

MORPHOLOGICAL EVOLUTION AND DYNAMIC MECHANISMS OF THE B. AMEDEO BLOCK IN THE HISTORIC DISTRICT OF TURIN

A Thesis Submitted to

Southeast University & Politecnico di Torino

For the Academic Degree of Master of Architecture

BY

SUN Zhitong

Supervised by

Prof. HAN Dongqing

Prof. TRISCIUOGLIO Marco

May 2026

Abstract

Historic districts, a type of urban space that combines heritage value with contemporary residential functions, exhibit complex characteristics in their morphological evolution, including multi-dimensionality, multi-scalar structures, and long-term processes. Existing studies have developed systematic approaches in morphological typology and conservation strategies. However, there remains a lack of comprehensive explanation of the interaction and internal mechanisms among multiple driving forces in morphological evolution. In particular, there is insufficient integration of the dynamic relationships and feedback structures among different factors.

In response, this study takes the B.Amedeo block in the historic center of Turin as a case study and adopts a research framework of “morphological evolution – driving forces – dynamic mechanisms” to systematically investigate the evolutionary process and underlying mechanisms of residential historic districts.

The study first employs urban morphology and typo-morphological analysis to divide the historical evolution of the block, from its establishment in the 17th century to the present, into distinct stages. It analyzes changes across three dimensions: physical form, use patterns, and property structure. Based on comparative analysis of historical documents, cadastral records, and spatial representations, the evolution is categorized into four stages: establishment, maintenance, transformation, and renewal. This process reveals a transition from a closed space defined by institutional segregation to an open residential block integrated into the broader urban system. Meanwhile, driving factors are identified and classified across multiple dimensions, including institutional context, social structure, economic conditions, and property relations. These are further structured into a hierarchical system of fundamental, intermediate, and direct driving forces. Building on this, the study integrates these factors from a mechanism-oriented perspective by introducing a system dynamics framework. Population stock, spatial capacity, and spatial pressure are defined as key state variables, while flows such as population inflow and outflow, spatial redistribution, and urban renewal are used to describe dynamic processes. Social actors are incorporated into the analytical framework, with attention to their social identity, economic capacity, and behavioral choices. Differences among groups in migration and space use are examined, as well as their impacts on morphological evolution. Through this approach, a dynamic mechanism model is constructed to represent the interactions among population, space, and institutional conditions.

The results indicate that the evolution of urban form is not a linear process driven by a single factor, but rather a multi-factor process shaped by institutional constraints, social stratification, and spatial conditions. In the early stage, institutional restrictions led to continuous population accumulation, which translated into spatial pressure and drove internal densification and functional

mixing. In the intermediate stage, institutional relaxation allowed population mobility in form, but due to social stratification and differences in migration capacity, outflows and inflows coexisted, resulting in a tendency toward re-aggregation and high-density spatial use through redistribution. In the later stage, the introduction of institutional integration and market mechanisms led to asynchronous changes between population movement and spatial adjustment. Spatial renewal proceeded gradually under constraints of property structures and interest relations, resulting in a pattern of local restructuring alongside overall continuity.

Further analysis shows that different morphological levels exhibit significant differences in their pace of change. Population and social structures can reorganize relatively quickly, whereas plots and property structures tend to remain stable, imposing long-term constraints on spatial transformation. This mismatch produces asynchronous and non-linear evolutionary processes and gives rise to different types of feedback structures at different stages, including reinforcement mechanisms, re-aggregation mechanisms, and structural asynchronous adjustment mechanisms.

The main contribution of this study lies in proposing a mechanism-oriented research approach. By integrating urban morphology, institutional analysis, and system dynamics, it extends morphological studies from static description to dynamic explanation of evolutionary processes. The study further shows that the spatial choices, residential strategies, and patterns of use of different groups serve as intermediaries through which institutional and market factors are translated into changes in urban morphology. This expands the analytical perspective of traditional morphological studies. It should be noted, however, that the proposed dynamic mechanism model remains exploratory, and its structure and conclusions require further validation and refinement through additional case studies and methods.

Keywords: Historic District; Morphological Evolution; Dynamic Mechanism; System Dynamics; Turin B.Amedeo Block

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Chapter 1 Introduction

1.1 Research Background

Historic districts possess the dual attributes of heritage conservation and residential life. They are neither purely monumental heritage sites nor commercialized cultural tourism projects, but rather “living urban spaces” that continue to accommodate residents’ everyday lives. In this study, “historic districts” refer to urban areas formed through long-term urban evolution, which demonstrate historical continuity in spatial form, functional use, and social relations. Their historical value does not depend entirely on formal institutional recognition; many historic districts that have not been included within official conservation frameworks still preserve important spatial textures and social memories^[1]. How to respond to contemporary living needs while sustaining historical value has become an important issue in contemporary urban regeneration and heritage conservation. However, before specific renewal strategies can be formulated, it is first necessary to understand the formation process of the current spatial condition of historic districts; that is, how their morphology, functions, property relations, and social structures have interacted over long-term evolution and jointly shaped the spatial pattern of today.

Among various types of historic districts, those primarily characterized by residential functions are particularly challenging to study. Compared with individual cultural relics or public monumental heritage, residential historic districts involve more complex practical issues, such as differentiated property structures, changing residential needs, aging infrastructure, insufficient public services, and the coordination of interests among multiple stakeholders during renewal processes. Such districts need to avoid functional distortion, community displacement, and cultural hollowing caused by excessive commercialization; at the same time, they should not remain limited to superficial preservation of historical appearance while neglecting the continuous evolution of internal spatial structures, social relations, and everyday life logics. The difficulty of studying residential historic districts lies not only in identifying their historical appearance and spatial characteristics, but also in explaining why these spatial conditions have formed, how they have continued, and why different morphological levels have changed at different rhythms. The focus of this study is not to propose a renewal design scheme, but to understand, from the perspective of historical evolution, the relationships among internal morphology, use, property relations, and social structure.

The block is a basic unit of urban space, and its morphological evolution is characterized by the coexistence of relative stability and gradual change. Streets, plots, buildings, modes of use, and social composition do not change synchronously; rather, they are continuously adjusted at different

rhythms under the influence of multiple factors, including institutional change, population mobility, economic restructuring, technological renewal, and shifts in governance. This means that the evolution of blocks within residential historic districts is not a single-dimensional spatial change, but the result of the interaction among physical space, functional organization, property relations, and social structure. Existing studies have accumulated substantial achievements in the conceptual clarification of historic districts, the identification of spatial morphology, the study of building types, and conservation strategies. However, there remains room for further development in systematically explaining how multiple driving factors interact over long periods, how they form structural feedback, and how they further promote morphological change. Research on residential historic districts therefore needs to shift from single-dimensional morphological description to process-based explanation, focusing on the continuous interactions among institutions, population, spatial capacity, property relations, and modes of use in different historical stages.

Research on historical and cultural heritage in China has already established a certain foundation. However, in terms of balancing residents' everyday life with heritage conservation and constructing scientific governance models, both theory and practice often struggle to address the complexity of such areas. In many cities, cultural tourism development has led to functional transformation, resident displacement, and cultural hollowing, indicating that a single path of conservation or renewal is insufficient to respond to this complexity. Countries such as Italy have, through the coordination of hierarchical conservation systems, community participation mechanisms, and dynamic planning strategies, achieved to some extent the dual goals of historical continuity and functional renewal in certain cities, thus offering valuable references. Therefore, gaining an in-depth understanding of the dynamic evolution of historic districts, identifying the driving factors behind their morphological changes, and revealing the spatial mechanisms underlying these changes have become crucial to achieving sustainable conservation and governance. This study is positioned upstream of the broader agenda of understanding evolutionary patterns and exploring renewal pathways. Its main objective is to investigate the internal logic of the evolution of residential historic districts, summarize their patterns, and answer the questions of how and why they evolve, thereby providing a theoretical basis for future conservation and renewal.

In recent years, many historic districts in China have experienced resident relocation, spatial homogenization, weakened living functions, and excessive tourism-oriented development in conservation and renewal practices. These phenomena suggest that neither appearance-oriented preservation nor development-oriented renewal alone can effectively respond to the complexity of such areas. European countries such as Italy have accumulated long-term practical experience in the conservation of historic urban areas, community continuity, and incremental renewal. While maintaining spatial continuity, their historic districts have also continuously faced transformation pressures brought by modern living needs, institutional adjustments, and changes in social structure.

This urban environment, characterized by both historical depth and contemporary tension, provides a relatively typical object for observing the evolutionary patterns of residential historic districts. Studying residential districts within Italian historic urban areas helps reveal the relationships among long-term institutional change, social restructuring, and spatial morphological continuity, and may also provide comparative references and insights for understanding the evolutionary logic of similar historic districts in China.

The studio to which the author belongs has long focused on the conservation, regeneration, and renewal of historic districts, and has accumulated a solid foundation in the study of urban historic areas. This has provided important support for the present research in terms of problem awareness, case understanding, and research methodology. The author participated in the double-degree exchange program between Southeast University and Politecnico di Torino, and during one year of study in Turin, directly engaged with the real context of an Italian historic city through observation and reflection. As a European city with profound historical accumulation and clear characteristics of urban morphological stratification, Turin's historic urban area demonstrates complex features in its long-term evolution, including the continuity of spatial structure, functional transformation, property adjustment, and social restructuring. During this study-abroad experience, the author developed a research interest in residential blocks within Turin's historic urban districts. This study therefore does not originate from an abstract theoretical question alone, but was formed through the continuous support of a domestic research platform and the direct stimulation of overseas field experience: the former provided academic training and methodological foundations in urban architecture and historic district studies, while the latter provided the specific case, on-site observations, and conditions for the formation of research questions.

This study aims to construct a methodological path that integrates urban morphological analysis, the interpretation of social factors, and mechanism analysis based on system dynamics. Taking one block within a residential historic district as the research object, it seeks to systematically construct and structurally express the mechanisms and operational logic through which multiple driving factors act during the process of morphological evolution.

1.2 Research Objectives

Studies on blocks within historic districts in China have mainly focused on the identification of morphological characteristics and strategies for conservation and renewal. Relatively systematic understandings have been developed regarding the description and classification of spatial morphology itself. However, the systematic explanation of the relationships among multiple driving factors and the internal mechanisms involved in block evolution remains in a process of continuous development and deepening. Taking the Beato Amedeo block in the historic urban area of Turin as the research object, this study attempts to construct a comprehensive analytical path centered on

“morphological evolution—driving factors—evolutionary mechanisms”, in order to understand more systematically the internal logic and structural relationships of blocks within residential historic districts during long-term evolution.

In terms of research approach, this study is not limited to describing the results of morphological change. Instead, it further focuses on the driving factors behind morphological changes in different stages, and reveals their modes of operation at different levels through the classification and integration of these factors. Starting from the three dimensions of physical morphology, use morphology, and property morphology, the study sorts out the changing characteristics of the block in each historical stage and identifies the key driving factors influencing its evolution. On this basis, by introducing the basic ideas of system dynamics, the study structurally expresses the action paths, feedback relationships, and stage-specific characteristics among various driving factors, so as to form a holistic understanding of the complex evolutionary process. It should be noted that this study regards system dynamics as an analytical tool for expressing mechanism relationships, rather than as a simulation method aimed at precise quantification.

The objective of this study is not only to reconstruct and summarize the historical process of a single case, but also to extract, on the basis of case analysis, an analytical framework that can be used to understand the evolution of historic districts and their driving mechanisms. This framework emphasizes tracing back from morphological results to underlying mechanisms, and enhances the explanatory capacity for the complexity of block evolution by integrating different types of driving factors and their relational structures. Through this methodological path, the study attempts to provide an analytical tool with a certain degree of applicability for the study of historic districts in different contexts. In doing so, it further promotes a shift from morphology-oriented description toward mechanism-based explanation and structured understanding, and offers a more logical analytical perspective and methodological support for the renewal and conservation of historic districts.

1.2.1 Core Research Questions

This study seeks to explore how the morphology of blocks within residential historic districts evolves, what factors drive this evolution, whether the mechanisms underlying these changes can be identified and explained, and how such understanding can provide theoretical support for future dynamic conservation. The core research questions consist of three parts.

(1)What kind of morphological evolutionary path has the block formed over its long historical process?

This question examines the long-term evolution of the block in terms of physical space, functional use, and property structure.

(2)How do multiple factors participate in and drive this evolution?

This question examines how factors such as institutional environment, social structure, economic conditions, and property relations influence the morphological outcomes of the block in different historical stages.

(3)How are multiple factors transformed into spatial morphological outcomes through feedback relationships and stage-specific mechanisms?

This question examines whether the driving factors of evolution operate independently, or whether they interact with one another to form certain mechanisms. It further explores whether causal relationships or feedback mechanisms can be abstracted from these interactions.

1.2.2 Research Value and Expected Contributions

The value of this study first lies in its explanation of the evolutionary logic of residential historic districts. Compared with studies that focus mainly on current historical appearance or conservation strategies, this study examines the interactions among physical morphology, modes of use, property structure, and social relations, thereby explaining the formation of the current spatial condition of the block.

Second, this study attempts to combine urban morphological analysis with mechanism analysis. By examining the different historical stages of the study block, it analyzes the structure of driving factors behind these changes and their action paths, and further expresses the relationships among population, spatial capacity, spatial pressure, and spatial adjustment.

Finally, this study provides preliminary reference value for the conservation and renewal practice of historic districts. The thesis does not directly propose specific renewal design schemes. Instead, by explaining the formation logic of the spatial condition of historic districts, it provides an analytical basis for future judgments on which spatial elements have continuity value, which problems arise from long-term structural constraints, and how renewal interventions should respect the block's own evolutionary logic.

1.3 Research Methods and Approach

1.3.1 Research Methods

This study follows the main analytical line of evolutionary analysis, driving-factor identification, and mechanism construction.

(A)Evolutionary Process Analysis: Typo-Morphological Method

Corresponding to Research Question 1: What kind of morphological evolutionary path has the study block formed over its long historical process?

From the perspective of urban morphology, this study adopts a typo-morphological analytical method to systematically examine the long-term evolutionary process of the block. Based on historical maps, archival materials, literature, and field investigation, the historical development of

the block is divided into four stages: the establishment stage, the maintenance stage, the transformation stage, and the renewal stage.

The analysis is conducted from three dimensions: physical morphology, use morphology, and property morphology. Through both chronological stage-based analysis and summary analysis of the three morphological dimensions, the study identifies the changing characteristics of different morphological levels, including streets and blocks, plots, and buildings, in different periods. This provides the morphological basis for the subsequent analysis of driving factors.

(B)Analysis of Driving Factors: Qualitative Analytical Methods

Corresponding to Research Question 2: How do multiple factors participate in and drive the evolution?

On the basis of clarifying the morphological evolution characteristics of the block, this study employs qualitative methods such as sociological analysis, institutional analysis, and historical literature interpretation. It systematically identifies the key driving factors influencing the block's evolution from several aspects, including institutional factors, socio-economic dynamics, infrastructure and transport conditions, property structure and land policies, as well as changes in planning concepts and heritage conservation ideas.

Through the classification and hierarchical assessment of these driving factors, this study clarifies the scope of influence and direction of impact of different factors in the evolution of the block, identifies the relationships among them, and lays the foundation for mechanism identification.

(C)Exploration of Evolutionary Mechanisms: System Dynamics Method

Corresponding to Research Question 3: How are multiple factors transformed into spatial morphological outcomes through feedback relationships and stage-specific mechanisms?

To explore how different driving factors are combined across temporal and spatial levels, and how they further form a morphological evolutionary logic with stage-specific characteristics, this study introduces the System Dynamics method as a language for mechanism expression. It is used to clearly present the relational structure among morphological states, processes of change, and driving factors.

(D)Other Research Methods

1. Historical Material and Literature Research

This study combines the collection of historical materials with literature research to systematically go through literature, historical images, historical maps, and other materials related to the research topic. It reviews relevant concepts, institutional regulations, and existing research findings, while also paying attention to research progress in this field both in China and abroad, so as to understand the current state of research and clarify the research direction and methods of this study. On this basis, the urban development process of Turin, Italy, is systematically reviewed, with

a particular focus on materials related to the morphological evolution of historic residential blocks, thereby providing solid theoretical support for the subsequent research.

2. Empirical Field Investigation

Field investigation is conducted in the study block and its surrounding areas to observe and record the current conditions of the block. Relevant information is also obtained through communication with nearby residents.

3. Inductive Summary Method

Through the analysis of textual materials, academic literature, interview records, technical drawings, and photographs obtained from the above literature research and field investigation, this study summarizes the evolutionary process of the study block.

1.3.2 Research Path

This study focuses on the identification and construction of the morphological evolutionary mechanisms of a block within a residential historic district. It follows a research path that gradually advances from empirical observation to structured causal explanation.

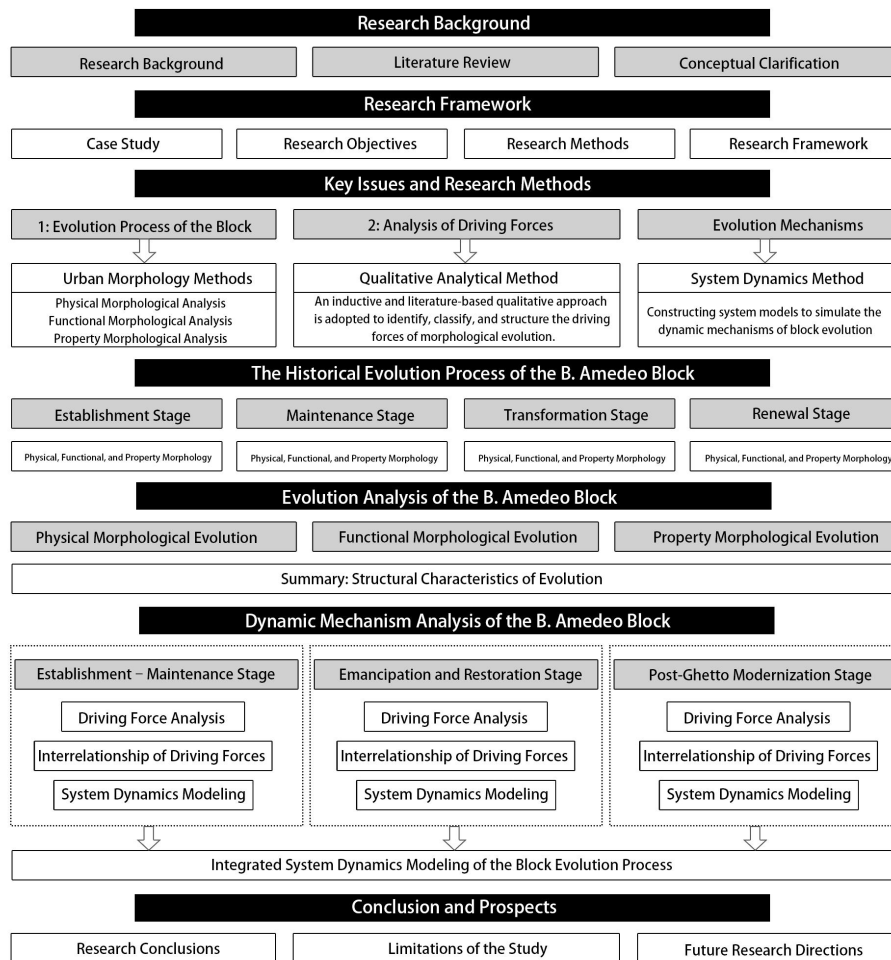


Figure 1-1 Research Structure Diagram

The research first applies urban morphological methods to systematically decompose the long-term evolutionary process of the Beato Amedeo block. Physical morphology, use morphology, and property morphology are incorporated into a unified analytical framework, thereby providing an operable spatial basis for the subsequent identification of driving factors and construction of mechanisms. On this basis, the study further examines the key factors influencing the evolution of the block from the dimensions of institutions, socio-economic conditions, infrastructure, property structure, and planning cognition. These factors are structurally classified and transformed into comparable analytical variables through hierarchical mapping. Focusing on the ways in which different variables are combined across temporal and spatial levels, as well as their long-term effects, this study introduces the System Dynamics method to present the relational structure among morphological states, processes of change, and external driving factors in both diagrammatic and structured forms. In this way, the originally dispersed historical evolutionary process can be expressed within a relatively clear relational framework.

Through the above research path, this study attempts to construct an analytical framework centered on evolutionary analysis, identification of driving factors, and mechanism expression. It aims to further shift the study of morphological evolution in historic districts from morphological description toward the explanation of relational structures and evolutionary logic.

1.4 Literature Review

1.4.1 Definition and Types of Historic Districts

“Historic district” is an important spatial concept in the field of heritage conservation. It was gradually introduced into China from foreign-language contexts under the influence of international heritage conservation theories in the 1980s, and has since evolved into a localized concept. Its origins can be traced back to medium-scale concepts such as “Historic Areas”, which were established in the 1976 Nairobi Recommendation and further developed into “Historic Urban Areas” in the 1987 Washington Charter, with the aim of emphasizing the holistic conservation of historic urban environments^[2].

China has experienced a stage in which multiple concepts coexisted, including “historic and cultural conservation areas”, “historic districts”, “historic blocks”, and “historic and cultural blocks”. It was not until the promulgation of the Code for Conservation Planning of Historic Cities in 2005 that concepts such as “historic districts” became standardized terms, marking the basic establishment of China’s meso-scale heritage conservation system.^[2] Li Chen, through a systematic review of “historic and cultural blocks” and related meso-scale concepts, points out that the differences among these concepts essentially reflect distinctions in institutional attributes and spatial scale, rather than merely differences in terminology^[3]. At the same time, historic and cultural

blocks can be regarded as key protected types within historic districts, and the two concepts present a nested relationship within the conceptual system. However, due to conceptual evolution and mixed usage, the current system still involves a certain degree of blurred boundaries and interpretive ambiguity.

In the current planning and academic context in China, “historic district”, as an important spatial concept, has gradually shifted from a broad academic concept to a standardized object of conservation. According to the Standard for Conservation Planning of Historic Cities (GB/T 50357—2018), a historic district is defined as “an area that can authentically reflect the traditional appearance and national or local characteristics of a certain historical period” (Ministry of Housing and Urban-Rural Development of the People’s Republic of China et al., 2018). The standard further indicates that a historic district may either be an area with a relatively high concentration of cultural relics or a spatial unit that, as a whole, reflects historical appearance and local characteristics, and it may or may not contain specific protected cultural heritage units.

Relevant regulations and policy documents have further clarified the hierarchical relationship of historic districts. The Opinions on Strengthening the Protection and Inheritance of Historical and Cultural Heritage in Urban and Rural Construction (General Office of the CPC Central Committee and General Office of the State Council, 2021) proposes the establishment of a conservation system centered on historic and cultural cities, towns, and villages, historic and cultural blocks/districts, and various types of heritage. It includes both “historic districts” and “historic and cultural blocks” within the system of conservation objects. This formulation indicates that historic districts are no longer merely academic descriptive concepts, but have been endowed with clear policy attributes, becoming important spatial carriers between individual cultural relics and the block scale. This change shows that historic districts have gradually transformed from academic descriptions into important spatial types with policy and management attributes.

Existing studies mainly classify historic districts from two perspectives: spatial attributes and functional characteristics. From the perspective of spatial environment, historic districts can be divided into urban and rural types. Historic districts in cities correspond to “Urban Historic Areas”, while those in rural areas include types such as historic villages and towns. This classification continues the basic logic of classifying “Historic Areas” in the international heritage conservation system.^[3] From the perspective of function and use attributes, scholars have further proposed more specific subtypes. Among them, residential historic districts constitute a typical type. They not only preserve historical and cultural heritage, but also accommodate residents’ everyday lives and social networks, and therefore possess significant cultural and social value^[4]. Against the background of urban renewal, the functions of some historic districts have gradually changed, shifting from purely residential spaces toward tourism, public activities, or mixed-use spaces. Their spatial attributes and social functions thus demonstrate dynamic characteristics of transformation^[5].

In summary, historic districts and historic and cultural blocks differ clearly in conceptual terms. The former, as a broader academic and planning concept, emphasizes the comprehensive capacity of an area to embody the historical appearance and spatial characteristics of a particular period. Its boundaries are relatively open, it does not depend on statutory recognition, and it has stronger morphological continuity and interpretive flexibility. The latter, by contrast, refers to statutory conservation objects formed through institutional selection on the basis of this broader category. Such areas usually have clearly defined boundaries and management requirements, reflecting the focused identification and regulation of areas with outstanding value. Therefore, historic and cultural blocks can be regarded as a specific type of historic district, while historic districts constitute a more inclusive higher-level conceptual framework.

The Beato Amedeo block selected in this study is located within the historic urban area of Turin and represents a typical residential historic district. Although its buildings have not been included in formal lists of protected cultural relics or historic buildings, the block as a whole still possesses a clear historical morphological structure and spatial pattern. This study therefore regards it as an ordinary block within a historic district and examines the mechanisms of its morphological evolution.

1.4.2 Typo-Morphological Research Methods for Historic Districts

Urban morphology provides a systematic methodological foundation for the identification and analysis of types in historic districts. Its core lies in revealing the compositional characteristics and evolutionary logic of different morphological types through the study of urban physical spatial structures and their historical transformation processes.

As early as the nineteenth century, Durand introduced the concept of type into design methods through his studies on the modularization and standardization of architectural composition. Quatremère de Quincy, by contrast, defined type as a universally meaningful “prototype”, emphasizing its abstract characteristics beyond specific forms. Since the twentieth century, Rossi, through the concept of “autonomous type”, pointed out that certain urban forms possess continuity and monumentality that transcend functional change^[6]. On this basis, the Italian school further understood type within the process of historical evolution. Muratori regarded the city as a continuously growing organism and emphasized the historical continuity of urban form. Caniggia, from the perspective of typological evolution, revealed the gradual transformation of types across different periods and contexts^[7]. These studies established type as an important analytical tool for connecting urban morphology with historical evolution.

The British historico-geographical school takes morphogenesis as its core concern, emphasizing the formation and evolution of urban form through the analysis of historical materials. Among its approaches, Town-Plan Analysis, proposed by the Conzenian school, is particularly

representative. This method examines the street system, plot structure, and building layout in an integrated manner, dividing urban form into three basic levels: the street network, plot structure, and building form. In this way, it establishes a systematic framework for morphological analysis^[8]. This method emphasizes chronological analysis based on historical maps. By comparing morphological elements across different historical stages, it identifies morphological units and their evolutionary processes. At the same time, related studies point out that plots, as important basic units of urban morphology, play a key mediating role between the street pattern and building form. Their boundaries and structures show strong continuity and exert an important influence on the overall structure of urban form^[9]. The Italian school, by contrast, takes type as its core concept, focusing on the generative relationship between architecture and urban form, and applying its research findings to design practice. The French school and related studies further introduced socio-cultural factors, incorporating “agents” and their actions into the analytical framework, thereby expanding the explanatory dimensions of urban morphological research^[10]. Overall, these different approaches together constitute a multidimensional research system of urban morphology.

Urban morphology research in China has gradually developed through the introduction and adaptation of Western theories. Gu Kai proposed that morphological analysis should be regarded as an important method in urban morphology research, and further constructed an integrated research framework by combining environmental behavior analysis with political-economic analysis^[11]. Subsequently, related studies have applied the Conzenian method to the analysis of historic cities and traditional blocks, while continuously exploring its localization in practice. In recent years, studies on historic districts have begun to focus on the division and identification of multi-scalar morphological units. By integrating methods from different schools of urban morphology, these studies have sought to establish a more systematic analytical framework^[12]. With technological development, urban morphological methods have gradually expanded from traditional qualitative analysis to quantitative analysis. Ye Yu and colleagues point out that analytical tools such as Space Syntax, Spacematrix, and Urban Network Analysis enable urban morphology research to measure spatial structures in a more refined and objective manner, thereby enhancing the scientific rigor of such studies^[13]. On this basis, GIS technologies and clustering analysis methods have been widely applied to the delineation of morphological regions and the identification of types. For example, Tian Yinsheng combined K-means clustering with Space Syntax to quantitatively analyze and classify morphological elements in an integrated manner, thereby improving the efficiency and comparability of morphological analysis^[14]. In addition, studies based on “morphological genes” have used data mining methods to identify urban morphological types, providing a new technical path for multi-scalar typological classification^[15].

In addition, on the basis of the above urban morphological elements and spatial hierarchy, research has further developed an interest in the topological relationships among elements, namely

the study of configuration. Configuration emphasizes the topological relationships among spatial units and their overall organization, understanding elements such as streets, plots, and buildings as interrelated network structures. This perspective extends urban morphological research from the analysis of physical entities to the analysis of abstract relationships, thereby revealing the organizational logic embedded in spatial structures and its mechanisms of influence on human activities.

In terms of specific methods, configurational analysis methods represented by Space Syntax translate urban space into a network system through Graph Theory, and characterize spatial accessibility and centrality through indicators such as integration and choice^{[16][17]}. Related studies show that urban street networks usually present a hierarchical structure composed of a small number of highly integrated and continuous “foreground networks” and a large number of localized “background networks” that serve everyday life. This structure forms a polycentric spatial organization pattern at different scales. In addition, the Route Structure Approach proposed by Stephen Marshall further emphasizes the relationship between road hierarchy and continuity. It argues that whether a route remains continuous at intersections is an important basis for defining its hierarchical level, thereby complementing the limitations of Space Syntax in identifying road hierarchy^[18].

In recent years, configurational studies have continued to expand their analytical dimensions, gradually moving from a single focus on street networks toward multi-element integrated analysis. For example, Karl Kropf has incorporated the plot scale into the framework of configurational analysis, exploring the coupling relationship between street networks and plot subdivision^[19]; At the same time, GIS-based methods and quantitative models have also been used to identify different configurational patterns and their spatial distribution characteristics. However, existing studies as a whole still mainly take the street network as the primary object of analysis. The integration of multi-level configurational relationships among streets, plots, and buildings remains to be further deepened, which also leaves room for subsequent research to understand urban spatial structure from a comprehensive morphological perspective.

1.4.3 Development of Historic District Conservation Systems in China and Abroad

The conservation system for historic districts did not emerge all at once. Rather, it gradually evolved under the combined influence of industrial urban renewal, the rise of modern planning, and the development of cultural heritage concepts. Its evolution generally experienced a shift from individual buildings to historic environments, from static conservation to dynamic governance, and from expert-led approaches to multi-stakeholder negotiation.

The concept of historic district conservation initially originated from the practice of protecting historic buildings. The 1964 Venice Charter was of great significance in this process. It clearly

proposed that the scope of conservation should be expanded from individual cultural relics to the level of the historic environment, emphasizing that conservation objects include not only “urban or rural settings that bear witness to a particular civilization, a significant development, or a historic event”, but also “more modest works of the past which have acquired cultural significance with the passing of time”. As a result, the object of heritage conservation gradually expanded from individual buildings to historic environments, and was further implemented at the meso-scale in spatial units such as historic districts and historic blocks. This marked the transformation of heritage conservation from individual monuments toward the overall historic environment.

In the nineteenth century, European conservation thought centered on the question of whether restoration should be permitted. The restoration tradition represented by Viollet-le-Duc advocated restoring a building to its “complete state” through rational deduction. As Viollet-le-Duc stated, “To restore an edifice is not to maintain it, repair it, or rebuild it; it is to re-establish it in a complete state that may never have existed at any given moment.” This view emphasized the designability of restoration and the order of typological reconstruction^[20]; Ruskin and William Morris, by contrast, emphasized historical authenticity and the traces of time, opposed “restorative restoration”, and advocated the preservation of the authenticity of materials and craftsmanship. This opposition laid the foundation for the later two major paradigms of restoration and conservation.

In the early twentieth century, the object of conservation gradually expanded from individual buildings to more complex historic environments. Alois Riegl proposed a system of “monument values”, including age value, historical value, artistic value, and use value, which shifted conservation from a technical issue to a question of value judgment. Gustavo Giovannoni further introduced the ideas of “urban heritage as a whole” and *ambiente*, emphasizing the integrity of historic urban areas as continuous places of everyday life. He also advocated selective thinning, or *diradamento*, to avoid large-scale demolition and reconstruction. The theoretical development of this period made conservation at the block scale possible and laid an intellectual foundation for later charter-based conservation systems.

After the Second World War, large-scale reconstruction and waves of modernist urban renewal created a stronger need for institutionalized conservation practices. In the mid-twentieth century, the international charter system centered on ICOMOS gradually established a shared international consensus on historic conservation: the object of conservation expanded from monuments to historic environments and urban fabric, while the goal of conservation shifted from the restoration of individual buildings toward holistic continuity. During this stage, historic urban areas were increasingly understood as integrated systems composed of street networks, plot patterns, building types, and public spaces. At the same time, urban studies and planning theory also had an important influence on conservation thinking. Patrick Geddes emphasized the regional planning method of “survey—analysis—action”, promoting the methodological connection between conservation and

planning^[21]; Urban critiques by Lewis Mumford, Jane Jacobs, and others prompted the planning field to refocus on everyday streets, community networks, and diversity, making the “living block” an important value orientation^[22]; Kevin Lynch’s study of urban image further strengthened the attention paid to the legibility of urban space and the continuity of urban structure.

A significant institutional feature of this period was that historic conservation began to expand from cultural heritage affairs under the cultural sector to a broader issue of urban governance. Conservation planning, regulatory control, public investment, and local governance became indispensable components of the conservation system. Historic urban conservation thus entered a new stage in which institutionalization and planning-oriented approaches advanced in parallel.

Since the 1990s, theories of historic conservation have further expanded from morphological objects to meanings and processes. On the one hand, discussions of authenticity have extended from materials and craftsmanship to cultural contexts and plural values. On the other hand, heritage has increasingly been understood as a product of social practice, closely related to identity, memory, power, and economic processes. Conservation has shifted from preserving established forms to coordinating continuous use under multiple interests.

At this stage, the theory and practice of historic district conservation have shown a significant turn toward integration. Conservation goals have gradually shifted from a static orientation that emphasizes morphological freezing and material preservation to a dynamic management model that maintains historical value amid continuous change. Governance methods have expanded from expert-led decision-making to participatory consultation mechanisms involving local residents, users, and multiple stakeholders. Value recognition has evolved from a single evaluation system centered on aesthetic and historical significance to a plural value framework that also considers cultural, social, economic, and environmental benefits. In terms of spatial understanding, attention has shifted from individual monuments or local fragments to the interpretation of historic urban areas within larger urban systems and cultural landscape structures, as reflected in the holistic and continuity-oriented perspective emphasized by the Historic Urban Landscape approach.

With the development of urban morphology, research methods for historic districts have continued to deepen. The Italian typo-morphological tradition represented by Muratori and Caniggia, together with the British and German historico-geographical tradition represented by Conzen and Whitehand, emphasizes the systematic analysis of different levels, such as streets, plots, and buildings. These approaches also point out that different morphological levels vary in their rhythms of change and degrees of adjustment during renewal processes. On this basis, conservation is no longer understood as the simple freezing of spatial form. Instead, it requires distinguishing the roles of different levels: which elements should remain stable, which can be adjusted, and how change is absorbed and transmitted across different levels. This hierarchy-based morphological analysis provides important theoretical support for the dynamic conservation of historic districts.

China's historic district conservation system has generally evolved from the protection of cultural relics to the conservation of historic and cultural cities and historic blocks, and has eventually developed toward living renewal governance. Since the twentieth century, the academic traditions of architectural history and ancient building conservation laid the foundation for early conservation practices. After the reform and opening-up period, the system of historic and cultural cities and conservation planning gradually took shape, bringing conservation into an institutionalized stage. At the same time, rapid urbanization and the logic of land finance placed historic blocks under intense development pressure, and a long-standing tension between conservation and renewal emerged in practice. As a result, ideas of organic renewal and incremental transformation gradually developed. These approaches emphasize small-scale and continuous improvement within the existing urban fabric, seek to avoid the rupture of social networks caused by large-scale demolition, and connect residential improvement, community governance, and conservation practice. Since the 2010s, approaches such as micro-renewal and acupuncture-style intervention have further strengthened the emphasis on small-scale, low-impact, and multi-stakeholder collaboration, in an attempt to find a sustainable balance between conservation goals and practical needs.

