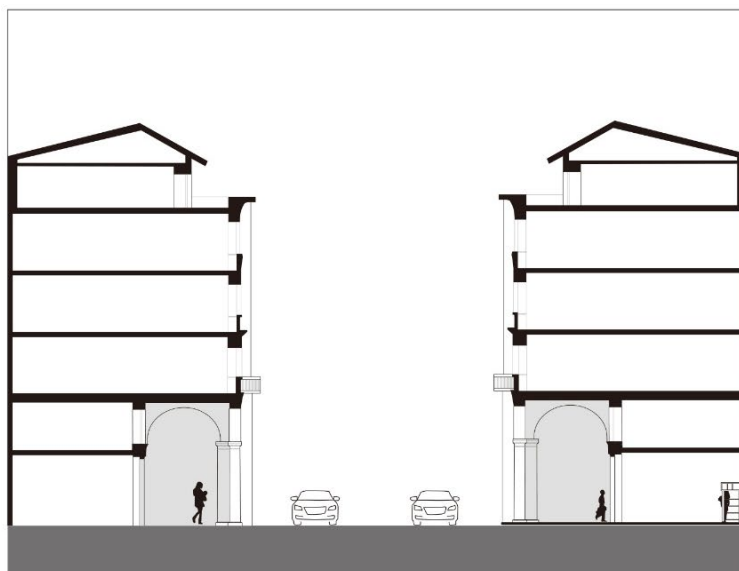
Among the core commercial and urban axis Porticoes, Via Roma and Via Po together constitute the most important public space skeleton of Turin Porticoes system. As the city's primary commercial streets, Via Roma concentrates high-end retail and brand consumption while hosting large-scale public events at specific times. The connected Via Po links the historical core with the riverside plaza space through highly continuous and unified Porticoes spaces, undertaking cultural consumption, daily commerce, and transit functions to support citizens' daily travel.



Fig 4-7 Commerce under the Via Roma Porticoes (Source: Photographed by the Author)

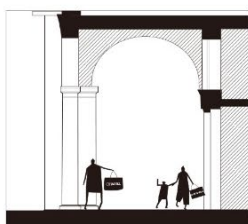
In commercial center Porticoes represented by Via Roma, this type is dominated by commercial activities, collectively supporting multi-level consumption behaviors such as luxury retail, brand consumption, and daily shopping, while simultaneously functioning as a transit route to serve high-intensity pedestrian organization. Due to its location on the city's core axis, significant public activities and large-scale parades frequently take place here: for instance, hosting major events like the 2025 Turin Motor Show; it was also a gathering place for citizen parades following the victory of the anti-fascist war in World War II.

Regarding spatial characteristics, the commercial Porticoes exhibits a typically high and narrow proportional relationship. Taking Via Roma as an example, its internal net height reaches 7.87m, creating an open and lofty space with relatively complex and exquisite ceiling decorative moldings to enhance the overall spatial experience. Its width is relatively narrow (approximately 3.15m); this moderate tightening of the lateral scale strengthens the continuity and compactness of the street interface, effectively improving the accessibility and visibility of the commercial frontage, which facilitates window displays and consumer behavior.

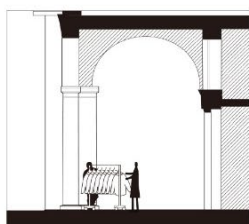


拱廊功能——Piazza San Carlo

拱廊内部



奢侈品购物



日常购物



拱廊外部



交通通行



活动展示



拱廊尺度

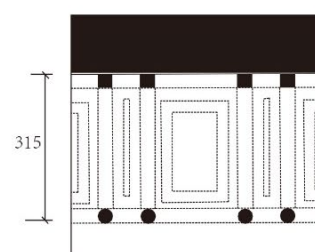
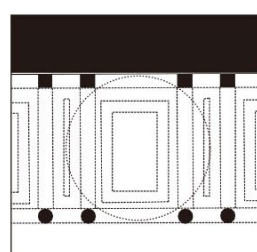
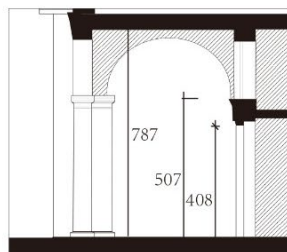
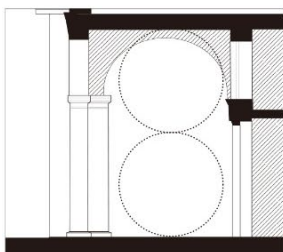


Fig 4-8 Functional Diagram of Core Commercial Porticoes—Via Roma

4.1.2.3 Transit and Office Porticoes

Functional transit and office service Porticoes are mainly distributed in areas such as Via Pietro Micca, Via Cernaia, and Corso Vittorio Emanuele II, and their formation is closely related to the concentration of financial, administrative, and office activities in the city. The core function carried by this type of Porticoes does not lie in commercial consumption or public lingering, but in providing a stable and efficient pedestrian environment for daily commuting. The commerce along the street interface consists mainly of coffee, light meals, and convenience services, with a limited overall proportion, serving more to assist the daily needs of the office population.

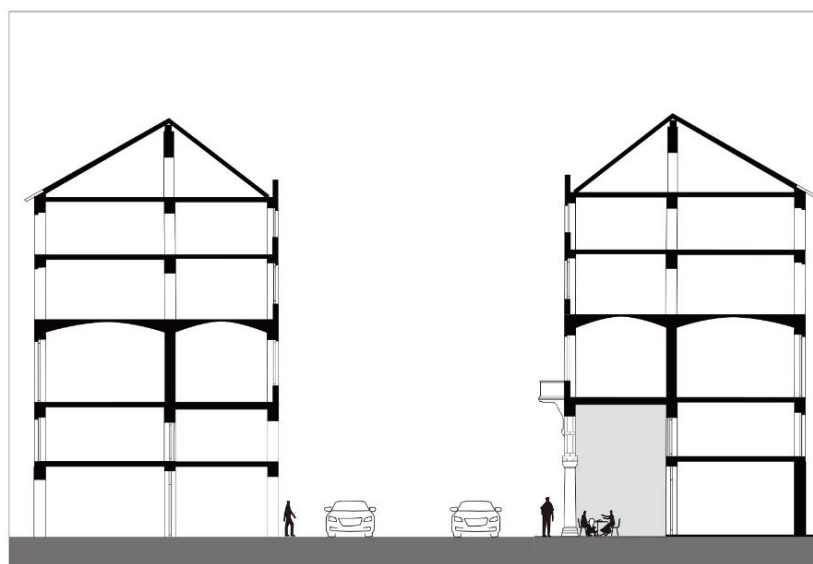


Fig 4-9 Commerce under the Via Pietro Micca
Porticoes



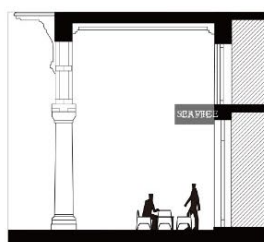
Fig 4-10 Commerce under the Corso Vittorio Emanuele
II Porticoes

Taking Via Pietro Micca as an example, the commerce along the line is dominated by service-oriented business formats, supplemented by functions such as banks and small service institutions, forming a spatial structure oriented toward commuting needs. At the same time, a large number of entrance porches leading to residential inner courtyards and office buildings are set up inside Porticoes, making it an important transitional interface connecting public streets and private spaces. In terms of scale control, its net width is approximately 4.92m and its net height is approximately 7.47m. The resulting spatial proportion differs from the other two types of Porticoes, belonging to the type with the most moderate height-to-width ratio, allowing pedestrians to achieve a more balanced relationship between transit and comfort of use.

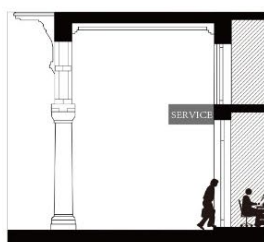


拱廊功能—— VIA PIETRO MICCA

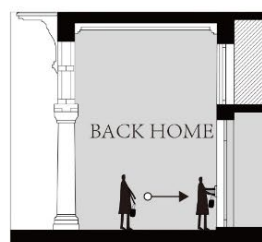
拱廊内部



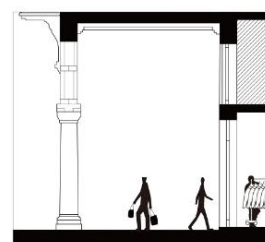
咖啡



商业服务



入户空间



日常消费

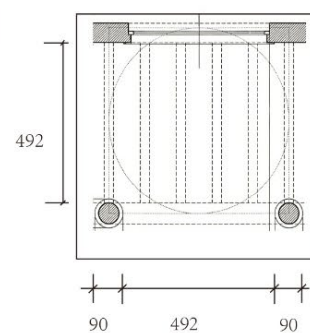
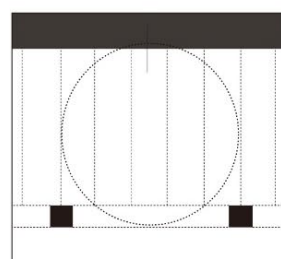
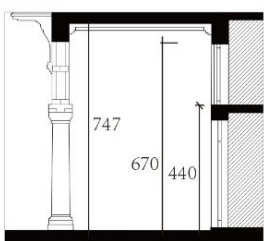
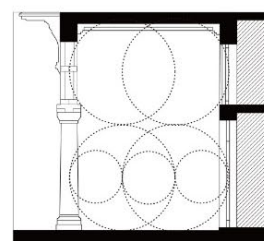
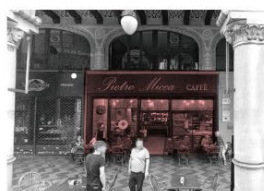


Fig 4-11 Functional Diagram of Transit and office Porticoes——Via Pietro Micca

4.2 Functional study of Guangzhou Qilou

4.2.1 Functional Distribution of Guangzhou Qilou

From a macro scale, the distribution of spatial functions in Guangzhou Qilou exhibits characteristics of high spontaneity and everydayness. The functions it undertakes are concentrated in daily commercial activities, with retail department stores, daily catering, and market spaces accounting for the highest proportions, constituting a Qilou network in the city full of the atmosphere of daily life. In terms of functional composition, Qilou space is dominated by daily commercial activities, and its business formats are collectively manifested as retail department stores, catering services, and market-type trading spaces, etc. These types of functions possess high accessibility and repeatability, directly serving surrounding community residents and daily floating populations. Different from spaces dominated by exhibition or symbolic functions, Guangzhou Qilou emphasizes frequency of use and lifestyle embeddedness more, and its spatial value is reflected in the continuous carrying of daily activities.

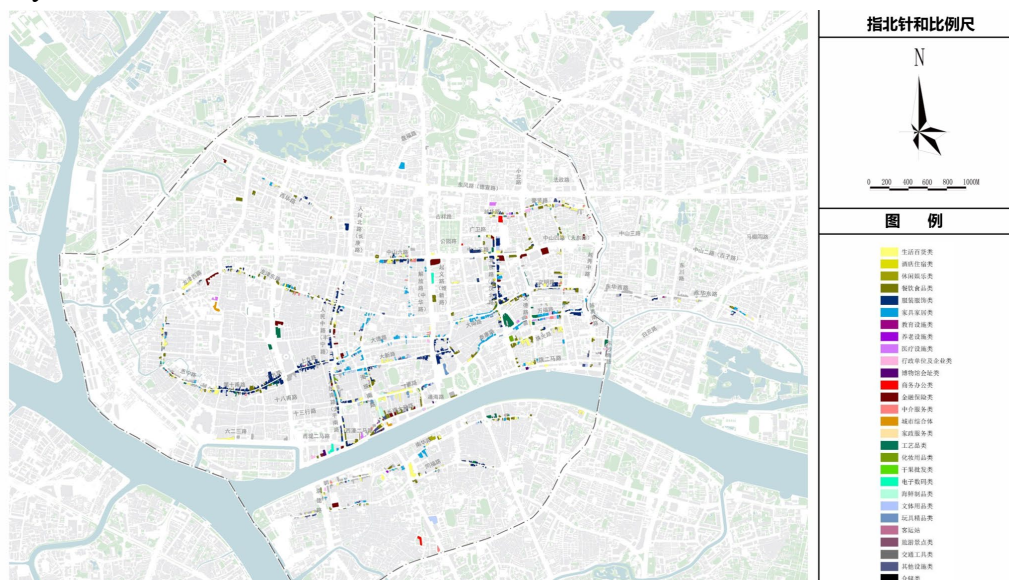
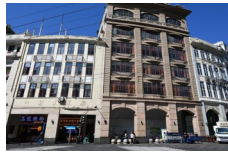
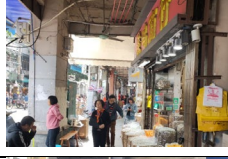


Fig 4-12 Functional Characteristics of Guangzhou Qilou

Table 4-3 Functional Distribution of Guangzhou Qilou

Image	Plan	Street	Primary Function	Functional Characteristics
		Shangxiajiu — Dixifu Road	Cultural Tourism	Strong commercial atmosphere; hub for mid-to-low-end catering and retail.
		Dade Road	Wholesale E-commerce	Transitioning from traditional trade to e-commerce, dominated by wholesale.
		Danan Road	Traditional Retail	Mainly retail; dense with clothing, small commodities, and daily necessities.

Image	Plan	Street	Primary Function	Functional Characteristics
		Wenming Road	Daily Catering	Relies on "Time-honored Brands" and neighborhood life; high-frequency consumption.
		Changdi Da Malu	Riverside Cultural Display	Combines riverside scenery with the image of a modern financial historic district.
		Beijing Road	Cultural Tourism	Cultural axis; integration of tourism sights and mid-to-high-end consumption.
		Wanfu Road	Home Decor Wholesale	Traditional commercial street focused on the home furnishing industry.
		Renmin South Road	Tourism + Wholesale	South: cultural experience & hotels; North: food & stationery wholesale.
		Daxin Road	Traditional Trade	A specialized street for traditional commerce and handicrafts.
		Yide Road	Wholesale Trade	Multi-format trade focused on dried seafood, snacks, and toys.
		Haizhu South Road	Wholesale Trade	Dominated by traditional wholesale of dried seafood and food products.
		Longjin West Road	Community Commerce	Focuses on community services, daily consumption, and neighborhood interaction.

4.2.2 Classification and Spatial Analysis of Guangzhou Qilou Functional Types

Based on the investigation into the functions of Turin Porticoes in the previous section, they can be classified into four functional types::

Table 4-4 Functional types of Qilou

Core Integrated Commercial and Tourism Qilou	Riverside Financial and Historical Display Qilou	Community Life and Traditional Commercial Qilou
		
Shangxiajiu — Dixifu Road, Beijing Road	Changdi Da Malu, Renmin South Road	Wenming Road, Longjin West Road, Wanfu Road, Yide Road, Dade Road, Daxin Road, Danan Road, Haizhu South Road

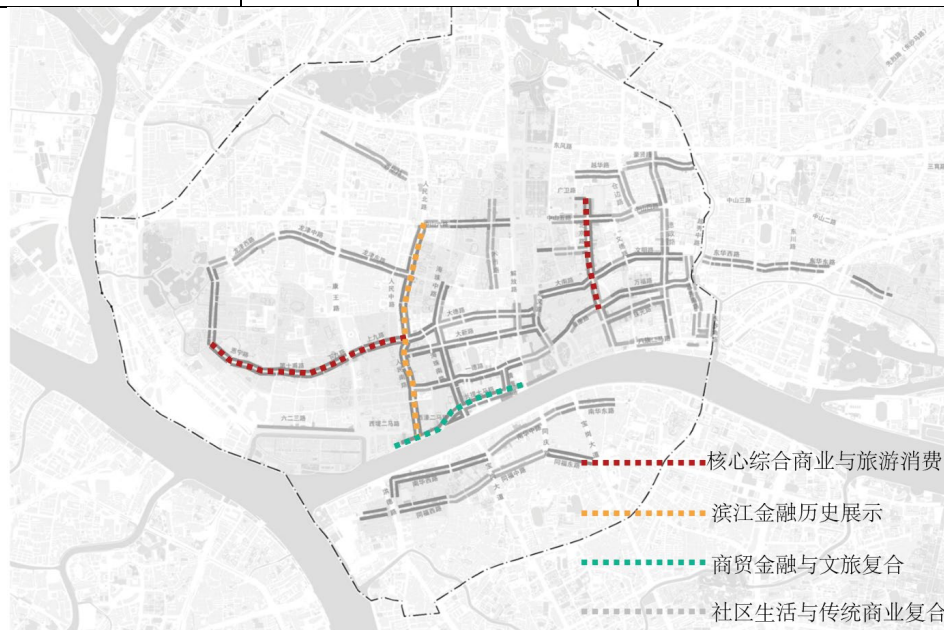


Fig 4-13 Functional Distribution of Qilou in Guangzhou

4.2.2.1 Core Integrated Commercial and Tourism Consumption Area

Guangzhou's core integrated commercial Qilou are mostly located in sections with strong urban display characteristics. These related Qilou streets have undergone secondary renovation and renewal under government guidance, allowing the original spatial forms to be adjusted to meet high-level commercial demands. The block content is dominated by retail, catering, sightseeing, and cultural consumption. There are two typical locations for core commerce: first, Shangxiajiu—Dixifu Road, which continues the high-density consumption characteristics of traditional Xiguan commercial streets; second, Beijing Road, which relies on the foundation of a thousand-year-old city site and combines a pedestrian street system with nighttime cultural tourism activities, creating a superimposed relationship between cultural, commercial, and tourism attributes within the same space.

Taking the Beijing Road pedestrian street as a representative, at the functional level, the Qilou is dominated by commercial activities, collectively supporting multi-level consumption such as brand shopping, daily retail, and leisure entertainment. Simultaneously, the old city ruins within its geographical location are integrated into the display space, resulting in a composite spatial structure

of commercial and cultural exhibition. Regarding spatial scale, the space under the gallery has a width of approximately 3.5m, a height of approximately 4.2m, and a bay width of approximately 3m, making the scale relatively moderate and homogeneous. An open pedestrian space approximately 15.5m wide is formed outside the gallery, expanding the lateral scale of the street. This allows the center of the pedestrian street to accommodate more diverse activities, such as ruin displays, temporary commercial facilities, and public activity spaces, thereby strengthening behaviors of staying, sightseeing, and gathering.

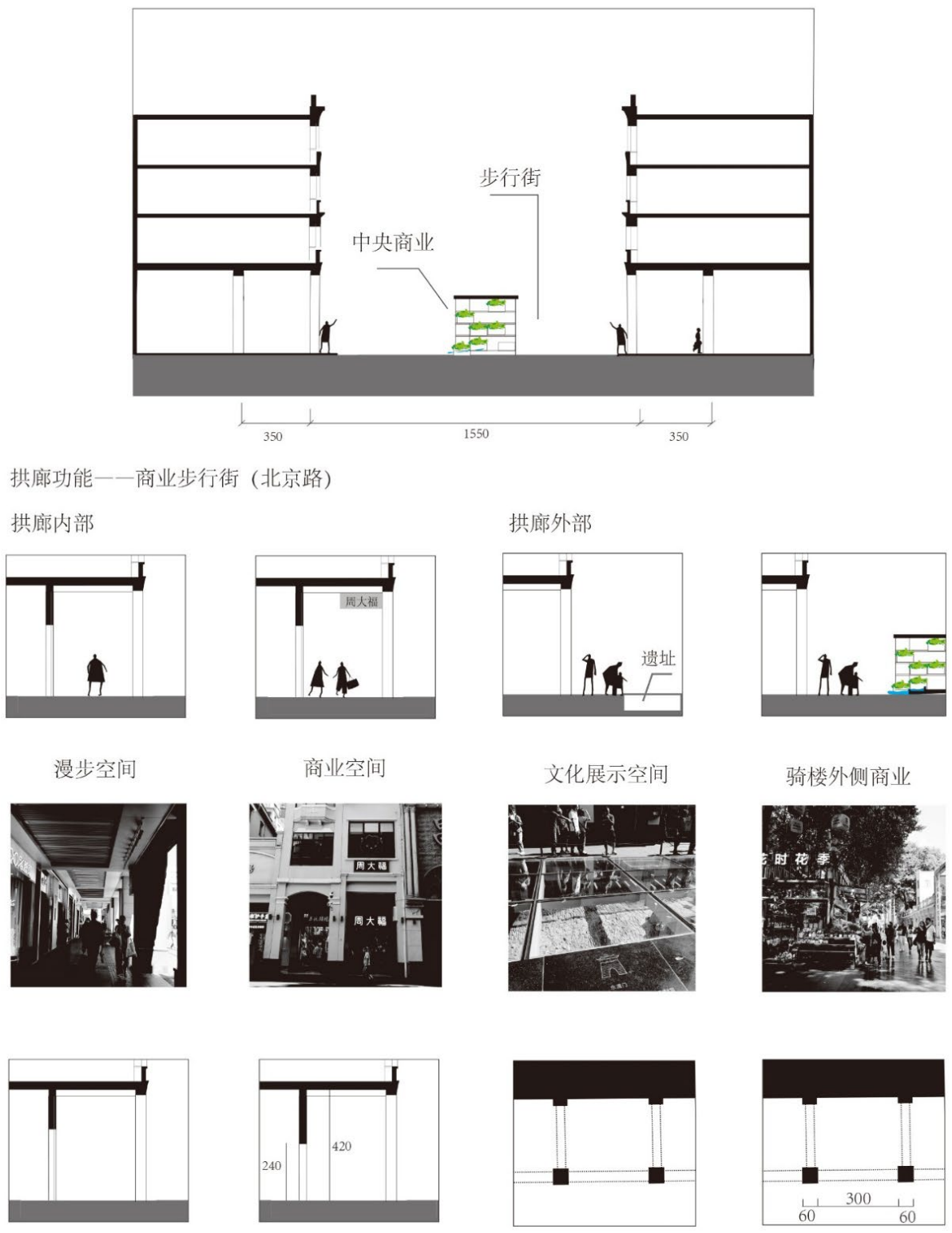


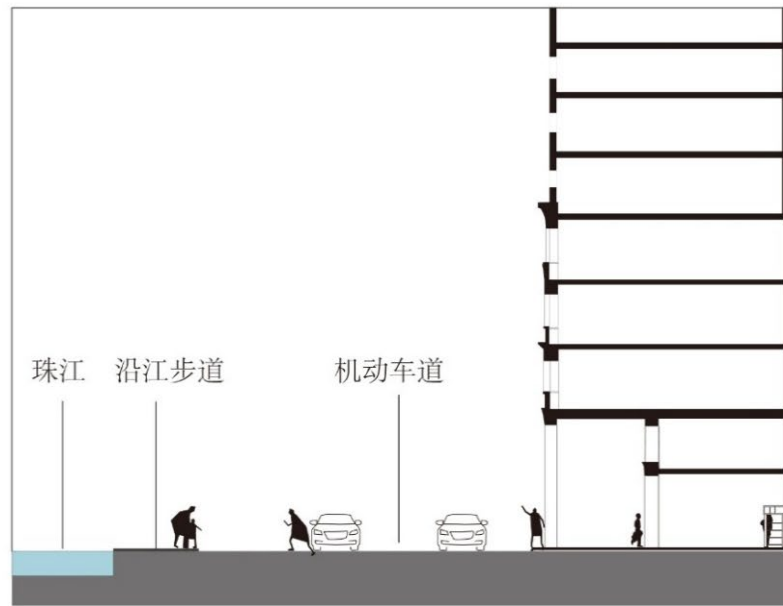
Fig 4-14 Core Integrated Commercial and Tourism Qilou——Beijing Road Qilou

4.2.2.2 Riverside Financial and Historical Display Qilou

The Riverside Financial and Historical Display Qilou primarily reflects the historical financial and trade memories of Guangzhou's modern waterfront area, serving as a display function for the riverside interface. In official Guangzhou protection and utilization plans, the Changdi area is described as the "Changdi Trade and Cultural Experience Zone," emphasizing the maintenance of the Qilou layout and continuous streetscape. This indicates that the focus of this area is not merely daily commerce, but a display space composed of trade history, urban memory, and waterfront landscapes.

In the Riverside Financial and Historical Display Qilou, represented by Changdi Da Malu, the functional level serves public activities such as riverside walking, urban sightseeing, and historical experiences, supplemented by a small amount of scattered commercial functions to maintain basic street vitality. Additionally, the space under the Qilou gallery serves as a foyer transitioning from the public street to indoor office spaces; on the exterior of the gallery, it incorporates auxiliary transportation functions such as short-term vehicle parking, consistent with riverside road conditions.

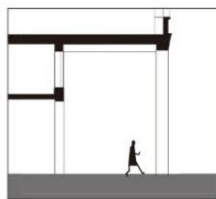
Regarding spatial characteristics, due to the emphasis on urban image display and historical narrative functions, this type of Qilou presents more open and solemn features in terms of scale and order. Taking Changdi Da Malu as an example, its gallery width is approximately 3.5m and its height reaches 5.8m, resulting in a more lofty overall spatial proportion. The morphology of this gallery also shares certain similarities with Turin Porticoes in terms of scale and continuity, making it one of the few spatial types within the Guangzhou Qilou system that possesses monumental characteristics.



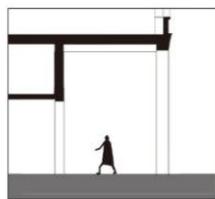
拱廊功能——沿江骑楼（长堤大马路）

拱廊内部

拱廊外部



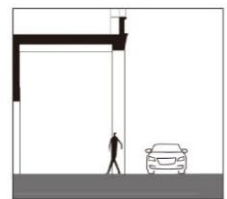
漫步空间



商业空间



连接办公空间



网约车停车空间

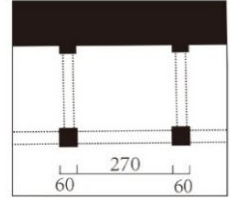
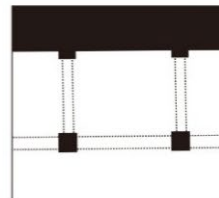
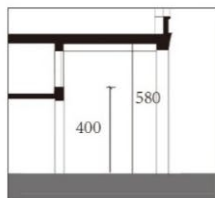
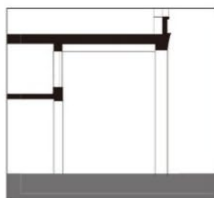


Fig 4-15 Riverside Financial and Historical Display Qilou

4.2.2.3 Community Life and Traditional Commercial Qilou

Community-type Qilou are the most widely distributed and best exemplify the close relationship between Guangzhou's Qilou streets and daily life. They serve surrounding residents and traditional trade networks. Although the commercial attributes of each street vary, their common characteristics

lie in serving daily transit, small-scale transactions, community consumption, and the continuation of traditional commerce.

Represented by Hongde Road, the functional composition and spatial characteristics of community life-type galleries reflect a high degree of everydayness and life-orientation. At the functional level, this type of Qilou primarily serves the daily needs of surrounding residents, dominated by basic consumption covering business formats such as catering, small-scale retail, and convenience services. Simultaneously, the space under the gallery assumes the role of multiple living infrastructures, such as waiting areas for public transportation and temporary parking spaces for shared bicycles and motorcycles. These informal but high-frequency functions were not anticipated or planned during the original Qilou planning, resulting in issues such as shared bicycles and motorcycles being parked haphazardly under the Qilou without forming an organic relationship with the architecture; instead, they act as spatial obstructions that negatively impact the original functions beneath the Qilou.

Regarding spatial characteristics, the overall scale of this type of Qilou is relatively compact, emphasizing the basic functions of shelter and transit. Taking Hongde Road as an example, its gallery width is approximately 2.7m and its height is approximately 3.4m. However, due to the common installation of suspended ceilings, the actual perceptible spatial height is approximately 2.4m, further compressing the vertical scale of the space. This relatively low and somewhat cramped spatial proportion limits the display and lingering attributes of the space, making it more suitable for short stays, rapid transit, or small-scale transactions. Additionally, a distinct feature of this type of Qilou is its strong discontinuity; along a single street, the termination points of the galleries are often unpredictable and irregular.

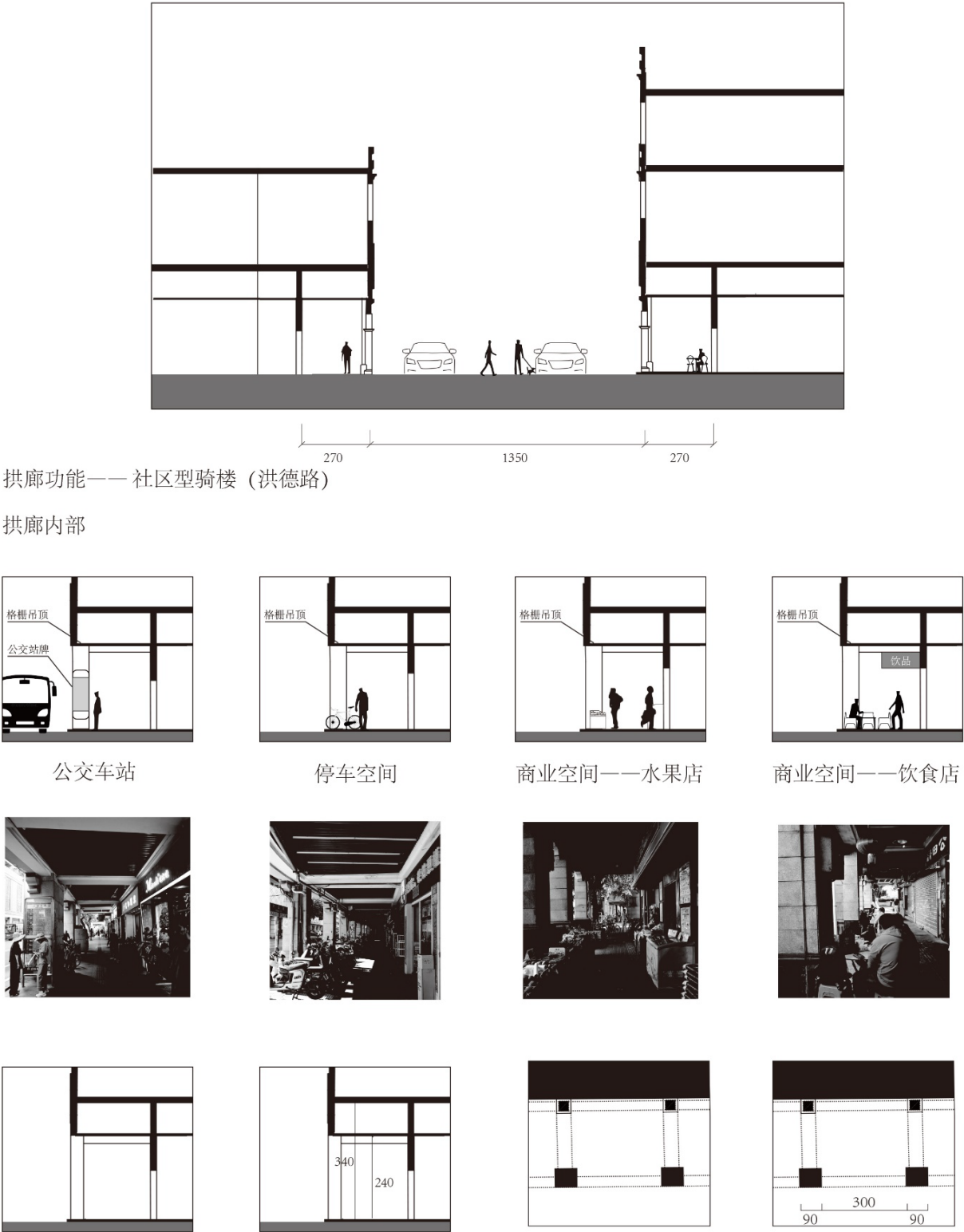


Fig 4-16 Community Life and Traditional Commercial Qilou

4.3 Comparative Analysis

4.3.1 Differences in the Functional Distribution of Arcades

From the overall characteristics of functional distribution, Turin Porticoes and the Guangzhou Qilou present two distinct spatial organizational logics. The functional distribution of Turin Porticoes exhibits strong planning and clear distribution patterns. Cultural display spaces are situated in the city's core areas, while commercial consumption Porticoes radiate outward from the urban center. Office-based commercial functions are distributed in non-core areas, with the functional types under Porticoes showing relatively clear spatial zoning within the urban structure.

In contrast, the functional distribution of the Guangzhou Qilou is characterized by greater divergence and an orientation toward daily life. The Qilou primarily develop along the streets of the old city, with functions distributed continuously along the streets. Community-based traditional Qilou are the most prevalent (accounting for 80%), supplemented by riverside display Qilou and core commercial Qilou. Qilou streets mainly undertake the function of commercial transactions, providing a relatively comfortable environment for commercial spaces. Riverside display Qilou and core commercial Qilou are new types formed through later government-led renovations, specifically aimed at creating urban symbolic spaces for external display, producing "urban postcards," increasing foot traffic, and attracting tourists. The functions they undertake differ from everyday transactions, being replaced instead by commercial spaces dominated by mid-to-high-end brand consumption.

4.3.2 Differences in Functional Types of Arcades

In terms of function and space, Turin Porticoes as a whole exhibits characteristics of strong scale uniformity, with heights generally maintained within the range of approximately 7–8m (such as 7.87m on Via Roma and 7.67m at Piazza Palazzo di Città), forming a relatively stable spatial scale proportion. On this basis, Porticoes of different functions have slight differences in lateral scale: the commercial Porticoes is about 3.15m wide, which to a certain extent improves the efficiency of people entering Porticoes and shops, thereby promoting and driving consumption; the office and transit Porticoes is about 4.92m wide, reflecting a sense of transit comfort; cultural display spaces strengthen the functions of staying and gathering through the plaza scale (about 15–150m), and Porticoes surrounding the plaza, acting as an extension of the plaza, have scales similar to the office Porticoes with slightly lower heights. Overall, the spatial scale of Turin Porticoes does not vary significantly due to different functional types, and the overall spatial proportion remains in a relatively stable state, which to a certain extent can also indicate that the typological characteristics of Turin Porticoes have no obvious correlation with the functions they carry.

Guangzhou Qilou and Turin Porticoes are completely different in the discussion dimension of functional and spatial types, presenting significant spatial proportion stratification and having a close correlation with the functions carried, meaning that different functional Qilou correspond to completely different spatial prototypes. The space under the gallery of core commercial and tourism Qilou (Beijing Road) is about 3.5m wide (4.2m high); the height of riverside display Qilou (Changdi Da Malu) is increased to about 5.8m, reflecting spatial openness and urban symbolism; community Qilou are further compressed to about 2.7m wide and 3.4m high (actual net height about 2.4m) to meet high-frequency daily life use. The author believes the reason for this is the lack of overall control

of a unified urban style and relevant legal clauses, coupled with the builders' preference for unconventional styles and the underlying commercial and economic value, such that they were not planned and constructed based on unified type standards and modules at the beginning of construction. On this basis, with the development of the city, in order to promote and build urban influence, the later government-led renovation of commercial Qilou adopted more trendy and unconventional styles popular at the time, resulting in large differences from the original Qilou types in the city, with new spatial types appearing alongside new commercial spaces.

4.3.3 Summary

This chapter takes the functions carried by Turin Porticoes and the Guangzhou Qilou as an entry point to conduct a comparative analysis of the roles of arcades within the urban spatial system. On this basis, it further discusses the correspondence between functional types and spatial characteristics, attempting to understand the differences in division of labor and spatial mechanisms within the urban structures of the two locations, and further explores and diagrammatically analyzes the differences and commonalities of arcade types under different functions.

Turin Porticoes can be divided into cultural-social, commercial, and transit-office types. The spatial scale and typology of these Porticoes are relatively stable, without significant differences due to functional variations, remaining within a relatively stable spatial framework. The Guangzhou Qilou develops along streets. When conducting functional classification, they can be divided based on street business attributes and daily usage patterns into three categories: core commercial and tourism consumption, riverside financial and historical display, and community life. There is a distinct relationship between their functions and spatial types: community life Qilou generally have smaller scales, while the riverside financial display Qilou and later-constructed core commercial Qilou were built according to different spatial scales and types, undertaking urban promotion and display functions. Their styles and decorative patterns often originate from the most trendy and popular styles of the time, and their scales are wider than community life arcades, providing better walking comfort and experiential quality. However, due to the rapid development of Chinese cities, the once-planned gallery spaces can no longer meet the functional needs of modern social life. For example, the unreasonable parking of shared bicycles or electric motorcycles under the galleries occupies the original usage space, reflecting that in the Chinese context, a specific type cannot satisfy rapidly changing, constantly updating, and iterating functional demands against a background of rapid era development.

Through the sorting of functional distribution and functional types of arcades, this chapter reveals the fundamental differences in urban mechanisms and usage logic between Turin Porticoes and the Guangzhou Qilou: the former manifests as a structured and orderly organization based on the urban public space system, representing an inheritance and preservation of function and type over time; the latter manifests as continuous changes in function and type following the development of the era, with a large number of arcades carrying different functions existing in the urban space, where different functions are often accompanied by different typological characteristics. Through this comparative analysis at the functional level, a foundation is laid for further discussion of arcade spatial morphology and generation mechanisms from a typological perspective.

Chapter5 Comparative Study on the Climate Adaptability of Arcade

5.1 Climate Adaptability Study of Turin Porticoes

5.1.1 Overview of Turin's Climate

Turin generally exhibits a distinct Mediterranean climate. As indicated by temperature range charts, winter temperatures are low while summer temperatures are high, resulting in a relatively pronounced annual temperature variation. The months of January, February, and December constitute the coldest period of the year, whereas June through August mark the hot season—with July and August being the hottest months. As temperatures rise during the summer, relative humidity generally declines; conversely, humidity tends to be higher during the colder winter months. In essence, Turin's summers are characterized primarily by warm, relatively dry conditions, while its winters are defined by low temperatures and higher humidity.

Regarding sky cover, cloudiness remains generally high throughout the year, and the frequency of clear skies is not particularly notable; this suggests that Turin is not a city characterized by intense, continuous sunshine year-round. Variations in sky cover are relatively uniform, implying that the city's climate frequently involves periods of overcast skies and environments dominated by diffuse light.

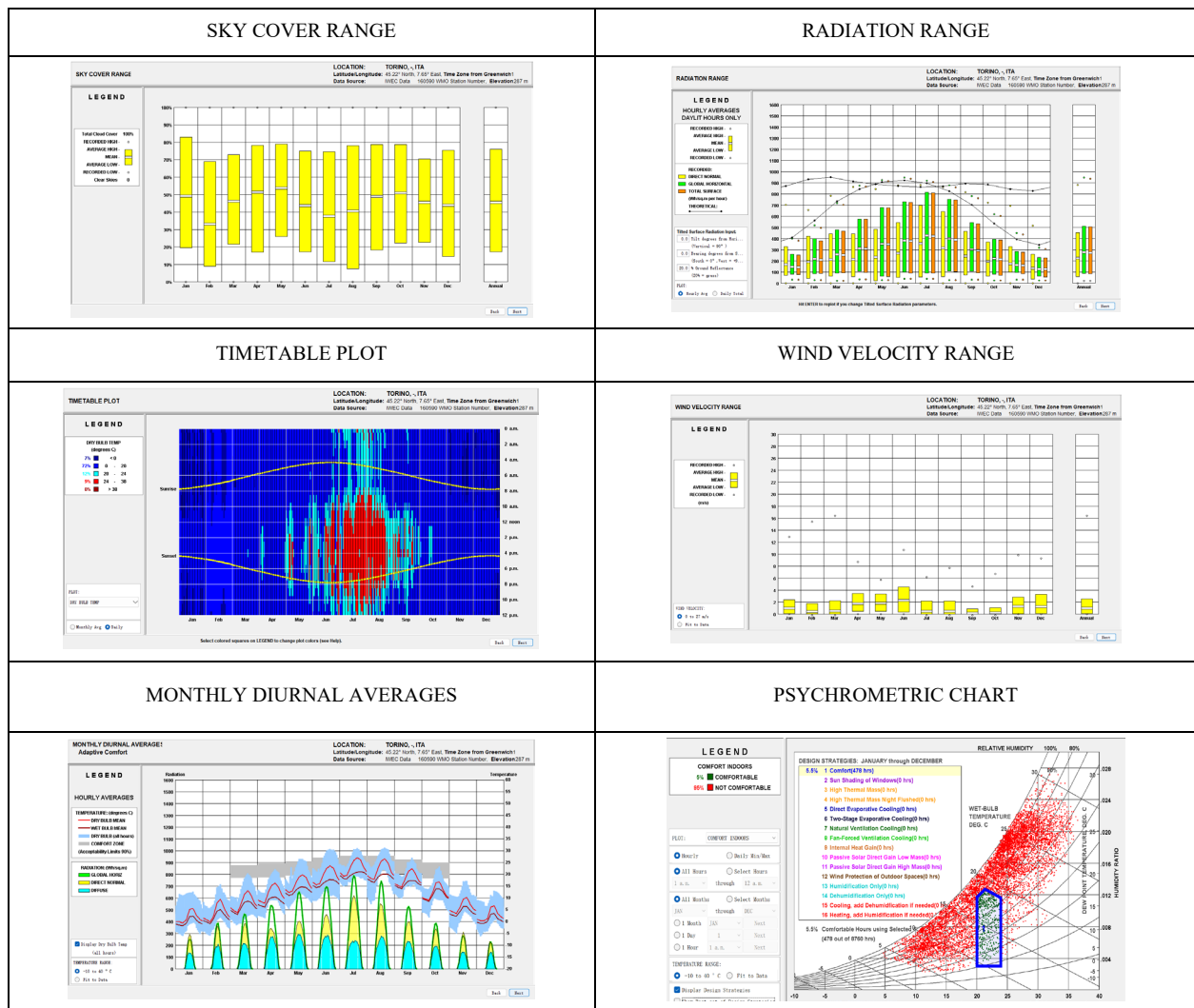
In terms of solar radiation, intensity increases significantly from late spring into summer—peaking specifically between May and August—while radiation levels remain low during the winter. The summer months present significant issues regarding solar exposure; particularly within streets and public squares, direct sunlight can have a substantial impact on thermal comfort.

Regarding wind speeds, Turin generally experiences low wind velocities; low-speed conditions prevail throughout the year, and the city is not characterized by particularly strong or sustained winds. This implies that the primary climatic challenges in Turin do not stem from strong air currents or ventilation issues, but rather from the combined effects of temperature, humidity, solar radiation, and precipitation.

Consequently, when formulating strategies for Porticoes spaces from a climate-regulation perspective, the focus—beyond simply incorporating shading systems for the summer months—should primarily be on mitigating the effects of the cold climate.

Table 5-1 Analysis of Turin's Urban Climatic Characteristics

TEMPERATURE RANGE	DRY BULB X RELATIVE HUMIDITY



5.1.2 Measurement and analysis of Turin Porticoes

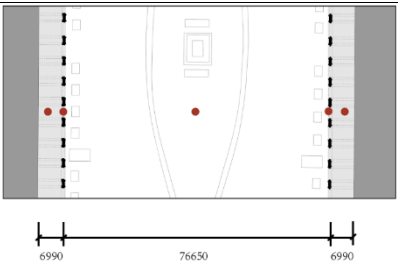
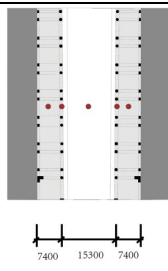
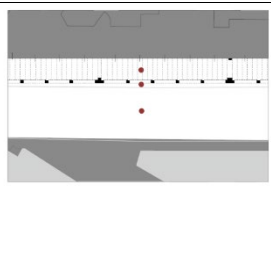
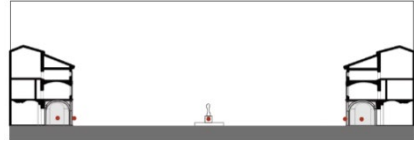
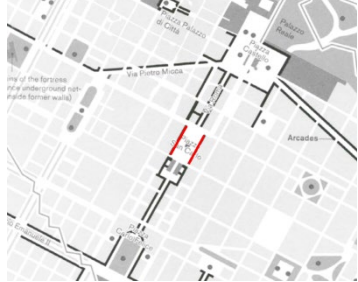
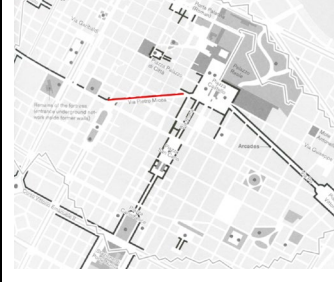
5.1.2.1 Introduction to the Field Measurements

The field measurements for Turin Porticoes were conducted on August 5, 2025, spanning the period from 9:00 AM to 6:00 PM. According to historical weather records from the Torino Caselle meteorological station, the average temperature in Turin on that day was 27°C, with a maximum of 33°C and a minimum of 21°C. The average relative humidity stood at 59%, ranging from a low of 43% to a high of 78%, and the weather conditions were sunny. Overall, the day featured typical hot and sunny summer weather, providing highly suitable meteorological conditions for observing the role of arcade spaces in providing summer shading, cooling, and enhancing pedestrian comfort.

For this field study, three representative Porticoes spaces located within Turin's historic center were selected as samples: Piazza San Carlo, Via Roma, and Via Pietro Micca. These three samples represent distinct spatial typologies—specifically, the enclosed-square type, the axial-street type, and the diagonal-street type—thereby enabling a comprehensive assessment of the climate-regulating effects of Turin's arcades across a variety of urban spatial contexts.

1 Measured Samples and Sampling Point Layout

Table 5-2 Measured Samples

	Piazza San Carlo	Via Roma	Via Pietro Micca
PLAN			
SECTION			
LOCATION			

Sample 1 is situated within the spatial expanse of Piazza San Carlo. The square as a whole constitutes a rectangular space characterized by a clearly defined axial layout, enclosed on both sides by continuous Porticoes. The open central area of the square measures approximately 76.65 meters in width, while Porticoes on either side are each approximately 6.99 meters wide and stand at a height of approximately 7.80 meters. During the measurement process, a total of five measurement points were positioned across the lateral cross-section of the square: two were located inside Porticoes on the left and right sides, two were situated at the interface between the arcades and the open square, and the final point was placed at the exact center of the square, thereby forming a centrally symmetrical layout. In terms of vertical positioning, the measurement points were established at a height of 1.5 meters above ground level.

Sample Site 2 is situated within the streetscape of Via Roma. The street is characterized by a distinct axial linearity, flanked on both sides by continuous Porticoes. According to survey data, the open space in the central section of the street measures approximately 15.30 m in width, while the arcades on either side are each approximately 7.40 m wide and 8.30 m high. During the measurement process, a total of five measurement points were positioned across the street's cross-section: two were located inside Porticoes on the left and right sides, two were placed at the interface between Porticoes and the street, and the final point was situated at the exact center of the street, forming a centrally symmetrical arrangement. Vertically, all measurement points were established at a height of 1.5 m above ground level.

Sample Site 3 is situated within the streetscape of Via Pietro Micca. The street exhibits a predominantly linear spatial configuration, characterized by a continuous Porticoes running along its length. According to the survey drawings, the open space in the central section of the street measures approximately 12.30 meters in width; Porticoes on one side measures approximately 5.10 meters in

width, with a ceiling height of approximately 7.75 meters. During the measurement process, a total of three measurement points were positioned across the street's cross-section: one located inside Porticoes, one at the interface between Porticoes and the street, and the third situated at the center of the street, thereby forming a lateral distribution. Vertically, the measurement points were established at a height of 1.5 meters above ground level.

2 Measurement Instruments and Methods

Testo Infrared Thermal Imager	Instrument Description	Testo 440 Environmental Measuring Instrument	Instrument Description
	Instrument Type: Testo Infrared Thermal Imaging Camera Temperature Measurement Range: -20°C to 650°C (depending on model) Thermal Resolution: $320 \times 240 / 640 \times 480$ (depending on model) Thermal Sensitivity: $\leq 0.05\text{ K}$ Data Format: .BMT / .IRB Acquisition Mode: Image Acquisition (Manual)		Model: Testo 440 Multifunction Environmental Meter Measurement Parameters: Air Velocity, Air Temperature Air Velocity Range: $0 - 20\text{ m/s}$ (depending on probe) Temperature Range: $-20^{\circ}\text{C} - +70^{\circ}\text{C}$ Acquisition Mode: Real-time Automatic Acquisition

A representative summer day (August 5, 2025) was selected for observations conducted at designated points along the chosen streets. The observations included measurements of air temperature at a height of 1.5 meters, wind speed and direction, and thermal imaging. During the period from 9:00 AM to 6:00 PM, a 10-minute stop was made at each test point to record data, allowing for a complete cycle of observations across the cross-section of each street within one hour.

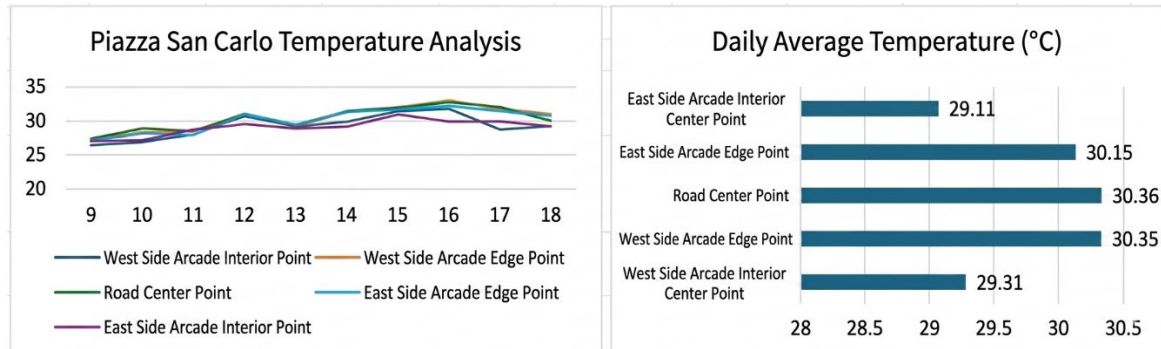
5.1.2.2 Analysis of Measured Results

1 Piazza San Carlo

Temperature Analysis

Based on field measurements taken at Piazza San Carlo, the highest daily average air temperature— 30.36°C —was recorded at the center of the square. The temperatures at the edges of the arcades on the eastern and western sides were 30.15°C and 30.35°C , respectively—values closely approximating that of the square's center. In contrast, the temperatures at the central points within the arcades on the eastern and western sides were 29.11°C and 29.31°C . This indicates that, under sunny summer conditions, the shading effect provided by the arcades lining the square in Turin is capable of lowering air temperatures to some extent; however, the magnitude of this cooling effect is modest (approximately 1°C), serving primarily to buffer the temperature within these transitional boundary spaces. Studies concerning thermal comfort also suggest that while the direct impact of shading on air temperature is typically limited, its more significant role lies in attenuating solar radiation and enhancing thermal comfort.

Table 5-3 Piazza San Carlo Measured Temperature Results



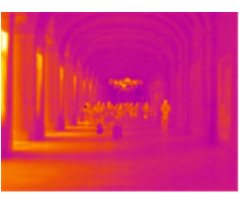
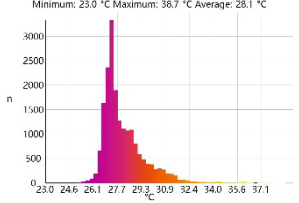
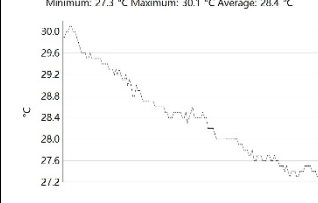
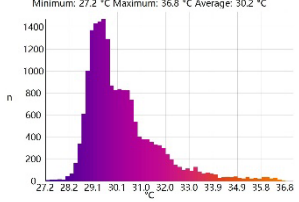
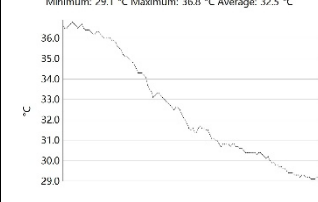
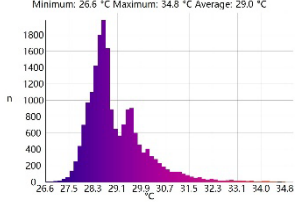
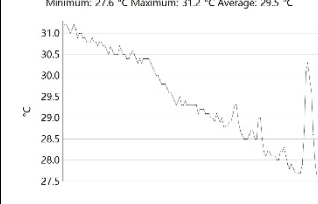
Thermal Comfort

Arcaded spaces exhibit distinct surface cooling and thermal buffering effects. Temperature readings consistently demonstrate a gradual downward trend, decreasing progressively from the open exterior space toward the interior of the arcade; the continuous overhead interface provided by the arcade effectively mitigates the direct heating of ground and building surfaces caused by solar radiation. Data analysis reveals a surface temperature differential of approximately 3–10°C between the exterior and interior of the arcade—a difference that becomes particularly pronounced during the midday to afternoon hours. This suggests that the arcade's regulation of the thermal environment is not primarily manifested through a substantial reduction in air temperature, but rather through a significant attenuation of surface temperatures and radiative heat loads.

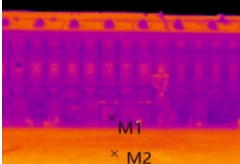
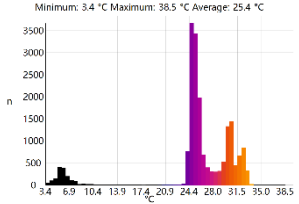
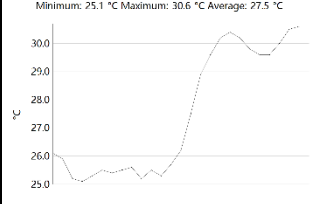
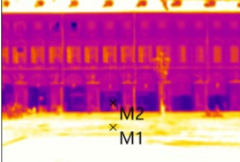
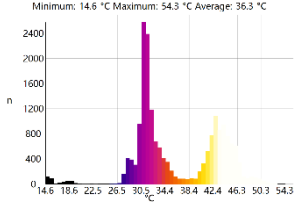
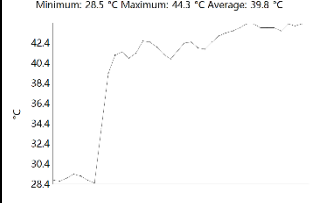
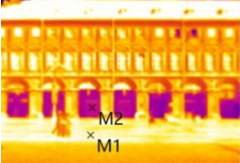
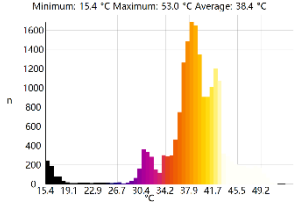
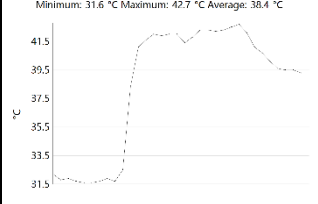
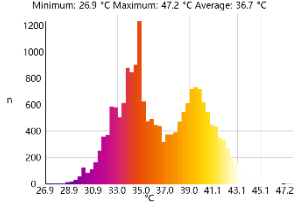
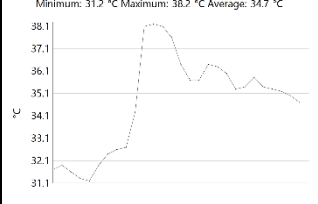
Furthermore, thermal imaging of the building facades indicates that the surface temperature differential between the arcade's interior space and the exterior facades exposed to direct sunlight can reach approximately 20–30°C. This underscores that the arcade's primary function lies not in significantly lowering air temperature, but rather in creating a cooler, more stable microclimatic zone—achieved by shielding against direct solar radiation, reducing surface heat accumulation, and lowering radiative heat loads—thereby enhancing the thermal comfort of the plaza environment for pedestrians and those pausing to rest.