In summary, the evolution of historic district conservation systems shows an overall trend from the expansion of conservation objects, to the diversification of values, and further to the increasing complexity of governance. International research has gradually understood historic blocks as complex systems with multi-level structures and feedback processes, emphasizing the maintenance of value amid change and the achievement of dynamic balance through institutions and consultation mechanisms. Chinese practice is also shifting from the restoration of physical objects toward living renewal. However, the systematic construction of evolutionary logic and mechanism structures remains relatively underdeveloped.

1.4.4 Analysis of the Driving Factors of Urban Morphological Change

Existing studies on urban morphology generally argue that the evolution of urban spatial form is not determined by a single factor, but results from the combined effects of multiple driving forces operating across different temporal scales and spatial levels. Related research usually analyzes the external drivers of urban morphological change from multiple dimensions, including institutions, economy, society, and infrastructure, and points out that urban form is a comprehensive result gradually formed and transformed through the coupled effects of multiple factors^[23].

Institutional factors are widely regarded as one of the key forces shaping the long-term stability of urban morphology. Planning regulations, land systems, property arrangements, and heritage conservation policies impose continuous and far-reaching constraints on urban spatial

structure by defining development intensity, land-use patterns, and renewal boundaries.

Related studies indicate that the institutional environment often exerts a foundational influence on block structure from an early stage, giving street networks and plot patterns strong characteristics of path dependence. As a result, subsequent morphological evolution tends to take the form of adjustments within the existing structure, rather than overall restructuring.^[24] Economic factors mainly influence the rhythm of urban morphological change and the direction of renewal through market mechanisms. Land value, rent levels, expected investment returns, and development strategies directly affect the frequency of building renewal and the intensity of spatial use. Studies by Zhou Tao, Li Jing, and others indicate that, in the context of rapid urbanization, land development models and real estate market behavior have become important forces driving the transformation of block plan forms, and have, to a certain extent, contributed to the expansion of block scale and structural reorganization.^[25] Social factors mainly concern the influence of demographic structure, residential needs, and changes in social groups on urban space. Population growth, migration flows, changes in family structure, and transformations in lifestyle continuously alter the demand for spatial use, and gradually feed back into spatial morphology over the long term.

Research by Fang Rong and others shows that the formation and evolution of street space depend not only on planning control, but are also deeply influenced by users' behavior and everyday life practices, reflecting the combined effects of top-down and bottom-up mechanisms. Such driving forces usually operate in a gradual manner, and their influence often becomes visible at the morphological level only over a relatively long time scale.^[26] In addition, infrastructure construction and technological conditions also constitute important driving forces. Transport systems, public service facilities, and technological renewal not only change the structure of urban accessibility, but also reshape patterns of spatial use in different stages, thereby providing new possibilities or constraints for morphological evolution. Related studies point out that the evolution of transport and infrastructure is often closely associated with urban expansion and the restructuring of spatial structure, and represents one of the important external factors influencing changes in block morphology.^[23] At the same time, some studies have begun to use systematic methods to explain the internal logic behind morphological evolution. Although the study on the morphological evolution of residential settlements in Milan focuses on settlements rather than historic districts, its methodology provides an important reference. This study divides the morphological evolution of residential settlements into several historical stages and, on the basis of analyzing morphological patterns, classifies the driving factors behind the evolution into three categories: direct drivers, indirect drivers, and special drivers. It attempts to explain the formation of morphological characteristics in different stages through the combined effects of historical context, policy

environment, social concepts, and urban renewal.^[27]

1.4.5 Research on the Mechanisms of Urban Morphological Evolution

Compared with earlier studies, which tended to remain at the level of identifying morphological characteristics, dividing evolutionary stages, and summarizing influencing factors, recent research on the morphological evolution of historic districts has gradually shifted toward discussions of mechanisms. Related studies no longer regard institutional, economic, social, or functional factors merely as independent external variables; instead, they pay greater attention to how these factors interact within specific historical contexts and shape the spatial outcomes of historic districts through a series of continuous processes. Taking the study of the Confucius Temple historic district as an example, researchers have clearly proposed that analysis should begin with the deep-seated rules and characteristics of spatial morphology, and should be combined with the historical and cultural context of the district. They examine how factors such as natural water systems, transport organization, and functional layout jointly act upon morphological evolution, and summarize the relationships among these factors as an “influence mechanism”.^[28] This indicates that, in studies of historic districts, mechanism analysis is no longer satisfied with merely listing influencing factors; rather, it further asks how these factors operate.

Within this research context, historic districts are understood as multi-level complex systems. Elements such as streets and lanes, plots, buildings, and property boundaries do not change in isolation; rather, they are continuously adjusted at different rhythms across different levels. Related studies emphasize the structural significance of plots and their patterns, pointing out that they are not only the intermediary connecting streets and buildings, but also an important basis linking physical morphology with the property system. Therefore, plots play a key role in explaining the gradual evolution of historic districts. For example, studies on the Xiaoxihu block have proposed that the plot pattern not only reflects the ordered foundation of urban morphology, but also implies underlying property relations. For this reason, the conservation and regeneration of historic districts cannot be separated from the plot level and its evolutionary logic; otherwise, it would be difficult to support small-scale and incremental renewal practices.^[29]

Mechanism-oriented research has also begun to incorporate complexity thinking and simulation methods. Studies on the morphological shrinkage of historic districts in the Pearl River Delta clearly point out that, against the background of urban expansion, such districts face compound crises including building deterioration, industrial decline, population loss, and spatial fragmentation. Their morphological evolution therefore cannot be simply understood as the result of a single process of decline. Instead, it requires the use of historical reconstruction and cellular automata simulation to identify the main influencing factors and patterns in the process of shrinkage.^[30] This indicates that mechanism analysis increasingly emphasizes the linkage among

multiple factors, stage transitions, and evolutionary paths, rather than statically establishing a direct correspondence between a single factor and a particular morphological outcome.

1.4.6 Summary of the Literature Review

Existing studies have developed a relatively systematic understanding of historic districts from the perspectives of conceptual definition, institutional systems, and typological classification, providing an important basis for understanding their spatial attributes and conservation value. On this basis, this study defines its research object as a “historic district”, in order to better encompass its morphological continuity across different historical periods as well as its composite characteristics in spatial, functional, and social dimensions. This provides a more appropriate research framework for analyzing its evolutionary logic and internal mechanisms.

Urban morphology provides a complete pathway for the typological study of historic districts, extending from concepts to methods and from qualitative to quantitative analysis. On the one hand, it understands the historical continuity of urban form through typological theory. On the other hand, it systematically analyzes morphological structures through a hierarchical analytical framework centered on streets, plots, and buildings. At the same time, with the development of interdisciplinary approaches and quantitative tools, the precision and operability of type identification and morphological analysis have been further improved. Together, these methods constitute an important methodological foundation for the typological study of historic districts. At the practical level, the Xiaoxihu project can be regarded as an important exploration of the typo-morphological method in China. Through a small-scale, incremental, and self-organized renewal path, it responds to contemporary use demands while maintaining the existing morphological structure, demonstrating the practical potential of the typo-morphological method in the renewal of historic districts.

Existing studies also show that the application of this method in China still has certain limitations. On the one hand, some studies and practices tend to emphasize the identification of morphological characteristics and the translation of formal patterns, while paying insufficient attention to the multiple driving factors and their interactions in the evolutionary process of historic districts. On the other hand, although typology and morphology have developed relatively mature analytical traditions, an integrated analytical framework is still lacking for explaining how urban form continues to evolve under the combined influence of institutional, property-related, social, and spatial factors. Meanwhile, related studies in China generally remain at the level of value judgment and strategy formulation, while mechanism-based explanations of evolutionary processes and the construction of verifiable models remain relatively weak.

In terms of driving factors, existing studies still remain, to a certain extent, at the level of factor summarization. They pay relatively limited attention to the interactions among different driving

forces and their transmission paths in specific spatial contexts, and lack a rational methodology for further explaining how these forces are transformed into concrete morphological outcomes. At the mechanism level, existing studies have generally shown a relatively clear mechanism-oriented tendency. First, the morphological evolution of historic districts is understood as a process shaped by multiple factors, multiple levels, and multiple stages. Second, the relationships among different levels, such as streets and lanes, plots, buildings, property boundaries, and management units, constitute important mediating elements for understanding morphological change. Third, mechanism-oriented research places greater emphasis on process, relationality, and structure, aiming to explain how urban form is generated, adjusted, and continued under specific historical conditions, rather than merely listing influencing factors. However, judging from existing research, such studies still mainly focus on case analysis, the identification of influencing factors, or the construction of technical methods. There remains room for further development in examining feedback relationships among different mechanisms, the cumulative effects of different historical stages, and more generalized explanatory models.

In summary, Chinese scholarship has established a certain research foundation in the conservation and renewal of historic districts. However, related studies still present several limitations overall.

First, although there has been considerable discussion of the morphological characteristics, type identification, and conservation strategies of historic districts, further explanation is still needed regarding how multiple factors jointly act upon the long-term evolution of residential historic districts.

Second, existing studies often pay more attention to physical space itself, while process-based analyses of how social structure, residential groups, property relations, and modes of use influence spatial morphology remain insufficient.

Third, existing studies are generally able to identify influencing factors, but their expression of action paths, feedback relationships, and stage-specific mechanisms among different factors remains relatively limited. Therefore, it is necessary to introduce a mechanism-oriented research perspective on the basis of urban morphological analysis, integrating morphological evolution, driving-factor structures, and mechanism expression.

Overall, although existing studies have made progress in value assessment, type identification, and renewal strategies, they still lack systematic explanations of the dynamic process of morphological evolution and the interaction mechanisms among multiple factors in historic districts. Within the framework of urban morphology, this study introduces a mechanism-oriented analytical perspective, integrating morphological evolution, driving-factor structures, and mechanism expression to explain how multiple factors jointly shape spatial outcomes. It attempts to advance the

study of historic districts from the description of morphological characteristics toward the explanation of evolutionary logic, and to provide preliminary support for value judgment and problem identification in subsequent conservation and renewal practices.

1.5 Clarification of Related Concepts

1.5.1 Urban Morphology

Urban morphology is a discipline that studies the composition, evolutionary process, and internal structural logic of urban physical form. Originating in the early twentieth century, this field emphasizes the historical continuity and stratification of urban spatial structures. In this study, urban morphology includes three dimensions:

1. Physical Morphology: Plots, Streets, and Buildings

Physical morphology refers to the spatial elements of a block that can be identified and measured at the material level, including plots, the street system, and the building fabric. This dimension constitutes the basic framework of urban morphology, and its structural characteristics directly influence urban accessibility, density, and spatial perception.

2. Use Morphology: Land-Use Structure

Use morphology refers to the land-use structure of urban space, including the spatial distribution and combination of functions such as residential, commercial, industrial, and public service uses. It reflects the adjustment of spatial relationships and organizational patterns among different functions. The evolution of this dimension reflects the process through which urban economic and social activities adapt to and restructure spatial organization.

3. Property Morphology: Ownership and Use-Rights Structure

Property morphology refers to the structure of ownership and use rights of spatial units, including private ownership, public ownership, leasehold rights, and other forms of tenure, as well as the spatial organization of these property relations. Property morphology is closely related to urban accessibility, renewal mechanisms, and social stratification, and has become an increasingly important dimension in urban morphology research in recent years.

1.5.2 Residential Historic District

In this study, a residential historic district is defined as a historic urban area formed in a specific historical period, which as a whole reflects traditional spatial patterns and local cultural characteristics. Its spatial structure is continuous and identifiable, and it is primarily characterized by residential functions, having long accommodated residents' everyday life and social networks. In such areas, physical forms such as streets, plots, and buildings are closely related to actual patterns of use and continue to evolve over time. Therefore, residential historic districts not only possess heritage value, but also demonstrate distinct characteristics of everyday life and sociality.

Their typical features include small- and medium-scale plot subdivision, compact street networks, high pedestrian accessibility, and a tendency to retain original resident groups or ways of life.

Unlike tourism-oriented historic blocks or commercial old urban areas, the morphological evolution of residential historic districts is more strongly shaped by the interaction between everyday life practices and urban governance models. Their transformation is often accompanied by micro-level changes in population structure, intensity of use, and degree of functional mix. Since these districts are often located in central or inner urban areas, their renewal processes easily become focal points of conflicts among multiple interests, and they are therefore better able to reveal the complexity of the mechanisms underlying urban morphological evolution.

1.5.3 Mechanism Analysis

Mechanism analysis is an important method in this study. Its core objective is not to describe changes in urban morphology at the phenomenal level, but to reveal how different elements behind morphological evolution jointly operate through causal connections and feedback relationships. Compared with result-oriented descriptive research, mechanism analysis focuses on the processes, driving logic, and internal structures that produce spatial change; that is, how changes occur in the evolution of urban morphology, and why they occur in specific ways.

A mechanism is not equivalent to a single factor or an external driver. Rather, it refers to a relatively stable pattern of operation formed through the interaction of multiple elements under specific institutional, economic, and social conditions. Such mechanisms often operate across different morphological levels and demonstrate temporal characteristics such as delay, accumulation, and path dependence. They therefore provide an important entry point for understanding the long-term evolution of historic districts. The mechanisms discussed in this study mainly include several interrelated dimensions. Institutional mechanisms, such as land systems, planning control, and heritage conservation regulations, impose long-term constraints on higher-level spatial structures by defining adjustment costs and legal boundaries. Economic mechanisms, such as changes in the real estate market, rent structures, investment logic, and development strategies, continuously influence the direction and intensity of spatial renewal. Social mechanisms, such as population mobility, immigrant inflow, and changes in residential composition, promote spatial adjustment through changing use demands and lifestyles. Governance mechanisms, including forms of collaboration between public authorities and private actors, the intensity of governance intervention, and the degree of community participation, regulate the process of morphological renewal. Cultural mechanisms, such as spatial identity, everyday practices, and living habits, affect patterns of spatial use and the acceptance of renewal.

It should be emphasized that these mechanisms do not operate independently. Rather, they function jointly across different morphological levels through interaction and feedback relationships.

On this basis, the mechanism analysis in this study does not aim to provide a comprehensive and exhaustive classification of all mechanisms. Instead, it understands mechanisms as meso-scale explanatory units. They differ both from abstract theories at the macro level and from specific descriptions of individual behavior at the micro level. Located between the two, they are used to explain the recurrent structural tensions and adjustment processes within multi-level urban morphological systems. By introducing mechanism analysis, this study aims to construct a logical bridge from macro-level institutional and planning conditions, to meso-level morphological structures, and further to micro-level renewal behaviors. This provides a conceptual basis for the subsequent extraction and analytical generalization of mechanism types. This analytical path not only helps deepen the understanding of the dynamic system of morphological evolution in historic districts, but also provides theoretical support for cross-case comparison and future urban intervention. To ensure that the subsequent analysis of driving factors and mechanisms is carried out within the same explanatory framework, this study defines the key terms as follows.

Drivers: Drivers refer to the set of influencing factors that promote or constrain morphological change under specific historical conditions. Drivers are not directly equivalent to morphological outcomes. Instead, by changing the possibilities, adjustment costs, and directions of change at different morphological levels, they constitute the conditional basis for the operation of mechanisms.

Mechanisms: Mechanisms refer to relatively stable structures of operation formed after drivers are absorbed, translated, and interact within different morphological levels. Their core characteristics are reflected in dynamic processes such as feedback relationships, path dependence, and time delay. They are used to explain why morphological change continues to occur, or is constrained, in specific ways.

Morphological Levels: In this study, morphological levels mainly refer to three analytical units: streets and blocks, plots, and buildings. They serve as the common coordinate system for locating drivers and constructing mechanisms.

In terms of mechanism expression, this study draws on System Dynamics, hereafter referred to as SD, as an analytical tool and expressive language. It is not used to construct a precise numerical simulation model, but to describe the relational network among morphological states, processes of change, and feedback structures. Within this framework, long-term retained morphological states are understood as stocks, the behavioral processes that promote adjustment are understood as flows, and the cyclical relationships formed among different levels are summarized as feedback loops. In this way, different mechanisms can be integrated and compared within the same analytical language, thereby strengthening the structure and testability of causal explanation.

Within this analytical framework, the following chapters first systematically identify the multiple drivers influencing the morphological change of the block, and then further explore how

these drivers are absorbed and transferred across different levels, thereby forming identifiable driving mechanisms of evolution. This provides a more solid theoretical foundation for understanding the structural logic in which the stability and complexity of block morphology coexist.

1.6 Research Case

The research object of this study has a clear focus. It is therefore necessary to define and explain the criteria for case selection, the temporal and spatial scope of the selected case, and the core research object. The research object of this study can be understood through three core concepts: the Beato Amedeo block in the historic district of Turin, morphological evolution, and driving mechanisms.

The historic district of Turin defines the geographical scope of the study, while the Beato Amedeo block further specifies the concrete spatial unit. The research period mainly covers the continuous evolutionary process from the establishment of the Jewish ghetto in this block in the seventeenth century to the present day. Morphological evolution refers not only to changes in the physical spatial form of the block, but also to the dynamic adjustment of its functional structure and property structure. Driving mechanisms focus on how multiple factors, including institutions, socio-economic conditions, property structure, and planning concepts, interact with one another and are translated into concrete spatial morphological outcomes.

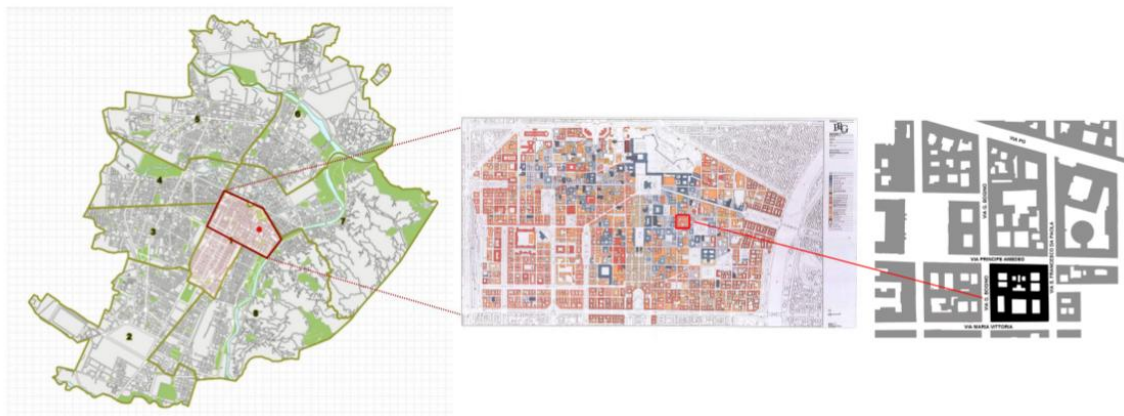


Figure 1-2 Location of the Beato Amedeo Block in Turin

The Beato Amedeo block, hereafter referred to as the B.Amedeo block, is located in the historic city centre of Turin, Italy. It is bounded by Via Maria Vittoria, Via Bogino, Via Principe Amedeo, and Via San Francesco da Paola, and lies close to the area of Palazzo Madama. As a typical block within the historic urban area, it once functioned as a Jewish Ghetto¹In functional

1. “Ghetto” originally referred to an urban area in which Jewish residents were forcibly segregated. It later evolved to denote residential areas isolated as a result of racial or social marginalization, reflecting urban inequality and spatial exclusion. In this study, it specifically refers to the former function of the block as a segregated Jewish residential community.

terms, it can be regarded as a dense residential historic block rather than a tourism-oriented area or an administrative core. Its historical evolution spans from the seventeenth century to the present.

Different blocks within the city vary in their historical formation processes, social composition, policy interventions, and spatial evolutionary logic. It is therefore necessary to establish a clear set of selection criteria to ensure that the selected block can more effectively reveal the comprehensive driving factors and mechanism logic behind morphological change. The B.Amedeo block is characterized by long-term continuous spatial evolution, typical traces of institutional intervention, and significant changes in social structure. These characteristics make it an ideal case for exploring the mechanisms of block morphological evolution.

(1)Clear Temporal Span. The B.Amedeo block has developed since the seventeenth century and has experienced multiple stages, including religious institutions, urban expansion, religiously segregated residential use, and contemporary renewal. Its morphological records are relatively complete. The transformation of the block from an early convent site, to a nineteenth-century urban residential area, and further to modern and contemporary redevelopment gives it clear longitudinal comparative value across different periods, making it suitable for tracing the logic of morphological evolution.

(2)Clear Spatial Boundaries and Distinctive Spatial Pattern. The B.Amedeo block is both part of the boundary of urban expansion and characterized by a typical regular grid structure combined with small-scale plot subdivision. Its internal streets and lanes are compact in scale, and its plot divisions are relatively clear, making it suitable for observing morphological characteristics. These features make it an ideal sample for understanding the structural logic of the block unit and the mechanisms of plot evolution.

(3)Rich Institutional Interventions. From religious control in the eighteenth century, to municipal planning and plot adjustment in the nineteenth century, and further to renewal measures in the twentieth century, the B.Amedeo block has experienced continuous institutional interventions over a long period of time. It therefore has strong potential for analyzing the interaction mechanisms between institutions and urban morphology.

(4)Multi-level Social Composition and Demographic Change. Historically, the block accommodated various social groups, including immigrants and vulnerable populations, and its demographic structure underwent significant changes over time. This diversity gives the block strong potential for examining how social structure drives morphological change.

(5)Relatively Complete Documentary Records. The B.Amedeo block has relatively complete historical cadastral records, planning drawings, information on the dates of plots and buildings, and records of subsequent changes. Some of these materials are also accessible to non-governmental researchers. This makes it possible to conduct a multi-level analysis of plots, buildings, and functions, thereby ensuring the reliability and traceability of the research conclusions.

(6)Significant Socio-Spatial Meaning. As a historically marginal residential area, the B.Amedeo block has borne the pressures of socio-economic change in the city, including immigrant settlement, shifts in the rental market, and the renewal needs of marginalized communities. It can therefore reflect how institutional, social, and economic factors jointly act upon urban morphology, making it a key case for understanding complex driving mechanisms.

In summary, the B.Amedeo block combines temporal continuity, spatial representativeness, rich institutional interventions, and social diversity. It can not only provide multidimensional evidence of morphological evolution, but also offer a basis for constructing the mechanisms of block morphological evolution. Therefore, this study selects it as the main case for in-depth analysis.

Chapter 2 The Evolutionary Process of the B.Amedeo Block

2.1 Current Spatial Characteristics

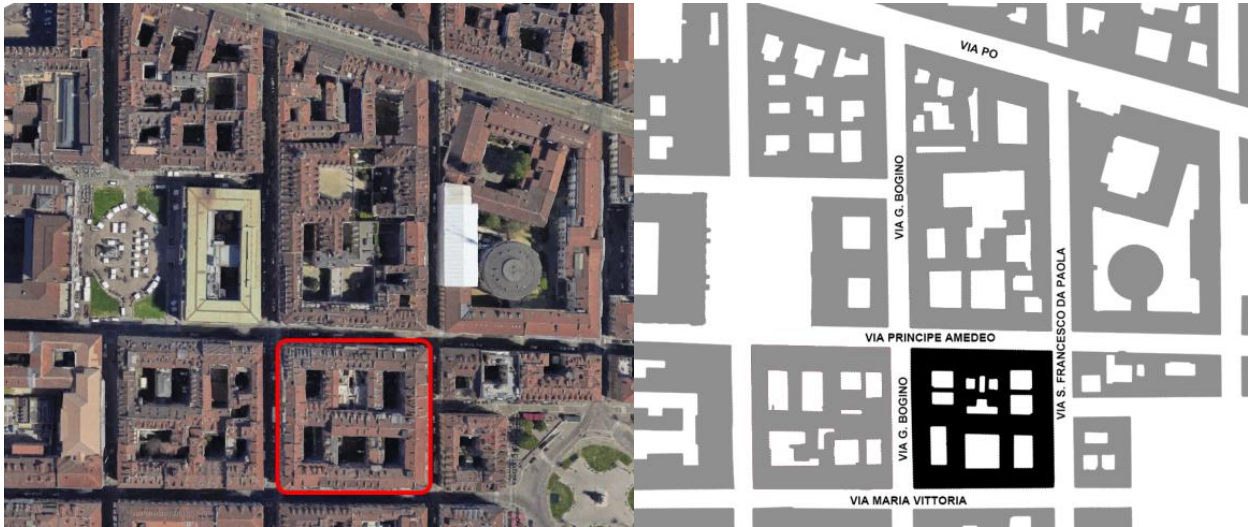


Figure 2-1 2025 Aerial View of the B.Amedeo Block and Its Figure-Ground Relationship with the Surrounding Area

1) Urban Fabric

The block is located within the regular grid system of Turin's historic city centre, which originated from the ordered urban expansions from the Renaissance to the Baroque period. The block is nearly rectangular in its street-enclosed form, with continuous street walls along the surrounding streets and courtyard-based urban blocks on the interior, namely perimeter blocks and cortili. To the east, it adjoins Piazza Carlo Emanuele II, an important public space node in this area with a scale of approximately 120×120 metres. To the west, it is adjacent to Piazza Carlo Alberto, one of the historic pedestrian squares in central Turin.

The internal open spaces of the block are mainly private courtyards, with a relatively low degree of openness toward the street. The block shows a typical high built-up ratio characteristic of the historic city centre, significantly higher than that of modern expansion areas in the suburbs. Its internal courtyards are relatively small, and the ratio between frontage width and building depth tends to be large. The street sections are relatively narrow and elongated, emphasizing the continuity of street walls and the accessibility of ground-floor commercial spaces along the street.

2) Building Types

The block is mainly composed of seventeenth- to nineteenth-century terraced urban residences or apartment buildings organized around courtyards, known as palazzi a cortile.^[31] The typical feature of this building type is that it is organized around an internal courtyard, with continuous

building volumes surrounding it, often forming a square or enclosed layout. The street-facing side usually presents a representative façade with a unified architectural style, while the courtyard-facing side serves more functional or service-oriented purposes. These buildings are generally three to five storeys high. The ground floor is mostly occupied by commercial and service functions, with some office uses, while the upper floors are mainly residential. In some cases, corner buildings or corner volumes strengthen the legibility of street corners through façade treatment and cornice design.

Terraced urban residences represent a courtyard-based building type commonly associated with aristocratic palazzi. Historically, the Jewish ghetto was a relatively crowded urban area inhabited by socially marginalized groups. The presence of this building type in the block may be related to its historical development and the requirements of segregation management. Before becoming a ghetto, the block had been used as a convent and a charitable hospital, and its original buildings therefore adopted a courtyard layout, with an open vegetable garden on one side.

During its transformation into the Jewish ghetto, the originally open side facing the garden was enclosed around 1682, so that the courtyard became fully enclosed, and additional entrances were introduced. This concentrated and enclosed structure, with controllable access points, corresponded well to the governance requirements of the ghetto. It allowed the authorities to monitor and restrict the movement of the ghetto population, thereby realizing spatial control over a minority group.

At the symbolic level, the retention of a traditional architectural form also helped maintain the urban image and the legitimacy of the institutional arrangement. The external appearance of the ghetto resembled that of aristocratic palazzi, which enabled it to blend into the surrounding urban fabric.

3) Land Use

Use Structure: The area is located within the mixed-use zone of the historic centre, where street-front commerce and arcade systems are widely present, especially along nearby main axes such as Via Po and Via Roma. Around the study block, street-front shops and continuous street walls are predominant, echoing the surrounding arcade network. The ground floors of the block are mainly occupied by restaurants, retail shops, and small service businesses, while the upper floors are primarily used as apartment housing. Some parts also contain small offices and short-term rental apartments. Public buildings, such as the Turin Library, are distributed around nearby squares.

Local Renewal: Some parts of the block have undergone twentieth-century façade restoration, internal functional renewal, and storefront renovation of commercial units. However, the block as a whole maintains the historical continuity of façade scale and cornice height control lines. Overall, renewal has mainly taken the form of partial transformation of existing buildings, rather than

large-scale demolition and reconstruction.

4) Property Structure

At present, the block is mainly characterized by private condominium ownership. Each owner holds full ownership of their individual unit, such as an apartment or a shop, and may independently sell or inherit it. Shared elements such as staircases, roofs, exterior walls, courtyards, and pipelines are jointly owned by the property owners within the same building according to their respective shares, in order to ensure the overall operation and maintenance of the building. The entire block is managed through multiple separate properties. Overall, it presents a mixed ownership pattern, with street-level shops and subdivided residential units on the upper floors.

2.2 Field Investigation

Through field investigation, it can be observed that the block is physically formed as an enclosed urban block surrounded by five-storey buildings. There are ten entrances leading into the interior of the block, which are numbered A to J for ease of understanding. The internal buildings vary from two to six storeys in height and divide the interior space into eight relatively small courtyards, numbered K to S for clarity. The ground floors of the buildings are mainly occupied by commercial functions, while the floors above the second level are used for residential purposes. Since the street interface along Via Principe Amedeo on the northern side is relatively closed, with no obvious entrance signs, the interior space in this area could not be accessed during the field investigation. Therefore, the internal conditions of the relevant area are inferred based on image materials.

At the urban level, the B.Amedeo block does not present strong spatial distinctiveness or visually prominent features. Its street-facing interfaces remain largely consistent with the surrounding blocks in terms of building height, façade rhythm, and functional composition, allowing it to blend naturally into the overall fabric of Turin's historic city centre. From the pedestrian experience, without prior historical knowledge, it is difficult to immediately identify the block as one with a specific historical background as a former Jewish ghetto. Several entrances distributed along the street are dedicated entrances for residential and commercial use. They are normally closed and require a key to open, or can be remotely unlocked by residents through the doorbell system. The iron-bar gates are historical remains, allowing views into the courtyards, and were installed during the Jewish ghetto period for the convenience of management. The more private, enclosed metal doors were added in later periods.

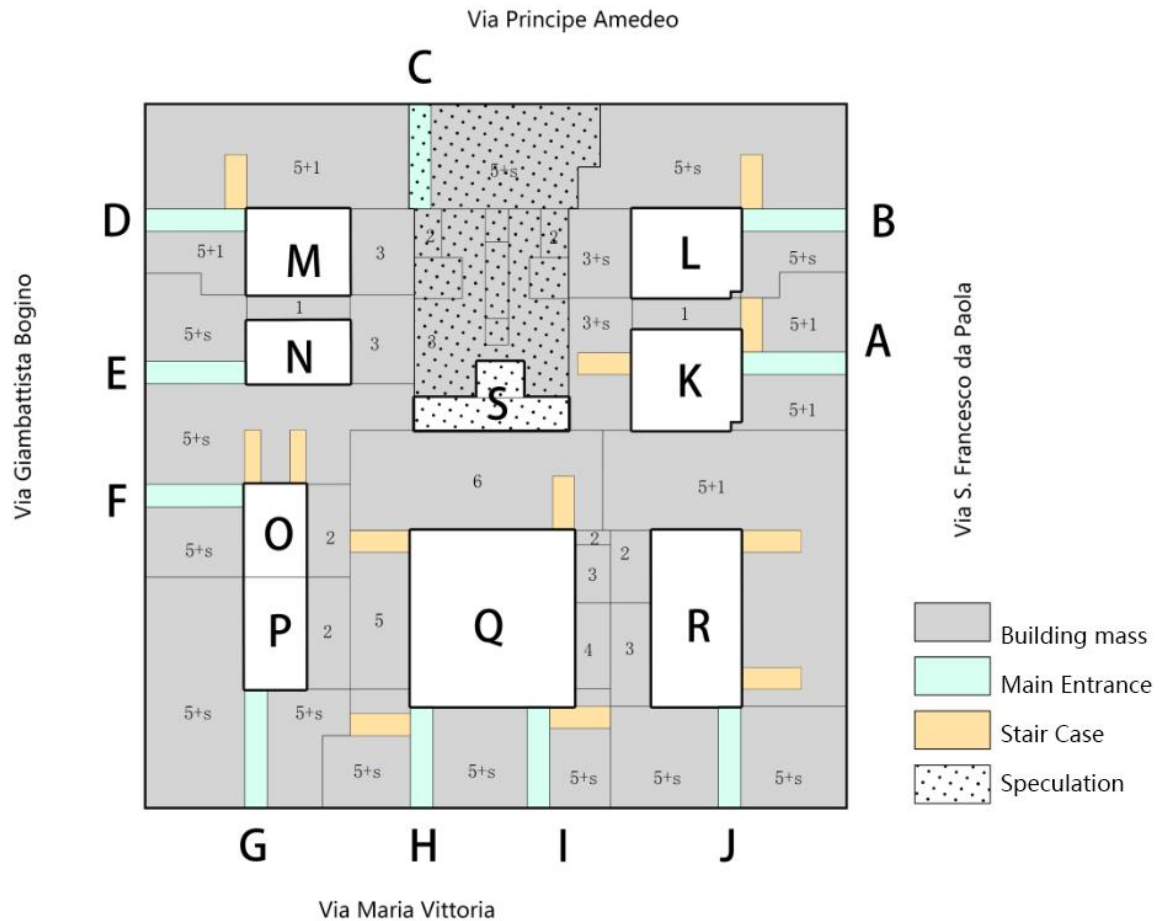
Figure 2-1 Building Massing and Entrance Structure of the B.Amedeo Block²

Table 2-1. Basic Information on the Main Entrances of the Block

No.	Street Number	Accessibility	Vehicle Access	Form
A	Via S. Francesco da Paola, 12	Residential / Commercial	NO	Iron-Bar Gate
B	Via S. Francesco da Paola, 10 bis/D	Residential / Commercial	NO	Iron-Bar Gate
C	Via Principe Amedeo, 20	Residential / Commercial	NO	Solid Metal Gate
D	Via Giambattista Bogino, 15	Residential / Commercial	YES	Iron-Bar Gate
E	Via Giambattista Bogino, 17D	Residential / Commercial	YES	Semi-Closed Iron Gate
F	Via Giambattista Bogino, 17	Residential / Commercial	YES	Iron-Bar Gate
G	Via Maria Vittoria 21	Residential / Commercial	YES	Iron-Bar Gate
H	Via Maria Vittoria 23	Residential / Commercial	YES	Iron-Bar Gate
I	Via Maria Vittoria 25	Residential / Commercial	YES	Iron-Bar Gate
J	Via Maria Vittoria 27	Residential / Commercial	YES	Iron-Bar Gate

2. The numbers on the building volumes indicate the number of storeys. “+1” means that the building includes an attic floor; for example, “5+1” indicates a five-storey building with one additional attic floor. “+s” means that the building contains a mezzanine; for example, “3+s” indicates a three-storey building with an internal mezzanine.



Figure 2-2. Photographs of the Main Entrances to the Block

After obtaining permission to enter the interior of the block, the spatial experience changed noticeably. Compared with the openness and continuity of the surrounding streets, the internal space appeared quieter and more enclosed. Several courtyards, connected through entrance passages and enclosed by buildings, form a series of small-scale spatial units that are not interconnected. At the same time, the internal courtyards are generally small in scale and surrounded by relatively high buildings, creating a strong sense of enclosure and spatial compression. Although some courtyards serve functions of lighting and ventilation, the internal space as a whole has a limited degree of openness and is more oriented toward service and circulation functions.