Table 5-4 Piazza San Carlo Thermal Imaging Analysis

Piazza San Carlo West Side Porticoes				
	Picture	Thermal Image	Temperature gradient	Histogram
10AM			Minimum: 23.3 °C Maximum: 37.0 °C Average: 26.7 °C 	Minimum: 25.9 °C Maximum: 34.7 °C Average: 30.3 °C
12 AM			Minimum: 24.9 °C Maximum: 36.6 °C Average: 28.4 °C 	Minimum: 26.5 °C Maximum: 36.2 °C Average: 31.1 °C

2 PM			Minimum: 23.0 °C Maximum: 38.7 °C Average: 28.1 °C 	Minimum: 27.3 °C Maximum: 30.1 °C Average: 28.4 °C 
4 PM			Minimum: 27.2 °C Maximum: 36.8 °C Average: 30.2 °C 	Minimum: 29.1 °C Maximum: 36.8 °C Average: 32.5 °C 
6 PM			Minimum: 26.6 °C Maximum: 34.8 °C Average: 29.0 °C 	Minimum: 27.6 °C Maximum: 31.2 °C Average: 29.5 °C 

Piazza San Carlo West Elevation

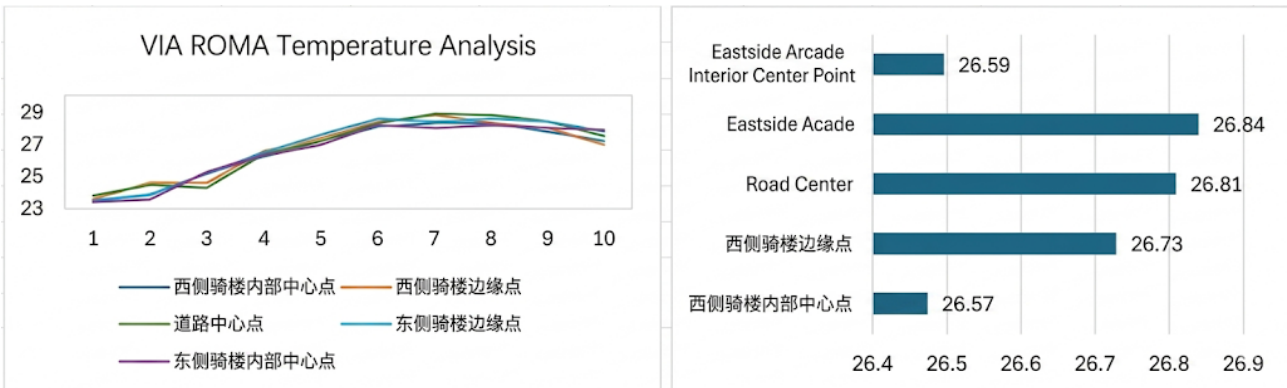
	Picture	Thermal Image	Temperature gradient	Histogram
10AM			Minimum: 3.4 °C Maximum: 38.5 °C Average: 25.4 °C 	Minimum: 25.1 °C Maximum: 30.6 °C Average: 27.5 °C 
2 PM			Minimum: 14.6 °C Maximum: 54.3 °C Average: 36.3 °C 	Minimum: 28.5 °C Maximum: 41.3 °C Average: 39.8 °C 
4 PM			Minimum: 15.4 °C Maximum: 53.0 °C Average: 38.4 °C 	Minimum: 31.6 °C Maximum: 42.7 °C Average: 38.4 °C 
6 PM			Minimum: 26.9 °C Maximum: 47.2 °C Average: 36.7 °C 	Minimum: 31.2 °C Maximum: 38.2 °C Average: 34.7 °C 

2. Via Roma

Temperature Analysis

Via Roma is a north-south oriented arcade. The distance between the roads inside the arcade is small, and the differences in daily average air temperature across various measuring points are minimal, generally concentrating between 26.57–26.84°C. Among them, the edge point of the eastern Porticoes is the highest (26.84°C), followed by the road center point (26.81°C), while the center points inside the eastern and western Porticoes are the lowest (26.57°C and 26.59°C, respectively). The interior of the Via Roma Porticoes is approximately 0.2–0.3°C lower than the edges and the road center; although the cooling magnitude is not large, this type of north-south oriented Porticoes can form a more stable and comfortable microclimate during hot summer weather.

Table 5-5 2 Temperature Analysis of Via Roma

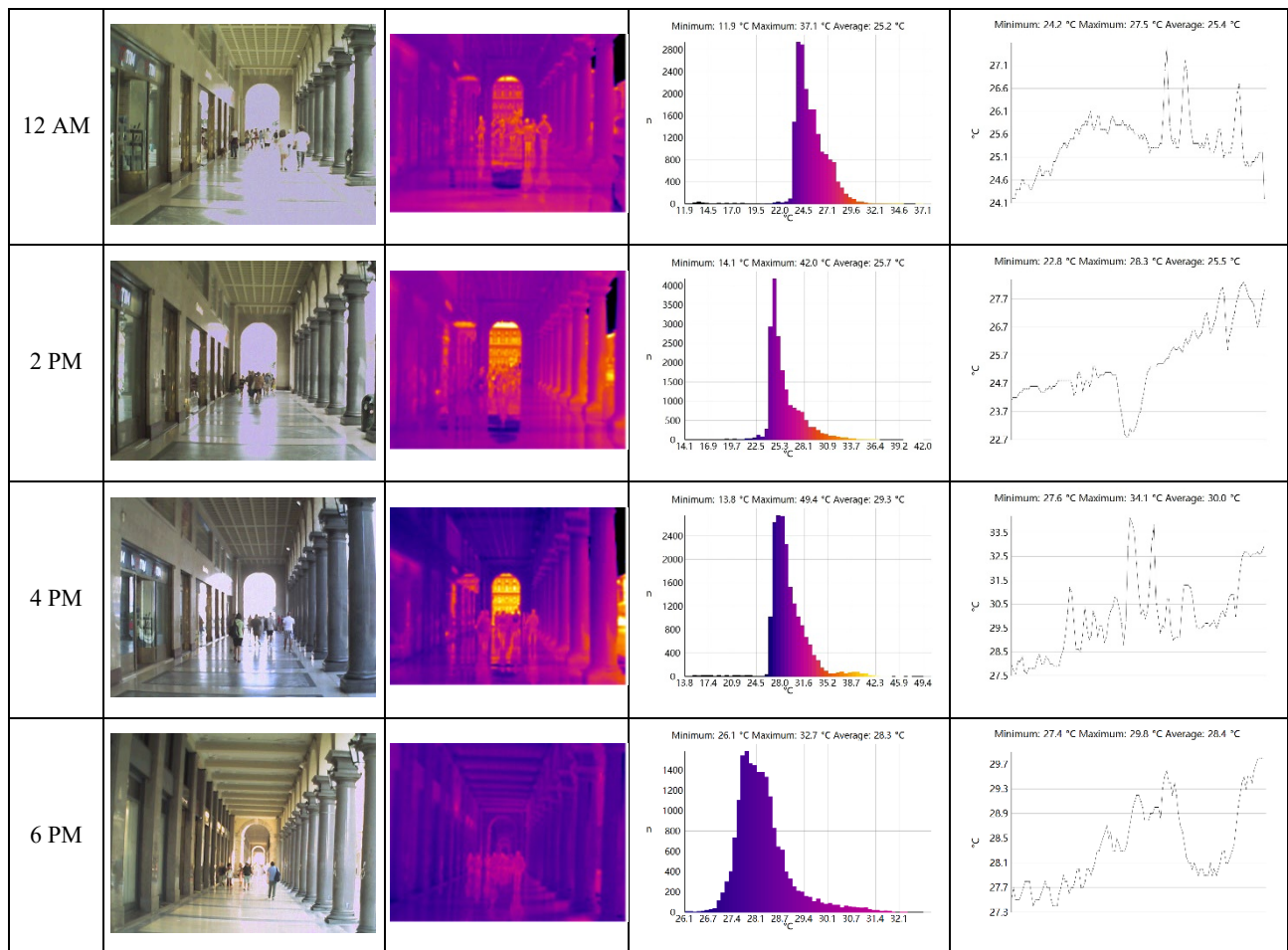


Thermal Comfort

The surface temperature of the spaces under the Via Roma Porticoes is lower than that of other Porticoes interior areas at all times of the day, with an average temperature difference of approximately 2–4°C. On one hand, this difference is related to its north-south orientation, which results in the interior being less affected by solar radiation, making it easier for Porticoes to form relatively stable shaded conditions. On the other hand, it is also related to the material characteristics of the interior, which is primarily marble; its surface heat absorption and heat accumulation are relatively low, thus allowing the interior space to maintain a cooler and more comfortable thermal environment.

Table 5-6 Thermal Imaging Analysis of Via Roma

Via Roma west side Porticoes				
	Picture	Thermal Image	Temperature gradient	Histogram
10AM			Minimum: 10.4 °C Maximum: 29.5 °C Average: 22.7 °C	Minimum: 21.5 °C Maximum: 25.2 °C Average: 23.2 °C

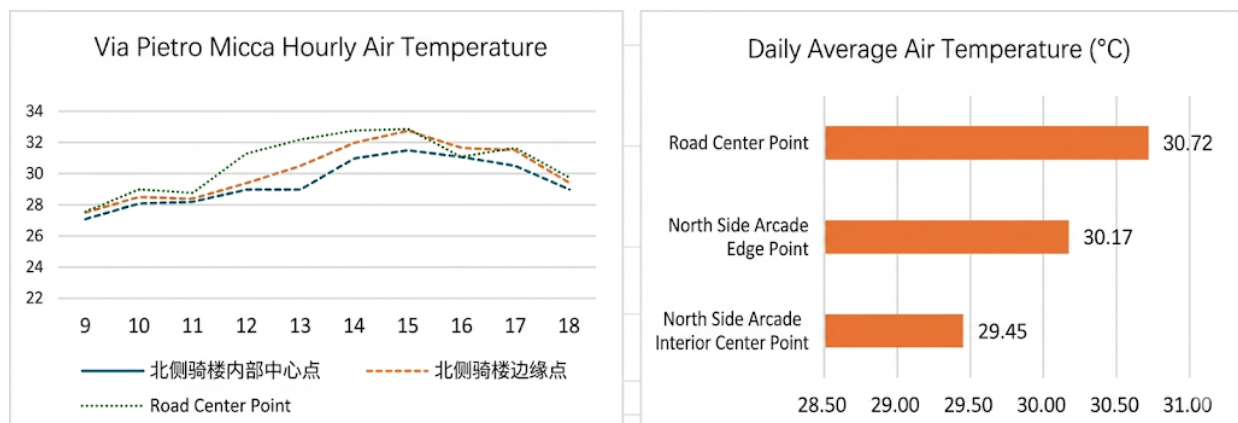


2 Via Pietro Micca

Temperature Analysis

The temperature distribution within the Via Pietro Micca Porticoes exhibits a distinct gradient pattern: the daily average temperature is highest at the center of the roadway (30.72°C), followed by the edge points of Porticoes on the northern side (30.17°C), while the lowest temperature is recorded at the central points within the interior of the northern Porticoes (29.45°C). As an east-west oriented street featuring an Porticoes along its northern flank, the roadway center and Porticoes edges are more susceptible to warming due to direct solar radiation; conversely, the continuous shading provided by Porticoes interior creates a boundary space characterized by relatively lower temperatures, thereby rendering Porticoes's climate-regulating effect particularly pronounced.

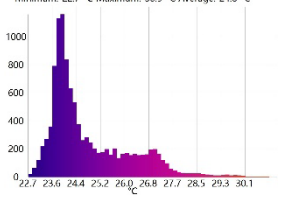
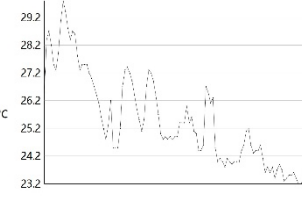
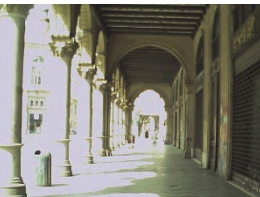
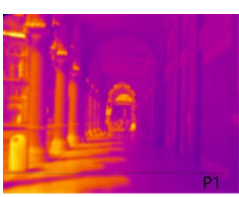
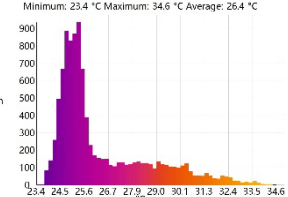
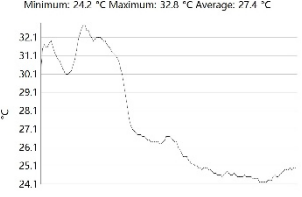
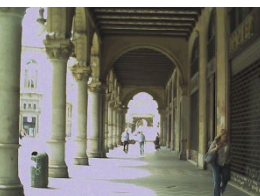
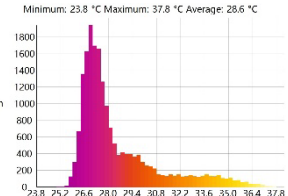
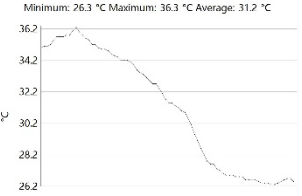
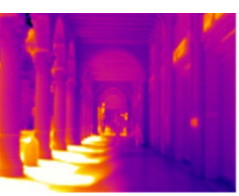
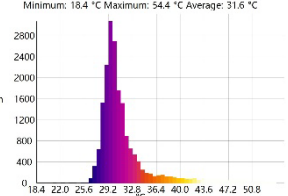
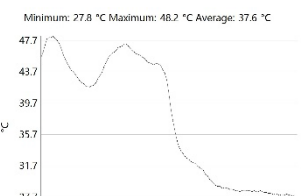
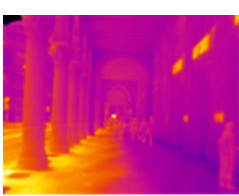
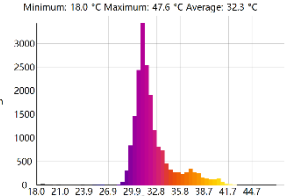
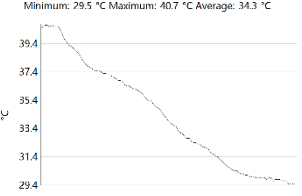
Table 5-7 Via Pietro Micca Temperature Analysis



Thermal Comfort

Via Pietro Micca runs in an east-west direction, allowing direct sunlight to penetrate the interior of the arcade between 12:00 PM and 4:00 PM. A particularly pronounced temperature gradient is observable during the 2:00 PM to 4:00 PM interval; within this timeframe, surface temperatures decrease significantly from the exterior of the arcade toward its interior. Notably, at 4:00 PM, the surface of the exterior street—exposed to direct sunlight—reaches 50°C, whereas the surface temperature beneath the interior arcade remains steady at approximately 20°C, demonstrating a highly significant moderating effect.

Table 5-8 Via Pietro Micca Thermal Imaging Analysis

Via Pietro Micca				
	Picture	Thermal Image	Temperature gradient	Histogram
10AM			Minimum: 22.7 °C Maximum: 30.9 °C Average: 24.8 °C 	
12 AM			Minimum: 23.4 °C Maximum: 34.6 °C Average: 26.4 °C 	Minimum: 24.2 °C Maximum: 32.8 °C Average: 27.4 °C 
2 PM			Minimum: 23.8 °C Maximum: 37.8 °C Average: 28.6 °C 	Minimum: 26.3 °C Maximum: 36.3 °C Average: 31.2 °C 
4 PM			Minimum: 18.4 °C Maximum: 54.4 °C Average: 31.6 °C 	Minimum: 27.8 °C Maximum: 46.2 °C Average: 37.6 °C 
6 PM			Minimum: 18.0 °C Maximum: 47.6 °C Average: 32.3 °C 	Minimum: 29.5 °C Maximum: 40.7 °C Average: 34.3 °C 

5.1.2.1 Conclusion

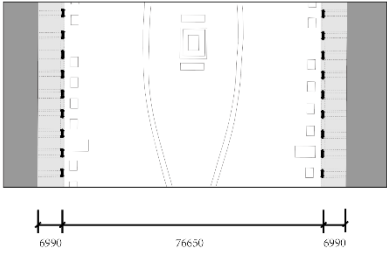
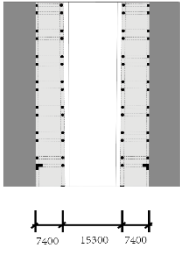
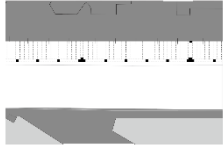
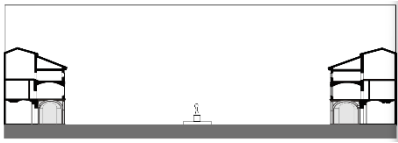
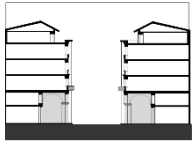
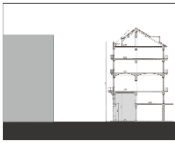
Street	Piazza San Carlo	Via Roma	Via Pietro Micca
Layout			
Section			
Height	7.80m	8.30m	7.75m
Street Width	76.65	15.3	12.3
H/W ratio	0.10 (7.80/76.65)	0.54 (8.30/15.30)	0.63 (7.75/12.30)
Orientation	Northeast–Southwest orientation	Northeast–Southwest orientation	Northwest–Southeast orientation

Table 5-9 Comparative Analysis of Turin Sample Information

Based on the empirical results from three sample sites in Turin, the climatic characteristics—specifically high summer temperatures and intense solar radiation—have generated a distinct need for the sheltered spaces provided by arcades. These measurements further validate the efficacy of Porticoes typology in regulating the local climate; at a more micro-environmental level, both the air temperature within Porticoes and the temperature differential relative to surface temperatures are demonstrably correlated with street width, the height-to-width ratio, and the orientation of the street.

Via Roma exhibits the most stable thermal environment and the most comfortable temperatures overall; temperatures beneath its Porticoes cluster within the range of 26.57–26.81°C. This stability is primarily attributable to a moderately proportioned "street canyon" geometry combined with a north-south orientation, which facilitates a balanced distribution of shade and thermal buffering throughout the day. Consequently, even during the intense heat of summer, both the center of the street and the interior of Porticoes maintain a relatively comfortable environment for pedestrians. However, the temperature-regulating effect of these north-south-oriented Porticoes is not particularly pronounced, as the temperature difference between the space beneath Porticoes and the center of the roadway is merely around 0.2°C.

In contrast, although Piazza San Carlo features continuous Porticoes with proportions similar to those of Via Roma, its central open space spans a considerable 76.65 meters, resulting in an extremely low height-to-width (H/W) ratio of just 0.10. This expansive openness allows solar radiation to impinge more directly upon both the central square and the interior of Porticoes. Consequently, the daily average temperature at the center of the square reaches 30.36°C. While the temperatures at the

central points within Porticoes flanking the square are slightly lower than that of the square's center (averaging 29.1°C), they remain approximately 2°C higher than the temperatures recorded during the same period in Via Roma—a Porticoes with an identical north-south orientation. This suggests that within a large public square, an excessively wide open expanse ($H/W = 0.1$) leads to elevated temperatures in the center of the square; however, it also renders the temperature-regulating effect of Porticoes—which provide an average temperature reduction of 1°C—even more pronounced.

Via Pietro Micca, which runs along an east-west axis, recorded the highest temperature at its street center point, reaching 30.72°C; the temperature at the central point within Porticoes on the northern side of the street was 29.45°C. Although the street width is merely 12.30 m—yielding an H/W ratio of 0.63, which theoretically favors shading—the street's northwest-to-southeast orientation allows sunlight to penetrate more directly into both the street and the interior of Porticoes from noon through the afternoon. Consequently, the temperature rise is more pronounced at the center and edges of the roadway; only the interior of Porticoes maintains a relatively lower temperature, demonstrating the greatest capacity for temperature attenuation—specifically, the temperature within Porticoes is approximately 1.27°C lower than that at the center of the roadway.

Table 5-10 Sample Temperature Comparative Analysis

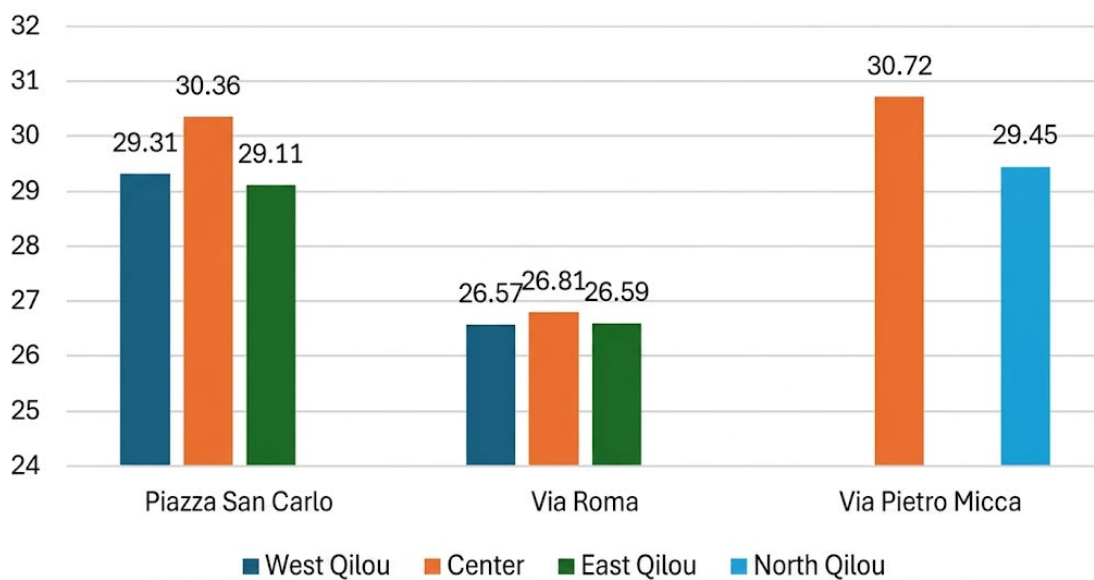
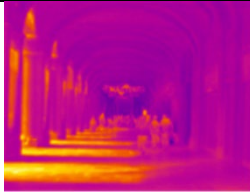
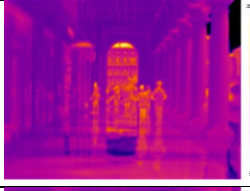
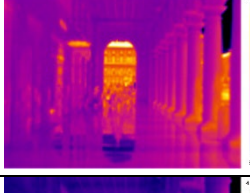
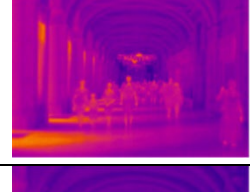
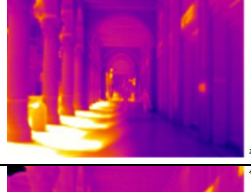
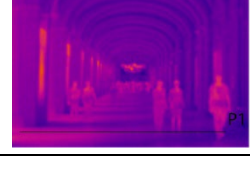


Table 5-11 Comparative Analysis of Thermal Imaging

	Piazza San Carlo	Via Roma	Via Pietro Micca
10am			
12pm			
2pm			
4pm			
6pm			

5.2 Climate Adaptability Study of Guangzhou Qilou

5.2.1 Overview of Guangzhou's Climate

Guangzhou is characterized by a distinct humid subtropical climate. As indicated by temperature range charts, temperatures remain generally high throughout the year; winters are relatively mild, while summers are persistently hot, with prolonged periods of high temperatures. The months of January and February constitute the coolest phase of the year, yet overall temperatures remain at a relatively high level. From May to October, the region enters an extended period of high temperatures, with the months of June through September being the hottest. Coinciding with the rise in summer temperatures, relative humidity remains consistently high, resulting in a pronounced "hot and humid" climate profile; even during the winter, when temperatures dip slightly, the air remains generally humid. Overall, Guangzhou's climate is characterized by warmth and humidity, with the combination of high temperatures and high humidity being particularly prominent during the summer months.

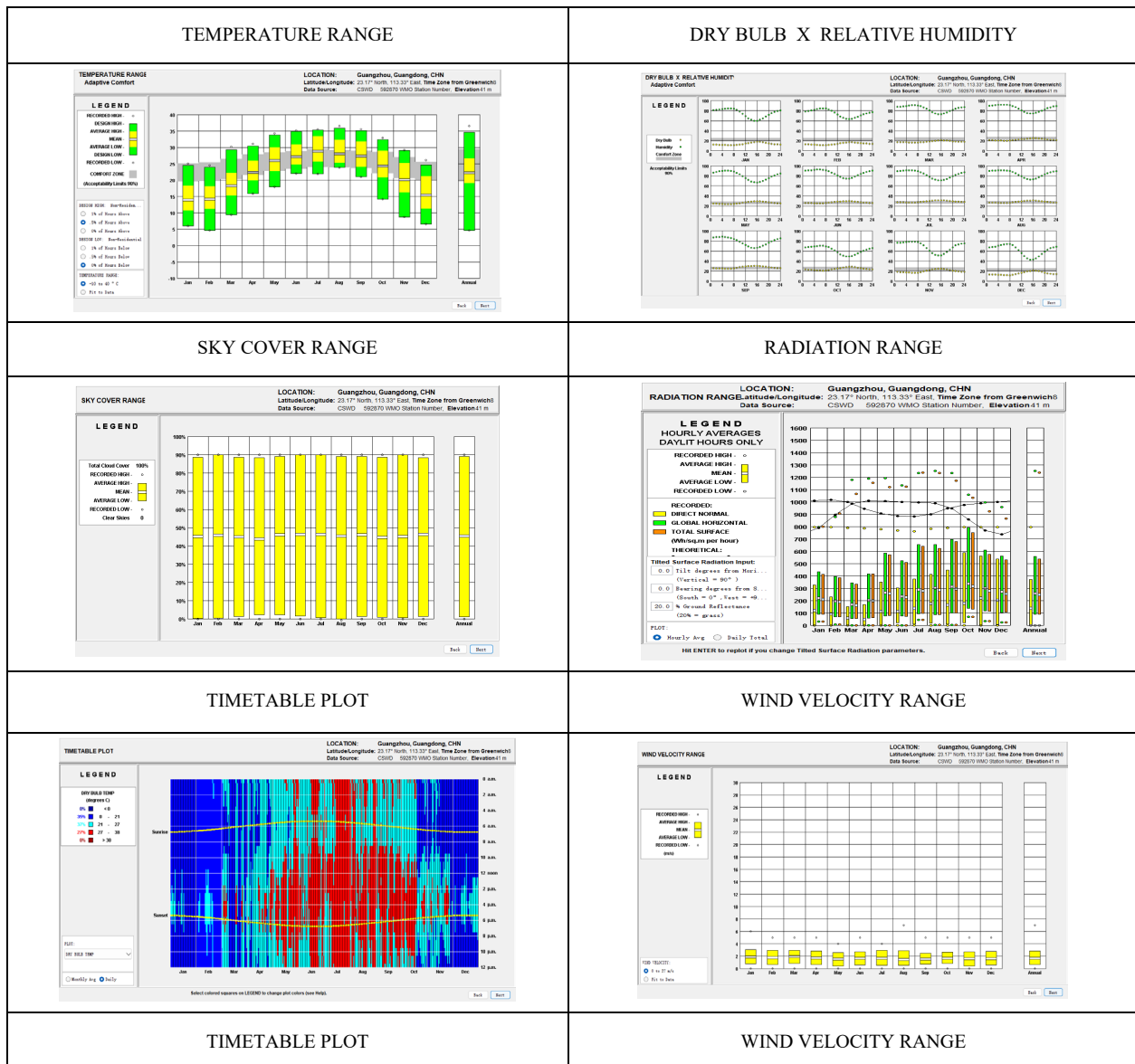
Regarding sky cover, cloudiness in Guangzhou remains consistently high throughout the year, exhibiting minimal month-to-month variation. Consequently, the region exists within a perpetual climatic context characterized by overcast skies, high humidity, and accompanying rainfall. This high and stable level of sky cover implies that outdoor environments are frequently subject to overcast conditions, diffuse lighting, and precipitation, lending a strong sense of persistence to the prevailing climatic conditions.

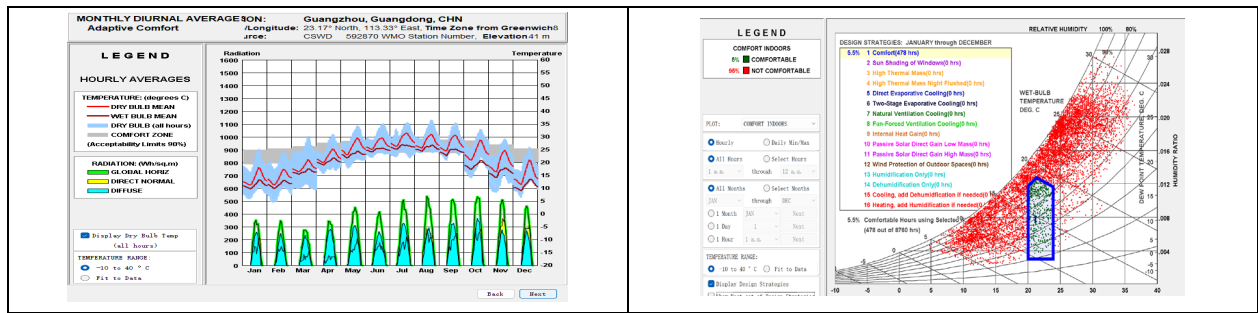
In terms of solar radiation, intensity begins to increase gradually in the spring, reaching peak levels during the summer—a period of high intensity that persists for an extended duration. Despite the high degree of sky cover, the prolonged duration of high temperatures means that urban streetscapes in summer still face significant issues regarding heat accumulation and solar exposure; here, the combined effects of solar radiation and humid heat significantly impact outdoor thermal comfort.

Regarding wind speeds, Guangzhou generally experiences relatively low wind velocities. Low wind speeds predominate throughout the year, with no distinct or sustained periods of strong winds; this indicates that the natural wind environment is insufficient to effectively ameliorate or regulate the hot and humid climatic conditions prevalent during the summer.

Therefore, from the perspective of climate-responsive design strategies, the primary focus of climate regulation lies in mitigating the persistent heat, humidity, and rainfall experienced throughout the year—with particular emphasis placed on the integrated application of long-term shading, cooling, ventilation, and rain protection measures during the summer months.