Table 2-2. Basic Information on the Courtyards

No.	Historical Name	On-site Access	Current Function
K	Il cortile della vite	YES	Gardening / Bicycle Parking / Commercial Service Entrance
L	Il cortile della vite	NO	Commercial Service Entrance (inferred)
M	Il cortile della terrazza	YES	Parking / Waste Collection / Commercial Service Entrance
N	Il cortile della terrazza	YES	Parking / Waste Collection / Commercial Service Entrance
O	Il cortile delle azzime	YES	Waste Collection / Residential Staircase Access
P	Il cortile delle azzime	YES	Waste Collection / Commercial Service Entrance
Q	Il cortile grande	YES	Parking / Commercial Service Entrance / Residential Staircase
R	Il cortile grande	YES	Waste Collection / Bicycle Parking / Residential Staircase
S	Il cortile dei preti	NO	Gardening / Lightwell (inferred)



K



L(Inside the porch)



M



N



O



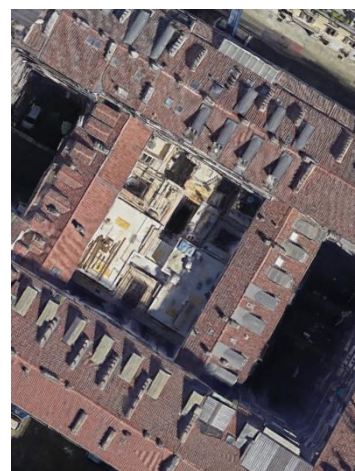
P



Q



R



S(no entry)

Figure 2-3. Interior Photographs of the Courtyards

Through interviews with nearby shop owners, it was found that the residential parts of the block are managed by multiple separate property administrations. Except for a small residential

portion between courtyards Q and R, the ground floor is mainly commercial, including bars, restaurants, supermarkets, tobacco shops, home furnishing retail, and other business types. A photography studio is located inside courtyard N. The upper floors are mainly residential. Residents enter the block through the main entrances, and then reach their residential units through entrance passages or staircases within the courtyards. This forms two typical access routes: “main entrance–vertical circulation” and “main entrance–courtyard–vertical circulation”. All courtyards are internal-use spaces and are not open to the public; access requires permission from residents. The overall architectural style of the block remains consistent with that of the surrounding blocks, largely continuing the block morphology and urban character formed during the seventeenth-century Baroque urban expansion. On the northern side along Via Principe Amedeo, the façade of the inferred section differs to some extent from the adjacent parts. According to documentary verification, this part underwent later reconstruction.

Overall, the block is characterized by an active street-facing interface, enclosed internal courtyards, and a vertical combination of ground-floor commercial uses with upper-floor residential functions.

2.3 Historical Background

The B.Amedeo block is divided by four mutually perpendicular urban streets into a regular square form, which is an important and common morphological characteristic of the area in which it is located. This basic form can be traced back to the Roman period.

Turin is located in the Piedmont region of north-western Italy. The basic form of its historic city centre originates from the orthogonal grid of the Roman military camp. On the one hand, during the continuous expansion of the Roman Empire, newly conquered cities needed to be constructed and managed rapidly in a standardized way, and the grid system provided an efficient and replicable model of spatial organization. On the other hand, the two perpendicular main roads within the chessboard-like grid strengthened the urban axial structure, facilitating rapid military movement and spatial control. In addition, this regular grid also made land subdivision and functional zoning easier, allowing residential, commercial, and workshop functions to be distributed in an orderly manner and thereby improving the efficiency of urban management.

Through the organic growth of the Middle Ages and the Baroque urban expansion under the House of Savoy, Turin gradually formed a typical urban pattern composed of a regular street network, continuous street walls, an arcade system, and enclosed urban blocks. The street system of the historic city centre developed through the continuous extension of the street grid of the Roman

military camp, largely maintaining the original orthogonal structure. This is because the street system continued to play a guiding role throughout the long-term evolutionary process, creating path dependence for subsequent changes in spatial morphology.^[34] Industrialization in the nineteenth century, automobile-manufacturing-led development in the twentieth century, and contemporary regeneration and cultural transformation further shaped Turin's urban development. Newly developed urban areas in the south became industrial centres, giving Turin's urban fabric a composite structure formed through the superimposition of multiple historical periods. The evolution of Turin's blocks reflects the long-term shaping effects of institutions, functions, and social structures on urban morphology, making it an important case for studying the mechanisms of spatial evolution in European historic cities.

This study begins with the period when the B.Amedeo block became a Jewish ghetto, namely the sixteenth to seventeenth centuries. During this period, Turin's urban evolution showed a marked duality. On the one hand, the rulers of the House of Savoy attempted to transform Turin into a modern capital through expansion, planning, and ordered spatial layout. On the other hand, they continuously reinforced socio-spatial segregation and institutionalized control, which was particularly evident in the spatial governance of the Jewish community.

In the second half of the sixteenth century, the Savoyard state gradually established its core position in north-western Italy. Driven by the needs of urbanization and military defence, Turin underwent several phases of expansion, among which the most important was the Second Expansion of the City towards the Po. The delineation of new streets and blocks reflected the geometric and orderly planning principles of the Renaissance. After the seventeenth century, the Baroque landscape of power further strengthened this planning logic: the unified street grid, axial spatial organization, and regular squares jointly shaped the image of a capital characterized by order and hierarchy.

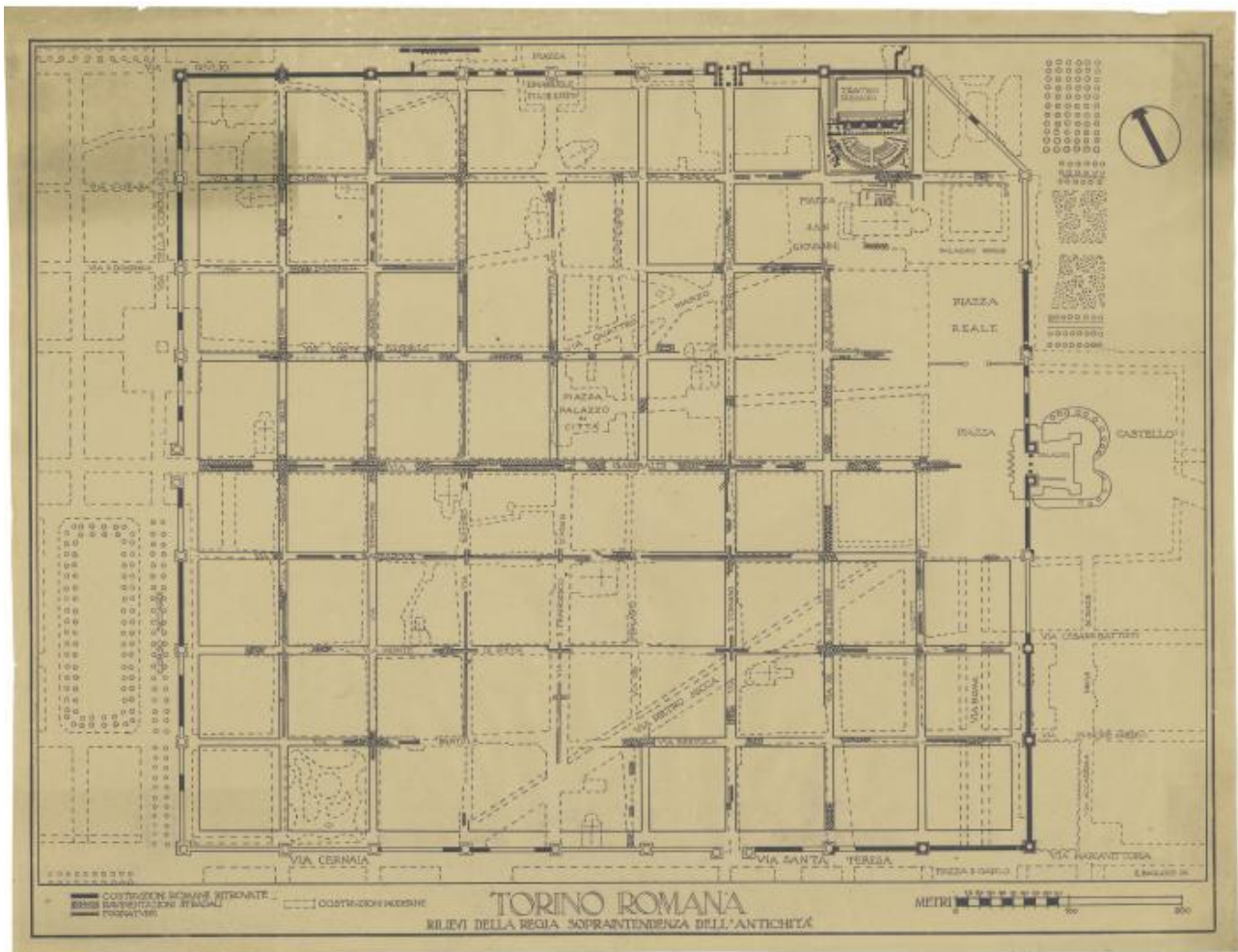


Figure 2-4. Grid Layout of Turin in the Ancient Roman Period (the study block had not yet emerged at this time)

Behind Turin's apparent unity and order lay a strong logic of social stratification. Different social groups were classified, segregated, and assigned to specific urban blocks according to functional and administrative requirements. This constituted an important spatial governance strategy in the process of Turin's urban expansion in the seventeenth century.^[35] The homogeneous urban form inherited from the ancient Roman period made it more conducive to distinguishing and controlling different social groups. Nobles, craftsmen, foreigners, and religious minorities were assigned to different blocks, forming an institutionalized pattern of spatial segregation.

In sociology and urban studies, "institutionalization" refers to the process through which certain social behaviors, power relations, or spatial forms become standardized, sustained, and legitimized. It means that space is no longer shaped only by spontaneous everyday practices, but is defined, constrained, and reproduced by institutional logics, such as law, religion, property structures, administrative management, and planning systems.^[33] Consequently, the formation and evolution of urban morphology was no longer a purely physical or technical process, but a

materialized expression of social and institutional structures. In the context of urban morphology, the institutionalization of urban form describes how institutions become embedded in urban space through planning decrees, land subdivision, property systems, and spatial management mechanisms, turning block boundaries, building types, and functional zoning into visible forms of social order. In other words, spatial form is both a product of institutional power and a mechanism through which that power is reproduced.

The establishment of the Jewish Ghetto was a typical manifestation of the institutionalization of urban morphology. In 1679, the regent Maria Giovanna Battista di Nemours issued a decree ordering the transformation of the former Ospedale di Carità site into a Jewish Ghetto. This decision had a dual significance:

First, at the religious level, it reflected an order system in which church and state were closely integrated.

Second, at the level of urban governance, it enabled the centralized management of land, population, and taxation through the creation of a controlled urban block.

In Venice and Rome, Jewish Ghettos were mostly established in areas where Jewish communities had already gathered. In Turin, however, the Jewish Ghetto was assigned to an entirely new location by the government and was delineated from above through administrative order. It therefore had a stronger degree of planning intentionality and symbolic meaning.

In the 1670s, Turin was at a critical stage of expansion toward the Po River. Urban expansion during this period was not merely an increase in spatial quantity, but also a reorganization of order and meaning. Street widths, square dimensions, and building heights were all incorporated into a calculable logic of governance, and social control was thereby spatialized.

This institutional production of space reflected three mechanisms of urban power: religious legitimacy, which used the order of faith as the justification for spatial division; political visibility, which displayed the rationality and control of royal power through spatial order; and fiscal efficiency, which unified revenue generation and governance through the centralized management of land and population. Therefore, the establishment of the block as a Ghetto was not simply a religious outcome, but a concrete architectural expression of the state governance system.

For the B.Amedeo block, the Jewish segregation system was not merely a social-policy background, but an institutional condition that directly shaped the spatial structure of the block. It first defined the residential qualifications and activity range of Jewish residents, giving the block boundary a clear governance function. Through entrance control and curfews, the entrances of the block were transformed into spatial nodes of surveillance and regulation. Through restrictions on

Jewish ownership of real estate, a property pattern of single ownership and Jewish communal rental use was maintained over a long period.

At the same time, the Jewish community's own religious, educational, commercial, and self-governance needs were forced to concentrate within the block. Therefore, the specificity of the B.Amedeo block lies not only in its former function as a Jewish Ghetto, but also in the fact that institutional exclusion and communal cultural practices jointly shaped it into a socio-spatial unit with clear boundaries, internal complexity, and externally controlled access.

2.4 Evolutionary Process

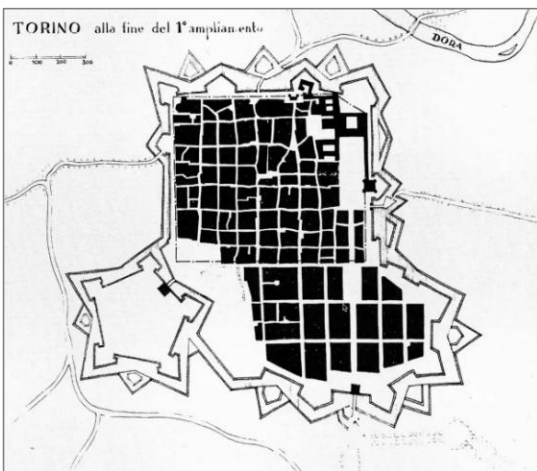


Figure 2-5. The First Urban Expansion of Turin

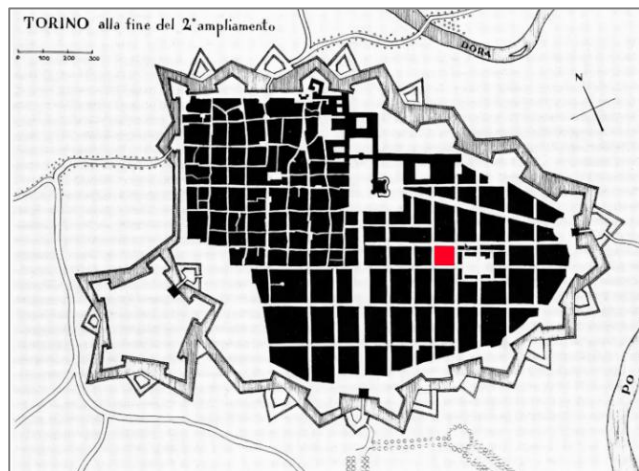


Figure 2-6. The Second Urban Expansion of Turin: “The Expansion Plan Toward the Po River”

The B.Amedeo block is marked in red.

The B.Amedeo block is located in the historic centre of Turin, and the formation of its morphology and functions was profoundly shaped by long-term urban expansion and institutional governance.^[35] In the seventeenth century, Turin was transforming from a medieval defensive city into an open capital, and its urban structure gradually extended toward the Po River through the first and second phases of urban expansion. The original B.Amedeo site was located outside the city walls and was a semi-rural peripheral area composed of a church, convent buildings, vegetable gardens, and a small number of other structures. In 1673, the site was incorporated into the Expansion Plan toward the Po River. After the relocation of the religious institution, it was converted in 1679 from the Ospedale di Carità, a charitable hospital for the poor, into the Jewish Ghetto.^[36] Its enclosed layout, controllable entrances, and multi-courtyard organization constitute a typical example of how Turin used spatial means to achieve urban governance.

With the continued expansion of the city in the eighteenth and nineteenth centuries, the block was gradually incorporated into a more complete central urban structure. Cadastral maps and property archives show that the courtyard system, passage structure, and block scale tended to stabilize during this period. At the same time, with the transformation of functional division and social composition, the original charitable and religious institutions gradually withdrew, and between the nineteenth and twentieth centuries the block evolved into an urban fragment characterized by civic housing and mixed residential-commercial uses. In the modern period, post-war reconstruction and contemporary urban renewal further promoted the spatial reproduction of the block, allowing it to maintain historical continuity while also facing local renewal and functional reconfiguration.

The review of the historical evolution of the B.Amedeo block forms the foundational work for the subsequent analysis of driving mechanisms. For historic districts, morphological changes are often scattered across different types of historical materials, including historical maps, cadastral archives, planning documents, property records, regulatory texts, and existing research literature. Without systematic integration of these materials, the spatial changes of the block may easily be understood as a series of isolated events, making it difficult to reveal the continuous processes and structural relationships behind them.

This study therefore first establishes the staged evolutionary trajectory of the block since its establishment through the comparison and reconstruction of multi-source historical materials. It then identifies its changing characteristics from three dimensions: physical morphology, use morphology, and property morphology. This provides the factual basis for identifying key driving factors, extracting state variables, and constructing mechanism models in the following chapters. In this sense, the review of the evolutionary process serves as an important intermediate step from empirical materials to mechanism construction.

Existing studies indicate that the evolution of urban morphology is not a continuous and homogeneous linear process, but rather presents clear stage-specific characteristics. Different historical periods show significant differences in dominant driving factors and spatial manifestations. This staged evolutionary pattern suggests that urban morphology is the result of continuous adjustment and reconstruction under different institutional contexts and social conditions.^[37] Therefore, dividing the morphological evolution of the block into several stages for analysis not only helps reveal the internal logic of its transformation, but also provides a reasonable analytical framework for the subsequent stage-based analysis of driving factors and mechanisms. To understand the morphological logic and spatial governance mechanisms of the B.Amedeo block in

different historical periods, this study divides its development into four stages:

1.Establishment Stage: taking the designation of the block as a Jewish Ghetto as the starting point of the study, marking the establishment of its institutional attributes and spatial structure;

2.Maintenance Stage: the stable operation of the block and the continuation of its morphology;

3.Transformation Stage: spatial adjustments brought about by changes in function and social structure;

4.Renewal Stage: spatial reproduction and adaptive renewal in the modern and contemporary periods.

The following sections will systematically analyze the evolution of the physical morphology, use morphology, and property morphology of the B.Amedeo block according to this structure.

2.4.1 Establishment Stage: The Initial Formation of the Ghetto (1679 – 1723)

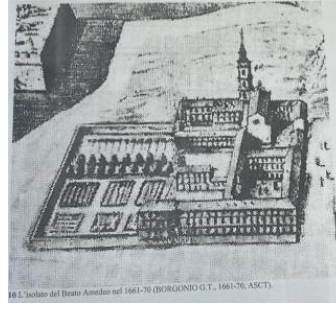
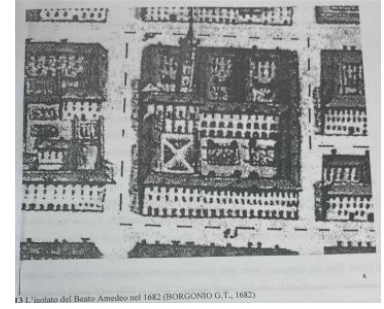
1. Physical Morphology:

Before the formation of the block, historical materials from mid-seventeenth-century Turin indicate that a church with a convent was located approximately on this site. The name of the church, la Chiesa del Beato Amedeo, is the origin of the block's name. However, information concerning its specific history and spatial structure is very limited, and the existing literature is not entirely consistent. Moreover, some engraving materials come from *Theatrum Sabaudiae*, an atlas that includes city plans and bird's-eye views and was intended to promote the House of Savoy and celebrate Turin's status as the capital of the kingdom. These materials therefore carry an intention of idealization and glorification. For this reason, their depictions of the architectural form of the block do not necessarily accurately reflect the actual urban conditions of the time.^[38] Several decades later, this area was converted into the Ospedale di Carità, a charitable hospital intended to provide relief for vulnerable groups. A bird's-eye view from 1661–1670 shows that the block consisted of two three-storey wings, divided into eastern and western parts by a central corridor. The western side contained a courtyard and vegetable garden, while the eastern side consisted of enclosed buildings. On the ground floor, arcades were arranged around the courtyard, whereas the street-facing sides were mostly composed of closed walls without windows.

The 1682 map drawn by Tommaso Borgonio further shows the expansion of this building complex, including newly added arcaded wings and two entrances facing toward the Po River. From 1679 onward, the block became the site of the Jewish Ghetto, later commonly referred to as the Old Ghetto.



Figure 2-7. Site of the Convent and Church

Figure 2-8. Engraving Materials of the Convent and Church
Drawn by Borgonio

with an area of approximately 8,000 square metres^[40], It is enclosed by four streets and presents an approximately square form. The main entrance was located at No. 5 on the street formerly known as San Filippo, leading directly to the Grande Cortile. This courtyard had two entrances, the other of which was located on the street formerly known as Contrada del Ghetto.

Table 2-3. Changes in the Names of Boundary Streets of the B.Amedeo Block

Current Name	Former Name
via Maria Vittoria	via San Filippo
via Bogino	via Scuderie del Principe di Carignano
via Principe Amedeo	via Teatro d'Angenes
via San Francesco da Paola	via Contrada del Ghetto

According to documents from the archives of the Turin Ospedale di Carità, in 1680 the hospital authorities renovated part of the buildings within the block to adapt them to the new use, establishing a Jewish synagogue and school (Sinagoga e Scuola Ebraica)³; and raised the height of all floors within the block in order to align them with the surrounding buildings.⁴ The main structure of the block consisted of five courtyards, namely the Cortile Grande (Great Courtyard), Cortile della Vite (Vine Courtyard), Cortile della Terrazza / d'la Tràsa (Terrace Courtyard), Cortile dei Preti (Priests' Courtyard), and Cortile delle Azzime (Unleavened Bread Courtyard).

3. Regarding the establishment of a synagogue and school in the Ghetto in May 1680, the Congregation of the Ospedale di Carità initiated the project after obtaining approval from Rome. See the Archives of the Ospedale di Carità, Turin (Archivio dell'Ospedale di Carità, Torino, ASCT), Ghetto Archives, Historical Notes on the Foundation of the Block (Cenni storici sulla fondazione dell'isolato), Vol. 31, Part II.

4. In July 1680, the municipal authorities ordered that the storey heights of all buildings within the Ghetto be unified with those of the surrounding buildings. See the Archives of the Ospedale di Carità, Turin (Archivio dell'Ospedale di Carità, Torino, ASCT), Ghetto Archives, Historical Notes on the Foundation of the Block (Cenni storici sulla fondazione dell'isolato), Vol. 31, Part II.

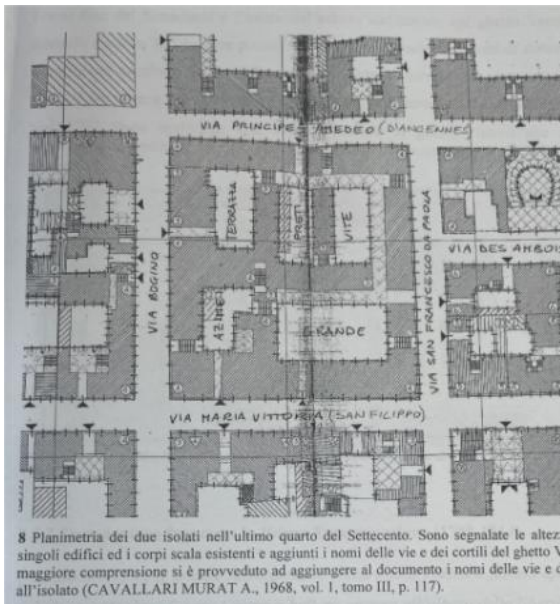


Figure 2-9. Speculative Ground-Floor Plan of the B.Amedeo Block

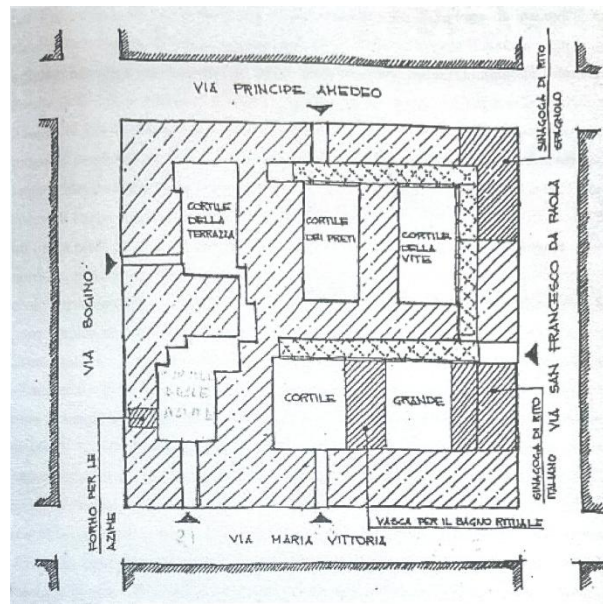


Figure 2-10. Diagram of the Internal Courtyards of the B.Amedeo Block⁵

The buildings surrounding the courtyards were mostly three-storey structures. The ground floor was occupied by shops, while the mezzanine level and upper floors were used for residential purposes. Mezzanines were inserted between the floors to maximize residential capacity. The Cortile Grande was equipped with wide balconies extending along the entire length of the façade, and the entrances to the apartments opened onto these balconies.

2. Use Morphology

In addition to residential use, the B.Amedeo block also contained important religious and educational facilities, including the “Italian Rite Synagogue” (Tempio di Rito Italiano), administrative offices, and separate Jewish schools for boys and girls (Talmud and Torà).

Commercial activities were mainly concentrated on the ground floor. The goods sold primarily included clothing, especially men's clothing, poultry, and kosher meat. In 1685, a designated commercial area known as the “Eight Shops” (Otto Botteghe) was established within the block, with mezzanine spaces used as temporary dwellings for Jewish families. However, its exact extent and location can no longer be determined.

The shops were closed on the Sabbath, namely Saturday, but could remain partially open on Sundays during festivals. Even when Jewish merchants were permitted to conduct business outside the city, they generally remained concerned that such privileges could be revoked at any time. If a

5. The shaded area in the centre of the Cortile Grande does not indicate a building, but rather represents the location of the Jewish ritual bath in the basement.

shop was located near a church, special regulations also had to be observed. For example, during Sunday Mass, the outer door had to be closed but not locked, in order to avoid offending worshippers.^[40] Despite these numerous restrictions, commercial activities within the Ghetto remained cautious yet active.

Based on the above materials, it can be seen that the use morphology within the block included everyday life, religious, educational, and judicial activities. This internal use pattern was not the result of free planning, but was constrained by the architectural basis of the former Ospedale di Carità and had to be accommodated within a limited existing structure. Functions that would normally have been housed in independent public buildings, such as synagogues, schools, and courts, were compressed into a single block and its internal courtyards.

Due to the limited size of the courtyards, their public character was clearly constrained. Under these conditions, the corridor-like balconies, or ballatoi, were given additional functions: they served not only as vertical circulation routes, but also as spaces for neighbourhood interaction. However, they could only partially substitute for the role of streets or squares.

This spatial pattern severely weakened residential privacy. The street-facing façades were closed, while domestic spaces had to open toward the internal courtyards and balconies, thereby intensifying the interweaving of private and public domains. Balconies, roofs, and small courtyards became not only the main sources of air and light, but also important places for neighbourhood interaction and children's activities. This highlights the highly blurred boundary between public and private space under conditions of high-density living.^[38]



Figure 2-11. Continuous Balconies Open Toward the Courtyard⁶

6. The photograph was taken in the courtyard accessed through the passage at Via Maria Vittoria 23, which corresponds to the location of the Cortile Grande.

3. Property Morphology

Before the formation of the B.Amedeo block, the ownership of the convent was once held by private individuals, and was later taken back by the government.^[38] Afterwards, the building was used for approximately five years as the Ospedale di Carità, a charitable hospital for vulnerable groups, before being formally designated as the Jewish Ghetto. From the establishment of the Ghetto onward, all real estate in the B.Amedeo block was owned by the Ospedale di Carità. Daily management and maintenance were undertaken by the Università degli Ebrei, namely the official autonomous administrative body of the Jewish community, which obtained income by collecting rents from Jewish residents. Under the laws of the Kingdom of Savoy, Jews were strictly prohibited from owning real estate, including houses and land. Therefore, all properties within the Ghetto were owned by Christian institutions or private individuals, while Jewish residents lived there only as tenants. This institutional arrangement was also continued in the later newly established Jewish Ghetto. At this stage, the Ospedale di Carità, as the sole property owner, held ownership of all land and buildings within the block. This pattern originated from institutional regulations issued by the government. Therefore, before the first French liberation of Turin, there was no property subdivision within the block in the modern sense.

4. Stage Summary

The core change in the establishment stage was that the B.Amedeo block was redefined from a site originally used for religious and charitable facilities into a residential and community-management space characterized by compulsory segregation. Its morphological changes were manifested in the formation of enclosed boundaries, controlled entrances, a multi-courtyard organization, and an internal passage system on the basis of the existing buildings. Institutional factors played a foundational role in this process, including residential segregation, entrance control, and restrictions on real estate ownership. Cultural factors further reinforced the mixed-use characteristics of the block through the internal concentration of functions such as religious rituals, community education, and autonomous management. From the perspective of morphological dimensions, at the level of physical morphology, the block formed a spatial structure characterized by external enclosure and internal connectivity. At the level of use morphology, residential, religious, educational, commercial, and community-management functions were compressed into the same block, forming a highly mixed internal living system. At the level of property morphology, the single ownership of the Ospedale di Carità and the rental-use relationship of the Jewish community together constituted the property basis for centralized control. It can thus be seen that the establishment stage not only defined the spatial boundaries of the block, but also

established three basic conditions: institutional control, limited spatial capacity, and concentrated property ownership. These conditions formed the initial constraints for subsequent morphological evolution and laid the foundation for the emergence of mechanisms such as population growth, spatial pressure, and internal spatial redistribution.

2.4.2 Maintenance Stage: Population Spillover and Community Expansion (1724 – 1797)

1. Physical Morphology:

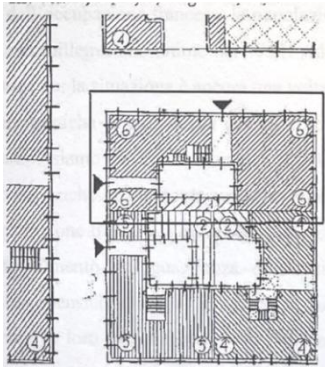


Figure 2-12. Ground-Floor Plan of the New Ghetto^[42]

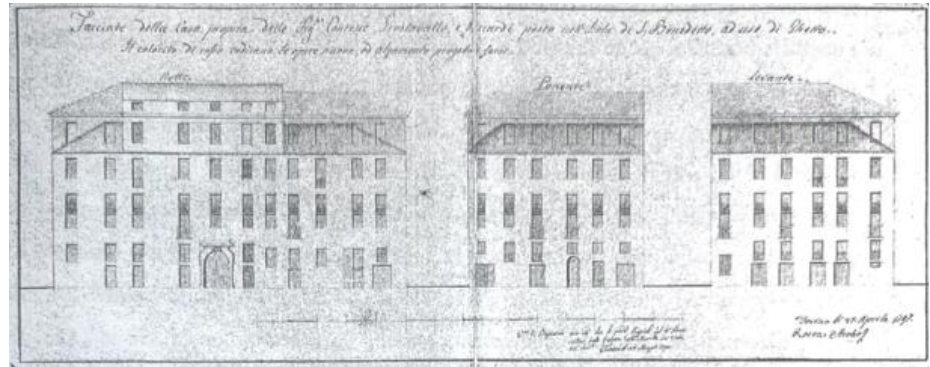


Figure 2-13. Elevation of the New Ghetto: Sketch of the 1797 Addition Project

The internal structure and governance order of the B.Amedeo block continued and were further reinforced, forming a relatively stable yet forcibly segregated spatial form. The laws of the Kingdom of Sardinia prohibited the construction of new houses within the Jewish Ghetto, so only existing buildings could be continuously repaired and maintained. As a result, spatial pressure increased and living conditions deteriorated. By 1723, due to population growth within the block, the Ospedale di Carità, at the request of the Università degli Ebrei, had to purchase new space to accommodate newly arrived residents outside the original Ghetto. The selected new block consisted of three adjacent plots. It is said that, at that time, some Jewish residents had already rented shops and additional rooms there for their families to live in. At the same time, the Casa della Misericordia was also purchased. This property had originally belonged to a religious brotherhood founded in 1698.⁷ The block, as the original Jewish Ghetto, came to be known as the Old Ghetto, while the San Benedetto block was referred to as the New Ghetto. The latter mainly consisted of three residential buildings and was located directly opposite the Old Ghetto, facing Piazza Carlo Emanuele II. By 1794, the population of the block, namely the Old Ghetto, had reached 1,100. The

7. On 2 July 1698, the Ospedale di Carità sold a house with a church, adjacent to the B.Amedeo block, to the Brotherhood of Charity. See the Archives of the Ospedale di Carità, Turin (Archivio dell'Ospedale di Carità, Torino, ASCT), Ghetto Archives, Vol. 11, Part I, documents related to the Ghetto, Historical Summary of the B.Amedeo Block.

space had become extremely overcrowded, and some shops were forced to be converted into dwellings. Living conditions were close to collapse. In 1797, an additional construction project was carried out in the New Ghetto to increase available space.

2. Use Morphology

At this stage, the block continued to maintain a superimposed functional pattern, including residential, commercial, religious, educational, and social activities. The internal spatial structure of the expanded New Ghetto was mainly composed of enclosed residential buildings, including courtyards, cellars, stables, shops, and a large number of residential rooms. It thus presented a mixed-use pattern in which residential and commercial functions coexisted, and everyday life and production activities overlapped.

3. Property Morphology

Between 1724 and 1797, the property structure of the B.Amedeo block largely continued the previous model of centralized management. The expanded New Ghetto did not break this pattern either: the authorities merely leased a building in the adjacent block to the Jewish community for use, while ownership remained in the hands of the original owner.^[44] In other words, no diversification of property units occurred within the Ghetto during this stage. Even some houses originally owned by private Christian families were, by government decree, forcibly designated for rental use by Ghetto residents.

At the same time, the community displayed clear residential stratification and high-density rental occupation. As the Ghetto was an enclosed community, its space was limited while its population continued to grow. By 1761, the population of the block had reached approximately 1,317. In order to accommodate as many families as possible, the buildings within the Ghetto were intensively subdivided both vertically and horizontally, forming rental units of different sizes. Within the four-storey buildings, mezzanines, attics, corridors, and terraces were added to accommodate more residents. Rental units in the Ghetto included various types of spaces, such as entire floors, apartment rooms, courtyards, and street-facing shops.^[44] This indicates that, under unified property ownership, residential conditions nonetheless showed clear internal stratification. Some wealthier Jewish families may have rented street-facing shops or larger rooms, while poorer families lived in cramped mezzanines, attics, or even basements. It is worth noting that when Jewish tenants were unable to pay rent, the owner, namely the Ospedale di Carità, was not legally allowed to evict them from the Ghetto. Instead, the unpaid rent could only be shared among other Jewish residents within the Ghetto.

Overall, from 1679 to 1797, the B.Amedeo block maintained a model of centralized and unified property management. The real estate was owned by a religious charitable institution, as well as a small number of Christian individuals, while all Jewish residents were tenants. Within the community, everyday life was maintained through complex spatial subdivision and rental arrangements.

4.Stage Summary

The main characteristic of the maintenance stage was the intensifying contradiction between population growth and insufficient spatial capacity under the continued existence of the closed segregation system. At the level of physical morphology, due to legal restrictions on new construction within the Ghetto, the block could only increase usable space through repair, the addition of mezzanines, spatial subdivision, and the expansion into adjacent spaces. At the level of use morphology, the mixed-use condition was further reinforced, while some shops and auxiliary spaces were converted into residential spaces, indicating that living demands had begun to exert reverse pressure on the original functional arrangement. Institutional restrictions were not relaxed, yet population growth continued, causing living demands to be continuously compressed into the existing space. Community culture maintained the continuity of internal functions, but also strengthened the block's dependence on its internal living system. At the level of property morphology, centralized ownership was not broken, but complex rental stratification and differences in spatial allocation emerged under unified ownership. It can thus be seen that the maintenance stage reveals an important mechanistic premise: when external migration and spatial expansion are restricted, population pressure does not directly lead to the reconstruction of the block structure, but is instead transformed into spatial morphological change through internal densification, functional compression, and rental subdivision.