Table 5-12 Guangzhou's Climatic Characteristics





5.2.2 Measurement and analysis of Turin Porticoes

5.2.2.1 Introduction to the Field Measurements

The on-site measurements of Guangzhou's Qilou are conducted on November 15, 2025, spanning the period from 9:00 AM to 6:00 PM. On this day, Guangzhou experienced a minimum temperature of 17.8°C, a maximum temperature of 29.2°C, and a daily mean temperature of 23.5°C. The weather was sunny, with no cloud cover or precipitation.

For this study, two representative Qilou streets located within Guangzhou's historic urban core were selected as samples: Hongde Road and Tongfu West Road. Hongde Road is situated in the historic western district of Haizhu, Guangzhou; running in a north-south direction, it features a moderate street scale and is characterized by a strong sense of residential vitality and daily routine. Tongfu West Road is located adjacent to Hongde Road and runs in an east-west direction. As both streets share similar characteristics regarding their Qilou structures and street dimensions, they serve as effective case studies for illustrating how the differing orientations of Guangzhou's Qilou—while other environmental conditions remain largely constant—influence climate regulation through shading, ventilation, and thermal buffering.

1 Measured Samples and Sampling Point Layout

Table 5-13 1 Measured Samples

	Hongde Road	Tongfu Weset Road
PLAN		
SECTION		



Sample Site 1 is situated within the streetscape of Hongde Road. The street features a predominantly linear, north-south orientation characteristic of traditional Qilou (arcade) streets, with buildings lining both sides in a continuous frontage; the arcade interface and the roadway space collectively form a relatively complete street cross-section. According to survey drawings, the central vehicular lane of the street measures approximately 7 meters in width, while the bicycle lanes on either side are approximately 1.5 meters wide; the arcade walkway on the left side has a width of approximately 3 meters. During the measurement process, a total of five measurement points were positioned across the street's lateral cross-section: two points were located within the interior of the arcades—or the adjacent pedestrian spaces—on the left and right sides, respectively, while two other points were situated at the interface between the arcades and the roadway.

Sample Site 2 is situated within the streetscape of Tongfu West Road. The street features a predominantly linear, east-west orientation, characteristic of traditional Qilou (arcade) streets. According to survey maps, the central vehicular lane measures approximately 10 meters in width, flanked by bicycle lanes of approximately 1.5 meters on either side, while the covered walkways beneath the Qilou arcades on both sides are approximately 3 meters wide. During the measurement process, the principles and logic governing the placement of sampling points were consistent with those applied at Hongde Road.

2 Measurement Instruments and Methods

Jingchuang GSP-8G Temperature and Humidity Data Logger	Instrument Description	FLIR ONE Pro Thermal Imaging Camera	Instrument Description
	Temperature and Humidity Data Logger Model: GSP-8G (GSP-8 Series) Measurement Parameters: Air Temperature, Relative Humidity Temperature Range: -40°C to 85°C		Infrared Thermal Imager Measurement Parameters: Object surface temperature, thermal distribution image Temperature Range: Measures up to 400°C; detects temperature differences of approximately 70 mK.

Measurements were conducted from 9:00 AM to 6:00 PM and included air temperature, relative humidity, wind speed, and wind direction at a height of 1.5 meters, as well as thermal imaging within the arcade. Observations and data recording were performed at each test point for a duration of 10 minutes; a complete measurement cycle covering all test points across a single street cross-section could be completed within one hour.

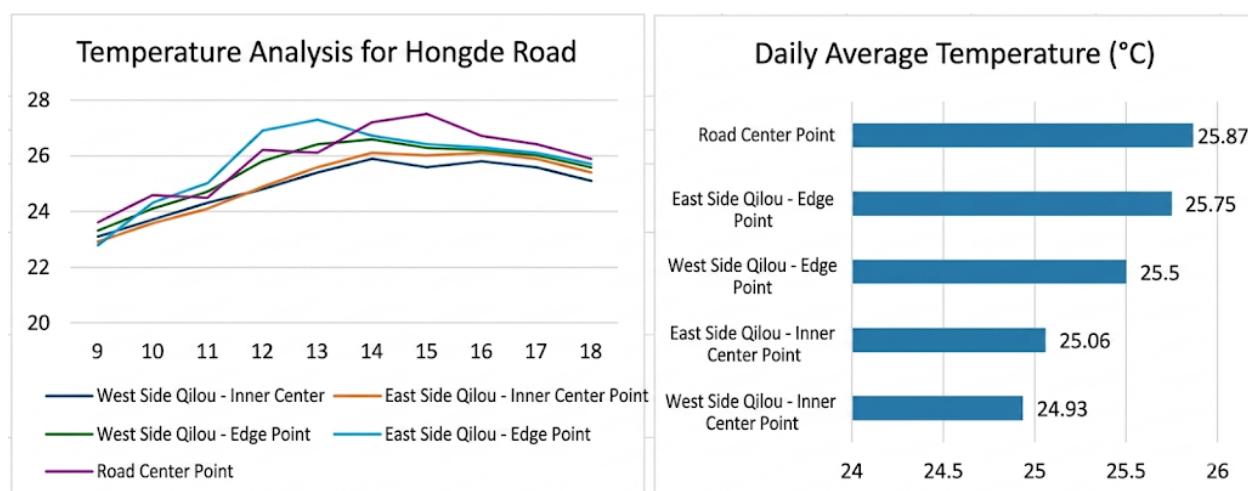
5.2.2.2 Analysis of Measured Results

1 Hongde Road

Temperature Analysis

According to the hourly air temperature data collected along Hongde Road, distinct temperature variations were observed across different measurement points. The air temperature in the central road zone consistently remained the highest (25.87°C), reaching its peak at 2:00 PM. In contrast, the air temperature within the interior spaces of the Qilou was generally lower and exhibited relatively milder fluctuations (ranging from approximately 24.93°C to 25.06°C within the western Qilou interiors); furthermore, the average temperatures recorded at the interior measurement points on both the eastern and western sides were essentially identical. Spatially, the street-level air temperature established a stable pattern characterized by the hierarchy: Road Center > Qilou Edge > Qilou Interior.

Table 5-14 Hongde Road Temperature Analysis

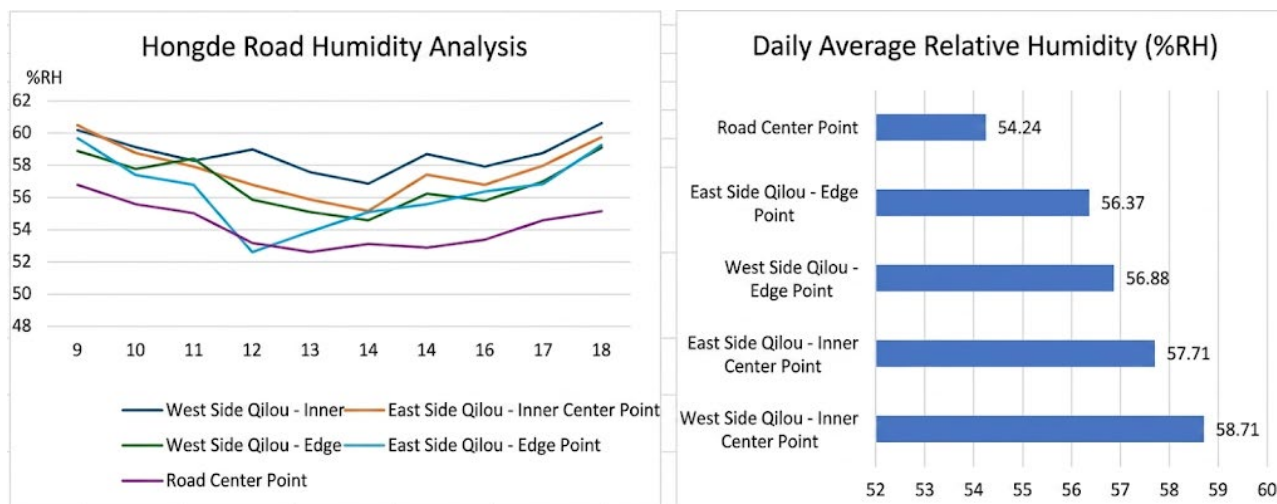


Humidity Analysis

Hourly variations in relative humidity observed along Hongde Road reveal a distinct pattern: relative humidity gradually decreases throughout the morning, reaches its lowest levels between noon and early afternoon, and subsequently rebounds in the evening. In terms of spatial distribution, the relative humidity at the central point within the Qilou (arcade) interior is consistently the highest overall (58.2% RH); this is likely because the semi-enclosed nature of the Qilou interior—characterized by overhead shielding—effectively mitigates both solar radiation and evaporative effects. In contrast, the relative humidity in the central roadway area remains at the lowest levels throughout the day, exhibiting a particularly pronounced decline during the noon-to-afternoon period. This is primarily attributable to the fact that the open roadway space is significantly exposed to direct solar radiation, rendering its atmospheric humidity more susceptible to the effects of evaporation.

Overall, the relative humidity within the Qilou environment exhibits a hierarchical gradient, increasing progressively from the street toward the interior of the arcade. This pattern indicates that, due to its semi-open spatial configuration, the Qilou's humidity environment is subject to the combined regulatory influences of both the architectural interface and external climatic factors—a trend that runs counter to the daily average temperature patterns observed within the Qilou.

Table 5-15 Humidity Analysis of Hongde Road

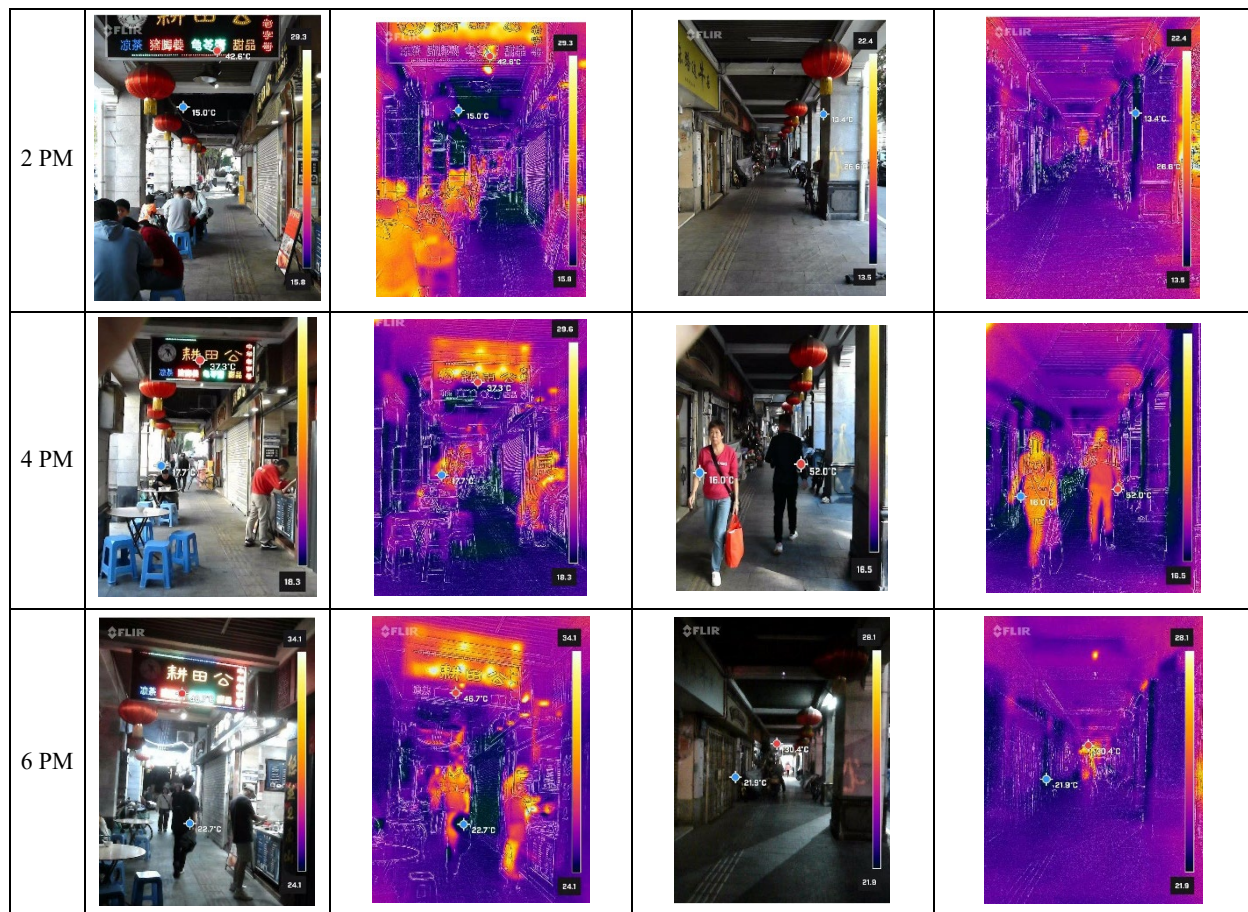


Thermal Comfort Comparison

Thermal imaging results indicate that Tongfuxi Road—a north-south oriented arcade street—exhibits no significant temperature gradient between the interiors and exteriors of its arcades; internal temperatures maintain a relatively stable and uniform distribution throughout the day. Furthermore, there are no discernible differences in the internal thermal environments of the arcades situated on the eastern and western sides of the street. This suggests that the temperature-regulating effect of north-south oriented arcades is not pronounced; rather, their primary function lies in providing physical shading to block solar radiation, thereby homogenizing and stabilizing the thermal environment of the space. Concurrently, as the interiors of the arcades are also influenced by the air conditioning systems of the shops housed within them, most internal arcade spaces offer a more comfortable environment compared to the outdoors, benefiting from this dual mechanism of thermal regulation.

Table 5-16 Hongde Road Thermal Imaging Analysis

Hongde Road				
	West		East	
	Picture	Thermal Image	Picture	Thermal Image
10AM				
12 AM				



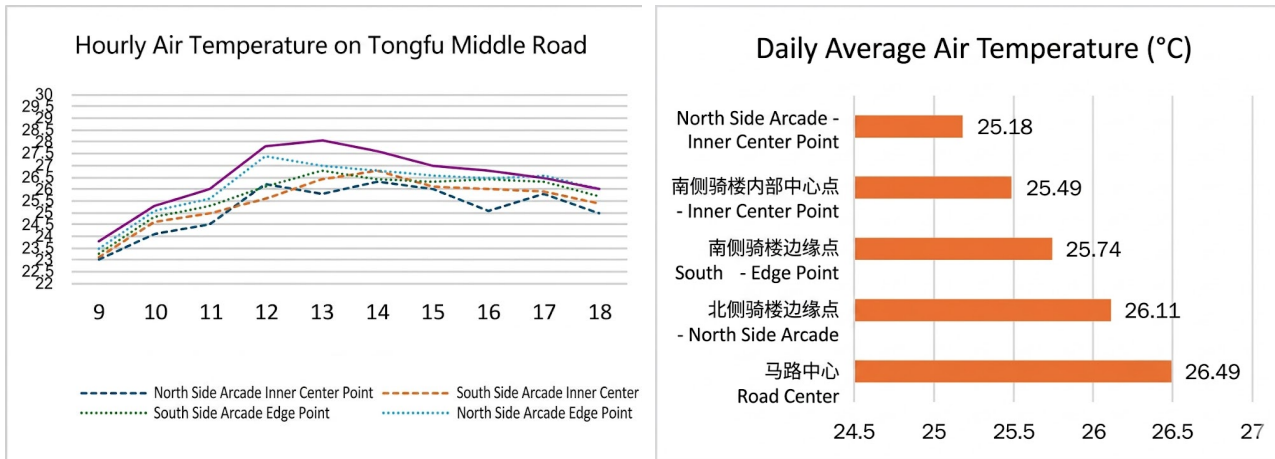
2 Tongfu West Road

Temperature Analysis

Based on the hourly air temperature variations along Tongfu Middle Road, the air temperature in the central roadway zone is the highest; throughout the day, it consistently exceeds that of the arcade spaces. The average air temperature in this zone is 26.49°C. In contrast, the air temperatures within the arcade interiors are generally lower; specifically, the daily average air temperature is lowest at the central point of the northern arcade interior (25.18°C), while it is slightly higher in the southern arcade interior (25.49°C). Furthermore, the daily average air temperature at the edge of the northern arcade (26.11°C) is slightly higher than that at the edge of the southern arcade (25.74°C), indicating that street orientation exerts a certain influence on the air temperatures in these peripheral zones.

Regarding hourly variation trends, the magnitude of temperature fluctuation is greatest in the central roadway zone, whereas variations within the arcade interiors are relatively more subdued. Additionally, the occurrence of thermal peaks within the arcades is slightly delayed, suggesting that the arcade structures possess a certain capacity for heat storage. Consequently, the thermal environment along Tongfu Middle Road follows a consistent hierarchy: Central Roadway > Arcade Edge > Arcade Interior.

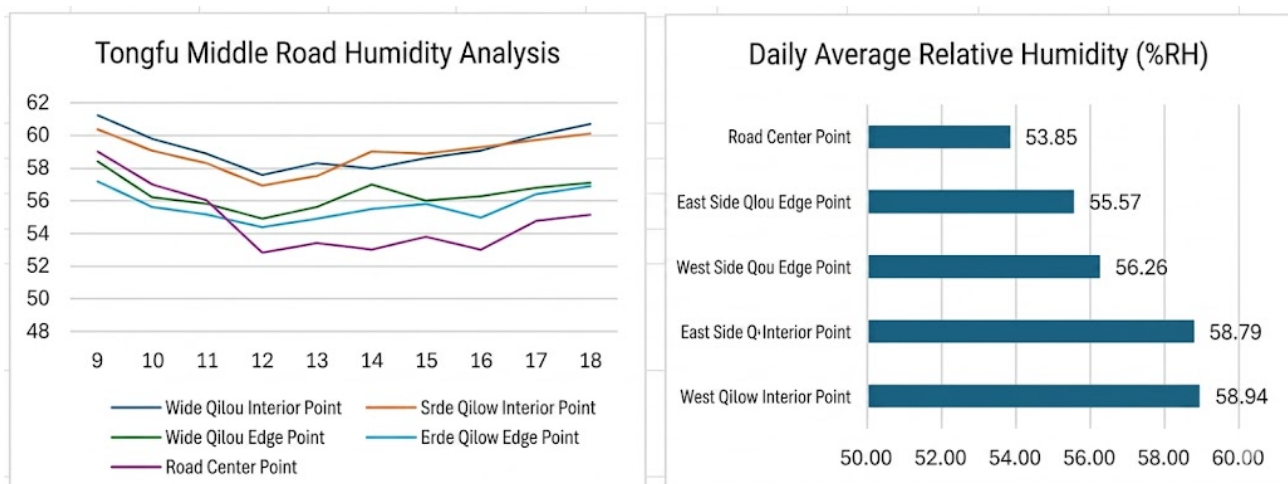
Table 5-17 Tongfu West Road Temperature Analysis



Humidity Analysis

Based on the hourly relative humidity measurements taken along Tongfu Middle Road, it is evident that the relative humidity levels within the interior spaces of the Qilou are the highest (58.87% RH), exhibiting relatively minor diurnal fluctuations. Conversely, the relative humidity in the central roadway area is generally the lowest, displaying a relatively larger range of diurnal variation characterized by a distinct pattern of "decreasing at noon and rising in the afternoon." The relative humidity in the peripheral zones of the Qilou falls between that of the interior spaces and the central roadway, thereby demonstrating clear transitional characteristics. This gradient variation in relative humidity aligns closely with the patterns observed in the north-south oriented Qilou along Hongde Road.

Table 5-18 Tongfuxi Road Humidity Analysis

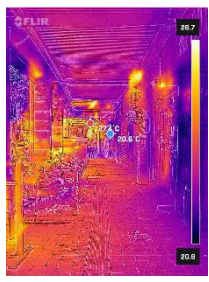
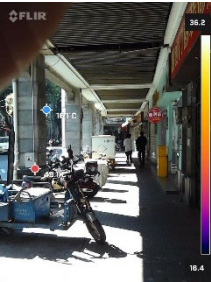
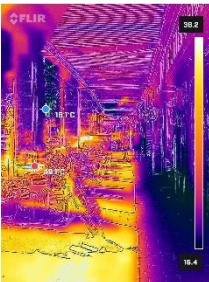
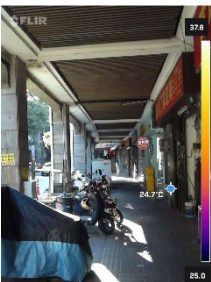


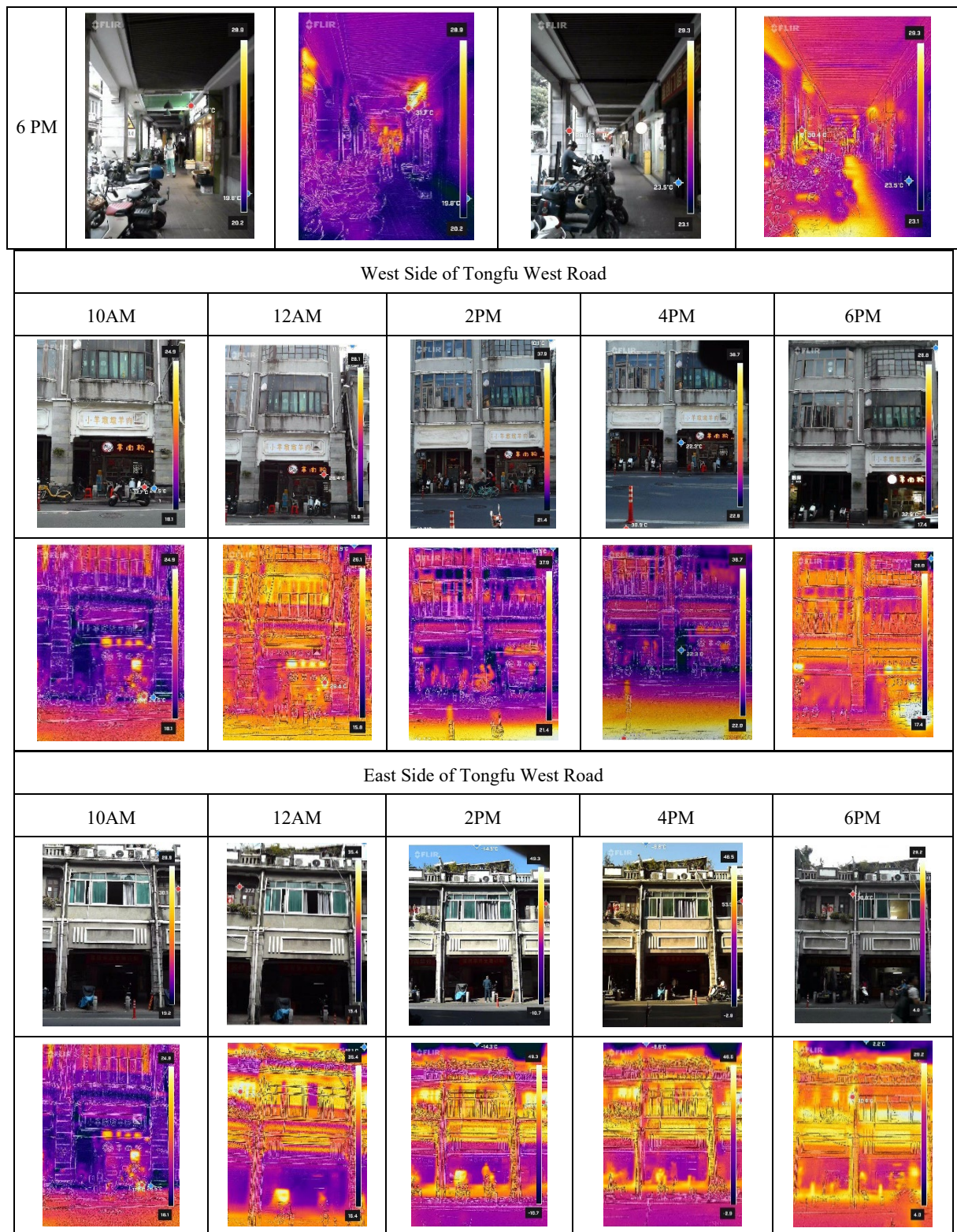
Thermal Comfort Analysis

Based on thermal imaging results, the thermal comfort of the arcade structures along the east-west oriented Hongde Road exhibits distinct temporal and lateral variations. During the midday to afternoon hours, direct solar radiation causes a significant rise in temperature at the edges of the arcades and on the ground surface; notably, the high-temperature zones on the northern side are more continuous and intense, demonstrating a more pronounced susceptibility to solar radiation. In contrast,

the internal temperature distribution within the southern-side arcades is relatively more uniform. Furthermore, there is a significant trend of decreasing temperature moving from the exterior of the street toward the interior of the arcade, indicating that the arcade serves a certain function in providing shade and thermal buffering. However, given that the depth of the arcade is merely 3 meters, sunlight can penetrate the entire interior during certain periods; consequently, the thermal regulation effect is not particularly pronounced, manifesting primarily in the deeper sections of the arcade rather than as a uniform cooling across the entire interface.

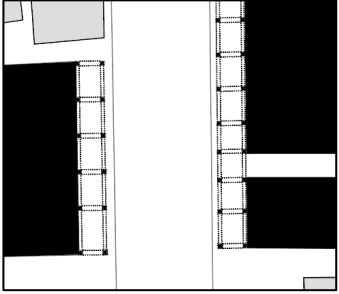
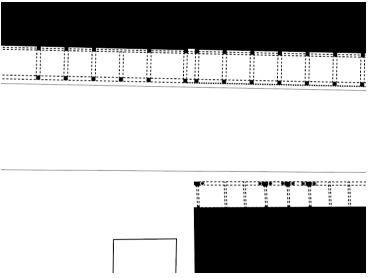
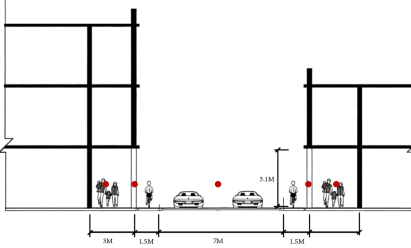
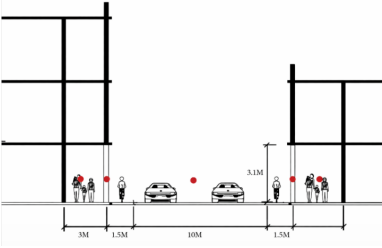
Table 5-19 Tongfu West Road Thermal Imaging Analysis

Tongfu West Road				
	South Side		North Side	
	Picture	Thermal Image	Picture	Thermal Image
10AM				
12 AM				
2 PM				
4 PM				



5.2.2.3 Conclusion

Table 5-20 Comparative Analysis of Guangzhou Sample

	Hongde Road	Tongfu Wset Road
Plan		
Section		
Height	9.2m	8.9m
Road Width	10m	13m
H/W Ratio	0.92	0.68
Orientation	南北走向	东西走向

Based on the field measurement results from two sample sites in Guangzhou, the persistent high temperatures and humid climate characteristic of summer have created a distinct need for shaded and ventilated spaces. These measurements further validate that the Qilou architectural typology is effective in improving the thermal environment within its sheltered corridors. Much like Porticoes of Turin, the air temperature, humidity, and surface temperature differentials within the Qilou corridors are all correlated with street width, the height-to-width ratio, and the street's orientation.

In terms of air temperature, the daily average temperatures at the center points of both streets showed little variation, generally remaining within the 25°C to 26°C range. However, the mean temperature at the center of Tongfu Middle Road was slightly higher than that of Hongde Road (26.49°C vs. 25.87°C). Furthermore, the temperature curve for Tongfu Middle Road exhibited a more pronounced upward trend between noon and late afternoon, indicating that east-west oriented streets—being susceptible to direct solar radiation—are more prone to heat accumulation during the day. In contrast, temperature fluctuations at the various measurement points along Hongde Road were relatively mild; notably, the temperature difference between the interior of the Qilou and its outer edge was minimal. This reflects the ability of north-south oriented Qilou structures to establish relatively balanced shading conditions throughout the day, thereby facilitating more stable regulation of air temperature.

Regarding relative humidity, both streets exhibited a trend of declining humidity around noon followed by a rebound in the evening. However, the daily average relative humidity at the center of Tongfu Middle Road was slightly lower than that of Hongde Road; this is because the former experiences more intense daytime heating, causing the air temperature to rise and consequently resulting in lower relative humidity levels. Concurrently, because the sheltered spaces beneath the Qilou can—to a certain extent—help maintain ambient humidity levels, the relative humidity within the Qilou interiors on both streets was generally higher than that at the street centers. Furthermore,

owing to these elevated humidity levels, the spaces beneath the Qilou are susceptible to moisture-induced corrosion, a phenomenon that is observed to be particularly severe.