2.4.3 Transformation Stage: Jewish Emancipation and Feudal Restoration (1798 – 1814)

In the late eighteenth and early nineteenth centuries, the Jewish population reached its peak. Due to the increasingly severe overcrowding within the study block, the establishment of the New Ghetto did not resolve the problems of population growth and insufficient space.⁸ In 1796, Napoleon's French army entered Turin, announcing the "first emancipation" of the Jews and introducing the revolutionary principles of civil equality and religious freedom into Piedmont. It

8. Ghetto Archives: documents related to the B.Amedeo block, together with the historical overview of the establishment of the block and various documents from 1681 to 1820. See the Archives of the Ospedale di Carità, Turin (Archivio dell'Ospedale di Carità, Torino, ASCT), Ghetto Archives, documents related to the B.Amedeo block known as the Ghetto (Documenti relativi all'isolato B.Amedeo denominato il Ghetto), Historical Notes on the Foundation of the Block (Cenni storici sulla fondazione dell'isolato), and other documents (Documenti diversi dal 1681 al 1820), Vol. 31, Part II.

was thereby declared that: 1. Jews were no longer restricted to living within the Ghetto; 2. the Ospedale di Carità, as the owner of the site, was for the first time allowed to rent or sell the building spaces within the block to all residents of Turin; and 3. Jews obtained the right to purchase property and engage in occupations that had previously been prohibited to them. These regulations promoted the liberalization of urban space. During this transformation, the Ospedale di Carità attempted to sell part of the block's assets, although several attempts were unsuccessful.⁹

1. Physical Morphology:

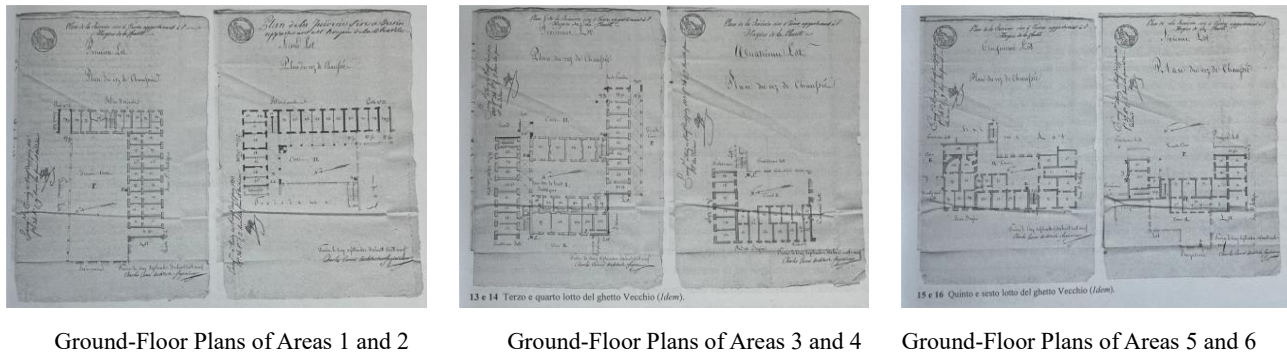


Figure 2-14. Ground-Floor Plan of the Six Areas Proposed for Sale and Lease

Through comparison of these documents and map materials, it can be seen that the physical morphology of the block did not undergo significant changes during this stage, but certain changes occurred in the ownership of land and real estate. In a French document preserved in the holdings of the Archives of the Ospedale di Carità, dated 1812–1813, Folder 20, Part I, the ground-floor plan of the block was divided by the Ospedale di Carità into six areas for the purposes of sale and lease.¹⁰ The main basis for examining the specific physical morphology of the study block during this period comes from the reconstruction drawing produced by Max Pellegrini based on the 1809 ground-floor plan of the block. According to this drawing, it is possible to identify relatively clearly that dense and regular rooms or residential units were distributed along the street-facing interfaces of the block, forming a continuous row-type pattern as a whole. Each unit directly faced the street and was arranged compactly, showing an ordered planning logic.

9. Announcements and printed materials concerning attempts to sell the Ghetto (1812 – 1813), including documents related to the division of the Ghetto into six lots for sale. See the Archives of the Ospedale di Carità, Turin (Archivio dell' Ospedale di Carità, Torino, ASCT), file “Announcements and Printed Materials Concerning Attempts to Sell the Ghetto” (Manifesti e stampati relativi ai tentativi di vendita del Ghetto, diviso in 6 lotti), Vol. 20, Part I.

10. For the subdivision and sale of the first and second lots of the Old Ghetto, see “Announcements and Printed Materials Concerning Attempts to Sell the Ghetto” (Manifesti e stampati relativi ai tentativi di vendita del Ghetto, 1812–1813). Source same as footnote 9.

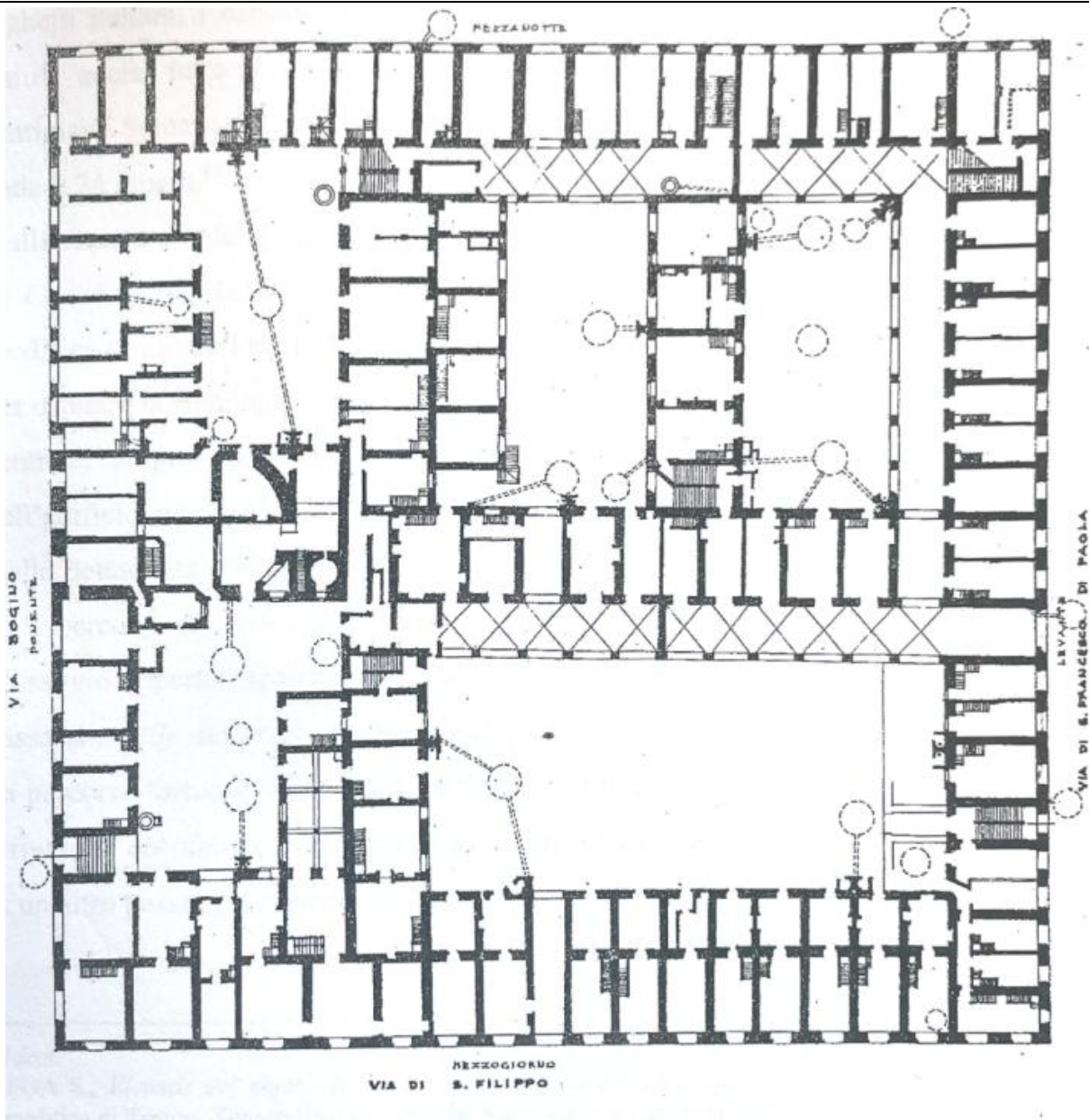


Figure 2-15. Reconstruction Drawing of the 1809 Ground-Floor Plan of the Block by Max Pellegrini, 1979

However, with the Restoration of the House of Savoy on 20 May 1814 and the return of Vittorio Emanuele I, the first emancipation of the Jews came to an end. Restrictive laws targeting religious minorities were reinstated, the Ghetto was re-established, and Jews once again lost the right to own real estate. This not only marked a regression in the social status and basic rights of the Jewish population, but also brought the spatial organization of the block back under a governance logic oriented toward segregation and control. As a result, the tendency toward spatial normalization that had briefly emerged during the short period of openness was interrupted, and the subsequent evolution of the block was once again shaped by the mechanism of institutional closure.

2. Use Morphology

By the early nineteenth century, the 2,000 Jewish residents in the B.Amedeo block were distributed among 527 extremely small rooms, or lived in other temporary arrangements. Mixed residence between Christian and Jewish families also continued. This period marked the most intense stage of population expansion in Turin's Jewish Ghetto.^[38] From the later period of French occupation to the post-Restoration period, the Jewish community in Turin can be broadly divided into three groups:

The first group was the bourgeois group, mainly composed of wealthy families. During the occupation period, they obtained permission to live in areas surrounding the study block, and were responsible for financially supporting other community members who still remained within the block.^[43]

The second group constituted the majority of the population within the study block. It was mainly composed of Jewish residents who could not afford housing outside the block, as well as some impoverished Christians, who could only continue to remain in the dwellings within the Ghetto. By this period, the Jewish Ghetto had generally come to be regarded as a place of low-end retail and concentrated poverty, with a very low social reputation.

The third group was a small minority composed of several wealthy families. They had previously moved to the urban periphery, and later transferred their capital to poorer rural areas, investing in the acquisition of craft-manufacturing enterprises. As national wealth increased, their financial situation also improved.

Despite strict legal regulations, the municipal authorities began in practice to grant exemptions, allowing some families to move out in order to relieve excessive overcrowding. According to the 1832 census, there were 212 families and 1,189 people in the Old Ghetto, while 280 people lived in the New Ghetto. In the 1830s, attempts were also made to redistribute the population to the suburbs or to Jewish quarters in other cities.^[40] At the same time, Turin's Jewish cemetery also underwent several relocations, gradually moving from the city centre to the urban periphery. This also reflects, to some extent, the historical transformation of the spatial use of the Jewish community.

3. Property Morphology:

Although the Ospedale di Carità did not succeed in its attempts to sell the assets of the B.Amedeo block, these attempts encouraged people to begin understanding the formerly unified estate as a set of physical units that could be subdivided, transferred, and used independently. This conceptual shift was both part of the modernization of the urban institutional system and a historical turning point in the evolution of the block from an enclosed and unified entity toward a multi-actor

property structure.

Although institutional closure was lifted, the block did not experience large-scale population outmigration. On the contrary, against the background of social differentiation between rich and poor, the low-threshold spaces retained a strong attraction for poorer groups, while housing units were redistributed in increasingly fragmented ways, producing what may be called a “bed-space market effect”^[38]. The space of the original block was further compressed. This was because some wealthy Jewish families who remained within the block no longer occupied entire properties on their own, but instead rented out part of their space, especially to Christian groups from rural areas who were seeking work and temporary accommodation. This form of subdivided rental based on “bed spaces” intensified spatial fragmentation and led to a continuous increase in residential density per unit area. Against the background of overall economic prosperity and continued population growth at the time, this phenomenon became particularly prominent.^[40]

As Jews gained freedom in residential and occupational choices for the first time, some were able to purchase property and open shops both inside and outside the city. During this period, the residential choices of the Jewish population showed clear class differentiation: most poorer Jews were absorbed into the city as part of the emerging proletariat, while a small number of wealthy families, supported by the emancipation policy, achieved spatial expansion that corresponded to their capital strength. These middle-class and wealthy families actively purchased properties around the former Jewish Ghetto and continued to live in this area. On the one hand, it was close to the commercial centre and therefore convenient for business operations. On the other hand, the study block still retained the synagogue necessary for everyday religious life. More importantly, the mutual support mechanisms within the community remained irreplaceably important.

In 1814, after the Restoration of the House of Savoy, the Jewish Ghetto status of the block was re-established, and the Jewish population was once again deprived of the right to own real estate. However, from 1816 onward, contradictions gradually emerged between the royal patents issued successively and the actual situation. Some economically advantaged Jewish groups in the city found it difficult to fully comply with the new regulations, while these restrictive decrees were also implemented in a relatively lenient manner for various reasons. This lenient governance strategy was partly due to the fact that the Jewish community continued to provide financial support to the royal family during this period, demonstrating its loyalty to monarchical power^[43]. On the other hand, the repeated postponement of policy implementation in practice also allowed most of the real estate previously purchased by Jewish residents to be retained, rather than being forcibly reclaimed.^[40] The legitimacy of these delays was attributed in government discourse to two main

factors. First, the segregated area for Jews urgently needed to be expanded in order to accommodate the Christian laborers working in Jewish workshops. Second, a large-scale sale of Jewish-owned properties could have caused a sharp decline in real estate prices in the city center, thereby damaging the economic interests of Catholic property owners. Therefore, although Jews had formally lost the right to own real estate, a *de facto* continuation of property ownership emerged within the B.Amedeo block, creating an ambiguous zone between law and practice.

Meanwhile, the Ospedale di Carità remained the largest landowner in formal terms. However, as institutional restrictions loosened, the hospital also attempted to sell part of its properties in 1845. These attempts ultimately failed again, as no suitable buyers could be found. This also indicates that the process of property privatization had not been effectively initiated, and real estate remained highly concentrated in the hands of public institutions. During this process, wealthy Jewish families moved to live outside the block while retaining property ownership within it and renting out their properties. Poor Jews and Christians, by contrast, rented dwellings within the block, further aggravating overcrowding. This suggests a clear separation between ownership and use, as the study block was gradually transformed into a “quasi-public rental district” jointly controlled by private individuals and institutions. Due to the continuous rise of land prices in the city center, the Savoy government was in fact unable to expand the segregated area, let alone relocate the entire Jewish population to the urban periphery. Under these spatial and institutional tensions, not only were previously purchased properties not sold, but some Jews also continued to purchase real estate through agents in order to evade legal sanctions against owning assets in their own names.

4.Stage Summary

During the transition stage, the institutional environment became more relaxed, but the morphology of the block did not immediately undergo a corresponding transformation. The period of French occupation brought the possibilities of residential freedom, occupational openness, and the marketization of property rights. As a result, the block began to be understood as a real estate unit that could be subdivided, rented, and sold. However, in terms of physical form, the basic spatial framework of the block remained relatively stable, indicating that institutional change does not immediately translate into comprehensive spatial restructuring. At the level of use form, the differentiation between rich and poor led to divergent mobility among different groups: some wealthy families expanded outward, while poor residents and migrant laborers continued to depend on low-cost spaces, further intensifying the subdivision of dwelling units and spatial overcrowding. At the level of property form, although legal and market conditions began to loosen, repeated attempts at sale failed, resulting in a transitional state in which the continuation of single ownership,

proxy ownership, subletting, and de facto differentiation of property rights coexisted. The economic capacity and degree of communal attachment of different residents were not the same, enabling wealthy residents to move out and purchase property elsewhere, while poor residents continued to remain in the original block. It can therefore be seen that the significance of the transition stage did not lie in the immediate completion of an open transformation of the block, but rather in revealing the mismatch between institutional change, social stratification, market mechanisms, and spatial inertia. This stage provides an important basis for the subsequent analysis of property mechanisms, spatial redistribution capacity, and morphological lag. In summary, between 1814 and 1848, the property structure of the B.Amedeo block gradually shifted from a single and closed pattern toward a more plural and mixed one, showing the following characteristics: first, property control shifted from a single public institution to a mixed structure involving multiple actors; second, although legal restrictions were restored, their enforcement was not strict, creating a grey zone in which property ownership was strictly limited in law but selectively preserved in practice; third, wealthy residents moved out, poorer residents concentrated within the block, and Christian tenants entered, producing a mismatch between spatial use and property ownership. Although the ghetto system was restored, the logic of property rights had already evolved. This period laid the social and spatial foundation for the subsequent de-ghettoization of the city and the individualization of property rights.

2.4.4 Renewal Stage: Block Reorganization after the Abolition of the Ghetto (1848 to the Present)

In 1814, after the restoration of the House of Savoy, the old system was temporarily reinstated, but the management of the ghetto had already become difficult to enforce as strictly as before. In 1816, the abolition of the yellow badge system further weakened the segregation measures. It was not until the promulgation of the Statuto Albertino in 1848 that Jews formally obtained equal civil rights, and the ghetto system was ultimately abolished in full. Compared with the brief transition stage during the Napoleonic period, the renewal stage after 1848 marked the complete end of the ghetto system and also signified a fundamental transformation in the function and meaning of the block.

1. Physical Morphology:

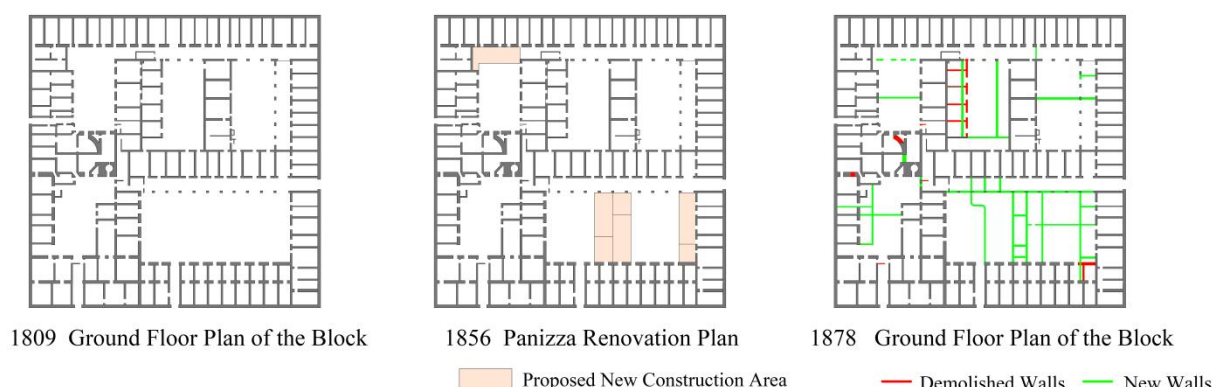


Figure 2-16 Changes in the Ground-Floor Plan of the Block

In 1851, the Jewish residents still living in the B.Amedeo block were still required to pay rent to the Ospedale di Carità. In 1853, due to the long-term disrepair of the buildings, the hospital committee discussed whether they should be demolished. To promote reorganization, several rounds of auction procedures were initiated under the coordination of the mayor, in order to resolve title deed disputes and accelerate the demolition process. In 1856, the architectural engineer Barnaba Panizza was commissioned by the government to prepare a technical assessment report, exploring possibilities other than demolition.¹¹ Scholars have disagreed on this issue: some argue that the block was almost demolished, while others maintain that it underwent structural transformation. Based on a comparison of archival materials and drawings, the more credible explanation is that the block underwent conservative renovation, including functional reuse and adjustments to residential density, but without large-scale reconstruction; the core spatial layout and major components such as staircases and entrances remained in their original state.¹² Panizza's assessment report included a sketch and valuation scheme that divided the block into eleven plots, each containing a detailed description of its existing condition and several renovation proposals for functional reuse. This report generated considerable response among the management and in public opinion, but no buyer was found.

During the Second World War, Turin was bombed by the Allied forces. In 1946, the Italian Fire Brigade (Vigili del Fuoco) drew a series of maps that documented in detail the bombing of central Turin by Allied air raids, especially those carried out by the Royal Air Force (RAF).

11. "From an economic point of view, it would be unreasonable to demolish this building, which appears dilapidated but remains structurally largely safe." — Barnaba Panizza

12. Judicial records concerning the increase of rents, 26 March 1851. Archivio dell' Ospedale di Carità di Torino (ASCT), relevant judicial documents (Pratiche fatte giudizialmente per l' aumento delle pigioni), File No. 26, Part I.

Bombe e Mezzi Incendiari Lanciati¹³Danni Arrecati agli Stabilimenti¹⁴

Figure 2-17 Map Drawn by the Italian Fire Brigade, 1946

In 1947, during a survey of buildings damaged and destroyed by air raids, Turin produced another map that recorded the condition of the B.Amedeo block more clearly. The map shows that the B.Amedeo block was hit by high-explosive bombs and experienced several instances of localized burning. Overall, however, the block did not suffer large-scale destructive damage, and a considerable number of buildings were preserved, with the original spatial layout largely maintained. Some buildings suffered only minor damage, mainly affecting façades, windows, roofs, and other components, while their main structures remained largely intact. The damage caused by the war was therefore concentrated more on building surfaces and local components, without fundamentally undermining the original physical and spatial framework of the block. This also

13. Legend: The red dots indicate the locations of incendiary bombs that caused fires.

14. Legend: Dark red: severe damage or complete destruction, indicating that the building was completely destroyed by bombs or suffered severe collapse and was almost beyond repair. Magenta: major damage, indicating that the building was seriously damaged, but parts of the structure remained repairable. Pink: minor damage, indicating damage to the building façade, windows, roof, and other components, while the structure remained basically intact.

provided a basis for its subsequent repair and continuity.

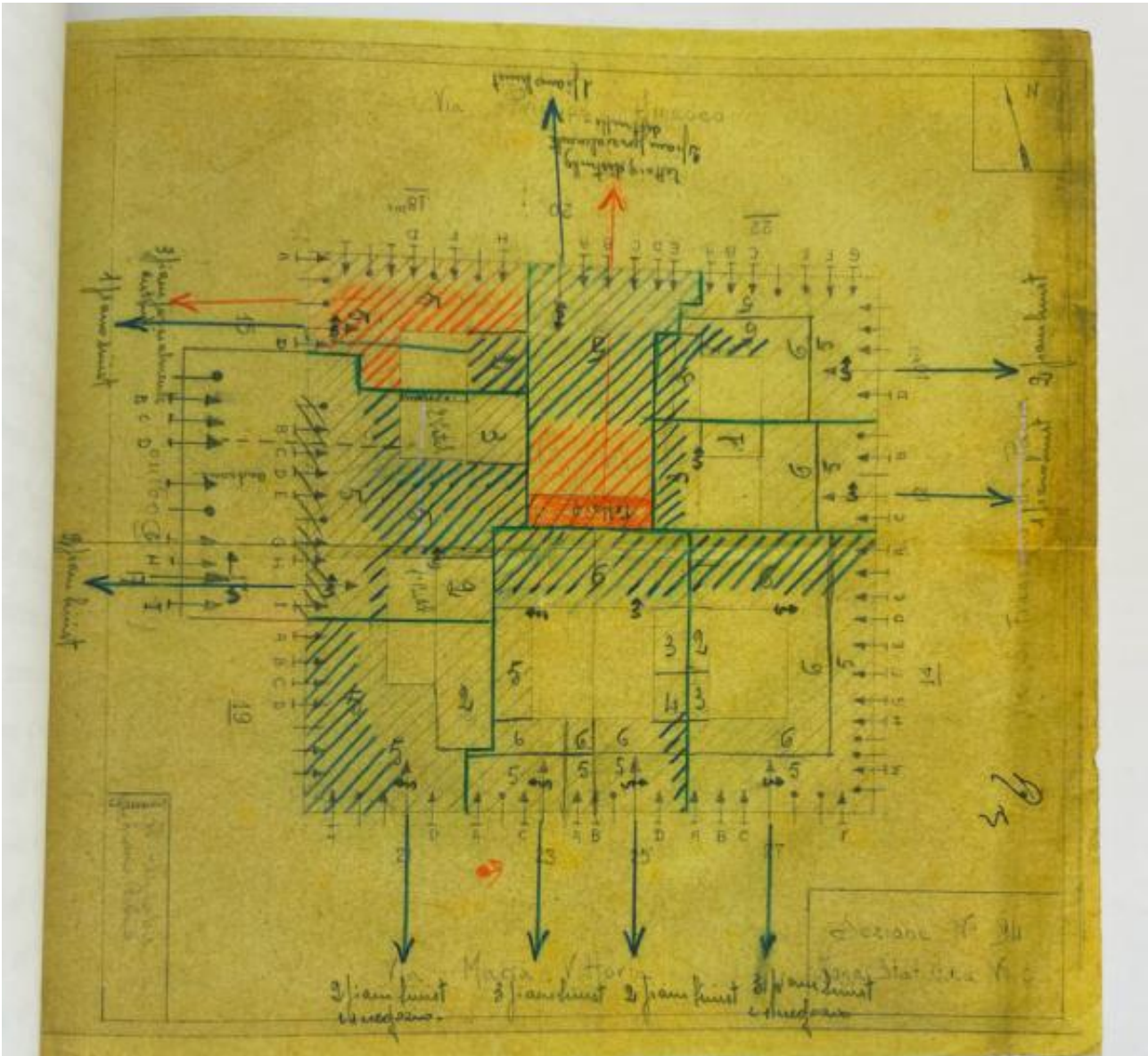


Figure 2-18 Survey Map of Damaged and Destroyed Buildings¹⁵

The façade corner volume at the northwestern corner of the block suffered relatively severe damage. It can be confirmed that almost all residential units on this corner plot were damaged in the bombing of 8 August 1943. The government oversaw the reconstruction of the apartment units in this area, restoring them largely according to their original condition. In general, the newly built parts maintained the same height as the original buildings, while the municipal government acted as the project approval authority. Owners often applied to the Comitato Riparazioni Edilizie for funding to offset the cost of repair works, although whether such funding was actually granted

15. Legend: Red indicates extremely severe damage, while blue indicates severe damage. The numbers marked in pencil indicate the height of the buildings. The street numbers of each entrance are also listed along the edges. Also marked in pencil along the edges are the number of damaged floors (Piani Sinistri), as well as cases of partial destruction and complete destruction.

2. Use Morphology

With the promulgation of the Statuto Albertino in 1848, Jews obtained equal rights and moved out, and the B.Amedeo block no longer needed to close its gates at night or maintain physical segregation. The originally highly inward-facing enclosed layout gradually transformed into a semi-open block connected to the surrounding urban space. The commercial layout once concentrated in the “eight shops” gradually spread to various street-facing locations and became increasingly consistent with the shop pattern in other parts of the city, while the façades became integrated into the more general urban landscape. In terms of housing, the multi-storey structures with mezzanines formed during the ghetto period to accommodate a high-density population were gradually converted into more conventional three- to four-storey dwellings, and the resident composition became increasingly diverse. Meanwhile, the original courtyards, corridors, and religious facilities no longer carried public functions such as worship and education, but were converted into ancillary residential spaces. It can therefore be seen that the block's commercial, residential, and public spaces all shifted from their former closed and highly concentrated state toward a more open, diverse form integrated with the city as a whole.

From the late nineteenth century to the early twentieth century, with changes in the division of urban functions and social structure, the block may have undergone deeper transformation, although the specific process is limited by the difficulty of accessing relevant materials. Judging from the current situation, the courtyard spaces have been partially subdivided, and the composition of users and occupied functions has changed to some extent. This is mainly reflected in the weakening of the original religious or charitable institutional functions, which have been replaced by civic housing or mixed residential-commercial uses. The diversity of residents has also increased, although a small number of interviews with surrounding shopkeepers and residents suggest that descendants of Jewish families still constitute a considerable proportion of the current residents of the block. After the Second World War, the residential units damaged by air raids largely retained their residential function during the repair process. The Priests' Courtyard, by contrast, shows a more evident functional transformation. Archival records indicate that its internal “gallery hall” (Salone a Galleria) once continued or restored the function of the “Edera” dance hall, and was later converted into a gymnasium during the reconstruction works of 1971–1973. Based on historical maps and municipal archives, the development trajectory of this courtyard differed from that of other buildings in the block. Its “large gallery hall” (Gran Salone a Galleria) may have been formed between 1865 and 1878, and was converted into a cinema in the early twentieth century.

After the war, the Priests' Courtyard underwent not only architectural repair and reconstruction, but also repeated redefinition of its functional attributes in different historical periods, shifting from an entertainment venue to a sports space. This reflects the diversification and adaptability of public-space use in the process of urban renewal.

3.Property Morphology:

The Statuto Albertino of 1848 legally abolished the ghetto system, marking the entry of the B.Amedeo block into a new stage of property-structure reorganization. As the block's gates were opened, Jewish residents gained the right to purchase property and live throughout the city, and many Jewish families moved to other parts of the city to settle.^[46] The rapid loss of population and rising vacancy rate in the former ghetto block created conditions for property restructuring and urban renewal. Due to the disappearance of its segregating function, the properties once held by institutions such as the Ospedale di Carità lost their original purpose and began to move toward comprehensive restructuring. In the first two decades after the abolition of the ghetto, the Ospedale di Carità, as the property owner, continued to collect rent from some Jewish tenants who remained in the block. However, as residents gradually moved out, this model became increasingly unsustainable. In the 1860s, the municipal authorities and property owners began to seriously consider disposal plans for the block. Panizza's official valuation report recommended avoiding large-scale demolition and instead transforming and reusing the block through urban planning.^[38] Ultimately, the block was renewed and transformed on its existing basis rather than being demolished and rebuilt. In 1875, the Ospedale di Carità sold the entire former ghetto block to private investors. This public sale marked the end of the era of religious/public ownership and brought the block into a private property system. The purchasers divided the formerly unified large real estate holding into several independent units for resale or self-use, opening a new stage of diversified property units.^[46] As the records state, "the ghetto space was released onto the market and thoroughly transformed." A large number of private buyers became involved, renovating or rebuilding the old buildings to meet the demands of urban life in the late nineteenth century.^[41]

In the same year, the company that acquired the block proposed extending Via del Moro, today's Via Des Ambrois, through the block in order to improve ventilation and traffic conditions.^[38] This proposal for "cutting through the block" would have divided the courtyard into two parts and inevitably altered the original property structure. However, due to concerns over funding, technical feasibility, and heritage conservation, it was not implemented, allowing the overall urban fabric of the block to be preserved. Meanwhile, the authorities began to emphasize repair and "sanitization" instead of large-scale demolition and reconstruction. In his report, Panizza recommended achieving

spatial reuse through improvement measures, such as adding entrances and improving lighting and ventilation, thereby gradually breaking up the originally enclosed courtyard system.

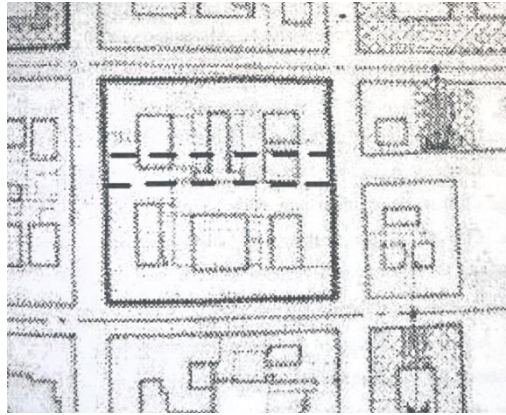
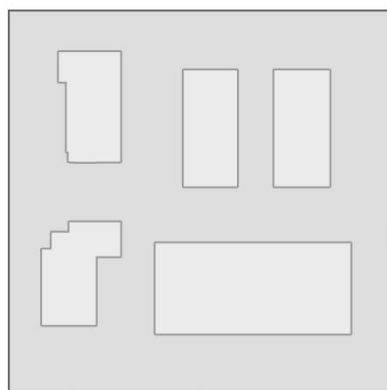
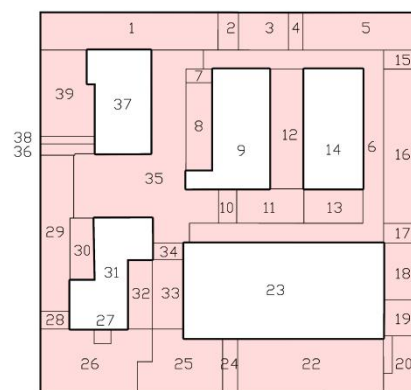


Figure 2-21 Schematic Diagram of the Proposal for Cutting Through the Block

These measures significantly advanced the fragmentation of property rights. On the 1856 cadastral map, the block was still registered as a whole under the name of the Ospedale di Carità. By contrast, the updated nineteenth-century Catasto Gatti already depicted the transformed layout, in which the block had been subdivided into multiple plots belonging to different owners. Between 1947 and 1973, municipal archives recorded more than ten permits involving structural reinforcement, façade repair, and the construction of new staircases. Most of these measures were proposed by the management committees of individual buildings, reflecting a gradual shift in the model of property governance from centralized management to multi-owner self-governance. Today, the block has been fully integrated into the central urban area of Turin, and its property structure no longer differs from that of surrounding blocks. However, certain remnants, such as the old iron gates, still recall its former history of concentrated property ownership.



18th Century: Mono Property



19th Century: Property Division²¹
Catasto Gatti

Figure 2-22 Schematic Diagram of Changes in Block Property Rights

4.Summary of the Renewal Stage

The renewal stage marked the transformation of the block from an institutionally segregated space into an ordinary urban block. Its morphological change was reflected in the combined process of opening-up, marketization, and adaptive renewal. At the level of physical form, the block gradually completed spatial reorganization on the basis of its original street-block and courtyard framework through the addition of entrances, local repairs, façade renewal, post-war reconstruction, and functional reuse. At the level of use form, the religious, educational, and self-governing functions that had previously served the internal life of the Jewish community gradually disappeared, and the block shifted toward a mixed urban function dominated by housing and street-facing commerce. The courtyard spaces also changed from the core of communal public life into spaces for service functions, parking, and limited public activities. At the level of property form, the concentrated ownership of the Ospedale di Carità gradually disintegrated, while private investors and multi-owner structures entered the block. Spatial renewal thus came to rely more on market transactions, owner self-governance, and urban management systems. It can therefore be seen that the renewal stage was not a single process of modernization, but rather a process in which the original enclosed structure was reabsorbed into the urban system under new institutions, new property relations, and new demands for use. Its key mechanism lay in the fact that property marketization increased the capacity for spatial redistribution, while the historical spatial framework limited the extent of renewal, giving the block an evolutionary character of gradual integration into the city.

2.5 Evolution Summary: From a Micro-City to Part of the Urban System

Through a systematic review of the evolutionary process across the four stages, it can be seen that the morphological evolution of the B.Amedeo block was not a simple accumulation of spatial changes, but rather a process of structural transformation. Overall, its development trajectory can be understood as a gradual shift from a relatively enclosed “micro-urban system,” mainly based on internal operation and capable of self-organization, toward a component of the broader urban system with closer connections to external urban space. In this process, the spatial boundaries, patterns of use, and organizational logic of the block all underwent corresponding adjustments.

On the basis of the staged analysis above, this section further extracts the evolutionary characteristics of the block from three dimensions: physical form, use form, and property form. It then translates these characteristics into the key variables required for the subsequent analysis of driving mechanisms, explaining how historical evolution was manifested in changes in variables

such as spatial capacity, spatial boundaries, living needs, functional mix, property constraints, spatial redistribution capacity, and market mechanisms.

Table 2-4 Timeline of Block Evolution

Time	Event	Description
1620–1670	Urban expansion; becomes Ospedale di Carità	Taken into the expansion area
1679	Established as the Ghetto	Forced segregation management
1798–1814	French occupation and abolition of the Ghetto	Legal freedom, residential inertia continue
1848	Complete abolition of the ghetto system	gradually shifted to mixed development
1856	Panizza's survey and mapping	Documentation of the morphology
1942–1943	Bombing damage during the Second World War	Localized destruction
1947–now	Post-war reconstruction, functional transformation	Local repair and renewal

2.5.1 Evolution of Physical Form

1. Building Form

1670 (Establishment Stage)

Based on engravings and historical maps, the B.Amedeo block consisted of two wings of three-storey buildings, with an enclosed green courtyard to the south containing planted gardens and vegetable plots. The buildings on the north side had two internal courtyards. At the center was a three-storey axial corridor that divided the entire block into two parts. The ground floor of the buildings appears to have had porticoes (*Portici*) surrounding the courtyard, while the exterior walls facing the street had no windows or openings. By 1682, the open area on the south side had also been enclosed, and an additional building wing with an arcade was added. Although the morphological sources are not entirely accurate, the block at this time can be broadly understood as consisting of three to four courtyards.

1809 (Transition Stage):

According to the reconstructed ground-floor plan of the Jewish ghetto in 1809, the B.Amedeo block had already become a fully enclosed courtyard building. Historical maps show that, at some point around 1800, the basic layout consisting of five courtyards had already emerged: the Great Courtyard, the Unleavened Bread Courtyard, the Priests' Courtyard, the Vine Courtyard, and the Terrace Courtyard. Clear continuous portico structures can be observed on the north side of the Priests' Courtyard, the north and east sides of the Vine Courtyard, and the north side of the Great

Courtyard, indicated in light grey in the figure. These structures allowed residents to move from one courtyard to another.

1878 (Renewal Stage):

In 1856, the engineer Panizza proposed in his survey and reconstruction plan that an additional floor be added to the buildings of the entire B.Amedeo block. Although Panizza's proposal was never formally adopted by the government, the available materials indicate that a considerable number of his recommendations were later implemented. It is therefore highly possible that the buildings in the block were transformed into four-storey structures at some point after 1856.

The main evidence for the changes during this period comes from an anonymous map attached to the *Catasto Gatti*, which appears to record changes in the ground-floor plan of the block after Panizza's reconstruction proposal, although the number of storeys is not confirmed in the drawing. A strip-shaped building was added in the middle of the Great Courtyard, dividing the courtyard into two parts. A new wing was added on the north side of the Terrace Courtyard, where a staircase was also installed. In the Priests' Courtyard, an arcaded wing seems to have been constructed and connected to the existing wing, significantly reshaping the spatial layout. However, due to the limitations of the available materials, the specific form of the space remains unclear. What can be confirmed is that, by this time, the Priests' Courtyard had been transformed from an outdoor courtyard into an indoor exhibition hall, with a gallery at roof level. Another important change was that the original porticoes in the courtyards were enclosed and transformed into interior structures known as dark porticoes. Overall, the building coverage ratio increased, and the courtyards were further reduced in size.

1985 (Modern and Contemporary Period):

Based on the building volume and number-of-storeys information in the 1985 Regional Technical Map of Turin, it is possible to reconstruct a relatively accurate 3D model of the block at this time. According to post-war repair records, a 1948 project for the repair of an attic damaged during the bombing led to changes in the form of the roof and dormer windows, and the building roof was raised by one additional level. This project only recorded the condition of a local attic, and the exact timing of the additions to the other buildings remains unknown. However, it can be confirmed that by this time all the surrounding buildings had been marked as five storeys. In addition, the original Priests' Courtyard had almost entirely disappeared and had been replaced by one- to two-storey buildings.

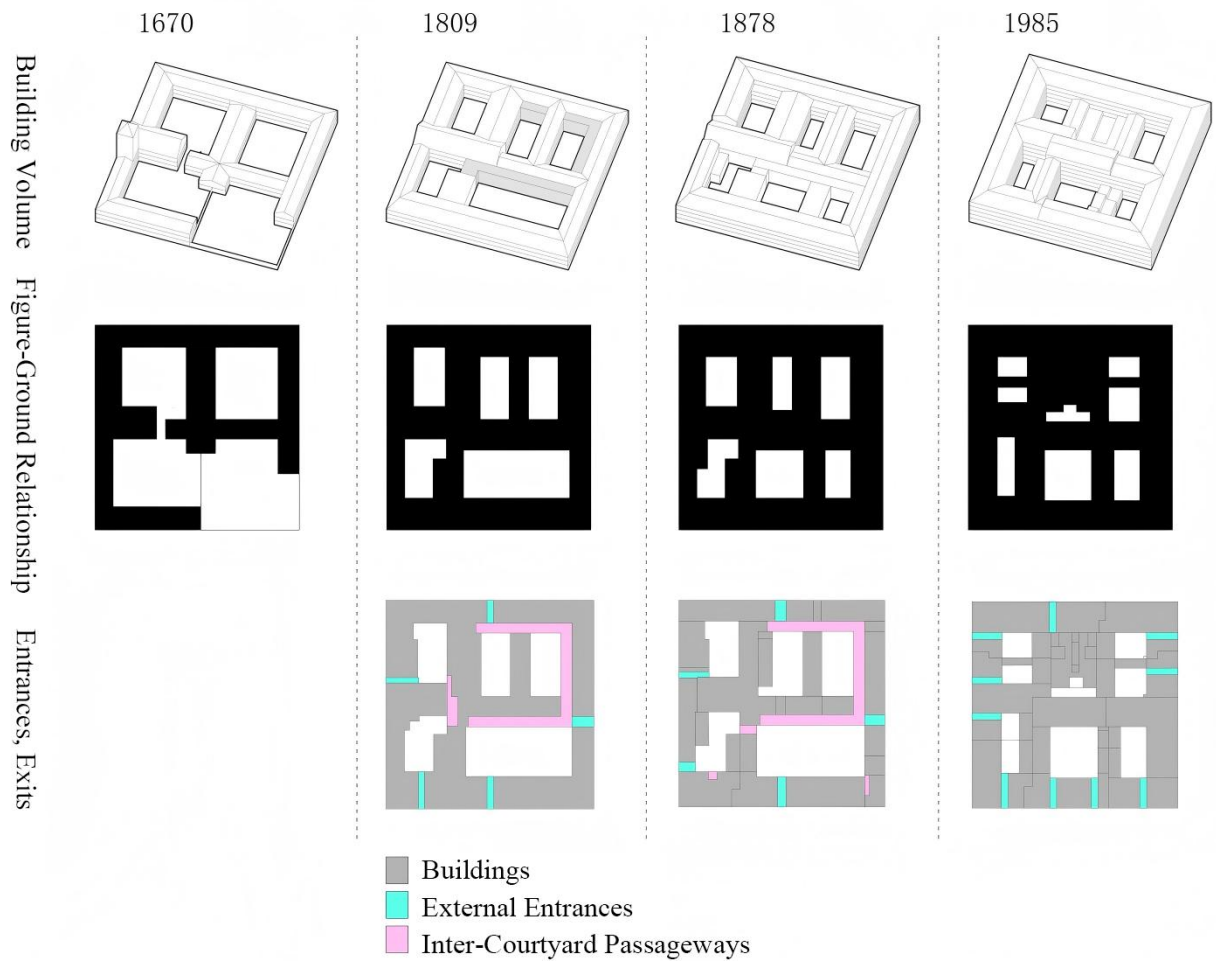


Figure 2-23 Evolution of the Physical Form of the B. Amedeo Block

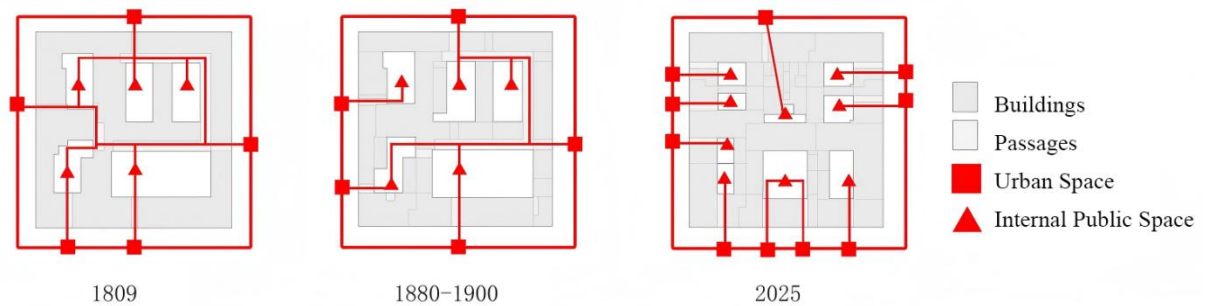
2. Spatial Configuration

To more clearly identify the internal spatial hierarchy of the block and its connectivity relationships, this study adopts a configuration analysis method based on spatial depth and topological paths.^[48] to provide an abstract representation of the block's spatial structure. In the construction of the diagram, the geometric scale and formal details of the buildings are no longer depicted; instead, different spatial types are translated into structural nodes and connective relationships. The block boundary and the entrances connecting it to the city are represented by square nodes, while internal public spaces, namely courtyards, are represented by triangular nodes. The lines between nodes indicate actual accessible circulation paths or spatial connections. They do not represent physical distance, but only express accessibility and direction of connection in a topological sense.

The configuration analysis shows that, in 1809, the internal space of the block formed a closed circulation system through continuous passages. Residents could access all courtyards through internal passages and covered porticoes, forming an integrated internal spatial system characterized by external control and internal connectivity. This mode of spatial organization was closely related

to its pattern of use. Since residents' movement outside the block was restricted, daily life functions were highly integrated within the block. Only by forming a structure that connected all courtyards could residents obtain relatively complete living services and convenient conditions. Between 1880 and 1900, the internal structure of the block began to change. The number of courtyards was largely retained, but the original closed circulation system was weakened, and the positions of entrances also changed. The internal passages shifted from a complete ring-like structure to a serial or semi-independent organization, and some courtyards, such as the Terrace Courtyard, lost direct connection with the overall system, leading to a decline in internal integration. By 2025, the internal connections between courtyards had largely disappeared. Each courtyard was mainly connected directly to the external streets through independent paths, and the spatial organization had shifted from an internally integrated structure to a dispersed multi-node structure. From a configurational perspective, the degree of enclosure seems to have decreased, and the block boundary has been opened at multiple points. However, this openness mainly serves internal users. Outsiders can only enter the interior building space through street-facing commercial frontages, but cannot access the courtyards or the residential areas. The block therefore still maintains a low level of public permeability.

Evolution of Block Spatial Configuration Based on Physical Form



Evolution of Block Spatial Configuration Based on Topological Relationships

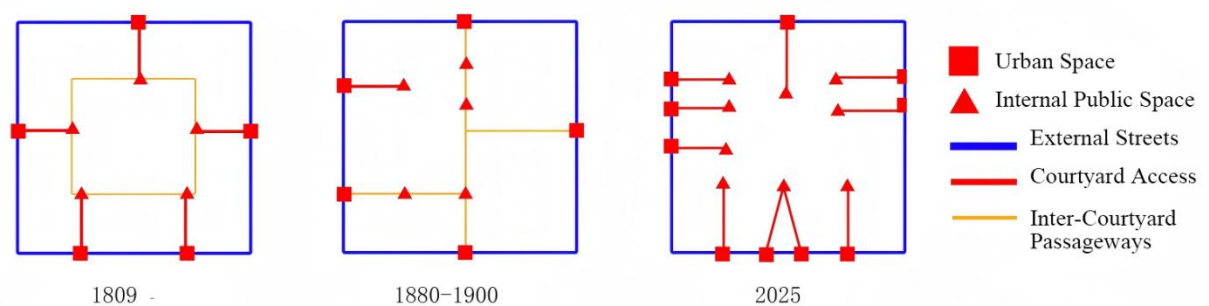


Figure 2-24 Schematic Diagram of the Evolution of the Depth-Path Plan of the B.Amedeo Block

In the early stage, the block presented a highly self-sufficient “micro-city” configuration in its physical structure. The entrances to the block performed a controlling function similar to city gates, forming a clear boundary between internal and external spaces; the internal courtyards served as the core nodes of spatial organization, functioning like squares for gathering and distribution; and the passages connecting the courtyards constituted an internal street-and-lane system with multiple routes of access. This micro-city was relatively enclosed and internally coherent, effectively separating the external urban environment from the internal space. By the middle stage, the physical configuration of the block began to change. Some spatial units gradually established direct connections with the external urban structure, and their spatial organization no longer depended entirely on the internal courtyard system. The original internal system and the new relationship of urban embedding coexisted, presenting a state in which two spatial logics were juxtaposed. In the modern and contemporary stage, the original “micro-city” internal configuration gradually disintegrated, the controlling function of the block boundary weakened, and the internal spatial structure no longer retained the characteristics of an independent system. The block as a whole was integrated into the larger urban spatial network, and its mode of spatial organization gradually became consistent with the conventional block structure of most urban blocks in Turin, eventually becoming fully embedded in the overall urban morphological system.

In summary, the physical morphological evolution of the block did not undergo comprehensive demolition and reconstruction, but unfolded gradually within the existing spatial framework through continuous internal adjustment and density increase. The scale of the street block and the basic spatial framework have remained relatively stable since their early formation, while morphological changes mainly occurred at the building level and in the subdivision of internal spaces. However, in this process of incremental densification and local renewal, the spatial organizational logic of the block still changed: the original inward-oriented spatial structure was gradually reorganized, and its overall spatial relationship shifted from a relatively independent internal system toward a more open state of urban embedding. Therefore, under the premise that the existing physical framework remained relatively stable, the block completed a transformation in its spatial organizational logic.

It can be preliminarily argued that the evolution of physical form mainly corresponds to two variables in the subsequent mechanism analysis. The first is spatial capacity, namely the carrying capacity that the block could provide within its existing building framework through additional floors, mezzanines, courtyard compression, and local transformation. The second is spatial boundary, namely the changing relationship between the block and the external city, from institutional enclosure to multiple points of connection. The former explains how population

pressure was transformed into internal densification, while the latter explains how the block gradually shifted from a segregated unit to part of the urban system.

2.5.2 Evolution of Use Form

The use form of the B.Amedeo block underwent a gradual transformation under the combined influence of institutional constraints, population pressure, and spatial conditions. It shifted from a highly enclosed and self-sufficient use structure, to mixed and fragmented use under more open conditions, and finally to a modern residential-commercial mixed use pattern. This section selects 1809 in the transition stage, the late nineteenth century in the renewal stage, and the modern and contemporary period as comparative nodes for visual analysis.

Although 1809 fell within the period of Jewish emancipation, the block still displayed the characteristics of a self-governing “micro-village” community formed under institutional constraints, with the evidence mainly derived from documentary records. In the renewal stage, the block showed certain transitional characteristics, also based on documentary records. In the modern and contemporary period, it presents a residential-commercial mixed community adapted to contemporary functional zoning and mainly guided by property management, with the evidence derived from field investigation.

1. Building Function

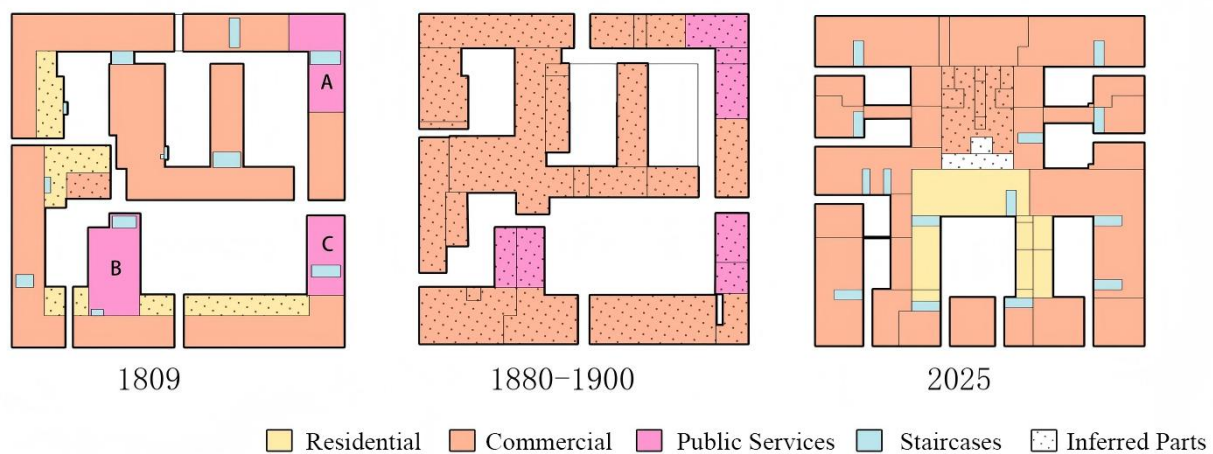


Figure 2-25 Ground-Floor Building Function Distribution of the B.Amedeo Block¹⁸

As a Jewish ghetto, the block in 1809 maintained the high degree of functional complexity and temporal rhythm that had characterized the earlier period. Before the French liberation of Turin, due

18. A: Spanish-Rite Synagogue; B: Educational Facilities; C: Italian-Rite Synagogue.

to strict institutional restrictions, the interior of the block was forced to accommodate multiple functions at the same time, including residence, religion, education, commerce, and self-governance, forming a complex system embedded within the architectural structure of the former Ospedale di Carità. Apart from public service spaces such as synagogues, almost all ground-floor spaces were used for commercial activities, while the upper floors were maximized for residential use, with mezzanines, attics, and partitions continuously increasing the intensity of use.^[38] Commercial activities themselves did not unfold freely, but were strictly embedded within the religious temporal system: shops were closed on the Sabbath and operated in a semi-open state on festival Sundays, with shutters lowered halfway to accommodate the special circumstance of Christians entering the ghetto.

At this stage, commercial activities in the block displayed a “cautious, localized, yet highly active” character.^[38] On the one hand, high-quality shops mainly served the aristocracy; on the other hand, large quantities of low-priced goods were sold to the urban poor and populations from the surrounding countryside. During religious festivals, the ghetto gradually developed into a regional market node, with commerce and residence highly overlapping in space. Due to institutional restrictions, street-facing windows were sealed, making courtyards and roofs the main sources of lighting and ventilation. Internal courtyards and corridor-like balconies served as spaces for children’s activities, neighborhood interaction, and household access. Although the early block imitated the structure of a city, replacing streets with internal passages, squares with courtyards, and stationary social spaces with balconies, these were ultimately only small-scale substitutes, which further intensified the erosion of residents’ private space. It is worth noting that the sources indicate that, although the ghetto accommodated all the daily activities of its residents, it did not form a genuine “sense of home.”^[40] Religious practice and spiritual belonging were mainly attached to the synagogues and the system of religious law, while the block itself was more often regarded as a passively accepted space of survival. The separation between spiritual space and residential space meant that, although the block operated at a high level of density, it lacked a stable emotional foundation. This also foreshadowed its later transformation after the loosening of institutional restrictions. Entering the nineteenth century, as the segregation system gradually disintegrated, the use form of the block shifted toward a conventional mixed urban structure dominated by residence and supplemented by ground-floor commerce. However, the high intensity of use, vertical functional division, and internal spatial utilization formed in the historical period did not disappear with the abolition of the system, but continued to be inherited at the level of buildings and plots. This phenomenon shows that the evolution of the block’s use form was not a simple functional

replacement, but displayed a clear path-dependent character: institutions could be abolished, yet the logic of use formed under long-term high-pressure conditions continued to be preserved through the spatial structure.

At present, most ground-floor functions are commercial. The outward-facing street-front spaces contain a diverse range of businesses, including supermarkets, antique shops, bars and restaurants, retail services, and others. The ground-floor commercial spaces on the inner side of the courtyards are mainly independent offices, photography studios, and similar uses. Residential functions are mainly distributed on the second floor and above. Most residents reach the upper floors directly through staircases inside the entrance halls and do not need to enter the courtyards.

2.Courtyard Function

In 1809, the functions of the courtyards were highly complex. In addition to their basic roles in lighting, circulation, and service activities, the most important function of the courtyards was to accommodate religious and community activities. The synagogues (*Sinagoga*) were located in the Great Courtyard and the Vine Courtyard, respectively serving Italian-rite and Spanish-rite religious ceremonies. They concentrated functions such as prayer, education, charity, the community civil court, and political organization. From the perspective of spatial structure, the synagogues were not only the religious core of the block, but also the organizational center of social life, representing the areas with the highest degree of functional mixture and the strongest symbolic significance.^[40] In addition, a Jewish ritual bath was located beneath the Great Courtyard and was used by residents in their daily religious life. An oven was located in the Unleavened Bread Courtyard for making the unleavened bread that had to be eaten during Passover (*Pesach*). Passover is held once a year and lasts for eight days. Although this function was not used frequently, the Unleavened Bread Courtyard still occupied an important position in community life because of the religious significance of the festival. The specific functions of the Priests' Courtyard and the Terrace Courtyard are not clearly documented; it is only known that the Priests' Courtyard was a courtyard remnant of the monastery that preceded the block. Due to the limitations of the available materials, the exact time at which these special religious functions disappeared cannot be confirmed. What can be confirmed, however, is that by 2025, these courtyards had largely retained only service functions, such as parking, waste collection, and rear entrances to shops.

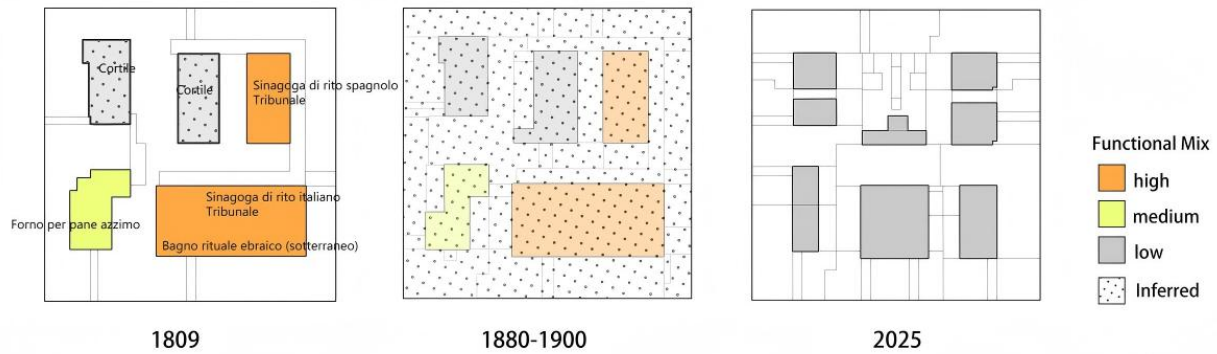


Figure 2-26 Schematic Diagram of the Evolution of Courtyard Functional Mix in the B. Amedeo Block

The evolution of the block's spatial form and governance logic can also be clearly observed through changes in the form of its entrance gates. During the period of the Jewish ghetto, the iron gates functioned like the gates of a micro-city. Their openwork structure ensured visibility from the outside to the inside, while also facilitating spatial control and social supervision, reflecting a mode of spatial organization centered on institutional segregation. Most of these iron gates were retained in later periods, becoming important material remnants of this historical stage. However, inside the passages leading into the courtyards, frosted glass doors or solid wooden doors were gradually added, blocking direct external views into the interior space. This change indicates that the mode of spatial control had shifted from institutional surveillance based on external visibility to residential demands oriented toward internal privacy. Meanwhile, later newly built entrances, such as No. 20 Via Principe Amedeo reconstructed after the Second World War, adopted fully enclosed solid metal doors, further strengthening spatial boundaries and privacy. Whether in the modification of existing entrances or the formal choice of new entrances, these changes reflect a fundamental transformation in the nature of the entrance: its function shifted from a spatial control node serving institutional segregation and collective management to an ordinary block entrance serving daily residence and individual life. This transformation not only reflects changes in the institutional environment, but also reveals the process through which the block shifted from an enclosed unit of governance to an open unit of urban life.

Overall, the evolution of the block's use form shows three characteristics. First, its use form always revolved around residence, but the social roles and meanings of identity it carried changed across different stages. Second, functional mixture was not a planning choice, but a structural result produced by the combined effects of institutional constraints and limited space. Third, a use pattern characterized by external enclosure, high density, and low privacy persisted throughout the

evolution of the block. In the subsequent mechanism analysis, the evolution of use form mainly corresponds to three variables: living needs, functional mixture, and spatial pressure. Early functional mixture was not the result of active planning, but a forced overlap formed under conditions of institutional segregation and spatial limitation. In the middle stage, population growth and wealth differentiation further amplified the contradiction between residential needs and spatial capacity. In the later stage, functions gradually became normalized, but the inertia of high-density use and internal spatial fragmentation remained. Thus, use form not only reflects what activities took place within the block, but also reveals how living needs were continuously transformed into spatial pressure.



External open iron gate at No. 10 bis, Via S. Francesco da Paolo, a remnant of the ghetto period.



Interior frosted glass door at No. 10 bis, Via S. Francesco da Paolo, newly added.



External solid metal door at No. 20, Via Principe Amedeo, newly added.

Figure 2-27 Comparison of Entrance Forms

2.5.3 Evolution of Property Form

Within the period examined in this study, the property form of the B.Amedeo block underwent a profound transformation from single public ownership to a multi-actor private ownership system. This evolutionary process showed clear stages and was closely related to institutional change, market mechanisms, and the transformation of social structure.

1.Evolutionary Path

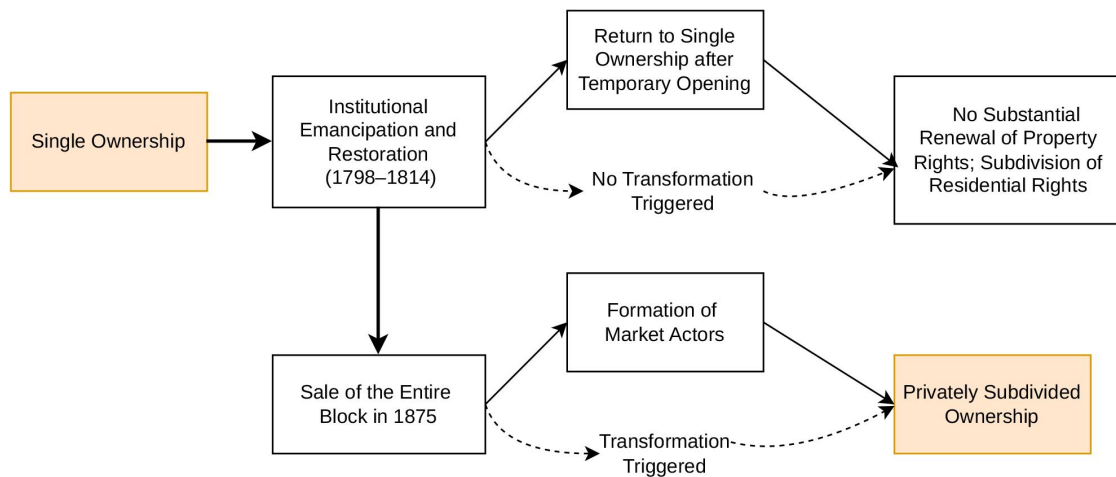


Figure 2-28 Summary Table of the Evolutionary Path of Property Form

At the initial establishment of the ghetto, the overall property ownership of the block was concentrated under the Ospedale di Carità, forming a typical single-ownership structure. This institution not only acted as the landowner, but also obtained stable income through leasing, while the daily management and maintenance of order within the block were undertaken by the autonomous organizations of the Jewish community. The property system at this stage thus presented a three-layered structure of public ownership, community management, and rental use. Its operational logic was centered on institutional constraints, and the allocation of spatial resources relied mainly on internal coordination rather than market mechanisms.

After Napoleon occupied Turin in 1796, the segregation system was abolished, and the Ospedale di Carità, as the property owner, obtained for the first time the right to rent or sell the block's properties to all urban residents. This marked the beginning of a loosening of the property system toward marketization. Against this background, the French authorities once proposed dividing the block into six plots for sale, and the Ospedale di Carità also attempted to advance the disposal of these assets, but these attempts failed repeatedly. After the restoration of the House of Savoy in 1814, although the Jewish community was once again restricted from owning real estate, the previous institutional loosening could no longer be completely reversed. A grey zone began to emerge at the level of implementation, and the property system entered a transitional state in which legal constraints and market-oriented attempts coexisted.

In the first half of the nineteenth century, although the property structure did not undergo substantive reorganization, its internal logic had already begun to change. In 1845, the Ospedale di Carità once again attempted to sell part of its properties, but again failed, indicating that market

mechanisms were not yet sufficient to leverage the highly concentrated property structure. At the same time, however, a clear separation of ownership and use had already appeared within the block: some better-off Jewish families moved out of the block, while still retaining properties within it and renting them out; poorer Jews and some Christians continued to rent and live there. At this stage, the block gradually evolved into a quasi-public rental district jointly involving public institutions and private individuals.

In 1848, the Statuto Albertino legally abolished the segregation system in full. With the establishment of freedom of residence and property purchase, a large number of Jewish residents moved out of the block, and the former residential structure centered on a specific group was broken. However, in the following two decades, the Ospedale di Carità remained the main property owner and continued to obtain income through leasing. Although the legal conditions for property marketization had been established, in practice, the number of actual transactions remained limited, and institutional change did not immediately translate into an adjustment of the property structure.

The real turning point occurred in the mid-nineteenth century. Under the combined pressure of the market and the needs of urban development, the municipal authorities and property owners began to reconsider how the block should be disposed of. Engineer Panizza's assessment report clearly proposed that large-scale demolition should be avoided and that gradual transformation should be achieved through planning measures. It also planned to divide the block into eleven plots for sale, but these still failed to find buyers. It was not until 1875 that the Ospedale di Carità sold the entire block to a private investment entity [this private investment entity was the property-owning company of the Beato Amedeo block (*società proprietaria dell'isolato Beato Amedeo*)], marking the formal dissolution of the long-standing property system centered on religious and public institutions, and the block's transition into a private property system dominated by market actors. In the same year, the proposed block division and road extension scheme was approved, but it was not implemented due to financial problems, allowing the existing spatial structure to be preserved.

By the late nineteenth century, property restructuring had been fully unfolded at the plot level. According to the materials of the Catasto Gatti, the ground floor of the block had already been divided into 39 independent property units, including 34 building properties and 5 courtyard spaces. Compared with the previous single-ownership model, this stage showed a high degree of subdivision and the coexistence of multiple actors, marking the completion of the block's fundamental transformation from centralized control to dispersed ownership.

Overall, the property evolution of the B.Amedeo block did not proceed in a linear manner, but went through a series of gradual processes: from single public ownership, to tentative marketization under institutional loosening, then to the separation of ownership and use, followed by overall resale and property restructuring, and finally to plot subdivision and the formation of a multi-actor system. These changes not only reflect the alternating roles of institutions and market mechanisms, but also reveal the foundational role of property structure in the evolution of urban form: the formation and restructuring of property actors constituted a key prerequisite for spatial adjustment to take place.

2. Analysis of the Relationship between Property Structure and Morphological Hierarchy

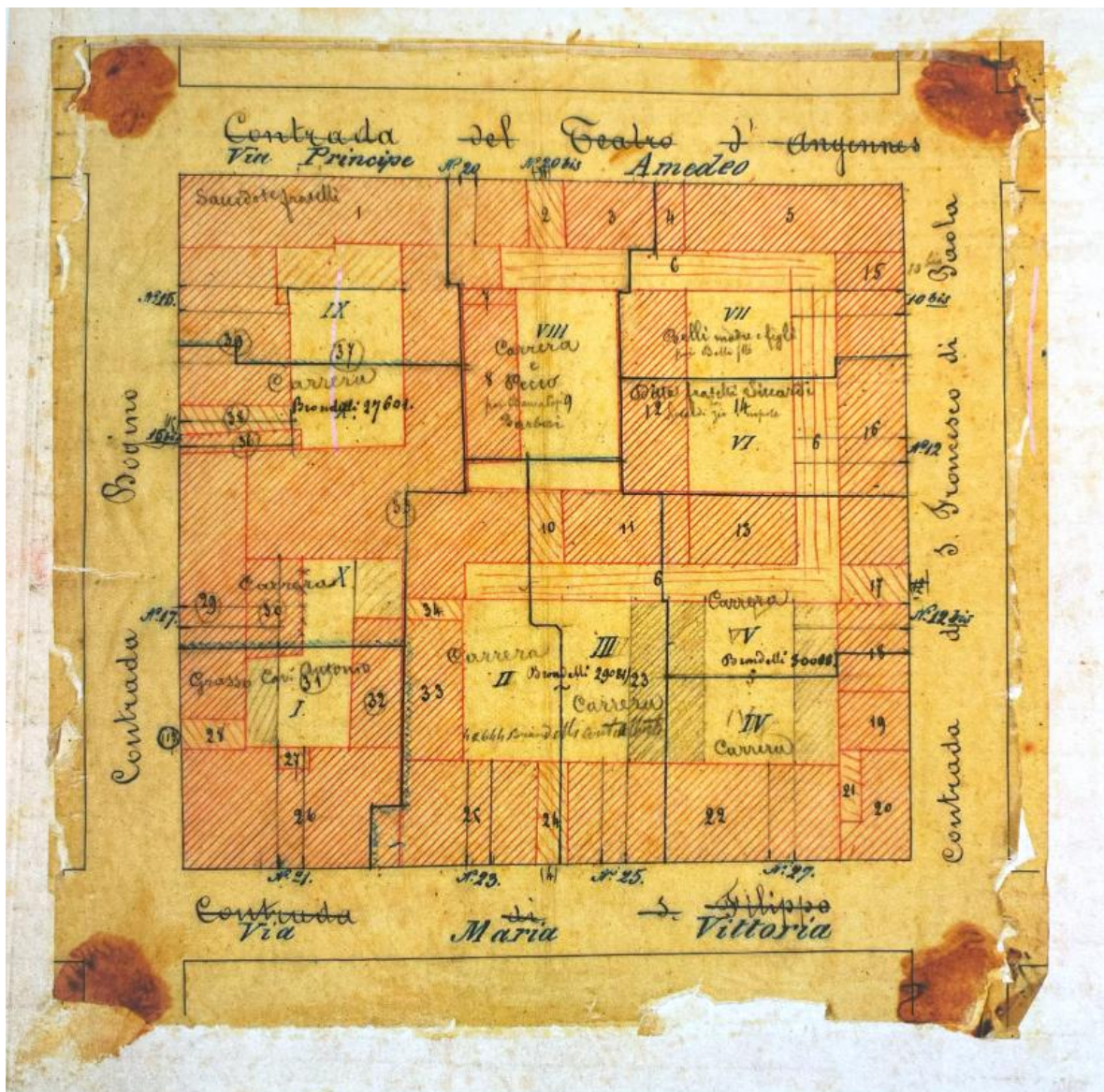


Figure 2-29 Cadastral Map of the Block in the *Catasto Gatti*

Information on the property form of the block is mainly derived from objective textual descriptions, while cartographic materials are relatively limited. The most important source is the nineteenth-century *Catasto Gatti*, which records plot divisions and property ownership information. These records are mainly collected in the *Property Transfer Register*, which identifies new owners, the dates of property transfer, and related changes in numbering. Some supplementary materials are also preserved separately in the *Appendix* to the Property Register. Although these graphic materials are stage-specific in terms of time, the relationships they reveal among property boundaries, plot patterns, and building form can still reflect the structural characteristics between different morphological levels.

In the cadastral map, individual ownership units and common parts, such as staircases and arcaded passages, are marked in red, while the division of the ten plots, numbered from I to X, is marked in blue. The new street numbers and street names are also written in blue. The surnames of certain owners after 1875 are marked in pencil. In the pages following the cadastral map sheet, the corresponding graphic appendix number is recorded after each property transfer. This map therefore provides a relatively clear view of the property subdivision of the block in the nineteenth century. When reviewing the archival materials left from different time points in the evolution of the block, a mismatch between building form and property plots can be observed.

In the *Catasto Gatti*, the division of ten plots can be observed. The original term used is “Lotti,” corresponding to the areas marked by the thick red lines in the figure below. This term can be regarded as equivalent to “plot” in English, referring to a form of subdivision used for land management within the block. This mode of subdivision continued into the modern period. Today, Turin’s urban planning RPG still adopts a highly similar method of plot division, as shown by the thick blue lines in the figure below, although the ten plots have been merged into eight through partial consolidation and minor adjustments. Usually, plot division is related to the construction sequence of buildings within the block and to their physical form, for example through elements such as building volumes of different heights, walls, and courtyards. However, in the *Catasto Gatti*, the logic of plot division is not clear. Some boundaries cut across building volumes and also divide courtyards. In addition, after overlaying the plots with the ownership map, it can be observed that property boundaries and plot boundaries do not fully coincide, and in some places the same property owner spans two plots. For example, Plot 3 includes part of the courtyard with property number 9, namely the Priests’ Courtyard; part of the courtyard with property number 23, namely the Great Courtyard; parts of the building volumes with property numbers 10, 11, and 22; and part of

the portico with property number 6. Generally speaking, plots and property ownership should show a relatively clear nested logic, rather than cutting across each other.