An analysis of surface temperature distribution—derived from thermal imaging data—reveals that the interior temperatures of the north-south oriented Qilou on Hongde Road remained relatively stable throughout the day. The temperature gradient between the interior and exterior was negligible, and the thermal environments on the eastern and western sides showed minimal variation, demonstrating a high degree of spatial homogeneity. Conversely, the east-west oriented Qilou on Tongfu West Road exhibited more pronounced edge heating and unilateral solar exposure during the midday to late-afternoon period; this resulted in a significant temperature gradient—decreasing from the street exterior toward the Qilou interior—and highlighted the starker thermal environmental disparities between the northern and southern sides of the street. Consequently, the thermal regulation effect of north-south-oriented Qilou is primarily manifested in the stabilization of the thermal environment; conversely, east-west-oriented Qilou possess a somewhat stronger regulatory capacity, as they are able to directly block direct sunlight, thereby creating a relatively comfortable pedestrian space.

Table 5-21 Temperature Comparison

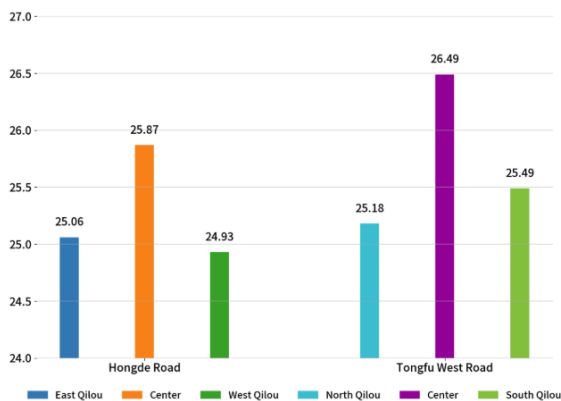


Table 5-22 Humidity Comparison

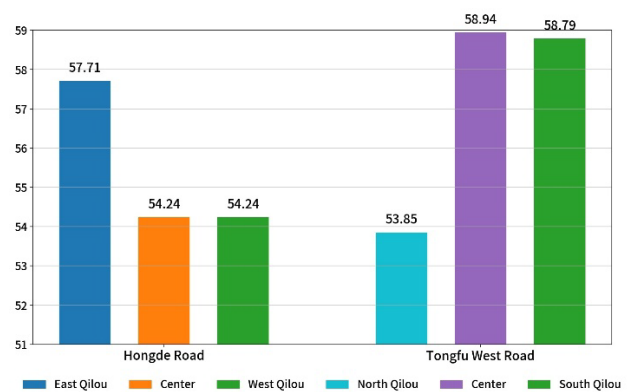
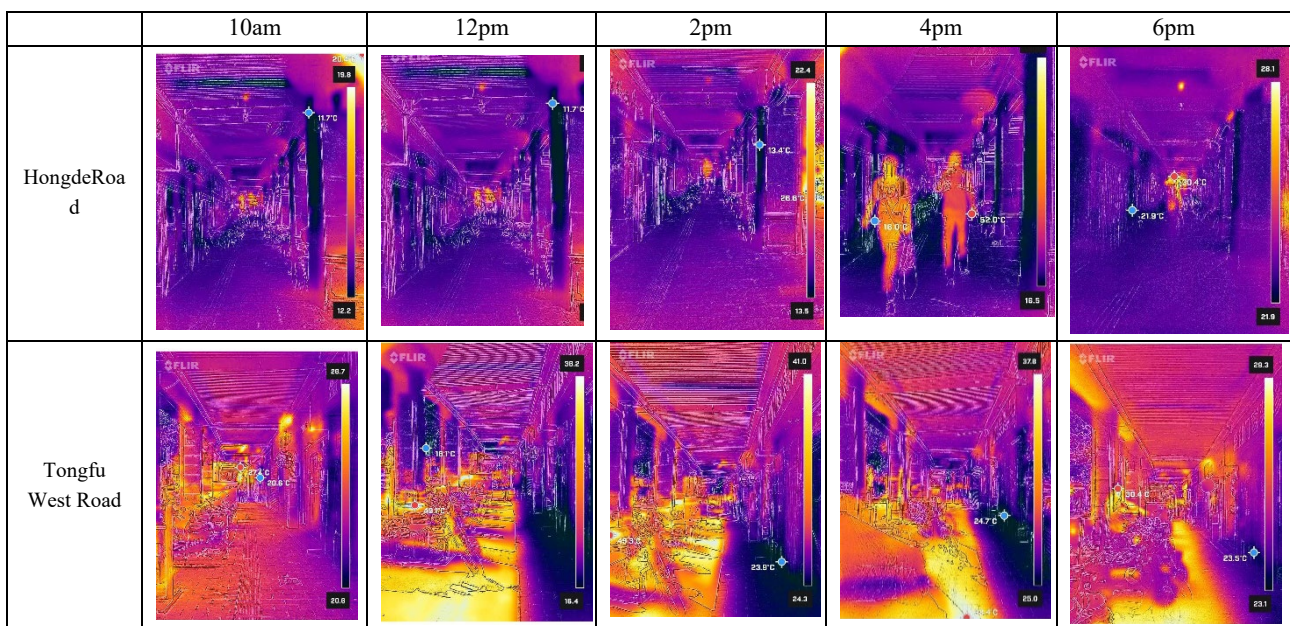


Table 5-23 Thermal Imaging Comparison



5.3 Comparative Analysis

5.3.1 Comparison of Climates

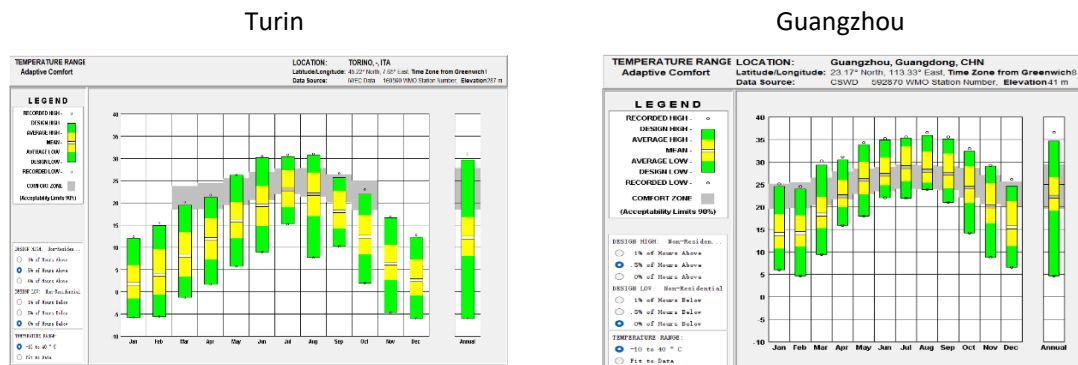


Fig 5-1 Temperature Comparison

When comparing temperature ranges against comfort zones, Turin exhibits significant annual temperature fluctuations; winter temperatures are distinctly low, while summer—though warmer—sees its highest temperatures concentrated within a relatively brief period. Consequently, the comfort zone is predominantly experienced during late spring, summer, and early autumn, reflecting a strong pattern of seasonal variation. In contrast, Guangzhou maintains generally higher temperatures throughout the year; winters remain relatively mild, while periods of high summer heat persist for longer durations. With a greater number of months falling above the comfort zone threshold, Guangzhou presents a more intense and prolonged thermal environmental challenge, resulting in reduced comfort levels during the summer season. Given that Turin features a Mediterranean climate—characterized by cold winters, warm summers, and pronounced seasonal shifts—whereas Guangzhou exhibits the traits of a subtropical climate—defined by long summers, short winters, and consistently high temperatures—this fundamental climatic divergence dictates the distinct priorities for climate adaptation in the corridor-like spaces of the two cities: Turin’s arcades are designed primarily to mitigate winter cold and summer solar exposure, while Guangzhou’s Qilou place greater emphasis on providing continuous summer shade, cooling, and shelter from rain.

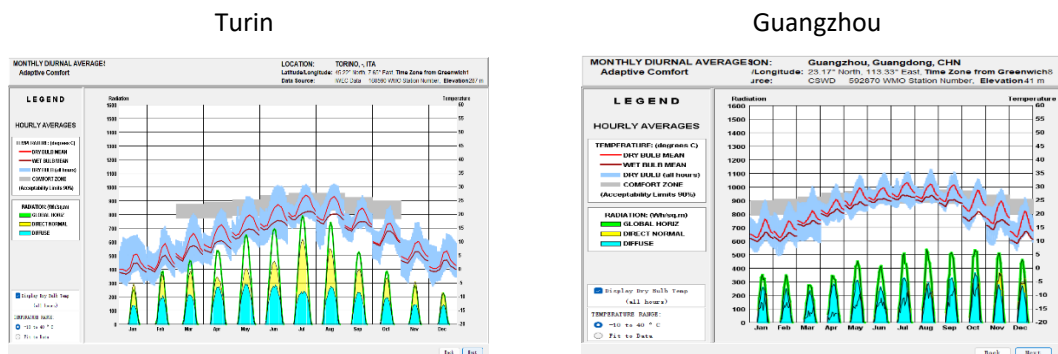


Fig 5-2 Humidity Comparison

Based on the charts depicting average monthly diurnal variations, Turin and Guangzhou exhibit distinct differences in their humidity characteristics. Turin generally maintains low wet-bulb temperatures; during the winter, these temperatures are particularly low—indicating cold yet relatively dry air—and while they do rise in the summer, they remain within a relatively mild range, such that air humidity exerts minimal influence on thermal sensation. In contrast, Guangzhou’s wet-bulb temperatures remain at elevated levels throughout the year; they rise significantly during the

summer—approaching the dry-bulb temperatures—indicating high air humidity and restricted evaporative heat loss, which renders individuals more susceptible to sensations of sultriness.

Turin is characterized by a temperature-dominated climate, wherein the impact of humidity on thermal comfort is relatively weak; Guangzhou, conversely, presents a climatic profile defined by the superposition of high temperatures and high humidity, where the role of humidity in contributing to thermal discomfort is far more pronounced. This distinction further underscores why Guangzhou’s Qilou require strategies involving ventilation and shading to mitigate sultry environmental conditions, whereas Turin’s arcades function primarily as buffer zones against temperature fluctuations and solar radiation.

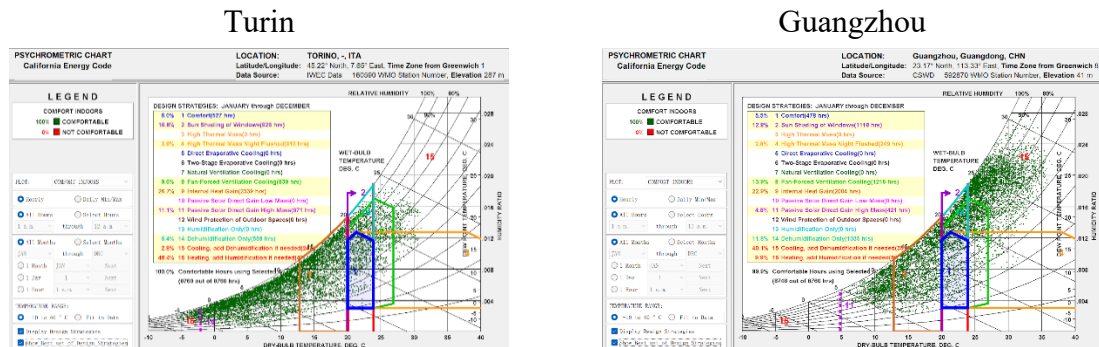


Fig 5-3 Climate Regulation Comparison

From the perspective of climate regulation, Turin’s primary regulatory requirements are heating and humidification, accounting for 48.4% of the total; this reflects the fact that Turin’s year-round climatic challenges center predominantly on low temperatures and cold environments. This is followed by the utilization of internal heat gains (26.7%) and, subsequently, the implementation of shading systems (10.6%). Analysis reveals that climate regulation in Turin is primarily focused on mitigating cold conditions, while also requiring specific shading measures during the summer months or periods of intense solar radiation. In contrast, Guangzhou’s principal design strategies involve cooling and—when necessary—dehumidification, accounting for approximately 40.1% of the total; high temperatures and high humidity constitute its most prominent climatic challenges. This is followed by the utilization of internal heat gains (22.9%) and, subsequently, the implementation of shading systems (12.8%). Regarding the climate-regulating functions performed by arcades, those in Turin prioritize ameliorating cold winter conditions by providing a semi-sheltered space, whereas those in Guangzhou place greater emphasis on mitigating the persistent heat and humidity characteristic of the environment throughout the year.

5.3.2 Comparison of Measurement Results

Since the field measurements in Turin were conducted on a typical summer day in August, while those in Guangzhou took place on a typical autumn day in November—and despite the fact that the daily average temperatures did not differ significantly—the absolute temperature values of the two locations cannot be directly compared to assess the relative intensity of their climates. Instead, it is more appropriate to compare their spatial climate regulation patterns. An analysis of the measured air temperature data reveals a consistent pattern across both locations: temperatures are highest in the centers of streets or squares, followed by the edges of arcades or Qilou (arcade-style buildings), and

are lowest within the interior spaces. Whether in the arcades of Turin or the Qilou of Guangzhou, these structures effectively create a thermal buffer for the adjacent pedestrian spaces.

However, the two types of structures demonstrate different priorities regarding air regulation. Influenced by their distinct geographical locations and climatic conditions, Turin's arcades place greater emphasis on mitigating surface temperatures and reducing radiant heat loads, whereas Guangzhou's Qilou focus more directly on regulating the air temperature and humidity within the street-level pedestrian spaces. Orientation, street width, and arcade height also influence the effectiveness of this regulation. In Guangzhou—where street scales and Qilou heights are relatively consistent—the pedestrian comfort level along Hongde Road (which runs north-to-south) is notably superior to that of Tongfu Middle Road (which runs east-to-west). In Turin, pedestrian comfort is optimal along Via Roma, characterized by continuous arcades on both sides and a moderate "street canyon" scale; conversely, the expansive Piazza San Carlo and Via Pietro Micca (which features arcades on only one side) are more prone to exhibiting pronounced temperature gradients. While the arcades' role in regulating solar radiation is most evident in these latter locations, the temperatures beneath the arcades still remain higher than those found along the north-to-south Via Roma.

Overall, the climate-regulating effect of Turin's arcades is less pronounced than that of Guangzhou's Qilou. There are two primary reasons for this distinction. From a climatic perspective, periods of high summer heat in Turin are relatively brief; consequently, the duration during which arcades are required to mitigate high summer temperatures is limited. As illustrated in thermal comfort charts, weather conditions in Turin fall within the "thermal comfort zone" for a significant portion of the period between April and September. Thus, Turin's arcades do not serve as an essential climate-regulating space specifically designed to combat extreme summer heat; rather, they function primarily as semi-enclosed spaces that offer shelter from wind and rain during the prolonged winter season. In contrast, Guangzhou experiences prolonged periods of high heat and humidity during the summer, making its Qilou structures highly effective in reducing solar radiation and facilitating ventilation to alleviate humidity. When evaluated strictly based on their respective climatic contexts, the climate-regulating performance of Guangzhou's Qilou surpasses that of Turin's arcades. Secondly, in terms of corridor geometry, Guangzhou's Qilou (arcade-houses) typically feature relatively low clear heights and shallow depths; this configuration facilitates the formation of continuous and stable shade during the summer, thereby effectively preventing solar radiation from penetrating the interior spaces. In contrast, the arcades of Turin are larger in scale—typically featuring clear heights of around 7–8 meters and relatively greater corridor widths—resulting in a higher degree of solar penetration into their interior spaces and, consequently, relatively lower shading efficiency during the summer months. The street canyon aspect ratio and the degree of shading coverage are critical factors influencing thermal comfort; specifically, deeper shading interfaces are more effective in mitigating thermal stress.

5.3.3 Summary

Climatic differences are one of the reasons leading to the typological variations between Turin Porticoes and the Guangzhou Qilou, and these distinct arcade types also produce different climate regulation effects. In the comparative analysis of the climatic characteristics of the two locations, it can be found that Turin belongs to a Mediterranean climate with cold winters, warm summers, and

significant seasonal changes; its climate regulation focuses on improving low winter temperatures and managing the periodic changes in summer solar radiation. In contrast, Guangzhou exhibits the characteristics of a subtropical climate with high temperatures and high humidity throughout the year. The climatic differences are reflected not only in the absolute values of temperature and humidity but also in the distribution of thermal comfort intervals and the emphasis on climate regulation needs.

On this basis, this chapter conducts a comparative analysis of the microclimate regulation mechanisms of the arcade spaces in both locations using measured data, focusing on air temperature, humidity, and the thermal environment. Both types of spaces are capable of forming a certain climatic buffer interface between the building and the street, but their regulation paths differ significantly: Turin Porticoes focuses more on mitigating solar radiation and providing sheltered space to cope with winter cold and summer sun, while the Guangzhou Qilou responds to the continuous year-round high temperature and high humidity through continuous shading, promotion of ventilation, and humidity reduction.

Further analysis from the perspective of the arcade's spatial morphology, geometric scale, and street orientation shows that the Guangzhou Qilou has a smaller net height and depth, which can form a stable shadow interface and achieve higher shading efficiency. In contrast, the larger scale of Turin Porticoes is relatively weaker in terms of summer shading and thermal environment control. At the same time, differences in street canyon proportions and orientations also lead to different performances in pedestrian comfort in the two locations.

Therefore, the architectural types formed by the joint action of climatic, historical, and social factors present differentiated characteristics in the scale, interface, orientation, and organizational methods of the arcades. This provides a foundation for the architectural typology research in the next chapter, ensuring that subsequent analysis no longer remains at the formal level but can further reveal the typological generation logic of Turin Porticoes and the Guangzhou Qilou from the perspective of climate adaptation and spatial mechanisms, summarizing their differences and commonalities in the process of architectural typological evolution.

Chapter6 Comparative Study of Arcade Typologies

Building upon the preceding comparative analyses of the historical evolution, public characteristics, functional distribution, and climatic adaptation of the Guangzhou Qilou and Turin Porticoes, this chapter moves into the core content of the research: a comparative study of arcade typologies. While previous sections primarily discussed the background and reasons behind the formation of typological differences, this chapter focuses on extracting and categorizing these differences into specific architectural types, systematically organizing the typological characteristics of the arcades in both locations.

This chapter will conduct research from the perspectives of facade types and spatial types of the arcades in both locations. It will analyze basic architectural elements including master plan layout, planar organization, facade composition, and sectional spatial characteristics. Combined with spatial scales and proportional relationships, it will systematically summarize and compare their typological features. On this basis, representative typical samples will be selected for analysis to discuss the spatial characteristics and differences of different types. As the core chapter of this thesis, it builds upon the previous discussions regarding the causes of typological differences to complete the categorization of arcade typologies.

6.1 Study of Turin Porticoes Typologies

6.1.1 Classification and Typical Characteristics of Turin Porticoes

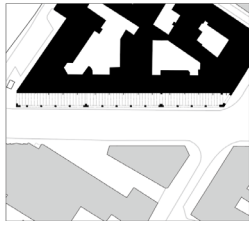
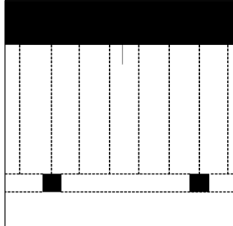
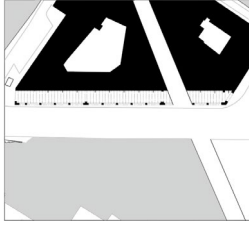
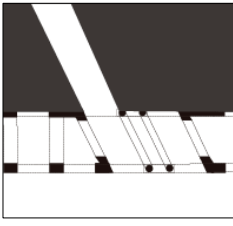
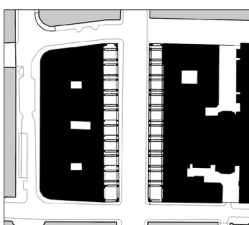
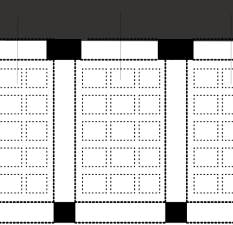
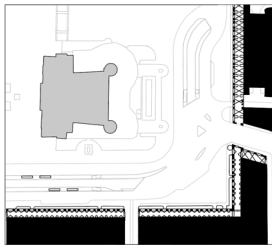
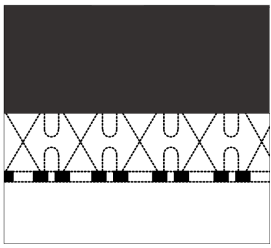
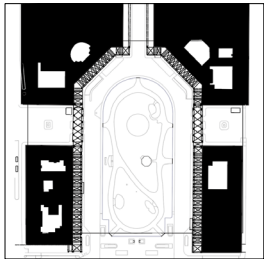
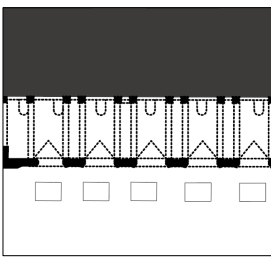
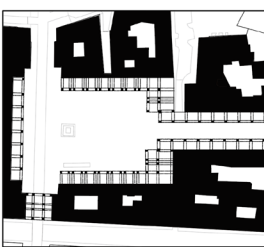
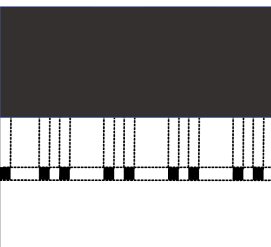
6.1.1.1 Spatial Typological Characteristics

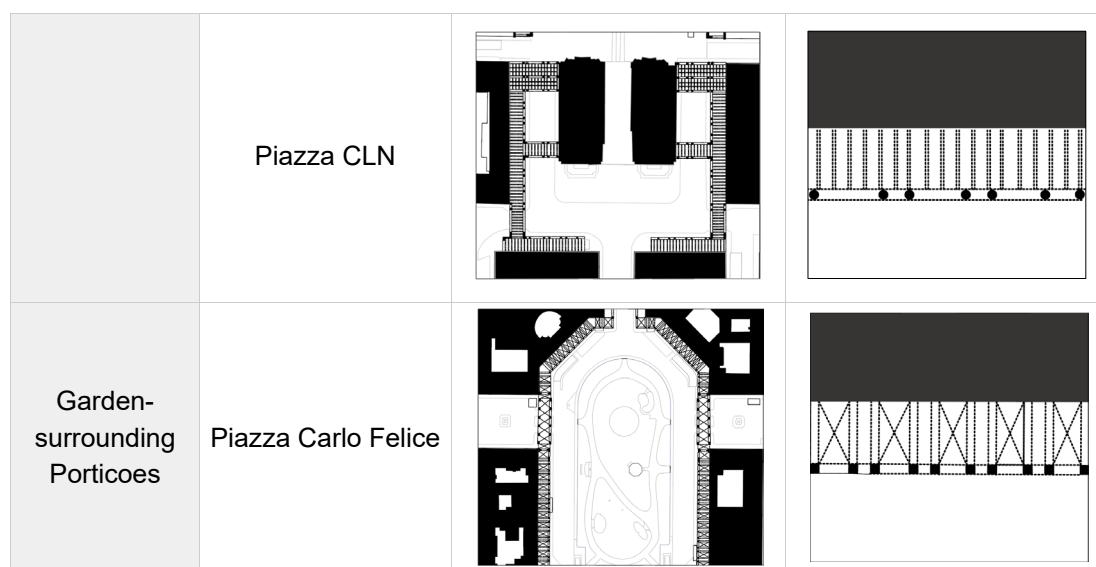
From the perspective of spatial typology, the differences in Turin Porticoes are primarily reflected in its organizational relationship with streets, plazas, and garden spaces. Based on the spatial combination methods, they can be summarized into several types: single-sided street Porticoes, double-sided street Porticoes, plaza-surrounding Porticoes, and garden-surrounding Porticoes.

Single-sided street Porticoes, represented by Via Cernaia and Via Pietro Micca, are characterized by Porticoes extending continuously along only one side of the street, primarily serving as a transitional interface between the building and the street; while they have strong linear characteristics, their spatial enclosure is relatively weak. Double-sided street Porticoes, represented by Via Po and Via Roma, feature Porticoes arranged simultaneously on both sides of the street, together defining a complete street space, possessing stronger continuity, symmetry, and a sense of order; this is the most typical form of street-type Porticoes in Turin.

Different from street-type Porticoes, plaza-surrounding Porticoes, represented by Piazza Castello, Piazza San Carlo, and Piazza Palazzo di Città, are characterized by a continuous arrangement around the edges of a plaza, clarifying the plaza boundaries through the interface of the eaves-gallery and enhancing the integrity and centrality of the space. Garden-surrounding Porticoes, represented by Piazza Carlo Felice, share a similar spatial logic to plaza-surrounding Porticoes, but the central space shifts from a hard-paved plaza to garden greenery, shifting the overall atmosphere toward landscaping and lingering.

Table 6-1 都灵拱廊空间类型统计 Table

Spatial Dimension	Typical Street / Plaza	Layout	Detailed Plan
Single-sided Street Porticoes	Via Cernaia		
	Via Po		
Double-sided Street Porticoes	Via Roma		
Plaza-surrounding Porticoes	Piazza Castello		
	Piazza San Carlo		
	Piazza Palazzo di Città		



6.1.1.2 Typological Characteristics of Porticoes Facades

From a typological perspective, the facade evolution of Turin Porticoes is not a simple replacement of styles, but a staged transformation process formed under the combined action of multiple factors such as unified modular control, spatial functional requirements, and changes in aesthetic orientation. Viewed as a whole, its development exhibits a transition from a facade form emphasizing modular repetition and overall order, gradually shifting toward a composition with enhanced decoration and rich layers, then developing into an expression where classical vocabulary tends toward regularization and integration, and finally moving toward a facade form characterized by simplified composition and rational expression. Throughout this evolutionary process, Porticoes has always served as an important interface for continuous urban public space; its facade is constrained by urban scale and planning controls, while also continuously adjusting and balancing between functional needs such as shelter and transit and aesthetic expression. Therefore, taking historical stages as a clue, this paper divides Porticoes facade types into four stages: Early Baroque, Mature Baroque, Neoclassicism, and Rationalism, and carries out analysis from the aspects of facade composition, modular relationships, and spatial expression.

Early Baroque Porticoes of the late 17th century are represented by Via Po and Piazza San Carlo. The facade feature is the use of continuous arches on the first floor to form a unified corridor, achieving overall unity through the recurring single arched module. Its most core characteristic is the sense of unity and order under modular repetition; the ceiling styles of the interior space of Porticoes are also relatively simple, dominated by conciseness.

The Mature Baroque stage in the mid-18th century is manifested by a fuller facade and richer layers. Compared with the 17th century, the window opening proportions of this period are more slender, the wall partitioning is clearer, and local decoration begins to strengthen; elements such as inter-column pilasters, window frames, cornices, and roof dormers are more complete and exquisite, and the decorative lines of the ceilings inside Porticoes are also more complex and beautiful. A representative case is Porticoes of the second section of Via Roma; compared to the Early Baroque style, Porticoes facade adds double-column openings with narrow bays but strictly adheres to the modular relationship with the upper-floor windows, further strengthening the exquisiteness and integrity of the facade in Porticoes motif.

The Neoclassical stage at the end of the 19th century is another facade language. Taking the type of Via Pietro Micca as an example, window openings are arranged in a regular rhythm, and classical details are concentrated on window casings, waistlines, and cornices; the arch feet, column orders, and spandrel decorations of the first-floor Porticoes are distinct, reflecting classical orderliness. During this period, the decorative style reached its peak, with carvings, murals, and other decorative elements added to the ceilings inside Porticoes, reflecting the preference for ornature and aesthetics in late 19th-century urban renovation and modern aesthetics.

The Rationalist Porticoes of the 20th century are most representatively seen in the area of the new axis of Via Roma. The facades of this stage have been clearly de-decorated, emphasizing straight vertical partitioning and clear horizontal layers; the first-floor openings are also closer to large-scale shop windows, and the use of marble materials reflects an elegant and modern texture, no longer relying on traditional classical decoration to shape aesthetic beauty.



Fig 6-1 Architectural Style Typology of Turin Portici

6.1.1.3 Atlas of Porticoes Typologies

Turin Porticoes has formed a highly stable typological system over the long course of its development, with its planar form, facade style, and spatial composition all exhibiting significant order and continuity. Through a comprehensive analysis of multiple dimensions—such as chronological evolution, functional bearing, and street orientation—it can be observed that under different historical periods, usage functions, and urban axis conditions, the basic types of Porticoes have not undergone fundamental shifts. Instead, limited adjustments and detailed changes have been made within the existing system, maintaining a strong sense of consistency and continuity as a whole. This stability provides a clear structural foundation for the establishment of a typological atlas.

From the dimension of spatial distribution, Turin Porticoes can be primarily summarized into two basic types: those distributed around plazas and those distributed continuously along streets. Porticoes distributed around plazas usually develop in reliance on core urban public spaces, and their overall characteristics are manifested by an interior dominated by continuous arch structures, with strong spatial enclosure and continuity. Although certain differences exist in the construction and decorative details of the arches, their main structures and spatial rhythms possess a high degree of similarity. In terms of scale control, the width and depth of this type of Porticoes remain relatively stable, with walkway widths of 4.5 to 5.7 meters and heights of 5.9 to 7.6 meters, forming a homogeneous and continuous pedestrian space interface. In contrast, Porticoes distributed along streets develop more in reliance on main urban roads, with walkway widths maintained roughly

between 4.5 and 5.7 meters. The overall spatial height is somewhat increased to approximately 7 to 7.9 meters; meanwhile, the internally heightened Porticoes also increase the spatial orientation, allowing people to stroll naturally through Porticoes connecting plazas toward another public plaza.

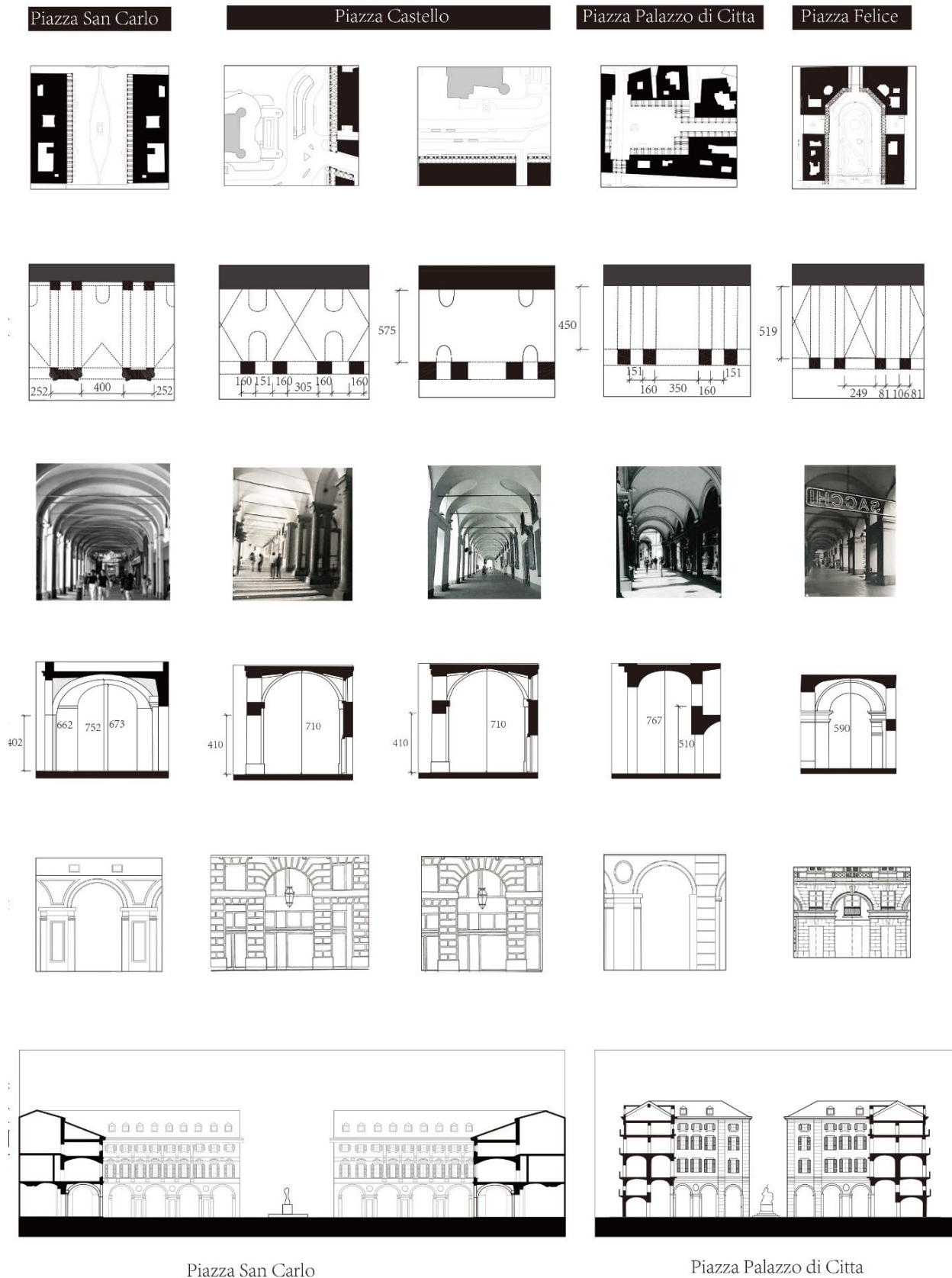




Fig 6-3 Atlas of Turin Porticoes Typologies — Street Type

6.1.2 Study of Typical Samples of Turin Porticoes

6.1.2.1 Via Roma

Table 6-2 Via Roma

Porticoes Name	Via Roma	Architectural Style	Mature Baroque	
City	Turin, Italy	Porticoes Height	Approx. 7.87 meters	
Spatial Type	Double-sided Street Porticoes	Porticoes Depth	Approx. 5.20 meters	
Urban Location	N-S Axis of Historic District	Street Width	Approx. 12 meters	
Connection Node	Piazza Castello – Piazza Carlo Felice	Construction Period:	1929–1934	

Via Roma is located on the north-south main axis of Turin's central urban area and is one of the most representative double-sided street Porticoes streets in Turin. The basic scale of Porticoes on both sides of Via Roma consists of a main bay of approximately 3m, a short intermediate spacing of approximately 1.4m, a depth of approximately 4.1m, and a height of approximately 7.8m. In the design of this section of Porticoes, Baroque architectural features are continued through double columns, rounded arches with square windows, and exquisite ceilings.

In terms of urban hierarchical relationships, it connects Piazza Castello, Piazza San Carlo, and Piazza Carlo Felice, integrating originally relatively independent urban nodes into a continuous pedestrian axis, strengthening spatial accessibility and providing a foundation for the occurrence of public activities. Analyzing from the perspective of climatic adaptation, Via Roma is called the "winter street"; even in winter, people still stay and engage in activities here, which indicates that Porticoes can provide a relatively comfortable space in winter, responding to the climate regulation role of Turin Porticoes discussed earlier, which is not only limited to shading solar radiation in summer but also creates a relatively stable and comfortable climatic space in winter.

In terms of urban hierarchical relationships, it connects Piazza Castello, Piazza San Carlo, and Piazza Carlo Felice, integrating originally relatively independent urban nodes into a continuous pedestrian axis, strengthening spatial accessibility and providing a foundation for the occurrence of public activities. Analyzing from the perspective of climatic adaptation, Via Roma is called the "winter street"; even in winter, people still stay and engage in activities here, which indicates that Porticoes can provide a relatively comfortable space in winter, responding to the climate regulation role of Turin Porticoes discussed earlier, which is not only limited to shading solar radiation in summer but also creates a relatively stable and comfortable climatic space in winter.

On the level of functional organization, Via Roma is a core commercial street long dominated by high-end retail, where continuous Porticoes and complete interfaces serve window displays and consumer lingering. As early as the 1911 discussions regarding the renovation of Via Roma, it was clearly mentioned that this is a main street where urban commercial life is most concentrated. At the

same time, this street also carries large-scale public activities such as book fairs, parades, and urban performances during specific periods, allowing its commercial functions and large-scale public events to overlap and unfold within the same space.

6.1.2.2 Piazza San Carlo

Porticoes Name	Piazza San Carlo	Architectural Style	Baroque	
City	Turin, Italy	Porticoes Height	Approx. 9.00 meters	
Spatial Type	Plaza-surrounding Porticoes	Porticoes Depth	Approx. 6.00 meters	
Urban Location	Core square of the historical city center, connecting the royal axis and the main commercial street	Square Scale	Approximately 168 × 76 meters	

Table 6-3 Basic information of Piazza San Carlo

Piazza San Carlo is one of the most representative squares in Turin's urban space. With a length of 168m and a width of 76m, it is a typical French-style square; its defining element is the triumphant equestrian statue at the center, which possesses strong commemorative significance. The surrounding Porticoes, built in the 17th century, stand approximately 9m high with a depth of 6m, exemplifying the typical Early Baroque style. These Porticoes form a continuous and complete spatial interface, carrying the multiple functions of commerce, social interaction, and daily life.

In the dimension of publicity, beyond its distribution around the public space of the plaza, the core characteristic of this section of Porticoes lies in its stage-like composition and axial control. The continuous Porticoes on both sides are clearly organized as a directional spatial sequence in the overall design, forming a visual convergence toward the southern end. The twin churches located on the south side—San Carlo and Santa Cristina—together constitute the core focal point at the end of Porticoes space, serving as an urban vista. Subsequent renovations of the Santa Cristina facade by Juvarra, along with adjustments to Porticoes structures, clarified the overall connection of this spatial sequence and further strengthened the integrity of Porticoes as an urban public space.

Porticoes of Piazza San Carlo in their early form used relatively slender double columns as the primary support. Combined with transparent openings and a roofing form that corresponded with circular windows (oculi) and mezzanine openings, they formed a relatively open spatial interface. The overall space was well-lit with strong continuity, extending the line of sight and allowing pedestrians to perceive the public activities within the plaza while walking. Later, for structural safety reasons, reinforcement was carried out; the reinforcing components were embedded between the double columns and into the inner walls. Consequently, the original transparency was affected, and the spatial brightness decreased. With these structural changes, Porticoes space gradually transitioned

from a relatively integrated and coherent state to an interface form with more distinct segments and a stronger sense of rhythm.

Piazza San Carlo is the site of major historical events and important activities. Porticoes surrounding the plaza, acting as a functional extension of plaza life, have witnessed historical milestones and served as a functional space for public activities. Following the victory in the Fascist war, this was a public space where the populace gathered to celebrate; later, with the rise of Turin's industry and the prosperity of Fiat, it hosted car exhibitions and racing displays. The spaces under Porticoes serve as an extension of the plaza, hosting cafes and bars, allowing public activities to naturally permeate from the square toward the building interface, thus continuously maintaining the continuity of urban public life.

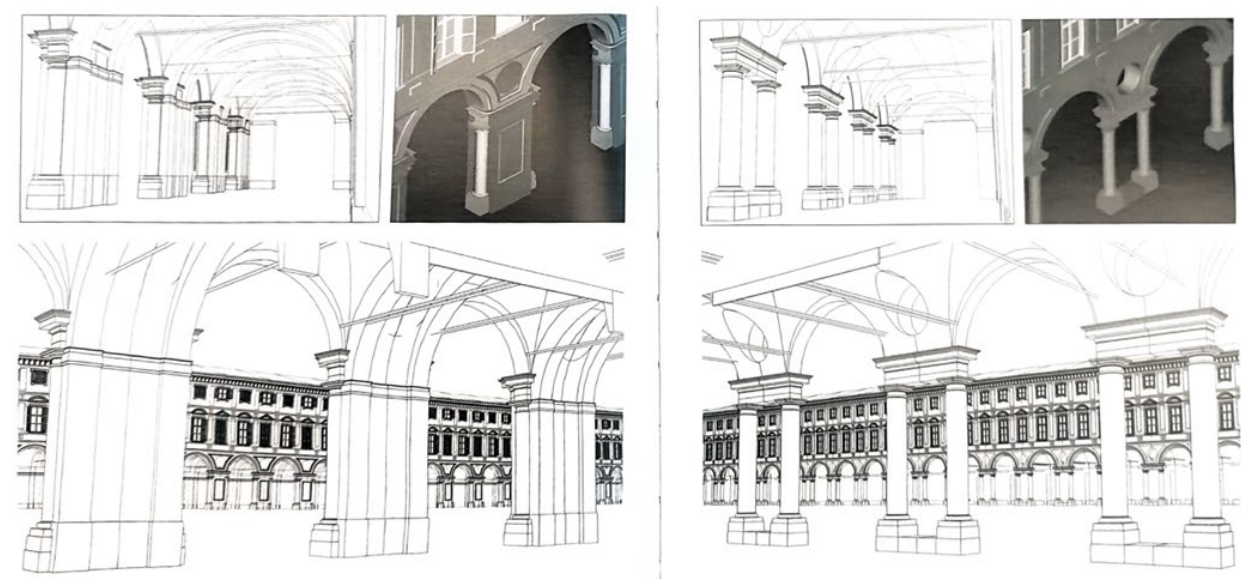
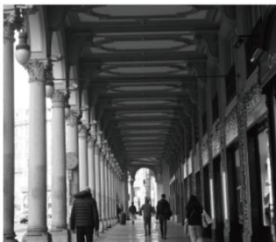


Fig 6-4 Porticoes Structure of Piazza San Carlo

6.1.2.3 Via Pietro Micca

Table Via Pietro Micca basic information

Porticoes Name	Via Pietro Micca	Architectural Style	Classical (Neoclassical)	
City	Turin, Italy	Porticoes Height	Approx. 9.00 meters	
Spatial Type	Single-sided Street Porticoes	Porticoes Depth	Approx. 5.50–6.00 meters	
Urban Location	Radial street in the northwest direction of the historical city center	Street Width	Approximately 16 meters	

Via Pietro Micca is a result of the urban renovation of Turin at the end of the nineteenth century, set against the overall background of a series of renewal actions aimed at sanitary improvement, traffic organization, and urban beautification, influenced by the Legge di Napoli (Law of Naples).

Unlike general street-side Porticoes, the peculiarity of Via Pietro Micca lies in the fact that it was not formed as a natural extension in response to the original street fabric, but instead cuts into the checkerboard street interior in a diagonal manner, superimposed on the original orthogonal street grid. The scale of Porticoes is similar to other Porticoes in the city of Turin, with a height of 9m and a depth of around 6m; although it is a single-sided Porticoes, Porticoes facade, vault decorations, and column ornaments are more complex and beautiful, reflecting a Classicist decorative style.

From the perspective of urban hierarchy, regarding this diagonal street, it establishes a direct connection between Piazza Castello and Piazza Solferino, becoming a corridor connecting two major urban public spaces with clear spatial orientation; the diagonal street represents Baroque urban planning characteristics, strengthening the centripetal feature of the road pointing toward the core plaza (Piazza Castello). Compared to the homogeneous block structure in the old city, this new geometric cutting method has caused changes in block boundaries, corner relationships, and architectural plans.

Among the typological characteristics of Porticoes, as the block form itself is relatively irregular, the buildings exhibit certain differences in corner treatment, planar depth, and facade modules. The scale changes of the street facade are quite obvious; column spacing is not completely uniform between different street sections, mostly between four and four and a half meters, with individual positions reaching nearly six meters, yet the overall proportion and typological characteristics remain relatively consistent. In terms of facade expression, this type of Porticoes is in a transitional stage from Classicism to Eclecticism; the treatment of the stone column capitals is quite detailed, featuring both Ionic volutes and decorative elements such as leaf ornaments and figure carvings; the outer edge of the arches enhances the hierarchical changes of the facade through the continuous treatment of moldings and the tapering of contours, making Porticoes space as a whole appear more exquisite and carrying a certain sense of ritual.



Fig 6-5 Via Pietro Micca Portici Column Orders

On the functional level, this section of Porticoes is not located in the most densely populated area of the city center; it supports daily commercial activities, such as cafes and daily necessity shops, as well as serving as the entrance for office and residential spaces. Since this segment belongs to a mixed-use residential and commercial block, the commercial spaces lean toward a more everyday nature. Furthermore, the space under Porticoes is not entirely occupied by commercial functions, as it retains a significant number of residential entrance interfaces.

6.2 Study of Guangzhou Qilou Typologies

6.2.1 Classification and Typical Characteristics of Guangzhou Qilou

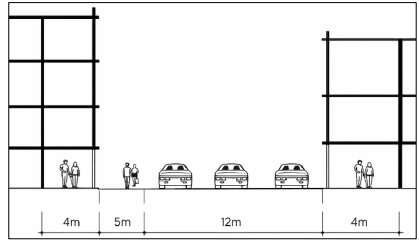
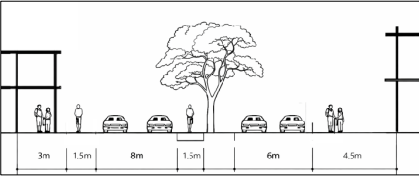
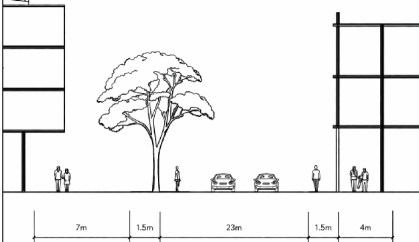
6.2.1.1 Spatial Typological Characteristics

From the perspective of spatial typology, the differences in Guangzhou Qilou are primarily reflected in their organizational relationship with street cross-sections and pedestrian spaces. Based on the distribution of Qilou within the street, they can be summarized into three categories: single-sided street Qilou, double-sided street Qilou, and central greening Qilou.

Single-sided street Qilou, represented by Haizhu South Road and Yide Road, are characterized by Qilou primarily concentrated on one side of the street, forming a continuous interface on that side, while the other side is dominated by ordinary building interfaces or partial Qilou; the overall organization leans toward a boundary-oriented structure. Double-sided street Qilou, represented by Beijing Road, Wenming Road, and Daxin Road, are the most typical shophouse street type in Guangzhou. Qilou are distributed continuously on both sides, forming a complete pedestrian interface where commerce, transit, and street life overlap and unfold beneath the colonnades. Central greening Qilou, represented by Xihua Road and Dade Road, are characterized by the setting of a central green belt or tree rows as a buffer space, with Qilou on both sides unfolding around them. Compared to double-sided continuous Qilou, this type of shophouse has a weaker sense of enclosure but emphasizes lingering, buffering, and landscape transition.

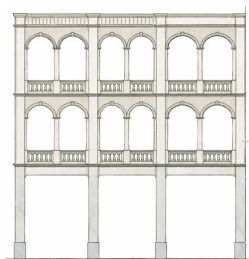
Table 6-4 Guangzhou Qilou Spatial Typologies

Spatial-Typological Dimension	Typical Streets	Layout	Sectional Schematic
Single-sided Street Shophouse	Haizhu South Road	Single-sided continuous shophouse interface; the other side is predominantly Qilou.	
	Yide Road	Dominated by single-sided Qilou, emphasizing a "boundary-type" sheltered pedestrian belt.	
Double-sided Street Shophouse	Beijing Road	Qilou on both sides form a symmetrical pedestrian interface; commerce and transit overlap.	

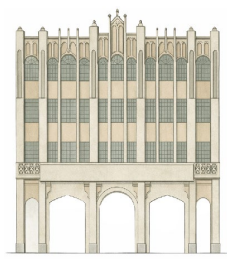
	Wenming Road	Continuous Qilou on both sides; street life mixed with consumption.	
Central Greening Shophouse	Xihua Road	Central greening and tree arrays act as a buffer core; Qilou on both sides provide sheltered walking and lingering.	
	Dade Road		

6.2.1.2 Typological Characteristics of Qilou Facades

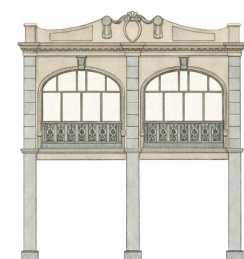
From the perspective of the typological composition of shophouse facades, Guangzhou Qilou formed a pattern in which multiple styles coexisted within a relatively short period. Their evolution reflects the introduction, integration, and localized transformation of foreign architectural styles in a modern commercial city, rather than a continuous evolutionary process gradually progressing over long-term development like that of Turin Porticoes. In terms of overall classification, Guangzhou shophouse facades can be roughly summarized into four types: Western style, Nanyang style, traditional Chinese style, and modern style. Among these, the Western style can be further subdivided into various expressive forms such as Romanesque vaulted gallery style, Neo-Gothic, Neo-Baroque, Neo-Renaissance, and Neo-French Classicism.



Neo-Vaulted Gallery Style



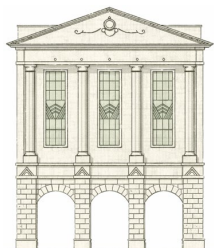
Neo-Gothic



Neo-Baroque



Neo-Renaissance



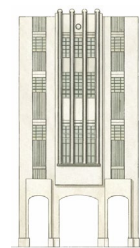
Neo-French Classicism



Nanyang Style



Traditional Residential Style



Modern Style

Fig 6-6 Stylistic Typology of Guangzhou Qilou Facades

Among the Western-style shophouse types, the Romanesque vaulted gallery style primarily constitutes the street interface through continuous arches on the first floor, thereby forming a stable and continuous gray space under the shophouse. Its facade is mainly characterized by horizontal expansion, with a relatively uniform overall rhythm and simplified decorative language; it relies primarily on basic components such as arch openings, orders, and moldings to complete the interface organization, reflecting the direct translation characteristics of early Western architectural vocabulary within the Lingnan context. Neo-Gothic Qilou emphasize the compositional logic of the vertical direction, strengthening the vertical proportional relationship through slender window openings and pointed arches, making the overall facade more upright and the division relationship clearer, thus presenting strong visual directionality and commemorative characteristics.

The facade design of Neo-Baroque Qilou is relatively magnificent, with the common use of decorative elements such as curvilinear pediments, volutes, and arched cornices, which enhance the sense of movement and layering of the building surface; compared to the aforementioned types, it emphasizes visual complexity and the layering of decoration. Neo-Renaissance Qilou pay more attention to proportion and balance, establishing a good sense of order through regular window organization and continuous arcade designs. Compared to the Baroque style, the Renaissance style is more restrained, reflecting the simplification and harmony of classical architectural composition. Neo-French Classicist Qilou adopt stricter geometric axes and symmetrical designs, featuring common elements like triangular pediments, pilasters, and neat window arrangements; compared to other types, the decorative style of Neo-French Classicist Qilou appears more rational and rigorous.

In addition to Western styles, Nanyang-style Qilou are more common in areas such as Wenming Road and Haizhu South Road in Guangzhou. Their characteristics lie in the frequent installation of fine railings and large window areas on the facade to enhance ventilation and shading effects, giving the facade a light and transparent visual effect; this style is a localized transformation of foreign styles under subtropical climatic conditions.

Traditional Chinese-style Qilou continue the construction methods of traditional Lingnan dwellings, retaining features such as colonnades, depth, and partial cantilevers; the facade decoration is simple, emphasizing the everyday connection with the surrounding street environment. Modern-style Qilou mostly appear in areas constructed after the liberation, such as Taikang Road; their facade design emphasizes simplicity, removing a large number of decorative elements, with window and wall designs being more standardized and functional expression being more prominent, marking a transformation of architecture toward rationality and functional orientation.

6.2.1.3 Atlas of Qilou Typologies

Guangzhou Qilou exhibit typological complexity and spatial heterogeneity throughout their long-term development process. Their planar organization, facade morphology, and spatial scales have not formed a unified stable system; instead, they manifest spatial characteristics of multi-type coexistence and continuous mixing, driven by the replacement of construction eras, the evolution of functional types, and the superimposed influence of foreign architectural cultures. Through a comprehensive analysis of temporal evolution, functional attributes, and street interface morphology, it can be found that under different historical stages and urban spatial conditions, although Guangzhou Qilou continue the basic compositional logic of combining a lower gray space with an upper usable

space, they exhibit significant differences in specific scale control, interface expression, and decorative style, representing a dynamic and diverse typological lineage as a whole.

The classification of the typological atlas can proceed from the dimensions of spatial distribution and functional correlation, and can be categorized according to the functional types in Chapter Four, as Qilou of different functional types vary greatly, while Qilou of the same functional category possess a certain degree of similarity in spatial scale. Among them, exhibition-type Qilou are mostly distributed in waterfront historical districts such as Changti Da Malu; their facades possess visual continuity and a sense of order, and their spatial scale is the largest (with a height of 5.9m). Core commercial-type Qilou are represented by main urban commercial axes such as Beijing Road; their spatial scale is in a moderate state (with a height of 4.2m), showing a relatively clear correspondence between spatial scale and commercial functions. However, the Qilou themselves lack continuity and a sense of order, and the facade styles vary significantly. Community life-type Qilou are mainly distributed in blocks with strong residential characteristics; their scale is relatively small (with a height of only about 2.7m), focusing more on daily life services and transit functions, thus the overall spatial organization is more compact and the interface expression is relatively simplified.

From the dimensions of facade and spatial composition, Guangzhou Qilou exhibit clear diversity and hybridity in style. Some historical street sections are influenced by Western architectural styles in their facade treatment, presenting various Eclectic expressions such as Neo-Renaissance and Neo-Gothic styles, with a certain degree of detail shaping in columnar components, cornice moldings, and window decorations. Conversely, in a large number of everyday shophouse districts, facades tend toward modernization and simplified treatment, dominated by functional interfaces with significantly weakened decorativeness.

The typological characteristic of Guangzhou Qilou lies in the juxtaposition of multiple stylistic types within the same colonnaded street, resulting in a mixture of facade styles and a weak overall sense of order. At the same time, the height of the Qilou often exhibits discontinuous changes, with obvious elevation differences between different buildings, causing the overall street interface to present a non-homogeneous spatial rhythm. This type is a composite characteristic formed by the joint action of demand, historical evolution, and stylistic superposition; its typological system is not an evolution under the control of unified rules, but is continuously generated and adjusted during the ongoing process of urban construction.

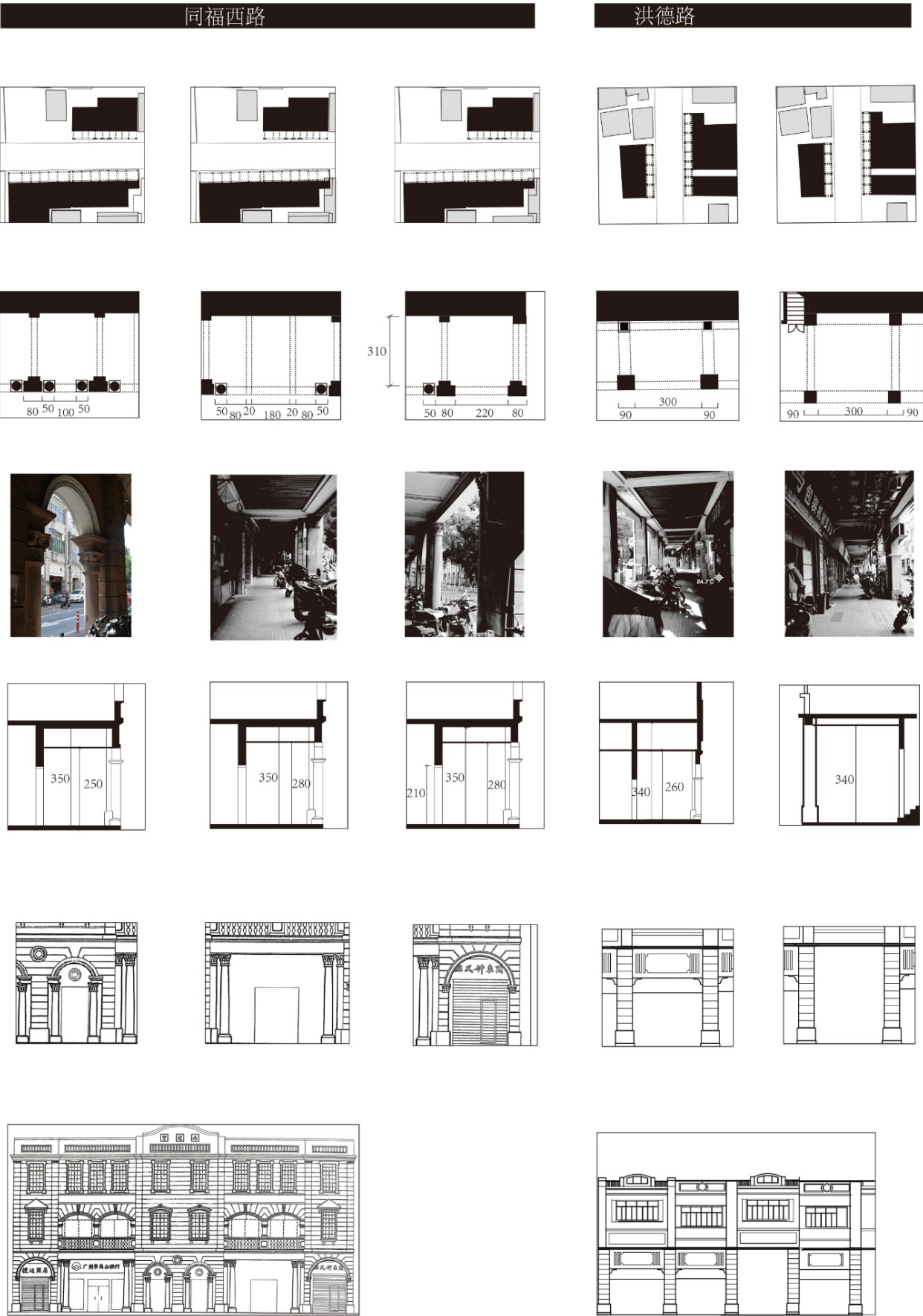


Fig 6-7 Guangzhou Qilou Typology Diagram 1

沿江西路



Fig 6-8 Guangzhou Qilou Typology Diagram 2

6.2.2 Study of Typical Samples of Guangzhou Qilou

6.2.2.1 Hongde Road

Table 6-5 Hongde Road basic information

Name	Hongde Road Qilou	Architectural Style	Modern Style	
City	Guangzhou, China	Arcade Height	Approx. 3.5 meters	
Spatial Type	Street-side Qilou	Arcade Depth	Approx. 3 meters	
Urban Location	Nanhuaxi Street Historic Cultural District, Haizhu District	Street Width	Approx. 12 meters	
Connecting Nodes	Binjiang West Road — Industrial Avenue North	Construction Era	1920s	

Hongde Road Qilu are located in the western part of Haizhu District, Guangzhou, in the area adjacent to the Nanhuaxi Street Historic Cultural District and the Hongdexiang Historic Cultural District. Compared with the Qilu streets on the north bank of the Pearl River, which are characterized by large volumes and strong display properties, the overall scale of Hongde Road Qilu is more intimate and the facades are relatively simple, reflecting the spatial characteristics of the combination of traditional commerce and residential alleys on the south bank.