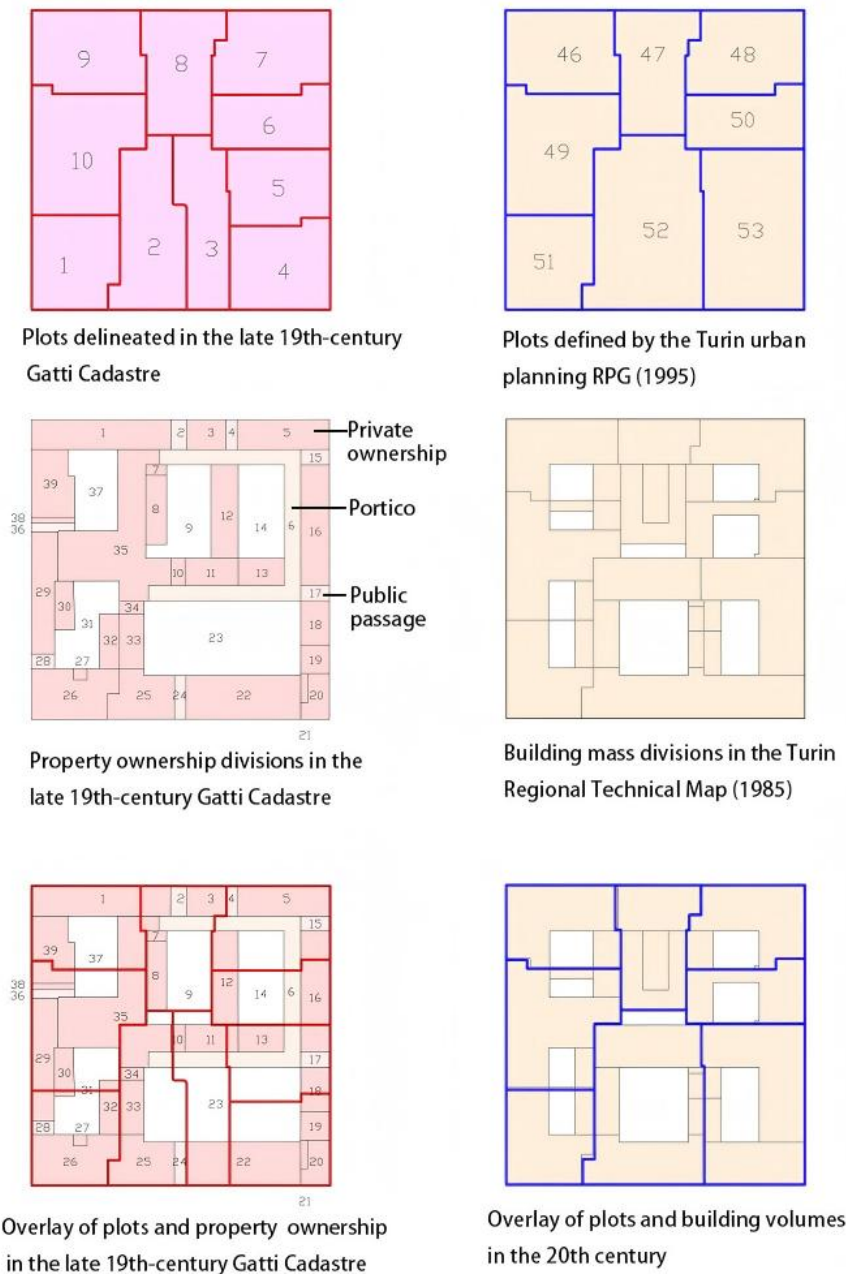


Figure 2-30 Cadastral Division in the 19th Century (Left) and the 20th Century (Right)

In modern planning and design practice, urban form is often implicitly understood as a “synchronous system.” In other words, under ideal conditions, spatial elements at different levels—buildings, plots, property rights, and façades—are assumed to change simultaneously in a coordinated and consistent manner. Under this assumption, adjustments to building form are seen as something that should be accompanied by changes in plot structure; the reorganization of plot

boundaries is considered to necessarily require the synchronous reconstruction of building form; and façade design is also expected to correspond to property boundaries. This linear and synchronous cognitive logic is relatively common in modern planning systems oriented toward regulatory management and technical rationality.

According to the theories of M. R. G. Conzen, Gianfranco Caniggia, and others, towns are usually understood through a hierarchical system based on the “part – whole” relationship, including levels such as materials, construction elements such as walls and roofs, rooms or spaces, buildings, plots, streets and blocks, and urban fabric. However, the constituent elements at different urban levels change at different rates. As a result, “non-synchronous evolution” inevitably occurs between them over time, leading to mismatches between forms. Buildings can be frequently rebuilt, extended, merged, or subdivided, whereas plot structures, which are usually determined by property rights, regulations, and historical boundaries, change much more slowly. Therefore, the two often do not coincide in many historical cross-sections.

Karl Kropf argues that the city is not a synchronous system, but rather “*a structural system composed of different analytical levels, within which perspectives can be shifted back and forth.*” In this view, analytical levels are not simply a sequence, but scales of analysis and levels of observation. The structural system is also not merely a relationship of containment between parts and wholes.^[50] This perspective focuses on describing how the same physical object may be understood as an “object of a different nature” when examined at different levels. On this basis, Kropf explicitly rejects the single nested understanding that buildings belong to plots and plots belong to blocks. At the building level, a building is a complete object with a clear volume, façade, and function. However, when the perspective shifts to the level of plots or property rights, the nature of the same building immediately changes: it is no longer a “complete object,” but something that occupies one or several plots, or possibly only part of a plot. At this level, the truly stable object is the plot, or property unit, while the building is only the physical realization attached to the property form. Kropf consciously chooses the plot as a key level of morphological analysis because plot structure carries and solidifies the material traces of property relations in the long-term process of evolution. The resulting inconsistency between plot patterns and building form is therefore not accidental, but a morphological outcome produced by the non-synchronization between the rhythm of institutional operation and the rhythm of morphological renewal.

This study shows that the phenomena observed in the B.Amedeo block, including buildings spanning multiple plots, a single plot being occupied by several buildings, the inconsistency between façade continuity and property continuity, and the mismatch between building outlines and

cadastral boundaries, are not abnormal or disorderly results of historical development. Rather, they are structural outcomes of urban form evolving according to different renewal cycles at different levels. This phenomenon can be understood as a temporal asymmetry caused by differences in the speed of renewal between morphological levels. Following Conzen's theoretical framework, in which the town plan is composed of the street system, plot pattern, and building form,^[8] 本 The case examined in this study further shows that these elements not only differ hierarchically in spatial scale, but also present significantly different evolutionary rhythms in the temporal dimension. Streets and block structures are usually established at a particular historical moment and remain highly stable over the long term; the plot pattern undergoes subdivision, consolidation, and inheritance within the established street system; while building form, as the lowest-level element, has the highest frequency of renewal and is most responsive to changes in function, economy, and use demands. In the B.Amedeo block, this hierarchical difference in morphological cycles has a clear historical orientation: in the seventeenth century, the street framework and block structure were established as a whole under specific institutional conditions, especially the spatial governance logic related to the establishment of the Jewish ghetto; from the eighteenth to the nineteenth century, plots were continuously reorganized on a small scale within the existing street system; and from the nineteenth to the twentieth century, the building level underwent frequent reconstruction, additions, and functional replacement.

Spatial decisions from different historical periods were not completely replaced by later updates, but were superimposed and coexisted within the same block through mismatches between morphological levels. The morphological inconsistencies observed within the block do not indicate a loss of order. It is precisely this hierarchical temporal mismatch that allows streets, plots, and buildings to coexist within the same space according to different historical rhythms, thereby constituting the historical depth through which the block can be “read.” Precisely because morphological elements are partly retained and partly replaced across different renewal cycles, the city appears as a historical complex formed by the superimposition of multiple temporal layers. This phenomenon suggests the need to further analyze, from the perspectives of institutions, property rights, and use mechanisms, why different morphological levels present differentiated paths of renewal and evolutionary logics.

2.6 Summary of the Chapter

This chapter mainly analyzes the spatial characteristics and historical evolution of the B.Amedeo block in the historic center of Turin, and systematically reviews its development trajectory and morphological foundation. The first section explains the macro-spatial background of

the study block in relation to the overall urban development of Turin, clarifying its position within the urban structure and the origins of its morphology. The second section analyzes the current spatial characteristics of the B.Amedeo block from the perspectives of urban fabric, building type, land use, and property structure. It explains the typical characteristics of a historic central block reflected in its high building coverage, enclosed street-block form, and spatial organization of “street-facing openness and internal enclosure,” and further supplements the analysis of its internal spatial organization and use conditions through field investigation. The third section reviews the historical evolution of the block in chronological order, dividing it into four stages: establishment, maintenance, transition, and renewal. It focuses on the changing characteristics of physical form, use form, and property structure in different stages, revealing how, under the combined influence of institutional constraints, socio-economic structure, and property relations, the block gradually transformed from an enclosed “micro-urban system” into an ordinary block unit integrated into the overall urban structure.

Table 2-5 Correspondence between Evolutionary Characteristics and Mechanism Variables

Dimension	Evolutionary Facts	Morphological Characteristics	Mechanism Variables	Significance
Physical Form	Early controlled entrances and internal passages, later increase of entrances and differentiation of courtyards	Shift from external enclosure and internal connectivity to weakened boundaries and internal dispersion	Spatial boundary, spatial capacity, internal connectivity	Indicates how spatial constraints shaped the block’s embedding into the urban system.
Use Form	Residence, religion, education, commerce, and self-governance were highly superimposed	Shift from forced functional superimposition to conventional mixed use, with publicness gradually weakening	Living needs, functional mix, spatial pressure	Indicates how demand pressure was transformed into spatial reorganization.
Property Form	Concentrated ownership by the Ospedale di Carità, rental use by Jewish residents, followed by later sale, subdivision, and multi-ownership	Shift from centralized control to marketization and fragmentation	Property constraints, renewal capacity, spatial redistribution capacity, market mechanism	Indicates how property structure constrained renewal capacity and evolutionary paths.

In summary, the morphological evolution of the B.Amedeo block did not take the form of a complete spatial reconstruction, but unfolded gradually within the existing structural framework through continuous internal adjustment and functional reorganization. Its evolutionary process reflects the interaction of multiple driving factors, including institutions, socio-economic conditions, and property structure, thereby providing a foundation for the analysis of the mechanisms of morphological evolution in the following chapters.

Chapter 3 Conceptual Foundations for the Analysis of the Driving Mechanisms

3.1 From Morphological Evolution to Driving Mechanisms

Chapter 2 has reviewed the long-term evolution of the B.Amedeo block from three dimensions: physical form, use form, and property form. This process shows that the block's morphology did not take the form of a single, comprehensive spatial reconstruction, but unfolded gradually within the existing structural framework through continuous internal adjustment, functional reorganization, and changes in property relations. It can therefore be seen that the morphological evolution of historic districts is not the direct result of any single factor, but rather a process in which multiple driving forces are continuously transmitted and mutually constrained across different temporal scales and morphological levels. On the basis of the analysis of the evolutionary process, this study further introduces an analysis of driving mechanisms, seeking to explain how factors such as the institutional environment, social structure, economic conditions, and property relations are transformed into specific morphological outcomes through processes such as population movement, spatial pressure, spatial redistribution, and functional adjustment. Chapter 3 therefore establishes a conceptual and methodological framework on this basis, providing support for the stage-based mechanism analysis in Chapter 4.

3.2 Hierarchical Relationship among Driving Factors, Mechanisms, and Morphological Outcomes

In this study, driving factors, mechanisms, and morphological outcomes do not belong to the same analytical level. Driving factors mainly refer to the external conditions or structural forces that promote changes in the block, such as the institutional environment, social structure, economic conditions, and property relations. Morphological outcomes refer to identifiable states of change in the block's space, such as building additions, spatial subdivision, functional mixture, property fragmentation, and boundary opening. Mechanisms are located between the two, serving to explain how driving factors are transformed into morphological outcomes through continuous processes and feedback relationships.

Driving mechanisms are not a simple list of influencing factors, but a structured expression of action pathways. For example, institutional constraints do not directly equate to spatial morphological change. They first affect population movement and spatial-use conditions, then alter spatial pressure, and subsequently act upon the morphology of the block through processes such as spatial subdivision, functional superimposition, or delayed renewal. Therefore, the focus of

mechanism analysis lies in revealing the transmission relationships, intermediary processes, and feedback structures among different driving factors.

3.3 Introduction and Scope of Application of the System Dynamics Method

The morphological evolution of the block is the result of the continuous interaction of multiple forces across different temporal scales and morphological levels, and often displays characteristics such as delayed effects, path dependence, and feedback loops. To systematically express this complex process, this study introduces System Dynamics, abbreviated as SD, as a tool for mechanism analysis.^[51] This study adopts System Dynamics not to construct a precise numerical simulation model, but to use it as a language for mechanism expression, in order to clarify the structural relationships among morphological states, processes of change, external driving factors, and feedback relations. In this way, different mechanisms can be integrated and compared within the same analytical framework. To systematically express the continuous evolution of block morphology across different levels and temporal scales, this study introduces several basic concepts from System Dynamics as tools for analysis and representation.

The morphological evolution of the B.Amedeo block shows clear systemic characteristics. First, changes in the block were not single events, but accumulated continuously over a long historical period. Second, the rates of change at different morphological levels were not consistent: population and patterns of use could change relatively quickly, whereas plots, buildings, and property structures showed stronger stability. Third, institutional change did not immediately translate into spatial reconstruction, but often operated gradually through intermediary processes such as social differentiation, population movement, spatial pressure, and property adjustment. Fourth, certain spatial adjustments in turn altered the carrying capacity of the block and its subsequent path of change. These characteristics correspond closely to the concepts of stocks, flows, delayed effects, and feedback relationships emphasized in System Dynamics.

This study introduces System Dynamics neither to establish a precise mathematical simulation model, nor to quantitatively predict population size, spatial capacity, or the speed of renewal. Due to the limitations in the completeness and comparability of historical materials, this study places greater emphasis on the value of System Dynamics as a tool for expressing mechanism relationships. Through the definition of variables and the construction of causal chains, the complex process of historical evolution is transformed into a relatively clear relational model. In other words, the focus of using System Dynamics in this study lies not in calculation, but in explanation; not in predicting the future, but in revealing the generative logic of existing spatial conditions.

The meanings of stocks, flows, and loops in this study are briefly explained below.

1.Stock: morphological states retained over the long term

In System Dynamics, “stock” usually refers to a state that can accumulate and persist over time. In this study, stock does not correspond to a single physical object, but refers to a

morphological state or structural outcome that gradually forms through historical processes and is retained over a relatively long period. For example, in the B.Amedeo block, the mismatch between building volumes, plots, and property boundaries is not an accidental result of a single moment, but the accumulated outcome of repeated building adjustments, institutional changes, and plot inheritance. Once such relationships are formed, they usually do not disappear completely through a single renewal, but are retained, reproduced, and further accumulated. Therefore, this study understands them as a form of morphological stock, used to describe this long-lasting spatial state. From a morphological perspective, stock emphasizes continuity rather than change itself.

2.Flow: processes that cause morphological states to change

In contrast to stock, “flow” refers to the specific processes that cause morphological states to change within a certain period of time. In this study, flow refers to types of events or actions that can drive adjustments in morphological states, such as adding floors, reconstruction, functional replacement, and the movement of residents into or out of the block. Unlike stocks, these processes do not themselves constitute long-term stable states, but through repeated occurrence, they can gradually alter the morphological structures represented by stocks. In this study, flow is mainly used to distinguish the mode and frequency of change, rather than to describe the scale or precise speed of change.

3.Feedback Loop: a closed causal chain between stocks and flows

“Feedback loop” is used to describe the interactive relationships formed among different factors, that is, how a certain change, through a series of processes, in turn affects itself or other morphological states. In the study of urban morphological evolution, feedback loops are used to describe the following situation: a spatial structure at one level remains stable due to institutional, technical, or cost-related reasons, so that pressure for change cannot be released at that level and is instead transferred to other levels; the results of these lower-level adjustments then reduce the necessity of adjusting higher-level structures, allowing the original structure to continue to be maintained. Through the concept of feedback loops, this study seeks to explain not simply “what changes occurred,” but why change continued to occur, or was suppressed, in a particular way. In the study of the B.Amedeo block, certain morphological adjustments did not trigger changes at higher structural levels, but instead allowed the existing structure to persist by altering modes of renewal or strategies of spatial use. Such processes are not linear causal relations, but reflect a cyclical logic of action: change was not eliminated, but was absorbed, transferred, or stabilized in specific ways.

3.4 Core Variables of Mechanism Analysis

In the process of mechanism analysis, the core variables include the following categories.

1.Population Stock

Population stock refers to the population size and group structure that continuously reside or gather within the block during a specific historical stage. This study is not concerned with precise population numbers, but with the trend of population concentration within the block and its spatial effects. In the B.Amedeo block, population stock is jointly influenced by institutional restrictions, community relations, economic capacity, and residential choices. An increase in population stock directly changes the intensity of spatial use and further promotes the formation of spatial pressure.

2.Spatial Capacity

Spatial capacity refers to the carrying capacity of the study block for residence, production, commerce, and public activities under its existing street-and-lane pattern, plot structure, and building conditions. It is not fixed, but is continuously adjusted through additions, subdivision, functional mixture, and the reorganization of internal space. For historic districts, spatial capacity is often jointly constrained by plot boundaries, building structures, property relations, and institutional regulations. Therefore, its changes usually take the form of gradual internal adjustment rather than overall expansion.

3.Spatial Pressure

Spatial pressure refers to the imbalance among population stock, activity demands, and spatial capacity. When population continues to concentrate while external expansion of the block is restricted, spatial pressure increases. When space increases its carrying capacity through additions, subdivision, or functional mixture, spatial pressure is temporarily absorbed or transferred. This study regards spatial pressure as a key intermediary variable connecting social change and morphological adjustment. It explains how population and institutional factors are further transformed into specific spatial changes.

4.Institutional Constraints

Institutional constraints refer to the external conditions constituted by residential restrictions, migration regulations, property rules, planning control, and modes of urban governance. They do not always directly change spatial form, but indirectly shape the evolutionary path of the block by restricting or releasing population movement, regulating spatial use, influencing property allocation, and affecting renewal rights. Institutional constraints are fundamental variables affecting the driving mechanisms, determining the basic boundaries and possible directions of block evolution.

5.Property Structure

Property structure refers to the relationships of ownership, use, leasing, and management of spatial resources. It is both the result of institutional arrangements and an important condition affecting the mode of spatial transformation. Concentrated ownership is conducive to unified management and internal allocation, but may also strengthen spatial control; fragmented ownership creates possibilities for market-oriented renewal, while also potentially leading to fragmented renewal actions. In the B.Amedeo block, changes in property structure profoundly influenced the

specific ways in which building transformation, spatial subdivision, and functional reorganization took place. It is therefore an important variable for explaining the delayed renewal and local adjustments in the modern and contemporary stages.

6.Social Actors

Social actors refer to the different groups participating in spatial use, migration choices, and renewal actions during the evolution of the block, including residents, owners, tenants, public institutions, and market actors. Social actors are not abstract population numbers, but groups with different identities, economic capacities, and conditions for action. Institutional change does not affect different actors in the same way. Differences in social stratification and migration capacity may lead to the coexistence of population outflow and re-concentration, thereby influencing spatial pressure and modes of spatial redistribution. Therefore, incorporating social actors into mechanism analysis helps explain why the same institutional change can produce differentiated spatial outcomes.

3.5 Summary of the Chapter

This chapter further clarifies the conceptual framework for the analysis of driving mechanisms on the basis of the analysis of the evolutionary process. Morphological evolution, driving-factor structure, and mechanism expression are not parallel relationships, but a progressive relationship moving from the identification of outcomes, to the analysis of causes, and then to the explanation of action pathways. In this study, System Dynamics is mainly used as a tool for expressing mechanism relationships, in order to explain the causal transmission and feedback relations among population stock, spatial capacity, spatial pressure, institutional constraints, property structure, and social actors. Based on this framework, Chapter 4 will discuss the specific manifestations of the driving mechanisms of the B.Amedeo block in different historical stages, revealing its gradual shift from a reinforcement mechanism under enclosed conditions, to a re-agglomeration mechanism under open conditions, and finally to a non-synchronous adjustment mechanism in the modern and contemporary stage.

Chapter 4 Driving Mechanisms of the Evolution

This chapter aims to identify the key driving factors that promoted or constrained the morphological changes of the B.Amedeo block in different historical stages. Driving factors refer to the various factors that influence changes in the research object under specific conditions. These factors act upon the system through certain pathways, thereby leading to morphological evolution or stability. Based on the previous analysis of the block's evolutionary process, it can be preliminarily observed that the driving factors related to the block's evolution are diverse and intertwined. Therefore, merely identifying and classifying these factors statically is insufficient to reveal the internal logic through which they are transformed into morphological changes in specific contexts. It is necessary to further introduce a mechanism perspective on this basis, in order to systematically clarify and structurally analyze their action pathways. Methodologically, this study introduces the analytical approach of System Dynamics, treating the block as a dynamic system composed of multiple state variables. Elements such as population size, spatial capacity, property structure, and functional composition are regarded as core variables within the system. By identifying the causal relationships and feedback loops among them, this chapter reveals the internal dynamic structure of the block's morphological evolution. Through this method, driving factors are no longer regarded as isolated elements, but are incorporated into a unified analytical framework as interacting components within the system.

4.1 Analytical Framework for Driving Mechanisms

This study classifies the driving factors of block evolution from two dimensions: source of influence and level of influence. On the one hand, according to their sources, driving factors are divided into external and internal factors. External driving factors refer to influences originating from outside the block and imposed by macro-level institutions, social structures, and economic systems, mainly manifested as constraints, guidance, or restructuring of space. Internal driving factors refer to the structural characteristics and self-organizing mechanisms formed within the block under given conditions, including community relations, property structure, and patterns of spatial use. These factors are more often manifested as responses and adaptations to external conditions. On the other hand, according to their action pathways and depth of influence in the evolutionary process, driving factors are divided into fundamental, intermediary, and direct factors. Fundamental driving factors refer to deep-seated factors that determine the basic direction and boundary conditions of block evolution. They are usually long-term and stable, such as institutional arrangements and ideology. Intermediary driving factors are located between fundamental driving factors and spatial outcomes, performing the role of transmission and transformation by converting macro-level constraints into mechanisms that can act upon spatial structure, such as economic

structure and property relations. Direct driving factors refer to factors that act directly on changes in spatial form, usually manifested as population change, spatial pressure, or specific use behaviors, whose effects can be directly reflected in physical form.

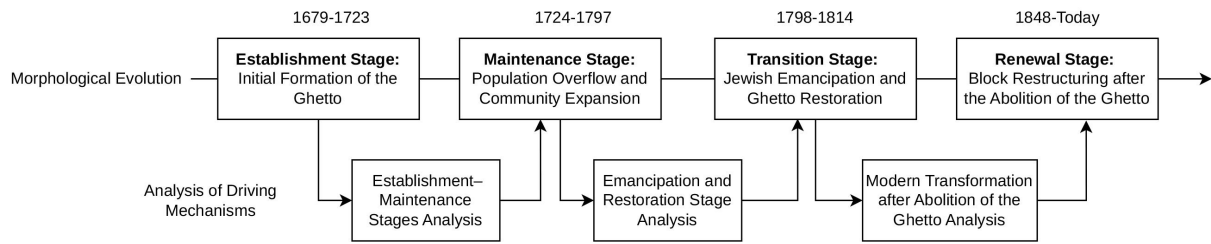


Figure 4-1 Stage Division for Driving Mechanism Analysis Based on the Stages of Morphological Evolution

The driving mechanism analysis is divided into three stages, corresponding to the four evolutionary stages identified above. By distinguishing the sources and levels of driving factors, and by combining them through cross-analysis, it is possible to identify the key nodes and action relationships in the evolution of the block at different stages, thereby shifting the analysis of driving factors from the identification of single factors to the construction of action pathways. On this basis, driving factors of different types and levels are integrated into continuous action pathways: starting from fundamental driving factors, transmitted through intermediary driving factors, forming concrete effects at the level of direct driving factors, and being continuously reinforced or regulated through feedback mechanisms, thereby forming the driving mechanisms of the block's morphological evolution. Based on this analytical framework, this study will analyze the different historical stages respectively, identifying the dominant action pathways and feedback structures in each stage, so as to reveal the core types of driving mechanisms underlying the block's evolution.

4.2 Analysis of the Driving Mechanisms in the “Establishment–Maintenance” Stage

During the establishment and maintenance of the ghetto, a space originally used for charitable relief was transformed into a residential space under institutional control. Under strict external institutional regulation, the pressure brought about by continuous population growth could not be released outward, and could only be absorbed through continuous internal compression and adjustment, thereby driving the morphology toward high density and functional complexity.

The emergence of the Jewish ghetto was essentially a process in which the state, through institutionalized means, transformed existing social differences and hierarchical relations into spatial segregation in order to achieve centralized control over a minority group. Political power used legal means to force Jews to live in a specific area, turning social difference into a clear spatial boundary, thereby enabling group identification and control, reducing management costs, and

improving the efficiency of governance. At the same time, religious and social ideas provided a basis of legitimacy for this institution, making segregation not only appear as a necessary measure, but also be interpreted as an arrangement beneficial to the overall social order. By restricting residence, migration, and economic activities, the institution kept the minority group in a specific social position over the long term and solidified this position through spatial form. This mechanism made the ghetto not only a physical spatial division, but also a concrete embodiment of social hierarchy and power relations.

The core contradiction of this stage lay in the fact that institutional enclosure restricted population outflow and spatial expansion, while the residential, religious, educational, commercial, and self-governing needs of the Jewish community continued to be concentrated within the block, creating structural tension between limited spatial capacity and growing living demands. Externally, the block boundary was not an ordinary urban block boundary, but a governance boundary jointly reinforced by law, administrative management, and religious ideas. Internally, the block had to accommodate the multiple functions required for the complete life of the community, including residence, worship, education, commerce, charity, and self-governance. Under these conditions, population growth could not be relieved through free migration, nor could spatial capacity be fundamentally increased through external expansion.

4.2.1 Driving Factor Analysis

1. Institutional Enclosure and the Solidification of Spatial Boundaries

Institutional constraints were the most fundamental external driving factor in this stage. Jewish residents were forcibly concentrated in a specific area, and their residence and migration were strictly controlled. The block boundary was transformed from an ordinary urban block boundary into a social boundary with governance functions. Entrance control, curfews, and daily management measures meant that the block was not only a spatial unit enclosed by buildings, but also a spatial apparatus through which state power identified, managed, and controlled a minority group.

This institutional enclosure affected not only the movement of people, but also property possession and spatial transformation. Since Jewish residents could not freely own real estate, the land and buildings of the block were long held by external institutions such as the Ospedale di Carità, while residents could only use the space as tenants. As a result, they lacked the ability to improve their living conditions through purchasing, expanding, or independently modifying property. At the same time, the ghetto system restricted the outward expansion of the block, making it impossible to release population growth and living demands by adding external space. Institutional factors therefore not only defined the boundary of spatial enclosure, but also determined the basic direction in which spatial pressure could only be transformed inward.

2. Internal Concentration of Community Life Functions

Corresponding to institutional enclosure, the religious, educational, commercial, self-governing, and mutual-aid functions of the Jewish community were compressed into the interior of the block. In an ordinary residential block, religious facilities, schools, commercial spaces, and community management functions could have been distributed across different locations in the city. Under the ghetto system, however, these functions had to be organized within the block. As a result, the block was not merely a residential container, but gradually formed an internal living system with a certain capacity for self-organization.

The *synagogue* not only served worship, but was also connected with education, charity, and the maintenance of community order; schools, management spaces, and community organizations formed institutional nodes of internal public life; and ground-floor commercial and craft activities supported the community economy and daily supply. Courtyards, passages, balconies, and ground-floor rooms were therefore no longer single-function spaces, but were endowed with multiple meanings in daily life: courtyards served lighting, circulation, and service functions, while also supporting religious, educational, and community interactions; balconies were both circulation elements and spaces for the overflow of daily life and neighborhood interaction; and ground-floor spaces constantly overlapped among commerce, production, and residence. In this sense, cultural factors were not an abstract identity background, but participated in spatial organization through concrete community life needs, driving the use form of the block toward a high degree of functional complexity.

3. Economic Exclusion and Differences in Actors' Capacities

Economic restrictions and social exclusion further transformed institutional segregation into real spatial constraints. The range of occupations available to Jewish residents was limited, and their economic activities were mostly concentrated in a few fields, such as small-scale commerce, second-hand trade, clothing repair, and small loans. This restricted occupational structure weakened residents' ability to improve their living conditions through economic accumulation, and also made production, trade, and residence more likely to overlap within the block. Social exclusion further intensified this process: the block was regarded as a special and inferior residential space, and group differences were continuously identified and solidified through spatial segregation.

The inequality of actors' capacities was also an important condition for the formation of the mechanism in this stage. Ordinary Jewish residents lacked both the ability to migrate freely and the ability to adjust property relations, and were the main bearers of spatial pressure. They could only adapt to population growth through co-residence, spatial subdivision, mezzanine use, and functional superimposition. Jewish community organizations maintained internal order through religious, educational, self-governing, and charitable functions, giving the block a certain capacity for self-organization. The *Ospedale di Carità*, as the property owner, controlled the rights of leasing, maintenance, and spatial adjustment, determining the allocation of spatial resources within the block. This produced a special structure of actors: residents bore the pressure, community

organizations maintained order, and the property owner controlled adjustment rights. This unequal relationship made it difficult for spatial pressure to be released through property change, residents' autonomous renewal, or external migration. Instead, it could only continue to be absorbed within the existing block.

4. Summary of Driving Factors

Table 4-1 Classification of Driving Factors in the “Establishment–Maintenance” Stage of Block Evolution

Level \ Type	External Driving Factors	Internal Driving Factors
Fundamental Driving Factors	Institutional Constraints	Internal Community Structure
Intermediary Driving Factors	Economic Restrictions and Social Exclusion	Single Property Structure
Direct Driving Factors	Population Concentration and Migration	Spatial Use Pressure

At the fundamental level, institutional constraints constituted the most central external driving factor, while internally this was manifested in a community structure centered on religion, education, and charity. Through legal and administrative means, Jews were forcibly concentrated in a specific area, their residence and migration were strictly controlled, and the spatial boundary was maintained over a long period. At the same time, daily life was continuously managed through measures such as curfews and entrance restrictions. This institution also restricted construction activities and spatial expansion, turning the block into a closed system in which space could not grow outward. Internally, an organizational structure gradually formed on the basis of residential function, integrating religious, educational, and commercial functions. Community relations were close, with a clear sense of ethnic cohesion and a high degree of internal coordination. Existing studies have shown that the community is an important spatial unit connecting macro-level institutions and micro-level behavior, and that its internal community structure further acts upon the evolution of spatial form by influencing residents' behavior and patterns of spatial use.^[52] During this period, the block displayed the characteristics of a micro-city. While this internal structure strengthened group stability, it also made spatial use more mixed and intensive, providing an organizational basis for the continuous adjustment of space.

At the intermediary level, restrictions on economic activities and social exclusion jointly constituted the key external driving factors, while internally this was reflected in the singularity of the property structure. This level played a crucial mediating role between institutional constraints and spatial form, transforming macro-level segregation policies into concrete mechanisms capable of acting upon space. The occupations available to Jews were highly restricted, and their commercial activities were mainly concentrated in a few fields, such as textile dyeing, clothing production and repair, second-hand trade, and permitted small loans, with only very limited exceptions in liberal professions, such as physicians.^[38] Under the dual constraints of the guild system and religious norms, they found it difficult to enter the mainstream systems of production and trade, and were also unable to participate in more profitable or stable economic activities. The

limited and low-level nature of this occupational structure kept their economic foundation in a fragile state over the long term. On this basis, economic activities gradually became spatially concentrated. On the one hand, restricted occupations often relied on small-scale workshops, household production, and market transactions, encouraging commercial and productive activities to cluster intensively within the block. On the other hand, certain permitted industries, such as textile and second-hand goods trade, formed relatively concentrated business networks and even controlled the circulation of specific goods in certain periods.^[40] This concentration did not result from free market choice, but was instead a spatial adaptation forced by institutional constraints. The continuous intervention of institutions in business activities further intensified this spatial compression. The instability of business permits, restrictions on shop locations, and religious temporal regulations, such as Sabbath closures and openings on specific festivals, strictly constrained commercial activities in both time and space. This uncertainty weakened the possibility of long-term investment and spatial expansion, making business activities rely more on short-term, flexible, and highly intensive forms of spatial organization. Meanwhile, social exclusion further reinforced this process through negative evaluations of both the space and the group. As segregation continued, the internal environment of the block gradually deteriorated, and public spaces and living conditions became increasingly crowded, damp, and poorly ventilated. This change was continuously amplified in social perception, causing the area to be regarded as an inferior and undesirable residential space. On this basis, the social atmosphere formed by segregation and discrimination meant that residents continued to be identified and distinguished spatially, further solidifying their difference. Among these factors, property structure played a decisive role as an internal intermediary driving factor. Internally, because the land of the block belonged to the *Ospedale di Carità*, residents could not acquire ownership of land or housing, and could only live there long-term as tenants. This single property system limited the diversification of property actors and weakened individual capacity for autonomous renovation, making large-scale and systematic spatial reconstruction difficult. As a result, changes were largely confined to superficial additions. On the other hand, this stable and concentrated property structure also provided the basis for continuous rental use and high-density residence. Related studies have also shown that, in the evolution of historic districts, changes in property relations—especially property subdivision and the coexistence of multiple actors—constitute an important mechanism driving the adjustment of spatial form and residential behavior, and can to some extent serve as a foundational driving factor for other spatial changes.^[53] At the spatial level, this series of constraints was ultimately transformed into the intensive use of existing buildings and plots. Limited courtyards, corridors, and public spaces were continuously converted into places for production and trade, while residential, commercial, and craft functions were superimposed within the same spaces. Functions that would normally have been accommodated by independent public buildings, such as religion, education, and judicial affairs, were also compressed and embedded within the block, making the spatial

structure increasingly complex and inward-oriented. In this process, space was no longer organized according to functional zoning, but adapted through continuous superimposition under restrictive conditions.

At the direct level, external population concentration and migration control interacted with internal spatial use pressure, directly driving changes in spatial form. The population was continuously concentrated within a limited space and lacked the possibility of outward movement. As the population grew, residential density continued to increase, and the contradiction between spatial supply and demand gradually intensified. Public spaces such as courtyards and corridors were occupied, while buildings were adjusted through additions, vertical stacking, and subdivision. The block thus gradually shifted from its original structure toward a high-density and functionally mixed form.

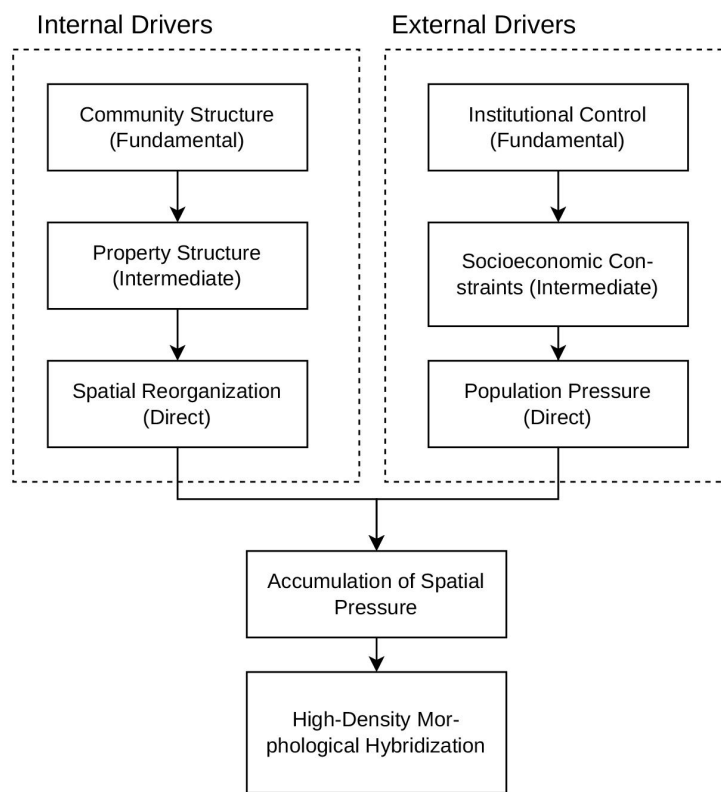


Figure 4-2 Interrelationships among the Driving Factors of Block Evolution in the “Establishment–Maintenance” Stage

Overall, institutional factors, as fundamental driving factors, established the basic framework of spatial enclosure. Social and economic restrictions reinforced and transmitted this constraint at the intermediary level, and acted upon space through the property structure. On this basis, population concentration continuously amplified spatial pressure, ultimately driving internal adjustments at the building level. The driving-factor system of this stage therefore showed a pattern dominated by external control and internal structural response, with different types of driving

factors jointly promoting the block's evolution toward high density and functional complexity through their interaction.