From the perspective of historical development, the functions undertaken by the arcades have been inseparable from commerce from ancient times to the present. During the Qing Dynasty, the Hongdexiang–Zhoutouju area was closely related to the Thirteen Factories, flourishing along the Shuzhu Stream with the emergence of wine shops and entertainment venues; in the middle of the Qing Dynasty, it gradually developed into a residential area, forming districts such as Zhoutouju Main Street, Baoshu Main Street, and Hongde Main Street, where residences were primarily bamboo-tube houses and historical residents were mostly merchants; by the Republican period, with the construction of roads such as Nanhua Road, Tongfu Road, and Hongde Road, the modern urban layout was basically formed, but the commercial attributes of the Qilu have continued to this day. Later, due to the planning and construction of residential areas here, the commercial functions also leaned more toward daily attributes, serving the surrounding residents.

From the perspective of publicity, the publicity reflected by the Hongde Road Qilu is exactly the opposite of the Turin arcades, which unfold around squares or monumental nodes; instead, it is a type of public space attached to daily life. The corridors under the Qilu undertake pedestrian transit and also accommodate activities such as lingering, conversing, watching, and small-scale transactions; for example, people eat, enjoy the shade, and converse under the arcades. Their public spirit is embodied in an everyday shared spatial order, namely the continuous interweaving among the street, shops, and residents' lives.

From the perspective of Qilu typology, the Hongde Road arcades belong to the modern-style Qilu. The arcades themselves are constructed of brick and stone materials, and the overall architectural style is simple without redundant decoration, featuring decorative volutes between beams and columns, while the internal ceiling uses only wooden decorative grilles for functional purposes to avoid exposing pipelines. From the perspective of the plan, the column spacing is mostly

around 3m, but in practice, it does not strictly adhere to a unified module; the span variations are relatively obvious and follow no clear pattern, because the arcades are derivative spaces of existing buildings. The original buildings in this block did not use the same column grid module, resulting in different column spacings where the lower arcades correspond to the upper buildings.

6.2.2.2 Tongfu West Road

Table 6-6 Tongfu West Road

Arcade Name	Tongfu West Road Qilou	Architectural Style	Neo-Renaissance	
City	Guangzhou, China	Arcade Height	Approx. 4.7 meters	
Spatial Type	Street-side Qilou	Arcade Depth	Approx. 3 meters	
Urban Location	Main commercial street section of the western historic district, Haizhu District	Street Width	Approx. 12.3 meters	
Connecting Nodes	Jiangnan Avenue — Hongde Road	Construction Era	1920s	

Tongfu Road Qilou are a significant representative of modern Qilou streets in the Haizhu District of Guangzhou, with the "Nandatang" at Nos. 257, 259, 261, and 263 Tongfu West Road being particularly typical. Built in the 1920s using a reinforced concrete frame structure, the building originally served as a large overseas Chinese residence and currently continues to support multiple functions including offices, commerce, banks, and residences. In terms of urban location, Tongfu Road is an important east-west commercial street in the old Henan area, connecting Jiangnan Avenue to the east and Hongde Road to the west, making it one of the sections in Haizhu District where traditional commercial activities are highly concentrated.

From the perspective of architectural typology, the building is Neo-Renaissance style, characterized by arched vaults and pilaster elements, with cornices emphasizing horizontal edges and classical architectural languages such as triangular pediments appearing above the windows. It consists of three floors, with the first floor serving as the Qilou interface to form a continuous sheltered walking space. Its bay width is approximately 3.0–6.4 meters, with a depth of 3.5 meters and a net height of 4.7 meters, corresponding to a street width of approximately 12.3 meters. The Qilou in this section exhibits a parallelogram plan, and even the cross-sections of some columns are parallelograms; this reflects that its form does not strictly obey orthogonal order but instead formed a highly adaptive local type under the combined influence of street alignment, plot boundaries, and orientation conditions.

From the perspective of developmental history, the composite "residential above, commercial below" functional model of this Qilou section reflects the characteristics of overseas Chinese capital participating in the renewal of modern Guangzhou street architecture. The name "Nandatang" itself bears a clear cultural mark of overseas Chinese hometowns, indicating that the construction served not only residential and business needs but also carried the social significance of overseas Chinese returning home to purchase property, assert their status, and introduce modern lifestyles.

Consequently, the Qilu is no longer a simple commercial building but has become an important intermediary space connecting private life with urban streets.

Regarding climate adaptability, east-west oriented Qilu have a significant regulatory effect on the climate, especially under the hot and rainy summer conditions, allowing major pedestrian traffic and commercial activities to unfold in a more comfortable microclimate. In the Tongfu West Road section, the climate adaptability of the Qilu is not merely an environmental strategy but an important mechanism supporting the continuous operation of street commerce. Combined with historical data, the Tongfu Road area was gradually formed during the urban transformation of road construction and Qilu building in Guangzhou in the late 1920s, rapidly driving commercial prosperity through the integration of new-style roads and Qilu interfaces. Commercial activities in sheltered areas are significantly more active than in unsheltered commercial areas, a phenomenon particularly evident in summer.

6.2.2.3 Yanjiang West Road Qilou

Arcade Name	Yanjiang West Road Qilou	Architectural Style	Neo-Gothic	
City	Guangzhou, China	Arcade Height	Approx. 5.8 meters	
Spatial Type	Riverside Qilou	Arcade Depth	Approx. 3.5 meters	
Urban Location	Main commercial street section of the western historic district, Haizhu District	Street Width	Approx. 14 meters	
Connecting Nodes	None	Construction Era	1930s	

Guangzhou Yanjiang West Road Qilou are located in the Changti historic area on the north bank of the Pearl River in Yuexiu District, Guangzhou, and are an important part of Guangzhou's modern riverside commercial system. Yanjiang West Road Qilu were built in the 1930s; under the urban construction background of land reclamation and embankment building, they carried multiple functions such as port trade, financial services, and commercial services. In this context, social forces represented by overseas Chinese capital promoted the construction of Qilu buildings, including those on Yanjiang West Road. The representative Qilu on Yanjiang West Road is the Aiqun Mansion; completed in 1937, it was one of the earliest modern high-rise buildings in Guangzhou, utilizing a steel frame structure, standing approximately 64 meters tall with 16 floors, and was the highest point in the city for a long period as well as an important symbol of Guangzhou's modern urban image.

From a typological perspective, the Yanjiang West Road Qilu exhibit characteristics of mixed types. On a single street, the colonnaded street does not adopt one type as a matrix to form an ordered and unified corridor space; instead, it combines different types of units to form a composite Qilu style that is relatively unified as a whole but diverse in unit types and varying in scale. Its spatial scale is large, with a height of approximately 5.8 meters and an internal width of 3.5 meters, making it one of the largest Qilu in Guangzhou's urban Qilu streets; the spatial scale is completely different from that of traditional Chinese-style Qilu and shares certain commonalities with the scale of Western Qilu.

This is related to the functions of riverside display, financial, and commercial services it carries; in order to highlight the urban appearance, the Qilu on the riverside display surface not only differ in function from other traditional Qilu but are also tall and grand at the scale level.

Regarding climate adaptability, the Yanjiang West Road Qilu buildings have significant effects on climate regulation. On one hand, because they expand east and west along the river, the natural ventilation effect is good, which can effectively alleviate summer heat and humidity; the natural river breeze has a significant impact on reducing the air humidity under the Qilu. On the other hand, the east-west oriented Qilu street can generate more shadows, effectively reducing the high temperatures caused by solar radiation and providing a comfortable walking environment for pedestrians.

6.3 Comparative Analysis

6.3.1 Comparative Analysis of Porticoes and Qilou Typologies

Through the previous induction of the facade types, spatial types, and typological atlases of Turin Porticoes and Guangzhou Qilou, it can be seen that the architectural type of Turin Porticoes is closer to a public space type dominated by urban order, while Guangzhou Qilou are closer to a functional type jointly driven by commercial activities and climate adaptation. In terms of spatial distribution, although both Turin Porticoes and Guangzhou Qilou belong to arcade-style architecture, the prototype of Turin Porticoes is closer to an urban public interface composed of arcades, squares, and streets, with the typological focus on urban hierarchy, axial order, and open space boundaries, carrying public life such as public activities, parades, and parliaments. The prototype of Guangzhou Qilou is closer to a reshaping of the street commercial interface, with the typological focus on the street cross-section, pedestrian shelter, and the functional attributes of daily life along the street.

In terms of facade types, the evolution of Turin Porticoes' facades reflects clear characteristics of the era, from early Baroque and mature Baroque to 19th-century Neoclassicism and Eclecticism, and then to 20th-century Rationalism and modern functional types; its changes are mainly manifested in the historical evolution of decorative styles, columnar relationships, window proportions, and geometric order. Guangzhou Qilou, within a relatively short period, intensively absorbed various foreign styles, forming multiple facade types such as Romanesque vaulted gallery, Neo-Gothic, Neo-Baroque, Neo-Renaissance, Neo-French Classicist, as well as Nanyang-style, Traditional Chinese-style, and Modern-style. It more reflects the juxtaposition, eclecticism, and localized translation of stylistic resources in modern commercial cities; the underlying difference lies in the citizens' fundamental cognition of urban space and architectural culture.

In the comparison of the typological atlases of Turin Porticoes and Guangzhou Qilou, it can be found that Turin Porticoes form a highly stable typological system, with their spatial scale, facade language, and structural modules remaining relatively consistent over a long period, adjusting only within existing frameworks, thus presenting continuous and unified orderly characteristics. In contrast, Guangzhou Qilou exhibit a highly open typological structure, the evolution of which is simultaneously affected by the superimposed effects of functional changes, differences in construction time, and foreign architectural influences. Although there is a certain correspondence in scale between different functional types, inconsistency in facade style and spatial scale still

commonly exists within the same street section, representing a non-homogeneous generation process under the influence of multiple factors.

6.3.2 Comparative Analysis of Typical Samples

6.3.2.1 Comparison of Turin's Via Roma and Guangzhou's Hongde Road Samples

From the perspective of street-type samples, Turin's Via Roma and Guangzhou's Hongde Road have a certain comparability. Both colonnaded streets are north-south oriented, the street scales are similar, and they possess a certain similarity in climate regulation during summer. Although both are a type of sheltered semi-enclosed space, their spatial properties are not the same: in the urban interface, Turin Porticoes on both sides of Via Roma have stronger overall control; the street interface is unified, the modules are clear, and the compositional order is an explicit, continuous, and complete monumental commercial axis formed under the leadership of urban renovation, bearing the unified image of the capital of the Italian Republic. While Guangzhou Qilou on Hongde Road have a street-side interface with the same orientation, their overall scale is closer to daily life and does not bear the role of urban spatial commemoration or display. Their interface continuity is weak, and the Guangzhou Qilou interface does not achieve continuous coverage along the entire street, but instead often breaks in the middle of street sections, reflecting that although the Guangzhou Qilou were under a unified street plan, they are the result of superimposed segmented, multi-phase, and multi-owner construction as well as later partial demolition, modification, and renewal.



Fig 6-9 Via Roma In Turin



Fig 6-10 Hongde Road in Guangzhou

From the perspective of architectural typology, the building type of the Via Roma section belongs to the mature Baroque architectural style. The scale of Turin Porticoes is large, reflected in a height of 7–8m and an internal pedestrian walkway width of 5m. The interior spatial decoration is exquisite and full of a sense of order, presenting overall modularity and continuity; the simple geometric lines of the interior decoration create an elegant and ceremonial space.

Guangzhou Qilou on Hongde Road feature a modern architectural style with a compact spatial scale that is close to the pedestrian walking scale (3m walkway under the gallery, 4.5m height). In terms of decorative style, the Guangzhou Qilou retain only the most basic elements of the colonnade, without redundant decorative lines, presenting the most concise and primitive style. These completely different architectural types reflect the distinctions between public life and urban construction culture.



Fig 6-11 都灵罗马大街拱廊内部



Fig 6-12 广州洪德路骑楼内部

From the perspective of the functions undertaken by the colonnaded streets, the functions undertaken by Via Roma lean toward space for high-end luxury consumption; therefore, the interior of Turin Porticoes in this section also utilizes elegant lighting atmospheres, exquisite marble flooring, and sophisticated ceiling designs to create a spatial style that aligns with high-end commerce. While also serving as a carrier of commercial space, the commercial space under the Guangzhou Qilou on Hongde Road is more everyday and accessible, serving as a functional sheltered space.

6.3.2.2 Comparison of Turin's Via Pietro Micca and Guangzhou's Tongfu West Road Samples

There is also a certain correspondence between Turin's Via Pietro Micca and Guangzhou's Tongfu West Road. Neither is the most core monumental colonnaded street, but they share the same east-west orientation and possess certain similarities in climate regulation during the summer. However, the difference between the two lies in: the prominent feature of Via Pietro Micca is that it cuts into the old city fabric diagonally, forming new urban connections through block cutting and the reorganization of Turin Porticoes interfaces; therefore, it emphasizes the centripetal spatial characteristics of the street. Guangzhou Qilou on Tongfu West Road followed the original street alignment and architectural fabric, more clearly preserving the continuous relationship of local alley spaces.



Fig 6-13 都灵皮耶特罗·米卡路拱廊



Fig 6-14 广州同福西路骑楼

In terms of architectural typology, the architectural style of Turin's Via Pietro Micca is Classicism, manifested in more complex and exquisite lines and columnar decorations. Although the same street presents diverse decorative styles, it maintains an overall unity and a high degree of order. In contrast, the style of Guangzhou Qilou on Tongfu West Road is a mixture of Modern and Neo-Renaissance styles. While the capital decorations share certain similarities with those in Turin, there are significant differences in scale. It is noteworthy that the mixture of different styles and patterns on the same street frequently occurs in Guangzhou Qilou streets, reflecting a vast difference between Chinese architectural culture and national perceptions compared to those abroad.



Fig 6-15 都灵皮耶特罗·米卡路拱廊内部



Fig 6-16 广州同福西路骑楼装饰样式

6.3.2.3 Comparison of Turin Porticoes at Piazza San Carlo and Guangzhou Qilou on Yanjiang West Road

As both serve as urban showcases and symbolic colonnaded streets, Turin Porticoes at Piazza San Carlo and the Guangzhou Qilou on Yanjiang West Road can be compared. Both are corridor spaces of a display nature, and their spatial scales share certain similarities. The relatively large-scale internal corridor spaces not only enhance walking comfort but also strengthen their monumental significance.

From the perspective of architectural typology, Piazza San Carlo in Turin features a Baroque architectural style, while the Guangzhou Qilou on Yanjiang West Road feature a modern architectural style in the Neo-Gothic tradition. Both adopt architectural styles and patterns from a Western context, possessing a degree of similarity.

The two also exhibit similarities in their spatial distribution, as both unfold around important urban spatial nodes—Turin Porticoes unfold around the historic Piazza San Carlo, which possesses strong public and cultural attributes, while the Guangzhou Qilou unfold along the Pearl River, serving as an important riverside display surface for the city. Therefore, in modern architecture, buildings that undertake urban display functions often possess certain monumental attributes. For example, the Guangzhou Qilou on Yanjiang West Road exhibit more order and integrity compared to Guangzhou Qilou in other locations to highlight the city's appearance.



Fig 6-17 都灵圣卡洛广场拱廊



Fig 6-18 广州沿江西路骑楼

6.3.3 Summary

Turin Porticoes embody a typological construction method centered on urban public space. Within the overall spatial structure, these arcades often unfold around squares and connect different public nodes through continuous interfaces, thereby constituting an integrated urban pedestrian system. This spatial model not only serves daily commuting but is also deeply embedded in urban public life, becoming an important venue for gatherings, social interactions, and activities. At the level of typological evolution, Turin Porticoes have developed and continued existing spatial prototypes, ensuring that the arcades consistently maintain relatively unified spatial scales and proportions in form and structure. This evolutionary mode, dominated by the continuity of spatial types, endows its typological characteristics with a stable and clear systematic nature.

In contrast, the generation of Guangzhou Qilou types is based more on practical usage needs and environmental conditions. There are significant differences in the types of Guangzhou Qilou colonnaded streets under different functions; the reason lies in the lack of overall control over a unified urban style and appearance during urban construction. Additionally, builders favored innovative styles and the commercial and economic value behind them, meaning that from the initial construction phase, planning and building were not based on unified typological standards or modules. In subsequent urban development, architectural space gradually served economic and commercial activities more directly. Its types have undergone huge changes by constantly adjusting to the needs of the era and changing urban functions, abandoning the continuity of traditional Guangzhou Qilou types.

The differences in typological characteristics between Turin Porticoes and Guangzhou Qilou essentially reflect two different logics of urban development and spatial demand orientations: Turin Porticoes center on public life and spatial order, maintaining stability through the continuation and inheritance of existing types; Guangzhou Qilou are oriented toward functional adaptation and environmental response, generating diversified spatial forms amidst constantly changing usage needs to respond to rapid development and achieve fast economic growth.

Chapter7 Conclusion

7.1 Typological Representations and Influencing Factors of Arcade

The typological representations of Turin Porticoes and Guangzhou Qilou exhibit significant differences: The typological characteristics of Turin Porticoes lie in two aspects: from the perspective of spatial distribution, they are often distributed around and connect squares, and their existence serves public life and public activities, making them an indispensable spatial form in urban space. Returning to the typological characteristics of the arcades themselves, they represent a continuation of a "prototype"; the basic type of arcade has not undergone fundamental transformations across different periods, different functional uses, or different urban axes, with only limited detailed adjustments and changes made within the existing system, reflecting the continuation and inheritance of the existing spatial prototype. The architectural type of Guangzhou Qilou can be summarized as a functional type. Unlike Turin Porticoes which serve urban public life, the existence of Guangzhou Qilou serves functional requirements, and there are significant typological differences between Guangzhou Qilou of different functions. Furthermore, under hot and rainy climatic conditions, the setting of continuous sheltered spaces responds to the issue of climate adaptation, thereby forming typological characteristics with distinct regionality.

The following are the influencing factors for the differences in colonnaded architectural types discussed in the core chapters of the thesis, which can be divided into four points:

1. Historical and cultural backgrounds determine the basic logic of colonnade generation.

Turin Porticoes are built upon the historical continuity of Ancient Greek and Ancient Roman colonnade traditions and the construction of a dynastic capital, and their formation possesses strong historical continuity and monumentality; Guangzhou Qilou were formed against the backdrop of modern trade, the input of foreign architectural forms, and localized transformation, reflecting stronger practical adaptability and complexity. The colonnaded streets of the two locations correspond to two different generation paths: historical continuation and modern translation.

2. Differences in the demand for public space are one of the core reasons for the typological differentiation between the two locations.

The formation of Turin Porticoes is the inheritance and continuation of the traditional arcade type, the continuation of a public lifestyle, and a response to the demand for unified, ordered, monumental, and display-oriented urban public spaces under the backdrop of establishing a dynastic capital. In contrast, Guangzhou Qilou do not directly participate in the construction of urban public space, and there are fewer public spaces in the city for direct use by citizens; the so-called public spaces that are typologically similar to those in Turin are mostly activity venues dominated by commerce.

3. Functional requirements influence the architectural typological characteristics of the colonnaded streets.

As a dynastic capital, Turin's urban planning possesses distinct hierarchy and order; Porticoes not only undertake transit and commercial functions but also carry multiple roles such as political and cultural display, social interaction, and office services. The formation of Guangzhou Qilou is a type generated by functional requirements: its space first serves the functional needs of street

business and daily transactions, and on this basis, forms a public interface with lifestyle characteristics.

4. Climatic conditions profoundly influence the formation and spatial scale of colonnaded streets.

The primary issues of the climate where Turin Porticoes are located are winter cold and summer solar radiation; therefore, their climate regulation is manifested as a buffer for radiation and low-temperature environments. Guangzhou Qilou face long-term high-temperature and high-humidity environments, making sun shading, ventilation, rain protection, and cooling the more core spatial demands. Although colonnaded streets in both locations can improve the pedestrian environment, the climate adaptability of Guangzhou Qilou is more persistent and necessary. It can be said that the form of Guangzhou Qilou was generated with the enhancement of commercial space comfort as the core demand, and the orientation and spatial scale of the Guangzhou Qilou are all results of responding to the climate.

Tracing back to the source, by comparing influencing factors such as history and culture, publicness, and climate adaptability, the differences in the causes of typological variation can be derived. The formation of Turin Porticoes type stems from the continuation of history and culture and the demand for public life and public space; the type itself is also a continuation and inheritance of the arcade spatial prototype that existed as early as the Ancient Greek and Ancient Roman periods. The emergence of Guangzhou Qilou is a type dominated by functional requirements. Due to Guangzhou's attribute as a trade city and its hot and rainy summer climate, the core problem solved by Guangzhou Qilou is the comfort and transaction efficiency of commercial activity spaces. Returning to the essence, the core attribution leading to the differences between the Guangzhou Qilou of the two locations lies in the difference in demand for public life and the difference in urban and construction culture; it is the difference in demand for functional space under different urban attributes and cultural backgrounds.

7.2 Limitations and Prospects of This Study

The limitations of this research mainly include the following points:

1. Limitations on climate comparison due to differences in actual measurement timing

In this study, field measurements were conducted in both Turin and Guangzhou; however, because the measurement times in the two locations were inconsistent—corresponding to different seasons and months—it is difficult to directly compare the two sets of data under identical climatic backgrounds. The existing analysis primarily reflects the regulatory effects of Turin Porticoes and Guangzhou Qilou on the local environment during their respective measurement periods, making it difficult to present quantitative differences between the two colonnaded spaces during the same climate phase through unified seasonal conditions.

2. Microclimate evaluation indicators are still not comprehensive enough

The comparison of the climate adaptability of turin Porticoes and Guangzhou Qilou in this study was mainly based on air temperature, relative humidity, and thermal imaging results, which can reflect the thermal environment regulation characteristics of the colonnaded spaces; however, the

overall evaluation of the urban microclimate is still not comprehensive enough. In fact, factors such as wind speed, wind direction, air pollutants, and negative ions also affect the walking environment and spatial comfort. Because wind speed measurement is easily interfered with by street morphology, traffic, and instantaneous airflow changes, resulting in large errors, related data were not included in the systematic analysis. Therefore, follow-up research still needs to combine more meteorological indicators to conduct a more complete evaluation of the colonnaded street microclimate.

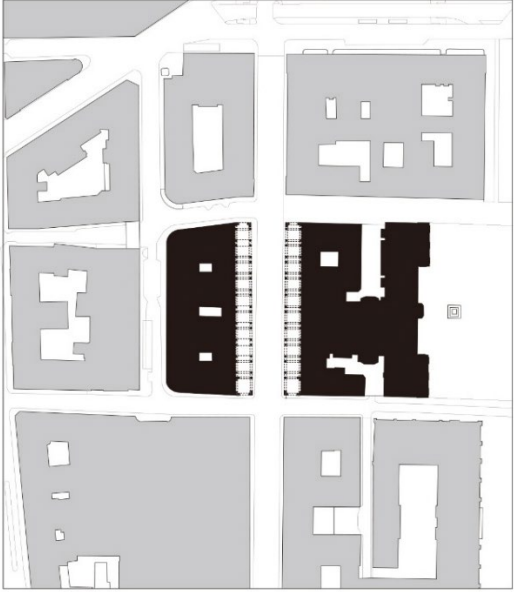
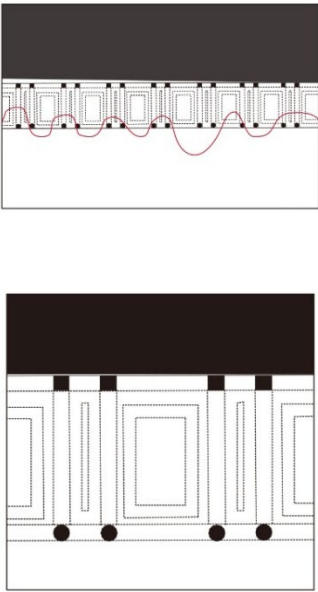
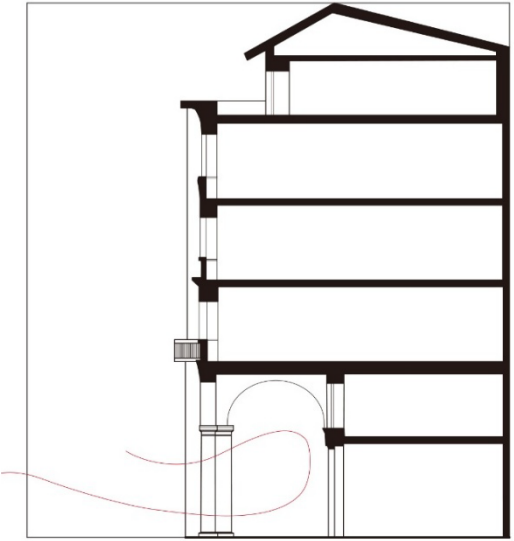
3. The research objects are still dominated by typical sample comparisons, and the overall coverage is limited

This paper selects representative colonnaded street samples from Turin and Guangzhou for comparison, which can reveal the typical characteristics of turin Porticoes and Guangzhou Qilou in both locations, but the overall coverage of colonnaded street types over a larger area in both places remains limited. Therefore, the conclusions of this paper are more applicable to comparisons between typical cases; in the future, the universality of the conclusions can be further verified by expanding the number of samples and the range of types.

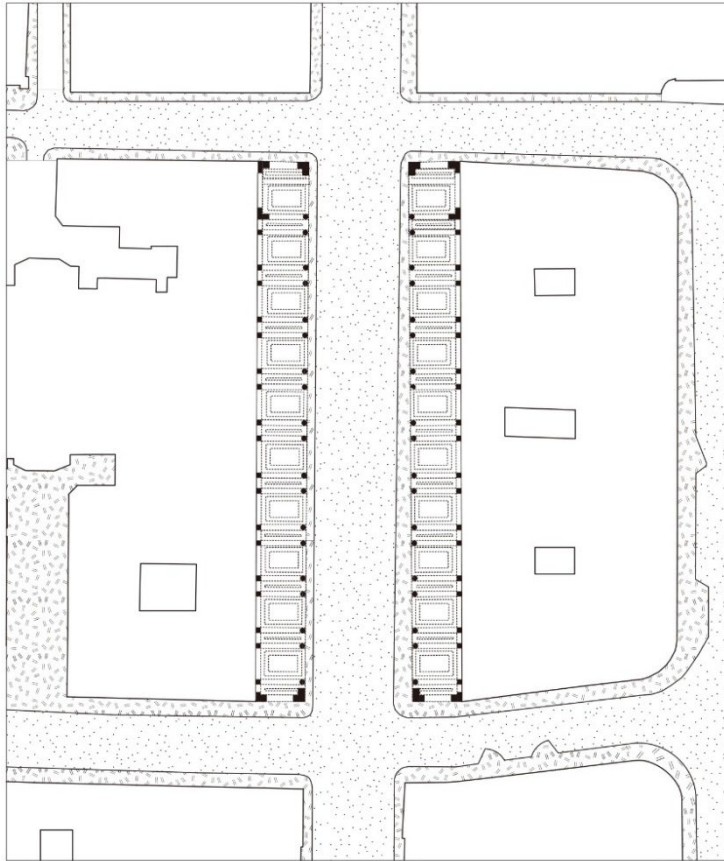
Appendix

1 Turin Porticoes Legends

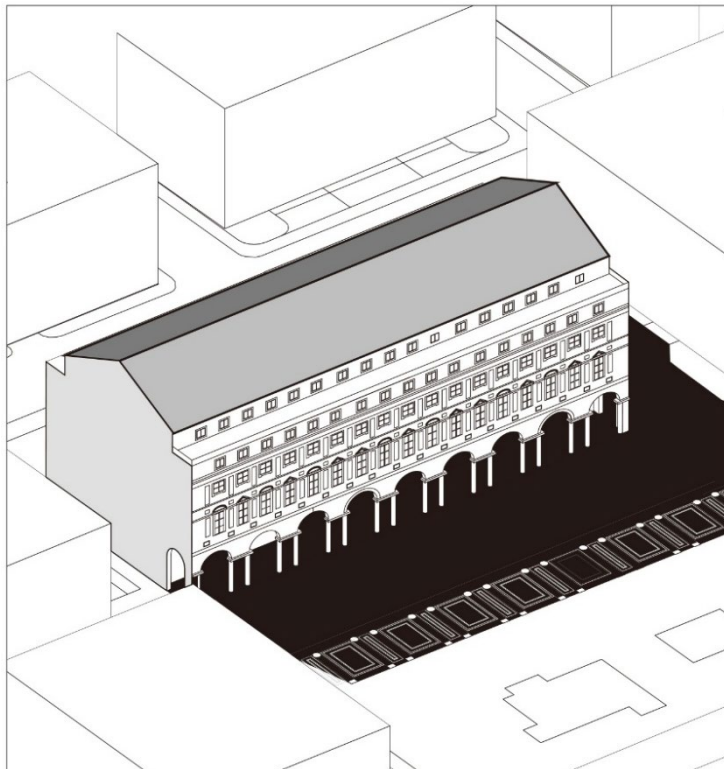
Via Roma

Name	Via Roma	Architectural style	Mature Baroque style
City	Turin, Italy	Porticoes Height	7.87m
Spatial type	Double-sided	Porticoes Depth	5.20 m
Master Plan		Arcade Plan	Picture
			
Section		Elevation	
			

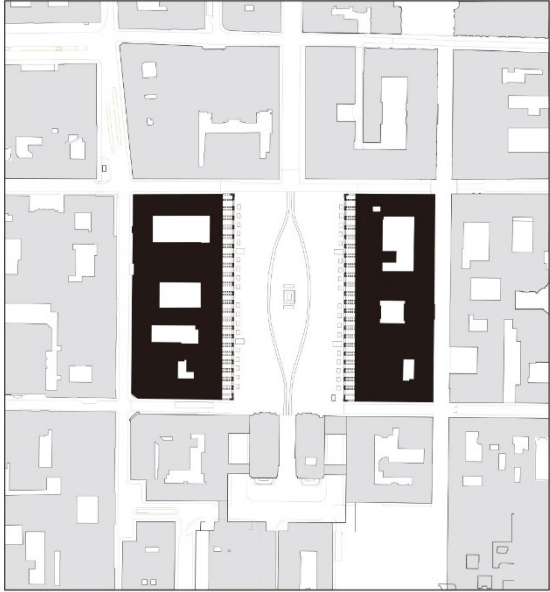
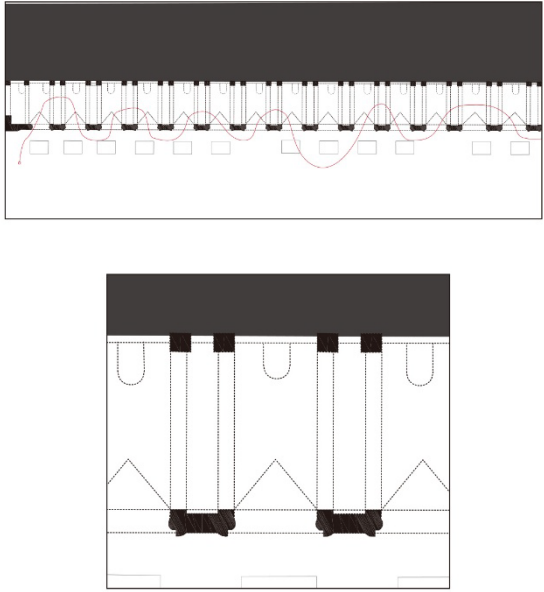
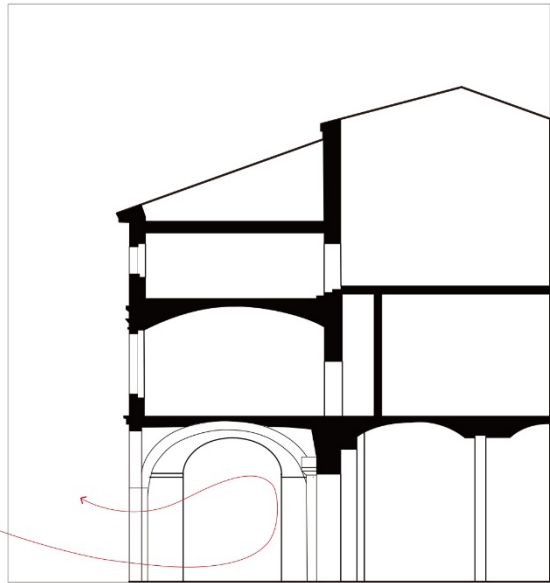
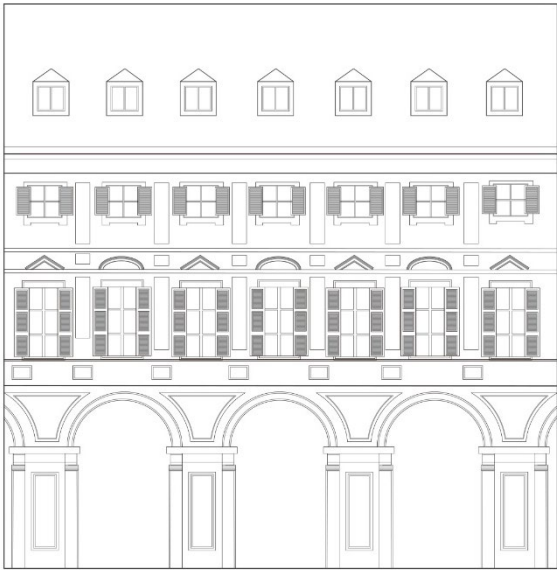
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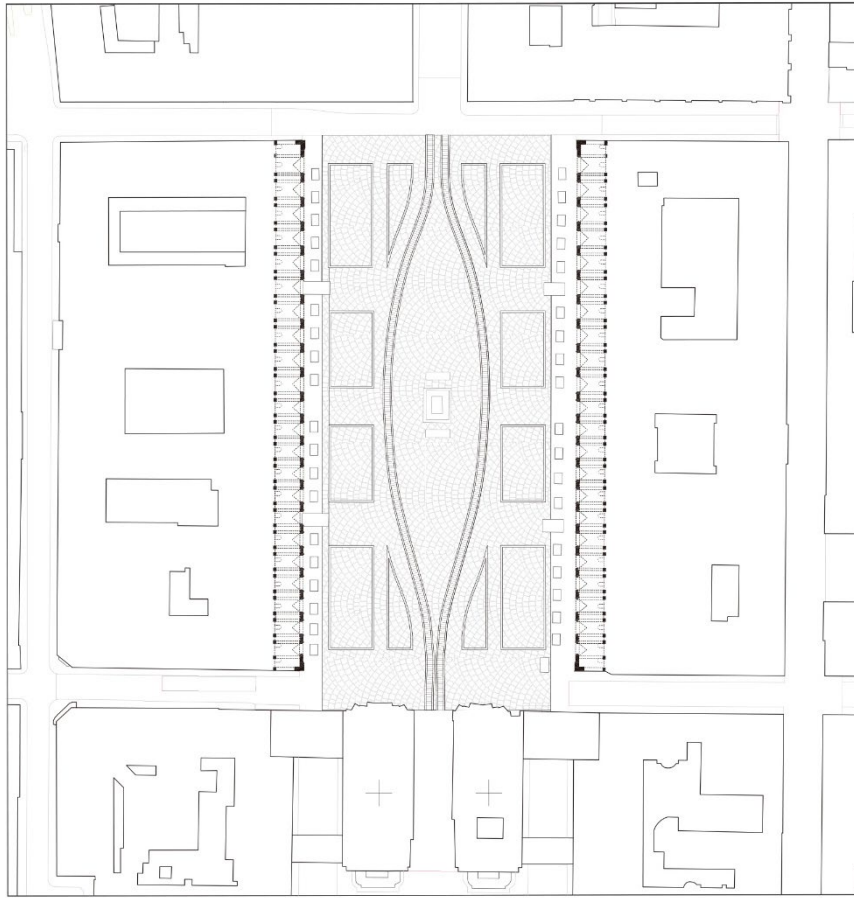
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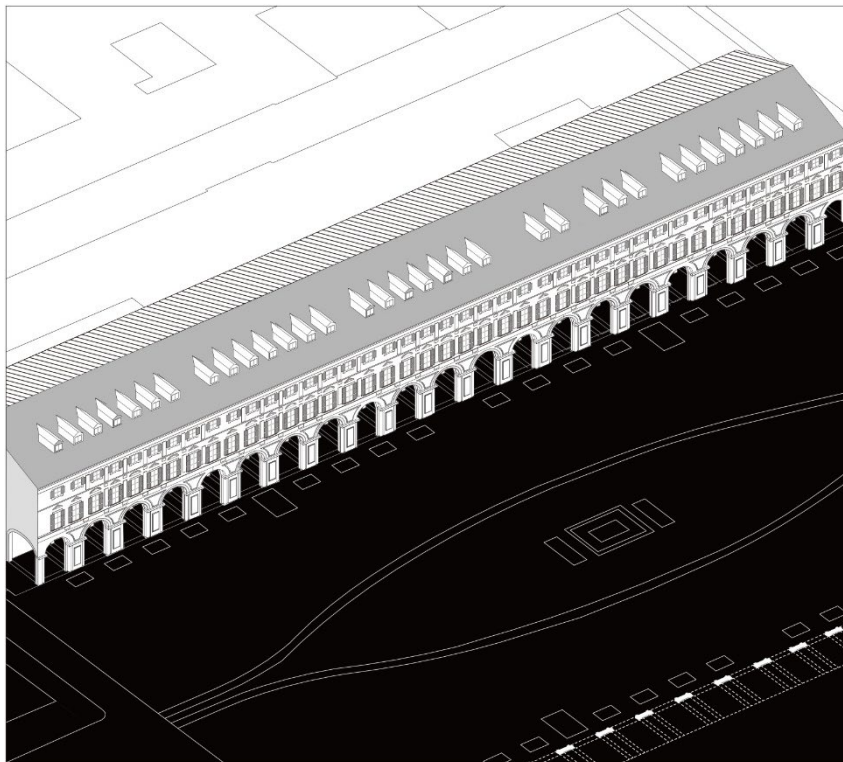
Piazza San Carlo

Name	Piazza San Carlo	Architectural style	Baroque Style
City	Turin, Italy	Porticoes Height	Approx. 9.00 meters
Spatial type	Double-sided portici	Porticoes Depth	Approx. 5.20 meters
Master Plan		Arcade Plan	
			
Section		Elevation	
			

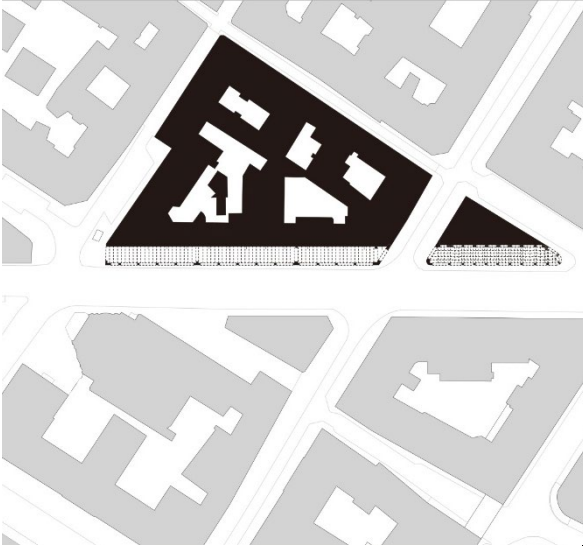
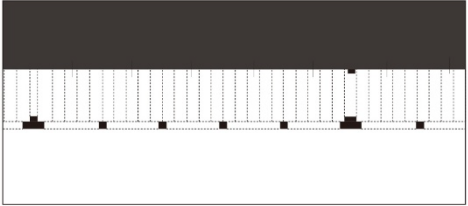
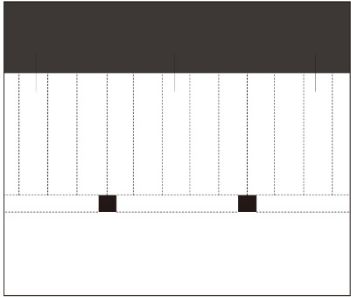
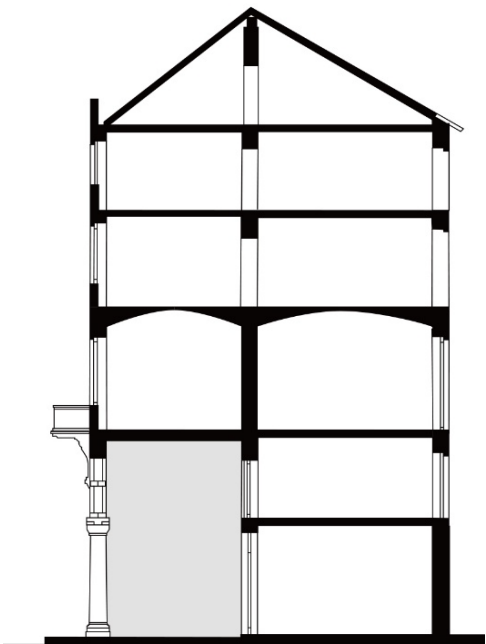
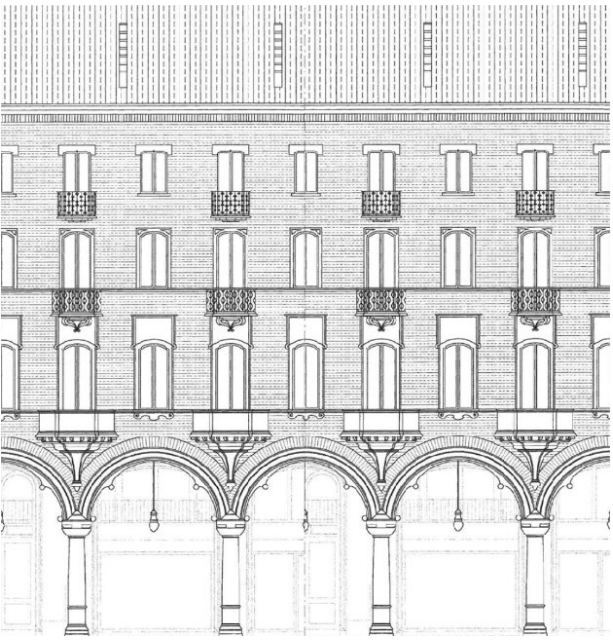
Plan



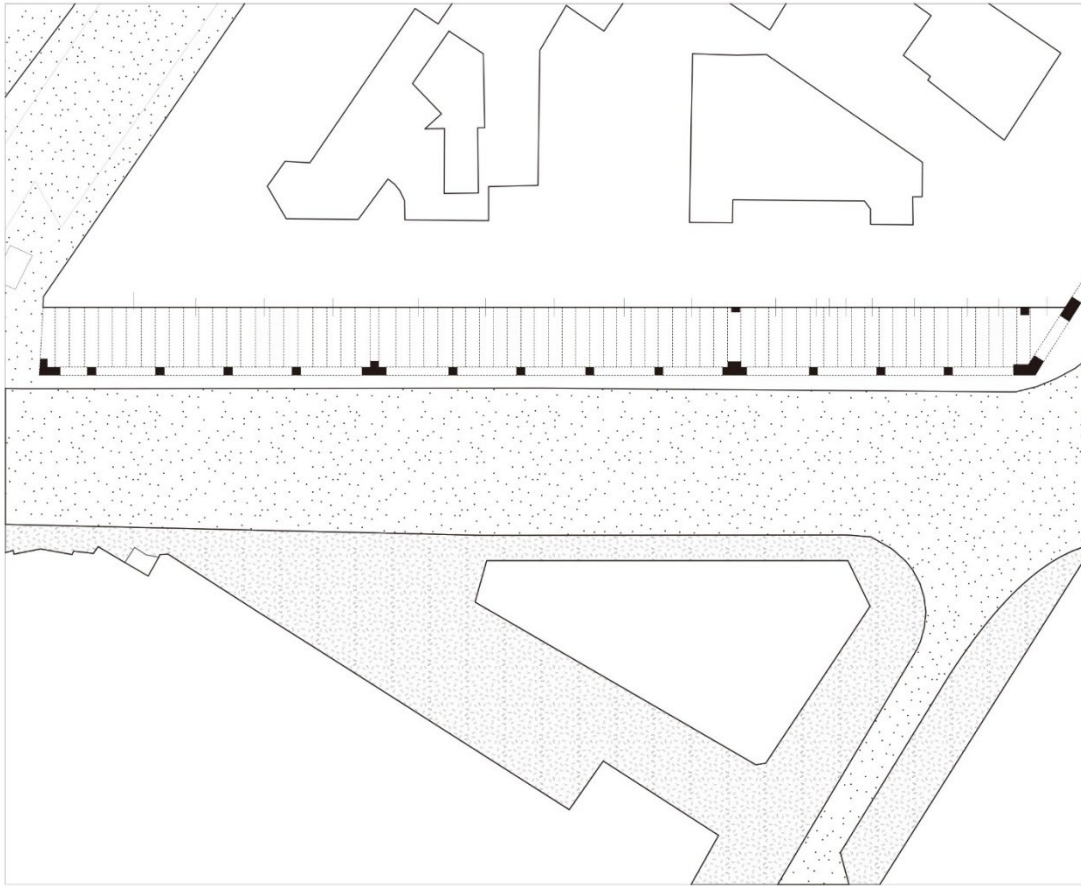
Axonometric Drawing



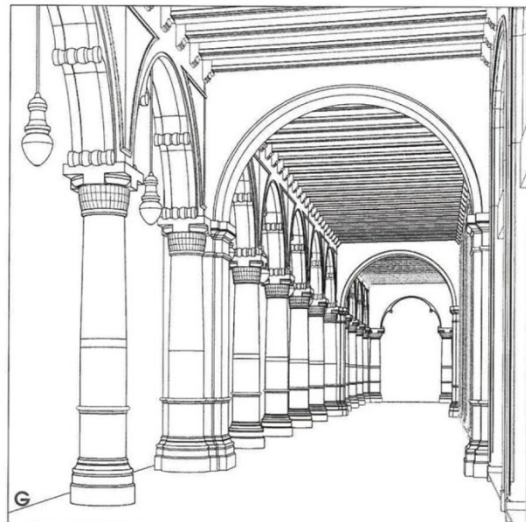
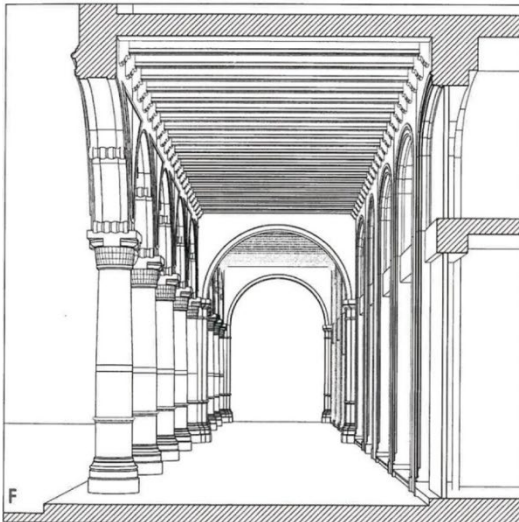
Via Pietro Micca

Name	Via Pietro Micca	Architectural style	Classical Style
City	Turin, Italy	Porticoes Height	Approx. 9.00 meters
Spatial type	Single-sided	Porticoes Depth	Approx.5.50–6.00 meters
Master Plan		Arcade Plan	
		 	
Section		Elevation	
			

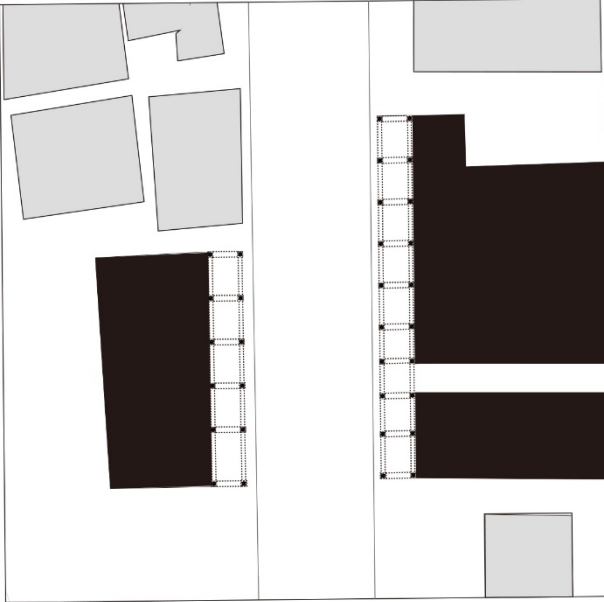
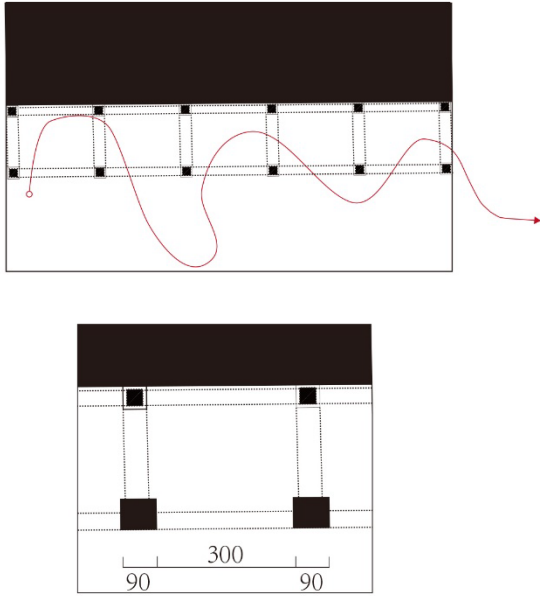
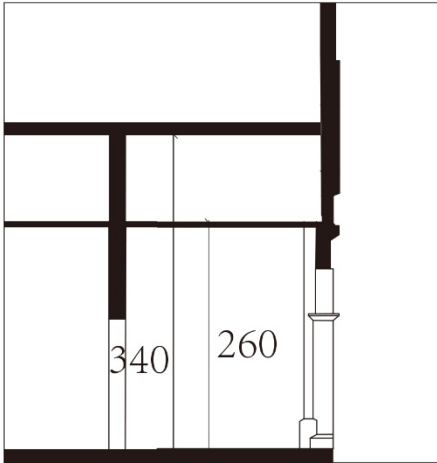
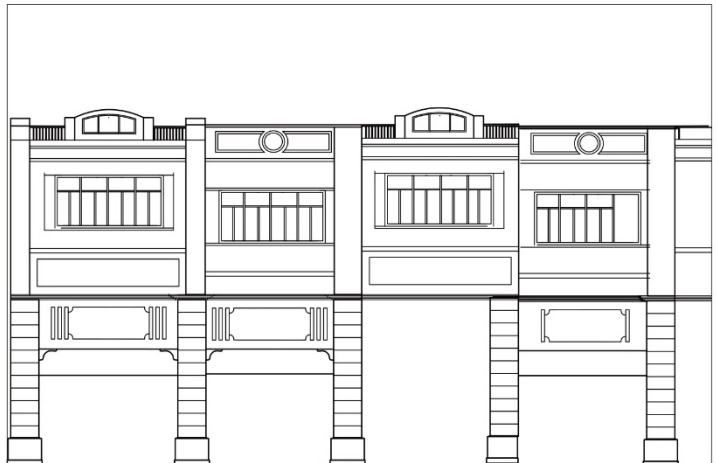
Plan



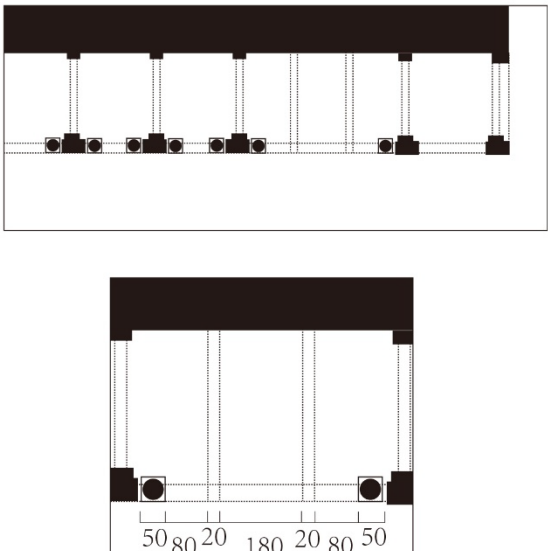
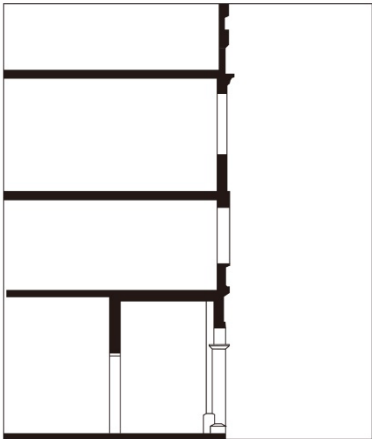
Axonometric Drawing



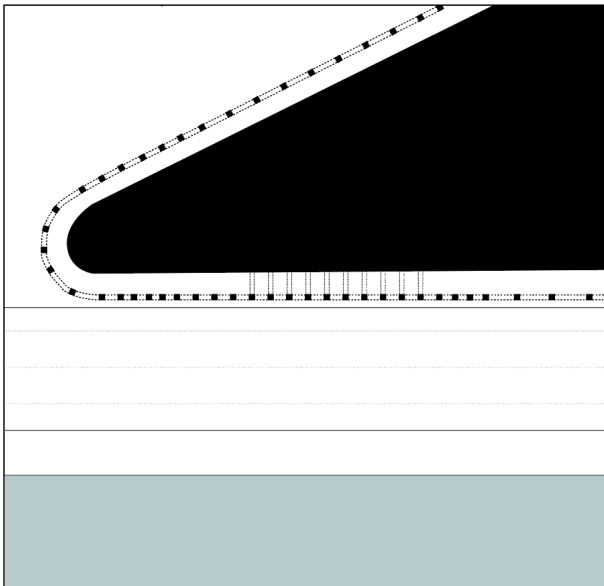
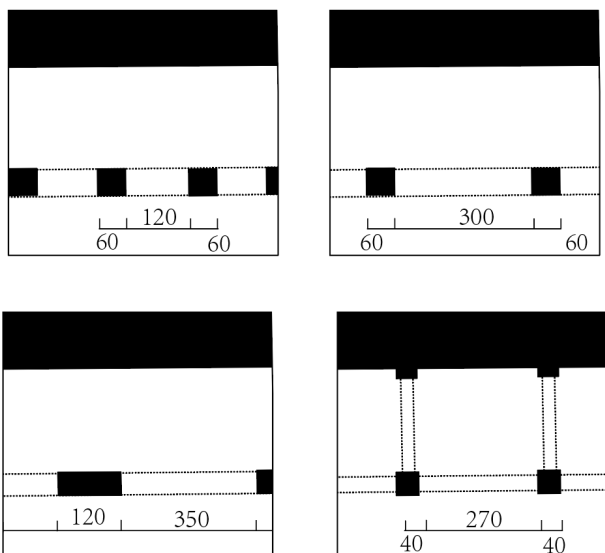
2. Guangzhou Qilou Hongde Road

Name	Hongde Road	Architectural style	Modern style
City	Guangzhou, China	Porticoes Height	Approx. 4.7 meters
Spatial type	Street-facing Qilou	Porticoes Depth	Approx. 3 meters
Master Plan		Arcade Plan	
			
Section		Elevation	
			

Tongfu West Road

Name	Tongfu West Road Qilou	Architectural style	Neo-Renaissance Style
City	Guangzhou, China	Porticoes Height	Approx. 4.7 meters
Spatial type	Street-facing Qilou	Porticoes Depth	Approx. 3 meters
Master Plan		Arcade Plan	
			
Section		Elevation	
			

Yanjiang West Road

Name	Yanjiang West Road Qilou	Architectural style	Neo-Gothic
City	Guangzhou, China	Porticoes Height	Approx. 5.8 meters
Spatial type	Riverside Qilou	Porticoes Depth	Approx. 3.5 meters
Master Plan		Arcade Plan	
			
Section		Elevation	
			

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