4.2.2 Mechanism Analysis

At this stage, forced segregation defined the residential range of Jewish residents, restricting the population within a specific block. Entrance control managed the connection between the block and the external city, further reinforcing the enclosure of the spatial boundary. Restrictions on real estate ownership weakened residents' capacity for spatial adjustment at the level of property rights, making it impossible for them to respond to residential needs through purchasing, expanding, or autonomously renovating property.

1. Transmission Process

Under the effect of institutional enclosure, population growth first manifested as the continuous accumulation of population stock within the block. Since population outflow was restricted, the block lacked the conditions to release residential pressure through migration. Meanwhile, the block did not accommodate a single residential function, but a complete community life system including religion, education, commerce, production, self-governance, and mutual-aid charity. The internal concentration of these functions meant that spatial pressure was caused not only by population growth, but also by the increased intensity of use resulting from the superimposition of life functions. In this process, culture and community life became important intermediaries connecting population and spatial pressure. Religious rituals, community education, and self-governance fixed specific functions within the block, while ground-floor commerce and craft activities further reinforced the spatial overlap between residence, production, and trade. As a result, strong cohesion of daily life formed within the block: residents not only lived there, but also carried out worship, education, commerce, social interaction, and community management. This cohesion improved the efficiency of spatial use, but also continuously intensified spatial pressure.

2. Spatial Adjustment

In response to rising spatial pressure, the block mainly relied on the reorganization of internal space to increase its carrying capacity. Specific methods included the addition of mezzanines, room subdivision, the overlap of ground-floor commercial and residential functions, and the mixed use of courtyards and passage spaces. In essence, this was a form of capacity growth achieved within the existing boundary by compressing per capita space and increasing the intensity of spatial use, showing a clear inward-oriented character. On the one hand, the basic boundary of the block was not broken through; on the other hand, functional zoning did not become clearer, but instead became further superimposed under high-density conditions. This temporarily eased the pressure placed by population and daily-life needs on spatial capacity, but also further strengthened the block's dependence on a high-density mode of use.

3. Feedback Structure

The above analysis shows that the morphological evolution of the block at this stage mainly took the form of a reinforcing mechanism driven by the interaction between the continuous accumulation of population stock and the process of spatial adaptation. Under the combined influence of institutional control and socio-economic restrictions, population outflow was significantly suppressed, while population inflow and natural growth led to the continuous concentration of population within the block. This drove the continuous increase of population stock and further transformed it into the accumulation of spatial pressure. It should be noted that the population here was not an abstract quantity, but a specific group constrained by religious segregation and occupational restrictions, whose residence, production, and daily activities were all confined within the block, thereby manifesting spatially as high concentration and inward-oriented development. On this basis, the spatial system did not adjust through boundary expansion. Instead, under the constraints of single ownership and restricted expansion, it adjusted internally through mezzanine additions, spatial stacking, and similar means. This process of spatial expansion acted upon spatial capacity, increasing it within a limited range. However, its path of realization was strictly constrained by property structure and spatial organization, and therefore took the form of an inward-stacking growth model. At the same time, religious, productive, and daily-life activities were continuously superimposed within limited space, promoting the formation of functional mixture and spatial complexity, and further enhancing the space's capacity to accommodate population by improving the efficiency of spatial use. Through these action pathways, a stable reinforcing feedback structure gradually formed within the system: the increase in population stock pushed up spatial pressure, while spatial pressure prompted the space to continuously increase its capacity through additions and reorganization, allowing more people to remain and thereby further reinforcing the tendency toward population concentration. Meanwhile, functional mixture and spatial complexity were not only passive responses to spatial pressure, but also played a key role in the feedback process by continuously strengthening the block's capacity to absorb population through improved spatial-use efficiency. In this process, the block gradually formed an internal self-circulating system with residential, productive, and religious functions, reducing its dependence on the external urban system and allowing the population to remain under institutional constraints and limited external choices. At the same time, high density and spatial complexity reduced living costs to a certain extent, structurally locking low-income groups into the area and further weakening population outflow as an adjustment mechanism. In addition, under continuous spatial pressure, the block improved the adaptive capacity of the system by constantly adjusting its spatial structure and functional organization, allowing it to continue operating under high-density conditions and thereby forming a pressure-driven process of adaptive reinforcement.

The morphological outcomes of this stage can be summarized from three dimensions.

First, in terms of physical form, the block formed a spatial structure that was externally enclosed and internally connected. Controlled entrances reinforced the governance function of the

block boundary, while the internal system of courtyards, passages, and balconies supported the circulation, interaction, lighting, and service functions required for community life. As spatial pressure increased, additions, mezzanine use, and spatial subdivision continuously appeared inside the buildings, and the block as a whole developed toward higher density.

Second, in terms of use form, functions became highly superimposed. This was not the result of free planning or market choice, but a forced form of functional mixture formed under conditions of institutional enclosure and spatial limitation. Spaces that originally had auxiliary functions, such as courtyards, ground-floor spaces, and balconies, were continuously incorporated into the daily-life system, giving the block an internally self-organizing character similar to that of a “micro-city.”

Third, in terms of property form, concentrated ownership by the Ospedale di Carità and rental use by Jewish residents jointly constituted a property structure of centralized control. Concentrated ownership provided a basis for unified management of the block, but also limited the possibility of residents’ autonomous renewal and property differentiation. Spatial adjustment therefore depended more on the reorganization of use within existing buildings than on the reconfiguration of the property structure.

Therefore, the driving mechanism of this stage was essentially a reinforcing system formed under conditions of institutional enclosure through the interaction among population stock accumulation, spatial capacity adjustment, and spatial pressure feedback. Spatial pressure was no longer merely a passive result, but was transformed within the feedback mechanism into an internal force driving building additions and functional mixture, ultimately promoting the continuous evolution of the block toward high density and functional complexity.

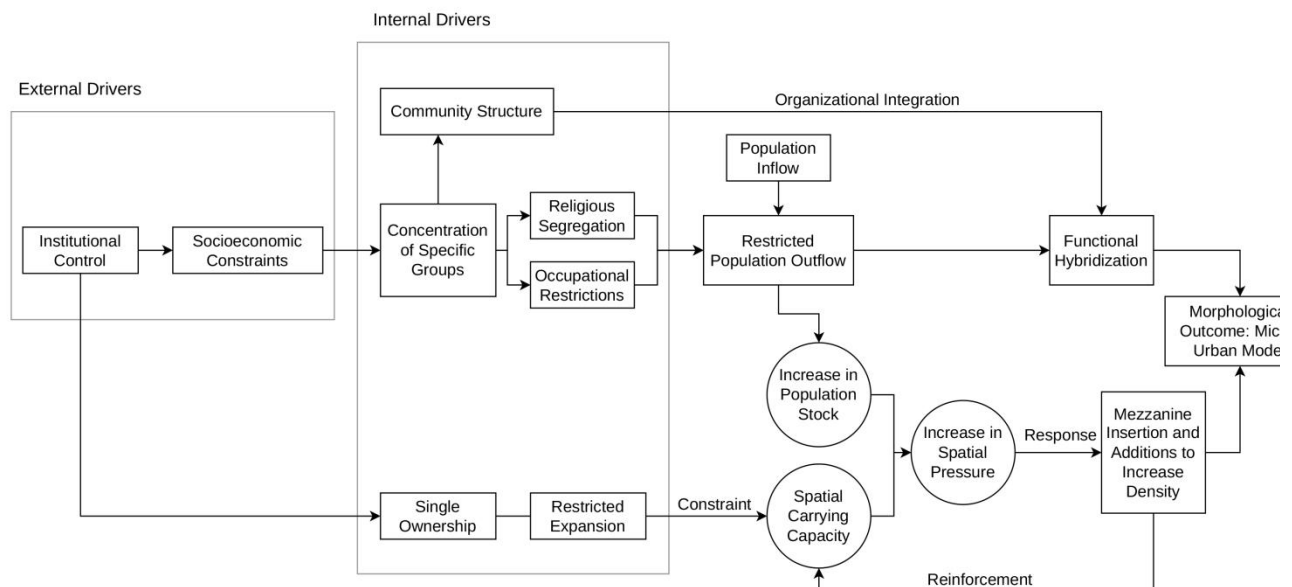


Figure 4-3 Diagram of the Driving Mechanism Relationships of Block Morphological Evolution in the “Establishment–Maintenance” Stage

4.3 Analysis of the Driving Mechanisms in the “Emancipation and Restoration” Stage

In 1798, French troops entered Turin and opened the gates of the ghetto, marking the beginning of the first Jewish emancipation. Residents gained unprecedented freedom in residence, migration, and economic activities. Jews were allowed to leave the ghetto, purchase properties inside and outside the city, open shops, and engage in occupations that had previously been restricted. At the same time, the Ospedale di Carità was permitted to rent its houses to anyone. However, this institutional emancipation did not directly lead to the spatial disintegration of the block or to population outflow. Instead, under specific social and economic conditions, the internal space of the block was further compressed and reorganized, presenting an evolutionary path different from that of the previous stage. With the restoration of the House of Savoy in 1814, restrictive policies were soon reinstated, and the institution was tightened again after a brief period of opening.

The core contradiction of this stage lies in the fact that, at the institutional level, possibilities for population migration, occupational choice, and property ownership had been opened, yet the spatial pressure within the block was not released synchronously. Spatial pressure shifted from the passive accumulation of population under early forced segregation to spatial re-agglomeration under conditions of institutional opening, caused by social stratification and differences in migration capacity. The block boundary began to loosen, but high-density residence, low-cost rental, and spatial subdivision continued to exist; property relations were loosened to some extent, but had not yet undergone complete market-oriented restructuring. This non-synchronization between institutional opening and the continuation of spatial pressure constitutes the central issue of the mechanism analysis in this stage.

4.3.1 Driving Factor Analysis

1. Institutional Loosening

During the French occupation, the block no longer existed as a completely independent unit of control, but began to establish more direct connections with the overall urban space. However, this institutional change was not a stable or continuous process of opening. After the restoration of the House of Savoy in 1814, restrictive policies were reintroduced. Therefore, institutional factors in this stage formed a transitional state in which opening and renewed restriction coexisted. This institutional fluctuation did not immediately change the material structure of the block, but it changed the possible actions available to different actors: those with economic capacity were able to use institutional opening to migrate outward or expand their assets, while those without sufficient economic capacity still found it difficult to truly leave the block, even after obtaining formal

freedom. The mechanism significance of institutional loosening lies in the fact that it changed the conditions of population movement; however, whether movement could actually occur, where it would occur, and what spatial outcomes it would produce still depended on the economic capacity, community relations, and spatial choices of different actors.

2. Spatial Absorptive Effect of Community Resources

As residential restrictions loosened, Jewish community life was no longer completely forced to remain enclosed within the block, but the original block still retained strong spatial absorptive power. For wealthy or middle-class Jewish families, the block and its surrounding area still had commercial locational advantages. It was close to the city center, making it convenient to maintain existing business activities and social relations. At the same time, the religious facilities and community networks retained within or around the block also meant that some families, even after moving out of the original block, still tended to remain in nearby areas rather than fully detach themselves from the original community space. For poor residents, low rents, familiar networks, religious mutual aid, and employment opportunities became important reasons for continuing to remain there.

3. Differentiation of Actors

Institutional opening legally provided all Jewish residents with the possibility of migration and property ownership, but different actors did not possess the same resources in practice. Wealthy residents had stronger economic capacity and social resources, enabling them to transform institutional opening into actual action, such as moving outside the block, purchasing properties inside or outside the city, opening shops, or retaining their original spaces and renting them out. For this group, institutional loosening meant an expansion of spatial choice. By contrast, although poor residents also formally obtained residential freedom, they continued to remain in the original block due to insufficient economic capacity, dependence on low rent, and the need for community support. For them, leaving the ghetto did not necessarily mean obtaining better living conditions; instead, it could mean losing familiar social networks and affordable living space. Therefore, the spatial behavior of poor residents was more often manifested as staying, co-renting, subletting, or accepting higher-density living arrangements. In addition, the entry of external low-income groups further changed the actor structure of the block. The interior of the block shifted from being dominated by a relatively homogeneous Jewish community to a more plural structure in which wealthy Jewish residents moved out, poor Jewish residents remained, and external low-income groups entered.

The capacity for action of property actors was also limited. Although the Ospedale di Carità gained the possibility of renting or selling spaces after institutional loosening, property restructuring was not completed quickly due to market conditions, transaction difficulties, and a shortage of buyers. Although the original property structure began to loosen, it did not immediately translate into complete spatial reconstruction. Institutional opening provided social actors with the possibility

of action, but socio-economic stratification determined whether different actors could actually make use of this possibility; property loosening provided the precondition for marketization, but actual transaction conditions limited the rapid transformation of the spatial structure.

4. Summary of Driving Factors

Table 4-2 Classification of Driving Factors in the “Emancipation and Restoration” Stage of Block Evolution

Level \ Type	External Driving Factors	Internal Driving Factors
Fundamental Driving Factors	Institutional Loosening	Differentiation of Community
Intermediary Driving Factors	Economic Opening and Social Stratification	Loosening of Property Structure
Direct Driving Factors	Population Movement and Re-Agglomeration	Spatial Redistribution

At the fundamental level, institutional emancipation and the re-regulation brought about by the Restoration constituted the main external driving factors. At the intermediary level, economic opening and social stratification constituted the main external driving factors, while internally this was reflected in the loosening of property relations and changes in patterns of spatial use. With the abolition of occupational restrictions, Jews began to participate in a wider range of economic activities and gradually entered the urban real estate market, while the formerly relatively enclosed economic structure of the block began to connect with the city as a whole. With the emancipation of Turin, urban population mobility gradually increased, and laborers from rural areas seeking work opportunities continued to enter the city, generating sustained demand for low-cost housing. This trend promoted changes in the way space was allocated within the block, gradually forming a pattern based mainly on room subletting and bed rental. Dwellings originally occupied by single families were continuously subdivided, and some wealthy families no longer occupied entire residences exclusively, but rented out unused space to obtain income. Migrants and poor groups entered existing building units at higher densities. In this process, property relations also changed accordingly. Space originally controlled by a single actor gradually shifted toward leasing and redistribution, and dwelling units were continuously subdivided, especially as they were opened to Christian groups who had previously not been allowed to rent or live there, making the internal situation of the block more complex. At the same time, residents' choices of residence increasingly showed stronger class differences: most poor groups, limited by their economic capacity, still chose to remain in the block, where rents were low but space was crowded and the environment was poor; while a small number of wealthy families were able to purchase properties inside and outside the city, and even open shops. This differentiation promoted the outward transfer of some functions, causing the formerly internally concentrated residential and commercial activities to begin spilling over, and continuously strengthening the connection between the block and the city.

At the direct level, population movement constituted the main external driving factor, while internally this was reflected in the increase in the intensity of spatial use. The dual-axis comparison chart further shows that, during the institutional transition period from the late eighteenth century to the early nineteenth century, the overall population of Turin experienced a certain degree of fluctuation and temporary decline, but this change did not translate into a corresponding population relief at the block scale. On the contrary, the population within the block continued to rise in the late eighteenth century. These opposite trends indicate that macro-level urban population change was not directly transmitted to the interior of the block. On the one hand, some residents lacked the capacity to migrate outward due to economic constraints; on the other hand, the relatively low cost of living and the existing social networks within the block exerted a continuous absorptive effect on migrants. Under the combined influence of these two factors, the population within the block did not disperse with institutional loosening, but instead further concentrated within the existing space, leading to a continued increase in the carrying pressure per unit of space and a growing intensification of spatial demand. Although residents were legally allowed to migrate freely, the block did not experience large-scale population outflow. During the institutional transition period from the late eighteenth century to the early nineteenth century, the overall population of Turin fluctuated briefly, but due to limited migration capacity and the absorptive effect of low-cost residential space, the block continued to maintain a high level of population concentration, and spatial demand continued to intensify. Against this background, the internal spatial carrying pressure of the block kept rising, residential density continued to increase, and the existing residential space was used with greater intensity.

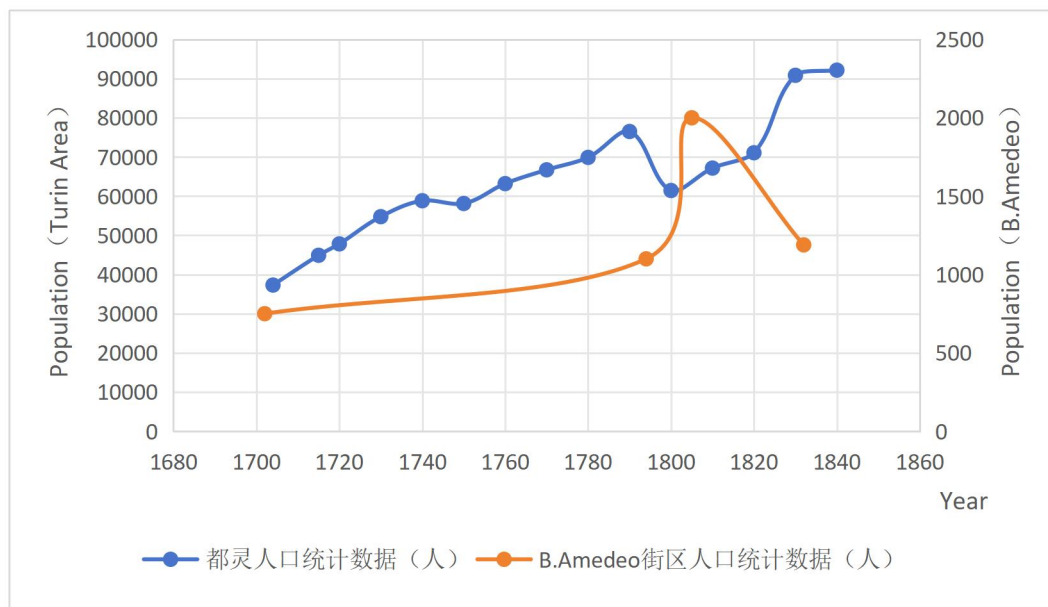


Figure 4-4 Population Growth Trends in Turin and the B.Amedeo Block from 1700 to 1840¹⁹

19. Population data for the Turin area: historical population statistics from MuseoTorino, see Appendix; population data for the B.Amedeo block: compiled from documentary sources.

Unlike the previous stage, in which morphological adjustment mainly took the form of building additions, changes in this stage were primarily reflected in the increased carrying capacity of existing internal spaces. In this process, the overall spatial form of the block also changed accordingly. On the one hand, as some residential and commercial functions expanded outward, the block boundary gradually weakened, and the block began to integrate functionally and structurally into the surrounding urban environment, indicating the loosening of the original “micro-city” model. On the other hand, the block’s locational advantages still remained. Its proximity to the commercial center, together with the retained religious facilities and community networks inside the block, meant that some middle-class and wealthy groups, even after moving out of the block itself, still tended to live nearby rather than move far away. As a result, the block retained strong attractiveness even after institutional loosening.

Overall, the driving-factor structure of this stage was no longer characterized by a single form of institutional enclosure, but by the combined effects of institutional loosening, social stratification, and internal spatial redistribution. Institutional emancipation opened up the possibilities of population migration, occupational choice, and property ownership, shifting the block boundary from forced enclosure toward relative openness. However, re-regulation after the Restoration made this openness unstable. Economic opening and social stratification further differentiated the action capacities of different actors, enabling residents with resources to move out or expand their assets, while resource-constrained groups continued to depend on the low-cost spaces and community networks of the original block. Meanwhile, although property relations loosened, this was mainly reflected in leasing, subletting, and redistribution at the level of spatial use rights, rather than in a complete restructuring of ownership. Population movement did not lead to the relief of density within the block; instead, re-agglomeration formed through the coexistence of outward migration, continued residence, and new entry. Spatial adjustment also no longer relied mainly on building additions, but shifted toward internal redistribution methods such as room subdivision, subletting, and bed-based rental use. Thus, the B.Amedeo block began to shift from an enclosed “micro-city” toward an open unit connected with the city as a whole. However, its interior still retained the characteristics of high density, functional complexity, and low-cost rental housing, presenting a transitional state in which boundary loosening and the continuation of spatial pressure coexisted.

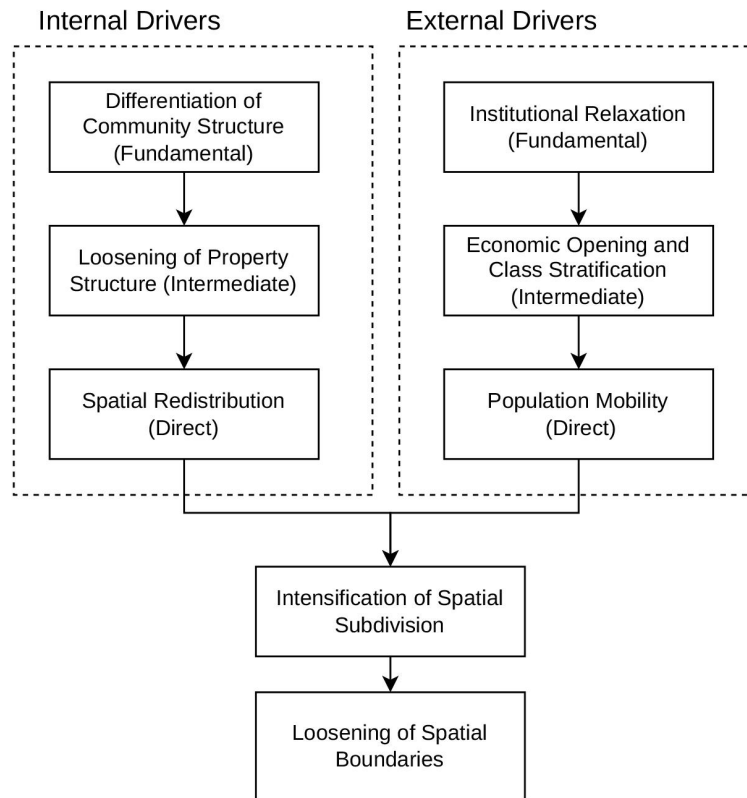


Figure 4-5 Interrelationships among the Driving Factors of Block Evolution in the “Emancipation and Restoration” Stage

4.3.2 Mechanism Analysis

At this stage, the block was no longer entirely an enclosed unit maintained by a compulsory boundary, and the relationship between residents and the overall urban space began to be reopened. However, institutional opening did not produce a stable or complete structural transformation, leaving the block in a repeated state between opening and renewed control. More importantly, the institution only provided the formal conditions for migration; whether residents could actually leave the block, purchase property, or participate in broader economic activities still depended on the economic resources, social relations, and identity positions of individuals or families. On the one hand, institutional loosening opened up the possibility of population outflow and spatial marketization; on the other hand, socio-economic conditions and renewed restrictions after the Restoration weakened the actual effects of institutional opening.

1. Transmission Process

Institutional loosening was first transformed into asymmetrical population movement through the differentiation of actors. For wealthy residents with economic capacity and social resources, institutional opening provided real and operable spatial choices: they could move out of the original block, purchase property inside or outside the city, or rent out their original spaces, thereby releasing residential pressure and expanding asset allocation. For poor residents, however, freedom

of migration remained more formal than practical. Insufficient economic capacity, limited affordable housing, and familiar networks and mutual-aid relations within the original block kept them dependent on the existing space. At the same time, low-income migrants from the wider city continued to enter the block, further strengthening its function as a low-cost rental space. As a result, an asymmetrical mobility structure formed in this stage: high-income groups moved outward, low-income groups continued to remain, and external low-income migrants continued to enter.

This asymmetrical movement indicates that population stock was the result of differentiated spatial choices made by different actors under conditions of social stratification. Although population outflow existed, it mainly occurred among groups with migration capacity; population inflow and continued residence were concentrated among groups lacking spatial choice. Therefore, institutional opening did not lead to overall population relief, but instead made the internal population structure of the block more complex.

2.Spatial Adjustment

In response to the continued spatial pressure brought about by asymmetrical population movement, the block was mainly adjusted through rental subdivision and spatial redistribution. In this stage, the increase in spatial capacity depended more on redistribution at the level of use rights. Dwellings originally occupied by single families were divided into smaller residential units, some underused rooms were rented out, bed rental and co-living arrangements increased, and non-residential spaces may also have been converted into residential use. This process of spatial redistribution formally increased the carrying capacity of the block, but it compressed per capita space, raised residential density, did not truly change the basic spatial boundary of the block, and could not eliminate spatial pressure.

The loosening of the property structure further reinforced this process. As the range of rental users expanded, the former mode of use under centralized control gradually shifted toward more complex relations of leasing, subletting, and subdivision. The relationship between spatial ownership and use rights began to separate. Space was no longer used only according to former family or community units, but was broken down into small units that could be rented, allocated, and circulated. Thus, the loosening of property relations did not immediately bring about comprehensive renewal; instead, it first promoted subdivision and high-intensity use at the level of spatial use rights.

2. Feedback Structure

Through the above analysis, the morphological evolution of the block in this stage can be understood as a complex mechanism triggered by institutional loosening but transformed into re-agglomeration under multiple constraints. During the stage of institutional emancipation, the flow channel of population outflow was formally opened, and some groups with economic capacity began to move out of the block and participate in wider urban spatial and economic activities. However, this outflow process did not reduce the population stock within the block as a whole. On

the one hand, large numbers of poor residents remained in the original space because of limited migration capacity; on the other hand, as population mobility increased across the city, external low-income laborers continued to flow into the block through leasing and subletting. As a result, the inflow of population partly offset, or even exceeded, the outflow, further increasing the population stock within the block. In this process, the increase in population stock was not effectively released through spatial expansion, but was mainly transformed into the continued rise of spatial pressure stock. Unlike the previous stage, in which spatial expansion flows mainly took the form of building additions, spatial adjustment in this stage was more often manifested as internal redistribution, namely by increasing the intensity of use within existing space through room subdivision, bed rental, and the conversion of non-residential spaces into residential use. This flow of spatial redistribution acted upon the stock of spatial capacity, increasing it in formal terms, but its essence was an “inward capacity expansion” achieved by compressing per capita space. Meanwhile, the property structure shifted from centralized control toward leasing and redistribution, gradually separating spatial use rights from ownership and further reinforcing the tendency toward spatial subdivision and high-intensity use.

At this stage, the block was no longer entirely an enclosed unit maintained by a compulsory boundary, and the relationship between residents and the overall urban space began to be reopened. However, institutional opening did not produce a stable or complete structural transformation, leaving the block in a repeated state between opening and renewed control. More importantly, the institution only provided the formal conditions for migration; whether residents could actually leave the block, purchase property, or participate in broader economic activities still depended on the economic resources, social relations, and identity positions of individuals or families. On the one hand, institutional loosening opened up the possibility of population outflow and spatial marketization; on the other hand, socio-economic conditions and renewed restrictions after the Restoration weakened the actual effects of institutional opening.

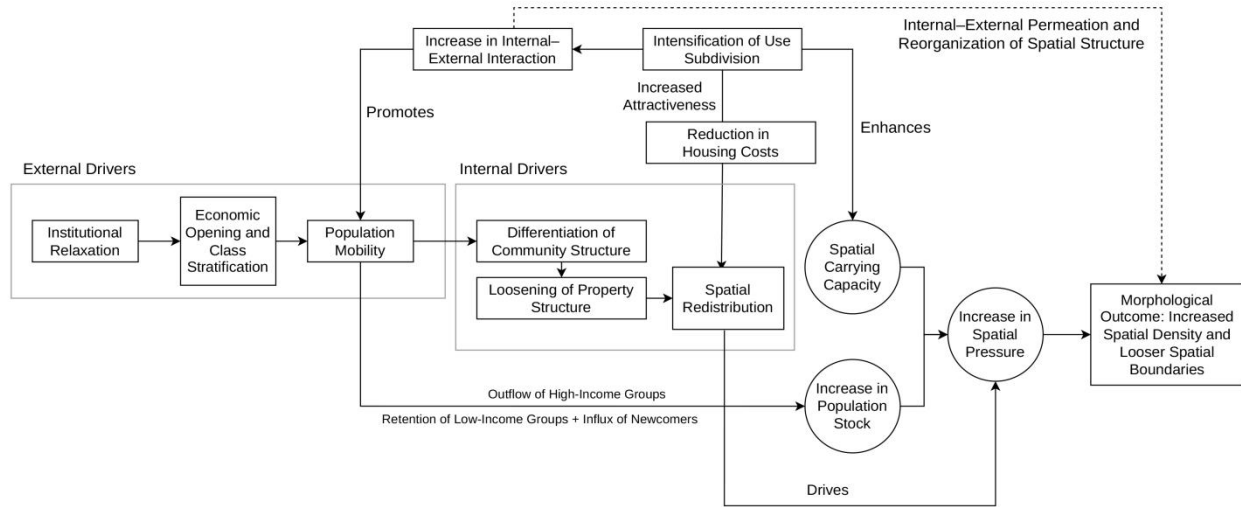


Figure 4-6 Diagram of the Driving Mechanism Relationships of Block Morphological Evolution in the “Emancipation and Restoration” Stage

Under the above action pathways, the following feedback structure formed within the system: due to institutional loosening, migrants were able to enter the block, while the outward migration of original residents was constrained by their economic conditions. The spatial system therefore continuously increased its apparent carrying capacity through internal redistribution, allowing additional population to be absorbed. Due to social stratification and differences in migration capacity, population outflow mainly occurred among high-income groups, while the continued inflow of low-income groups and migrants jointly kept population stock at a relatively high level. Differences in migration capacity and spatial choice among different social groups led to a clear differentiation in patterns of spatial use: the outward migration of wealthy groups pushed some functions to spread into the city, while low-income groups and migrants maintained the intensity of internal use through high-density residence and spatial sharing. At the same time, the outward spillover of commercial activities and the rise of the internal rental economy gradually transformed the block from an enclosed space of a single community into a composite space embedded in the urban system. In summary, institutional opening provided the possibility for population movement, but due to the constraints of socio-economic structure and spatial conditions, this movement did not translate into population relief. Instead, spatial pressure continued to accumulate internally. Meanwhile, the high-density use produced by spatial redistribution further lowered living costs, enabling the block to continue absorbing low-income groups and migrants, thereby reinforcing the positive relationship between population stock and spatial pressure.

The morphological outcomes of this stage are reflected in three dimensions.

First, in terms of physical form, the overall framework of the block remained relatively stable, but the internal space was further subdivided and used with higher intensity. Compared with the

previous stage, the block boundary began to weaken, and some functions and residents expanded into the surrounding urban space, indicating the loosening of the original “micro-city” model. However, the interior of the block did not become less dense as a result, but continued to accommodate high-density residence and mixed use within the existing building framework.

Second, in terms of use form, the block shifted from an enclosed space of a single community toward a more complex space of low-cost rental housing and mixed use. The outward migration of wealthy residents and the spillover of commercial activities caused some functions to spread into the city; the entry of poor residents, external low-income groups, and the rental economy further reinforced the overlap of residence, commerce, and production within the block. The use form therefore presented the coexistence of opening-up and high density.

Third, in terms of property form, the original centralized control began to loosen, and spatial use rights gradually separated from ownership. Although the property structure had not yet completed a thorough market-oriented restructuring, leasing, subletting, subdivision, and redistribution had already changed the way space was used. At this stage, the loosening of property relations was first manifested as subdivision at the level of use, rather than as comprehensive restructuring at the level of ownership.

The driving mechanism of this stage was essentially a re-agglomeration mechanism formed by the combined effects of population movement, spatial redistribution, and social stratification against the background of temporary institutional loosening and renewed regulation. Spatial pressure was not released by institutional opening, but was transformed, through the combined effects of flow structure and spatial adjustment, into a driving force for internal reorganization and high-density use. As a result, the block displayed the characteristics of structural loosening and density intensification during the process of opening.

4.4 Analysis of the Modernization Driving Mechanisms after the Abolition of the Ghetto

Since the promulgation of the Emancipation Decree in 1848, Jews gradually obtained a legal status equal to that of other citizens, and the former institutional system centered on segregation and control was formally abolished. In 1865, the demolition of the ghetto walls marked the final dissolution of spatial restrictions as well. The core contradiction of this stage lies in the fact that institutional segregation had disappeared and the block had been incorporated into a unified system of urban governance and the market, yet its spatial form was not reconstructed synchronously. The original street-block structure, courtyard system, building fabric, and property relations retained strong inertia, while market-oriented renewal was also constrained by property fragmentation, economic conditions, and multi-actor coordination. As a result, the block did not undergo comprehensive transformation, but instead displayed local repair, functional replacement, and

gradual adjustment. Therefore, the focus of the mechanism in this stage is no longer how spatial pressure was internally absorbed, but rather the non-synchronous relationship among institutional opening, market mechanisms, and historical spatial structure.

4.4.1 Driving Factor Analysis

1. Institutional Integration and Boundary Dissolution

The Emancipation Decree changed the institutional attributes of the block. The B.Amedeo block was no longer subject to special regulation as an exceptional space, but was transformed into an ordinary block within the city's overall spatial system. Its former enclosed and exclusionary boundaries were broken down, and the block began to follow unified legal rules, property transaction logic, and urban management systems. As a result, the way institutional factors acted upon the morphology of the block changed: in the earlier period, institutions mainly shaped spatial boundaries through residential restrictions and entrance control, whereas in this stage, institutions influenced spatial renewal more through property transactions, building approvals, sanitary improvement, post-war repair, and historical conservation.

2. Transformation of Community Structure

With the abolition of the ghetto system and the establishment of Jews' legal status, the community structure within the block also changed. The cohesive community of the previous stage, which had been based on religion, kinship, mutual aid, and community organizations, gradually weakened, while the status of individuals as independent citizens and market actors increased. Residents' spatial choices no longer depended mainly on internal community allocation, but were increasingly influenced by individual economic capacity, housing opportunities, and market conditions. The original cultural functions gradually receded, and courtyards, passages, and ground-floor spaces gradually shifted from spaces of communal public life to service, lighting, circulation, parking, and property-management spaces within an ordinary residential block. Cultural factors no longer directly organized the order of daily life, but were instead transformed into clues of historical memory, spatial names, material remnants, and the historical layering of the block. The functions of the block gradually became normalized, while its historical spatial framework and special memories were still retained.

3. Market-Oriented Regulation and Differentiation of Property Structure

With the abolition of the ghetto system, the block space gradually entered the urban real estate market, and property transactions, rental income, and asset allocation began to become important logics influencing spatial use and renewal. Space was no longer mainly internally allocated through institutional arrangements, but gradually came to be driven by market transactions and the decisions of property owners. However, marketization did not immediately bring about comprehensive spatial reconstruction. Before 1875, several attempts to sell the block failed. This indicates that, after the abolition of compulsory segregation, spatial form did not automatically respond to institutional

opening through comprehensive change, but was constrained by market transaction conditions, expected investment returns, and forms of property organization.

At the same time, the property structure shifted from relative concentration to a multi-actor distribution. Property diversification made local renewal and market-oriented transformation possible, but also increased the cost of overall coordination. The interests of different owners, residents, commercial operators, investors, and municipal management actors were not consistent, making renewal more likely to appear as local repair, individual-building transformation, and functional replacement rather than comprehensive reconstruction.

4. Summary of Driving Factors

Table 4-3 Classification of Driving Factors in the Modernization of Block Evolution after Abolition of the Ghetto

Level \ Type	External Driving Factors	Internal Driving Factors
Fundamental Driving Factors	Institutional Integration and Transformation	Transformation of Community
Intermediary Driving Factors	Market-Oriented Regulation	Differentiation of Property Structure
Direct Driving Factors	Urban Renewal Intervention	Transformation of Spatial Functions

At the fundamental level, institutional integration and transformation constituted the most central external driving factor of this stage. The promulgation of the Emancipation Decree marked the formal incorporation of the Jewish community into the national legal system, with their rights to residence, occupation, and property institutionally recognized. This institutional transformation was not the result of a single decree, but was closely related to the process of state restructuring in the Kingdom of Sardinia in the mid-nineteenth century. Under the political reforms promoted by figures such as Camillo Benso di Cavour, the state gradually established a modern governance system based on constitutional principles, emphasizing legal unification, market openness, and social integration.^[54] Against this background, the former differentiated mode of spatial governance based on religious identity gradually lost its legitimacy, and the ghetto system was incorporated into the reform agenda and eventually abolished. The block was no longer subject to special regulation as an exceptional space, but was transformed into an ordinary unit within the city's overall spatial system. Its boundary shifted toward the regular organization of the urban road system and administrative management, and its operation followed unified legal rules, market mechanisms, and urban management systems. As a result, the former institutional boundary characterized by enclosure and exclusion was broken down, replaced by an open and mobile urban spatial structure, and the morphology of the micro-city was fully integrated into the urban environment. At the same time, the fundamental internal driving factor of the block was manifested in the transformation of community structure from a collective community toward individualized citizenship. Unlike the highly cohesive community of the previous stage, which had been based on religion, kinship, and community organizations, the emancipation of Jews and the establishment of their legal status significantly

enhanced the position of individuals as independent social actors, and the community was no longer the only vehicle for action. This transformation was first reflected in the restructuring of social relations. Traditional mechanisms of mutual aid and internal allocation within the community gradually weakened, and individuals began to detach themselves from institutional dependence on religious and community organizations, becoming embedded instead in the broader urban social and economic system. This change not only altered community relations, but also reshaped the relationship between the block and the city as a whole, gradually transforming the formerly relatively enclosed social structure into an open system. Before this, spatial decisions had been made with the community as the basic unit, and residential arrangements were mainly achieved through internal allocation, such as local additions, subdivision, or shared space in response to population pressure. In the individualized structure, however, spatial decisions gradually shifted to the individual as the basic unit, and residential choices were increasingly made according to economic conditions and life opportunities. In this process, some groups with sufficient resources chose to move out, while resource-constrained groups continued to remain. As a result, the internal structure of the block shifted from a collective structure based on religion and community ties to a social network based on individuals.

At the intermediary level, market-oriented driving and regulation, together with the differentiation of property structure, played a joint role and were further reinforced by ideological and socio-cultural mechanisms, transforming institutional integration into concrete spatial adjustment. First, with the abolition of the ghetto system and the entry of real estate into the free market, the block space was gradually incorporated into the city's overall real estate system. Economic logic centered on rent, return, and asset allocation began to dominate spatial use, and the block became an ordinary urban plot that could be traded and developed. However, this transformation did not immediately lead to the restructuring of the spatial structure. Unlike the ghetto period, when spatial adjustment relied on institutional intervention, spatial regulation in this stage gradually shifted toward market mechanisms. In 1858, the government-commissioned engineer Panizza proposed a subdivision and renovation plan and attempted to sell the properties, but the attempt was unsuccessful. It was not until 1875 that the transaction was completed by the government-supported property-owning company of the ghetto block, the *Società Proprietaria dell'Isolato Beato Amedeo*. During this period, until 1865, no renovation or reconstruction proposal for the block managed by the *Ospedale di Carità* was submitted to the municipal authorities. This indicates that, in the absence of compulsory institutional intervention, spatial form did not automatically respond to institutional change through active adjustment, but was constrained by the process of market transactions and economic conditions, showing a certain degree of delay and inertia. Second, the property structure shifted from relative concentration to multi-actor distribution, and became clearly differentiated under the influence of market mechanisms. Some former

residents or external capital acquired control over properties, while economically weaker groups continued to depend on low-cost rental spaces for survival. This imbalance between property ownership and economic capacity meant that, even as the block was institutionally integrated, differentiated social and spatial structures continued to exist internally, giving it a divided character of partial renewal and partial retention. In addition, ideological and socio-cultural factors played an important role in this process. Religious and intellectual leaders represented by Lelio Cantoni promoted Italian-language education and advocated participation in the construction of the nation-state, such as calling on Jewish volunteers to take part in the war against Austria, in an attempt to facilitate the integration of the Jewish community into society. Giacomo Dina, meanwhile, used journalism and publishing to explain the “universal values” of Jewish tradition to the outside world at the cultural level, promoting a change in social perception. These two paths, one through internal education and the other through external communication, weakened the former community-centered closed structure. At the same time, political and intellectual figures such as Gioberti and Cavour, as well as newspapers such as *Messaggero Torinese* and *Concordia*, continuously promoted Jewish emancipation in public opinion, providing it with legitimacy on multiple levels, including religious morality, legal principles, and national interest, and further facilitating the transformation of Jews from a protected special group into ordinary citizens.^[40] In this process, the functions previously undertaken by the Jewish community, such as credit support, charity, and social organization, were gradually absorbed by the state and social systems, and its special status as an independent institution continued to weaken. Individuals no longer relied primarily on internal networks for resources and identity, but were gradually integrated into a social structure based on the state and the market. This process not only changed society's perception of the Jewish community and its space, causing segregated space to lose its legitimacy at the conceptual level, but also reconstructed the mechanism of spatial regulation, transforming the direct adjustment formerly dominated by institutions into indirect regulation dependent on market operation, thereby creating conditions for the gradual transformation of its physical form.

At the direct level, urban renewal intervention and spatial functional transformation constituted the main forces driving morphological change. First, the demolition of the ghetto walls in 1865 completely broke the original spatial boundary at the physical level, and the block was formally integrated into the overall urban structure.^[40] Subsequently, under the combined influence of the market and governance, the block underwent a renewal process mainly characterized by repair, local transformation, and functional adjustment, rather than large-scale reconstruction. The sale of the entire block in 1875 and the involvement of the relevant company further promoted spatial reuse and structural adjustment, but the overall process showed the characteristics of gradual renewal. Meanwhile, the spatial functions changed significantly. The original functional system centered on religion, education, and community organization gradually weakened; residential function became dominant, and the block shifted toward an ordinary urban residential district. Some spaces were

converted into commercial or entertainment uses, such as dance halls and cinemas, reflecting the diversification of the functional structure. At the same time, institutional transformation did not immediately change the existing spatial structure, showing clear “spatial inertia.” The existing layout continued under the influence of factors such as property structure, economic conditions, and residents’ choices. For example, in the post-war repair process, many buildings were reconstructed according to their original structures, further reinforcing morphological continuity.

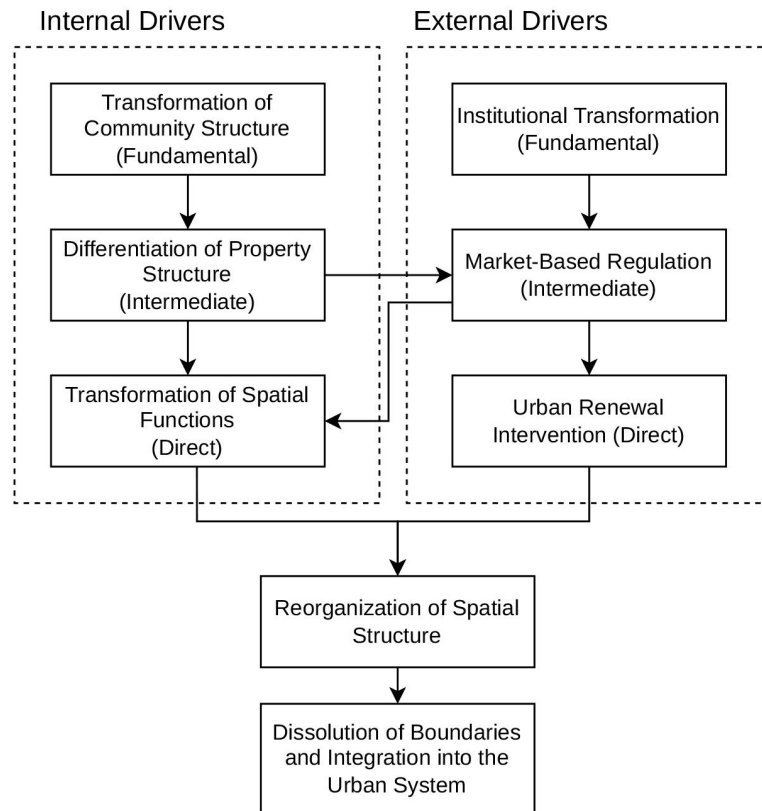


Figure 4-7 Interrelationships among the Driving Factors of Modernized Block Evolution after the Abolition of the Ghetto.

4.4.2 Mechanism Analysis

The main characteristics of this stage were institutional integration and the dissolution of segregated boundaries. However, the dissolution of institutional boundaries did not mean the simultaneous disappearance of spatial boundaries and morphological structures. The original street-block structure, building volumes, courtyard organization, and plot relationships continued to exist and became the basic conditions for subsequent renewal. The institution shifted from restricting residence to managing renewal, but the historically formed spatial structure continued to constrain the ways in which transformation could take place.

1. Transmission Process

After institutional integration, the use logic of the block gradually shifted from a community-based internal life system to ordinary urban residential and commercial functions, and

the actor structure of spatial renewal also changed. The original structure dominated by the Jewish community, the Ospedale di Carità, and governmental control gradually shifted toward a multi-actor pattern involving private owners, residents, commercial operators, municipal institutions, approval departments, and market investors. Multi-actor participation made local renewal possible, but it also subjected spatial adjustment to more interest relations and coordination costs, dispersing the renewal momentum of this stage across different actors and spatial units. Therefore, the transmission process of this stage can be understood as follows: institutional integration weakened special control, the withdrawal of cultural functions promoted the normalization of use, and market mechanisms and property differentiation introduced multi-actor renewal.

2.Spatial Adjustment

In response to the new demands brought about by institutional integration and functional transformation, the block mainly adjusted through local renewal and property restructuring. Unlike the previous two stages, which absorbed pressure through internal densification or spatial redistribution, spatial adjustment in this stage was more often manifested as building repair, entrance adjustment, façade renovation, courtyard functional transformation, post-war reconstruction, and partial functional replacement. The property structure shifted from centralized control to multi-actor ownership, increasing the possibility of spatial transactions and local transformation. However, multi-actor property ownership also weakened the capacity for comprehensive transformation, making renewal more likely to unfold at the scale of individual buildings or local spaces. Meanwhile, the original street-block and courtyard system continued to be retained through multiple rounds of renewal. Even though some buildings underwent repair, transformation, or post-war reconstruction, the block as a whole still preserved a clear historical framework.

3.Urban Renewal

At the direct level, urban renewal intervention and spatial functional transformation promoted gradual morphological change in the block. The demolition of the ghetto walls in 1865 completely broke the original segregated boundary at the physical level, and the block was formally integrated into the overall urban structure. After that, the block underwent a renewal process mainly characterized by repair, local transformation, post-war restoration, and functional adjustment. At the same time, its spatial functions changed significantly. Residential function once again became dominant, while some spaces were converted into commercial, entertainment, or other urban functions, such as dance halls, cinemas, and later gyms, reflecting the adaptive transformation of historical space in modern urban life.

4.Feedback Structure

The above analysis shows that the morphological evolution of the block in this stage presented a re-agglomeration mechanism driven by the interaction between population movement and spatial redistribution. Against the background of institutional loosening and economic opening, the channel

of population outflow was formally opened. Some groups with economic capacity and social resources began to move out of the block and gradually became embedded in a broader urban spatial and economic network. However, this outflow did not reduce the overall population size within the block. On the one hand, a large number of low-income groups remained in the original space due to limited migration capacity; on the other hand, as overall urban mobility increased, external low-income laborers continued to enter the block through renting and subletting. As a result, population inflow generally offset, or even exceeded, population outflow, further increasing the population stock within the block and producing a pattern of structural re-agglomeration.

In this process, the continuous rise of population stock was not effectively released through spatial expansion, but was mainly transformed into the accumulation and intensification of spatial pressure. Unlike the previous stage, in which spatial expansion mainly took the form of building additions, the adjustment of the spatial system in this stage was more often manifested as internal redistribution, namely by increasing the intensity of use within existing space through room subdivision, bed rental, and the conversion of non-residential spaces into residential use. This process of spatial redistribution acted upon spatial capacity and increased it to a certain extent in formal terms, but its essence was an “inward capacity expansion” achieved by compressing per capita space. It did not change the overall spatial boundary or structural pattern. Meanwhile, the property structure gradually shifted from centralized control to a use pattern dominated by leasing and redistribution, promoting the separation of spatial use rights from ownership. This further subdivided space and brought it into a state of high-frequency circulation, thereby reinforcing the structural basis for high-intensity spatial use.

Under the above action pathways, a reinforcing feedback structure centered on population stock and spatial pressure gradually formed within the system: the increase in population stock drove the continuous rise of spatial pressure, while spatial pressure, by driving spatial redistribution and use subdivision, increased spatial capacity, enabling new population to be absorbed and remain, thereby further reinforcing the tendency toward population concentration. It should be emphasized that, in this process, population outflow did not form an effective negative feedback adjustment mechanism. Instead, it took the form of an asymmetrical structure of “high-income outflow” and “low-income retention and migrant inflow” making population movement produce re-agglomeration rather than relief overall. At the same time, functional mixture and spatial complexity played a key role in this mechanism. As commercial activities, craft production, and residential functions continued to overlap in space, different types of activities became nested and reorganized within limited space, promoting further subdivision and improving the efficiency of spatial use. This process not only strengthened the capacity of space to absorb population, but also shifted the spatial organization of the block from overall superimposition to a dynamic mode of “subdivision and recombination.” On this basis, the block gradually formed an inward-oriented reinforcement mechanism under open conditions: institutional opening provided the possibility of population

movement, but due to social stratification, differences in migration capacity, and spatial constraints, this movement did not translate into effective population relief. Instead, through spatial redistribution and population re-agglomeration, spatial pressure continued to accumulate internally. Meanwhile, high-density use and spatial complexity reduced living costs to a certain extent, allowing the block to remain attractive to low-income groups and migrants, further reinforcing the positive relationship between population stock and spatial pressure and weakening outflow as a potential adjustment path.

Against the background of institutional loosening, population mobility increased, but it did not reduce the block's population. Instead, outward migration, continued residence, and new inflows coexisted, keeping population density high. Since this pressure could not be released through outward expansion, the block adapted through internal redistribution, such as room subdivision, mixed use, and functional overlap. As a result, limited space was used more intensively, further reinforcing high-density residential, productive, and commercial activities. In summary, institutional integration dissolved the segregated attributes of the block, market mechanisms and property differentiation changed the modes of spatial adjustment, the withdrawal of community cultural functions normalized the use of the block, and urban renewal intervention promoted local repair and functional replacement. As a result, the block shifted from an institutionally segregated space to an ordinary urban block. However, its morphological change did not take the form of comprehensive reconstruction, but instead showed the coexistence of local renewal and structural continuity.

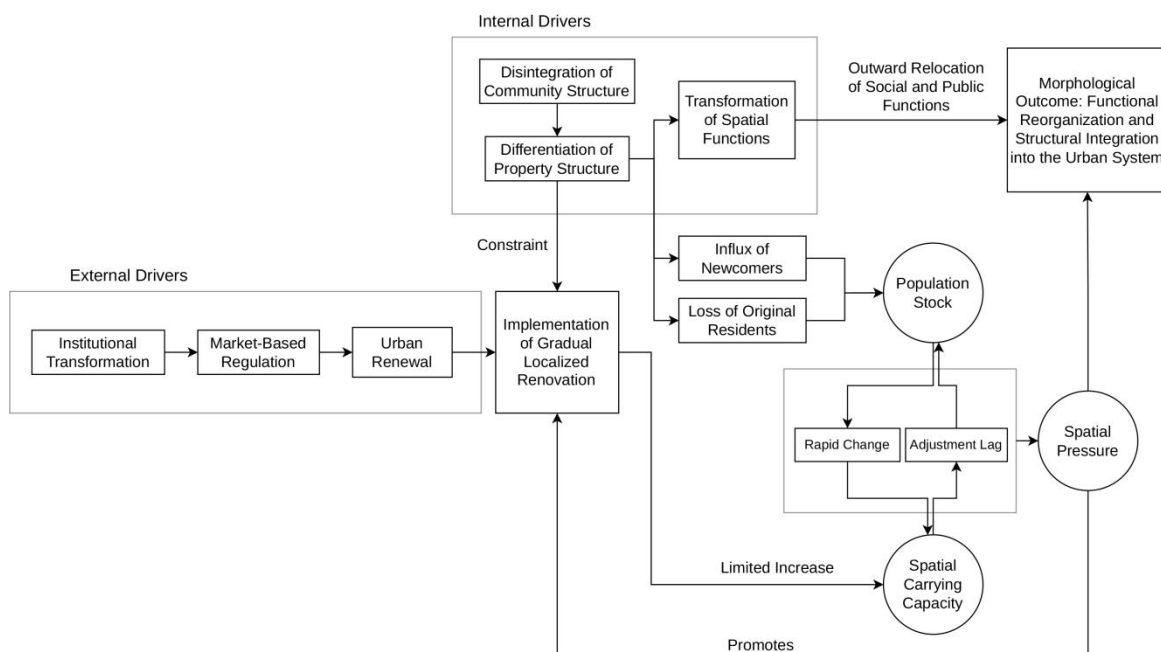


Figure 4-8 Diagram of the Driving Mechanism Relationships of Block Evolution in the Modernization Stage

4.5 Mechanism Implications for Urban Renewal in China

On the basis of the preceding analysis of the morphological evolution and driving mechanisms of the B. Amedeo block, it is necessary to further discuss the referential significance of its research findings for the renewal of residential historic districts in China.

The formation and evolution of the B. Amedeo block are rooted in specific contexts of European urban history, the institutional system of the Jewish community, and local property relations. These differ significantly from Chinese historic districts in terms of land systems, property-rights systems, urban governance structures, and renewal policies. Therefore, the value of this study as a reference lies in the variable relationships and mechanism logic it reveals. In other words, the morphological evolution of historic districts is not the result of a single planning decision, a single conservation policy, or a single market action, but rather the outcome of long-term interactions among institutional environments, property structures, social actors, economic conditions, spatial capacity, and use demands.

4.5.1 Renewal Problems and Typical Cases in China

As China's urban development shifts from incremental expansion to stock-based renewal, the conservation and renewal of historic districts is no longer merely a matter of cultural relic restoration or townscape control. Instead, it has become a comprehensive process involving the continuity of historical value, improvement of living conditions, functional replacement, property-rights coordination, and community governance. Residential historic districts, in particular, are living spaces that continue to accommodate residents' everyday life, neighborhood interaction, and social relations. Their renewal should therefore not be evaluated only in terms of building façades, streetscape appearance, or the introduction of commercial functions. Rather, it is necessary to understand the long-term interactions among physical space, property structures, social actors, and everyday use^[55]. The following cases collectively illustrate typical problems faced by residential historic districts in China in terms of spatial capacity, property-rights coordination, functional transformation, and social continuity.

Dashilar in Beijing reflects the tension among townscape conservation, facility improvement, and living needs in high-density historic districts. Relevant studies have pointed out that Dashilar is located in the core area of Beijing's old city. Within an area of 1.26 km², it accommodates more than 80,000 residents, with a building coverage rate of nearly 80%. At the same time, it faces problems such as aging infrastructure, imbalance in population structure, declining competitiveness of commercial activities, and blurred cultural characteristics. Although its street-and-lane framework has been preserved, the internal use of space and the capacity of facilities are already under considerable pressure^[56]. This case suggests that the renewal of high-density residential historic districts cannot take the integrity of townscape as the only basis for judgment. It is also

necessary to identify the relationships among population pressure, spatial capacity, infrastructure capacity, and everyday living needs.

Xiaoxihu in Nanjing demonstrates the influence of complex property-rights relations on incremental renewal processes. Relevant studies have pointed out that although the Xiaoxihu area covers less than 5 hm², it contains 216 relatively independent property parcels and more than 800 property-right holders. The property types include public housing, private housing, and properties owned by industrial and enterprise units, while property-right holders also differ in their willingness to stay or relocate. Such complex ownership relations and differentiated demands make it difficult for existing planning schemes to be directly transformed into operable construction actions. Therefore, the Xiaoxihu practice takes courtyards or individual buildings as renewal units, and carries out voluntary and incremental population relocation and spatial renewal based on residents' willingness, existing property-rights conditions, and historical parcel structures^[57]. This case shows that property structures directly affect the division of renewal units, implementation sequences, and methods of design adjustment. The Xiaoxihu practice overlays typological maps with land and building property-rights information, records residents' willingness to relocate, and dynamically adjusts the urban design master plan and renewal guidelines at different stages, thereby establishing a linkage mechanism between overall morphological control and specific construction implementation.

Pingjiang Road in Suzhou reflects the complex relationship among cultural-tourism activation, commercial introduction, and the continuity of residential functions. Space syntax analysis shows that, as the north-south core road of the district, Pingjiang Road has relatively high integration and choice values. Commercial and tourist flows therefore tend to concentrate in highly accessible streets and lanes, while other internal roads within the district mainly serve residents' everyday living needs. Meanwhile, the strengthening of the main street by tourism-related commerce has led to the differentiation of internal living spaces within the district^[58]. From the perspective of governance mechanisms, Pingjiang Road also demonstrates the influence of multi-actor collaboration on renewal outcomes. Relevant studies summarize its renewal model as one in which the government provides guidance and support, state-owned enterprises provide existing assets, private enterprises invest in and operate projects, and social forces participate broadly. They further point out that the government, enterprises, and residents respectively play roles in goal-setting, financial and technical support, and demand feedback^[59]. This indicates that the renewal of historic districts involves a process in which different actors jointly influence the spatial evolution of the block through resource allocation, decision-making participation, and everyday use.

Shanghai Xintiandi, by contrast, reveals the possible social consequences of combining historic conservation with capitalized renewal. Relevant studies have pointed out that before redevelopment, Xintiandi was a residential space mainly composed of Shanghai shikumen lilong buildings. During the redevelopment process, the external appearance of shikumen buildings was

preserved, while the spatial functions were replaced by consumer-oriented uses such as restaurants, bars, and fashion stores. The government and developers occupied dominant positions in decision-making and action, ultimately leading to the replacement of space users and changes in spatial social relations^[60]. The preservation of the physical form of historic districts does not necessarily mean the continuation of everyday life and social structure. If renewal relies excessively on capital operation and the shaping of consumer spaces, the original residents and everyday life networks may be replaced.

The above cases collectively show that the complexity of residential historic district renewal in China is mainly reflected in four aspects.

First, there is a tension between historic townscape conservation and the improvement of contemporary living conditions. High-density old-city districts such as Dashilar show that the continuity of street-and-lane textures and historical townscape often coexists with aging infrastructure, building safety risks, and pressure on spatial capacity. Renewal judgment should therefore not remain limited to the external townscape level.

Second, property-rights relations and actors' demands influence the implementation process of renewal. Cases such as Xiaoxihu show that fragmented property rights, multiple actors, and differentiated intentions directly affect the division of renewal units, implementation sequences, and methods of design adjustment. The renewal process therefore requires continuous coordination between overall control and incremental implementation.

Third, cultural-tourism activation and commercial introduction may change the original residential attributes. Historic districts such as Pingjiang Road show that commercial and tourism functions can enhance district vitality, but may also weaken daily-life services, differentiate residential spaces, and dilute community relations. It is therefore necessary to pay attention to both functional renewal and the continuity of everyday life.

Fourth, capitalized renewal may lead to the replacement of social structures. Cases such as Xintiandi show that the preservation of architectural appearance and historical imagery does not necessarily imply the continuation of social relations. If the original residents and everyday life networks are replaced, the continuity of life in historic districts may still be disrupted.

It can therefore be seen that the key issue in the renewal of residential historic districts in China is not simply "what to preserve" or "what to renew", but how to understand the interactions among physical space, property structures, resident composition, functional use, and governance mechanisms. This also indicates that the analysis of the relationships among institutions, property rights, population, spatial capacity, and use structure in the B. Amedeo block can provide a certain reference for understanding the complex renewal problems of similar districts in China.

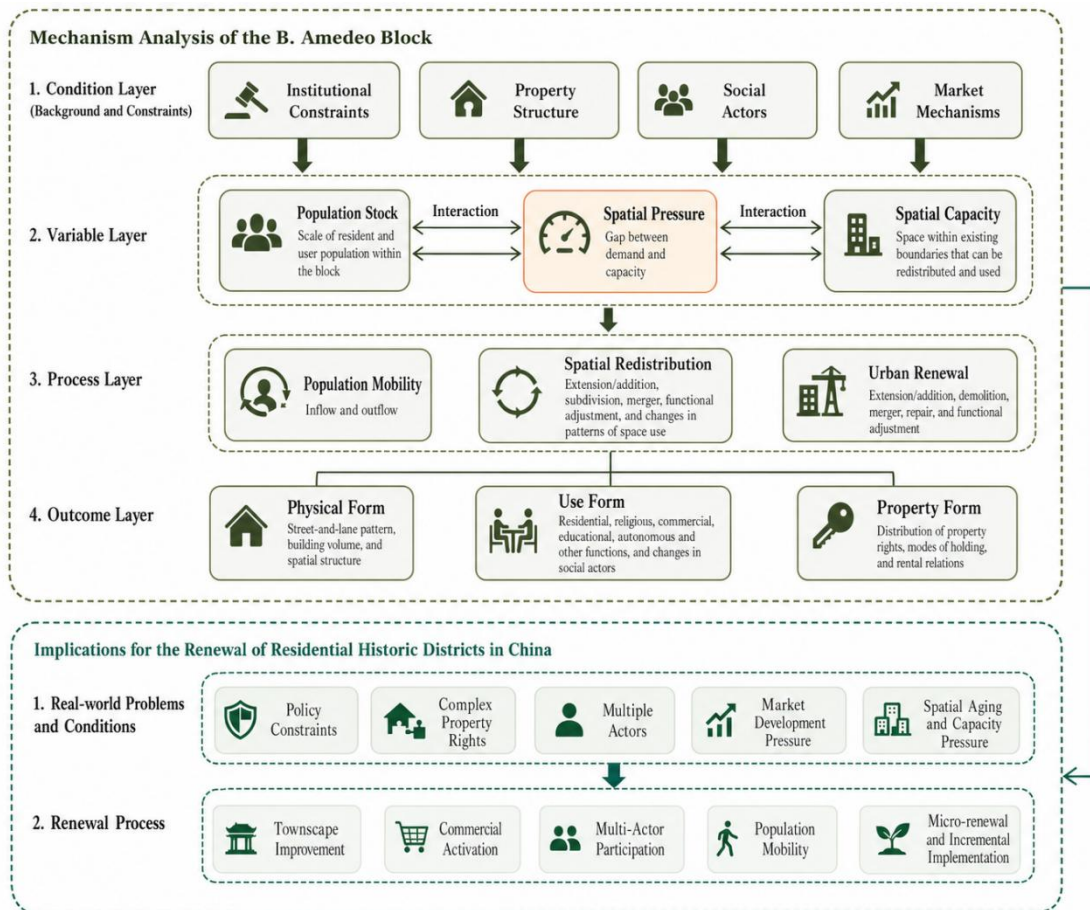


Figure 4-9 Transfer Framework of the Evolutionary Mechanism of the B. Amedeo Block for the Renewal of Residential Historic Districts in China

4.5.2 Correspondence between Mechanism Findings and Domestic Issues

Based on the above domestic cases, the renewal problems they reflect can be further corresponded with the findings of the mechanism analysis of the B. Amedeo block. The relationship between the two is not a direct analogy of specific historical experiences, but rather a comparability in terms of problem structure. Residential historic districts in China similarly face issues such as the continuity of spatial frameworks and the adjustment of internal functions, complex property relations and multi-actor coordination, cultural-tourism activation and the continuation of residential functions, as well as capital intervention and changes in social structure.

The mechanism analysis of the B. Amedeo block provides three levels of reference for understanding the renewal of residential historic districts in China. First, at the level of variable identification, the renewal of historic districts should not focus only on building age, townscape value, and spatial image, but should also incorporate population structure, property relations, intensity of use, spatial capacity, and actor relationships into the analysis. Second, at the level of driving-factor hierarchy, institutional policies, market capital, or conservation planning usually do not directly translate into spatial outcomes. Instead, they take effect through intermediary factors

such as property structure, residents' capacities, spatial carrying conditions, and use demands. Finally, at the level of outcome evaluation, the physical form, functional use, and social relations of historic districts often do not change synchronously. The preservation of external appearance does not necessarily imply functional continuity, and functional activation does not necessarily imply community continuity. Therefore, the renewal of historic districts in China needs to shift from a single outcome-based judgment toward an explanation of process mechanisms.

Table 4-4 Implications of the Mechanism Findings of the B. Amedeo Block for the Renewal in China

Renewal Problems in China	Mechanism Findings from the B. Amedeo Block	Mechanism Implications
Tension between conservation objectives and living needs	The spatial framework shows long-term stability, while patterns of use, property relations, and the organization of everyday life are continuously adjusted.	The renewal of historic districts should shift from townscape continuity alone toward a comprehensive assessment of morphological, functional, and everyday-life continuity.
Complex property relations and difficulties in multi-actor coordination	Property transfer and property subdivision profoundly influence building use patterns and the evolutionary path of the block.	Property structure should be incorporated into pre-renewal analysis as an important variable for explaining spatial change.
Cultural-tourism orientation and commercial replacement may weaken residential attributes	There are asynchronous changes among physical form, functional use, and property structure.	Renewal evaluation should pay attention to the different rhythms of change across morphological levels, and avoid substituting physical preservation for functional continuity.
Risks of resident relocation and social-structure replacement	Institutional change must be transmitted through intermediary factors such as population structure, economic capacity, and spatial carrying capacity.	Attention should be paid to differences among social actors, as well as their migration capacity, affordability, and differentiated interests.
Superficial townscape improvement may obscure internal mechanisms	Morphological evolution results from the combined effects of institutional environments, property structures, social actors, economic conditions, and spatial capacity.	Renewal research should shift from outcome description to process explanation, and strengthen the identification of driving-factor transmission and mechanisms.

Overall, the significance of the B. Amedeo block case for the renewal of residential historic districts in China does not lie in providing a directly replicable conservation model, but in offering a mechanism-oriented perspective for understanding complex evolutionary processes. Its findings show that the sustainable renewal of historic districts needs to move beyond a single logic of

townscape improvement, cultural-tourism development, or architectural repair, and instead shift toward a comprehensive identification of the relationships among institutions, property rights, population, space, and use. For current practices of historic district conservation and urban renewal in China, this mechanism-oriented perspective helps to first understand the historical origins, changing paths, and internal constraints of the spatial condition of a block before renewal strategies are formulated, thereby providing an analytical basis for more refined, incremental, and socially continuous renewal practices.

At the same time, the applicable boundaries of these mechanism implications should also be recognized. The historical institutions, religious community background, and local property-rights system on which the B. Amedeo block in Turin relied are highly specific, and cannot be simply compared with Chinese historic districts. The domestic implications proposed in this study mainly involve the transfer of an analytical framework and research method. That is, through variable identification, hierarchical classification of driving factors, and analysis of mechanism relationships, they help to understand the complex issues involved in the renewal of residential historic districts. Future research may further select Chinese historic districts characterized by the continuity of residential functions, complex property relations, and pressure for incremental renewal as study objects, so as to locally test and revise the mechanism analysis approach proposed in this study.

4.6 Summary of the Chapter

4.6.1 Progressive Relationship among the Three-Stage Driving Mechanisms

On the basis of the review of morphological evolution, this chapter further analyzes the internal action pathways of morphological change in the B.Amedeo block from the perspective of driving mechanisms. By distinguishing between external and internal driving factors, and further dividing them into fundamental, intermediary, and direct driving factors, this study incorporates the institutional environment, community structure, economic conditions, property relations, population movement, and patterns of spatial use into a unified analytical framework. It focuses on explaining how different driving factors are transformed into stage-specific changes in physical form, use form, and property form through continuous transmission and feedback relationships.

The morphological evolution of the B.Amedeo block was not directly driven by a single factor, but was determined by the continuous reorganization of relationships among institutional boundaries, population movement, spatial capacity, property structure, and actors' actions. In the establishment and maintenance stage, forced segregation, entrance control, and restrictions on real estate ownership jointly formed an enclosed institutional boundary. Population outflow and spatial expansion were suppressed, while community life functions such as religion, education, commerce, and self-governance were compressed into the interior of the block. As a result, population stock continued to accumulate, spatial pressure kept increasing, and this pressure was absorbed internally

through additions, mezzanine use, room subdivision, and functional superimposition, forming a reinforcing feedback mechanism centered on “population stock–spatial pressure–spatial capacity.”

In the emancipation and restoration stage, institutional loosening opened up the possibilities of population migration, occupational choice, and property ownership, but this openness did not directly translate into the relief of pressure within the block. Under the influence of social stratification, differences in migration capacity, and the absorptive effect of low-cost space, groups with resources were able to move out or expand their assets, while resource-constrained groups continued to remain, and external low-income groups further entered the block. As a result, population movement in the block presented an asymmetrical structure in which outward migration, continued residence, and re-entry coexisted. Spatial adjustment also shifted from capacity expansion through building additions in the previous stage to internal redistribution methods such as room subdivision, subletting, and bed-based rental use, forming a re-agglomeration mechanism under open conditions.

In the modern and contemporary stage after the abolition of the ghetto, institutional segregation was formally abolished, and the block was incorporated into a unified system of urban governance and the market. The original community life functions gradually receded, while ordinary residential, commercial, entertainment, and service functions became the main forms of use. However, institutional integration did not bring about the synchronous reconstruction of spatial form. The original street-block structure, courtyard system, building fabric, and property relations retained strong inertia, while market-oriented renewal was also constrained by property differentiation, economic conditions, and multi-actor coordination. Therefore, the block was more often characterized by the coexistence of local repair, functional replacement, property restructuring, and overall morphological continuity. Thus, the driving mechanism in the modern and contemporary stage shifted toward a non-synchronous adjustment mechanism under conditions of market-oriented renewal.

Overall, the driving mechanism of the B.Amedeo block underwent a progressive transformation from a reinforcing mechanism, to a re-agglomeration mechanism, and then to a non-synchronous adjustment mechanism. The role of spatial pressure also changed across different stages: in the early stage, it was mainly the result of institutional enclosure and population accumulation; in the middle stage, it became a driving force for spatial redistribution and high-density use; and in the modern and contemporary stage, it was transformed into an adjustment tension among modern use demands, property differentiation, and historical spatial structure. **This indicates that the morphology of historic blocks is not a direct response to institutional change, but rather the result of continuous reorganization through feedback mechanisms, path dependence, and local adaptation under multiple constraints.**

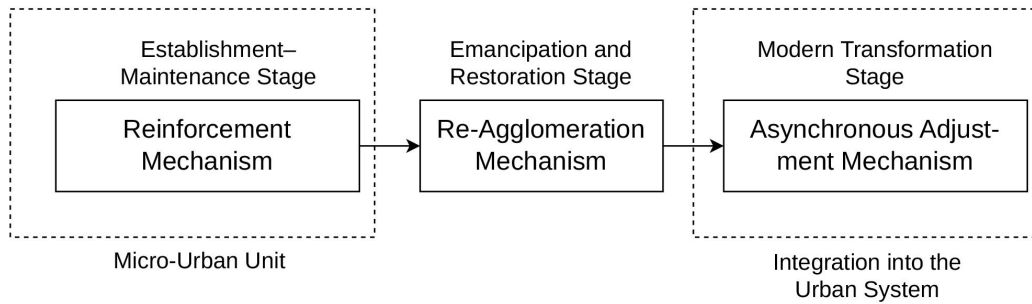


Figure 4-9 Progressive Relationship among the Three Stages of the Driving Mechanisms of Block Evolution

4.6.2 Mechanism Role of Social Actors

The mechanism analysis further shows that the relationships among population, space, and property are always embedded in specific social institutions, community life, and actors' actions. Institutional factors define residential eligibility, property possession, spatial transformation rights, and the degree of boundary openness, determining whether spatial pressure can be released outward. Community-life factors organize the internal functions and everyday spatial order of the block through religious rituals, education, commerce, self-governance, and mutual-aid relations. Actors' capacities further transform institutional conditions and living needs into spatial outcomes through the migration, continued residence, leasing, management, and renewal behaviors of different groups.

In the establishment and maintenance stage, institutional enclosure, cultural cohesion, and unequal actor capacities jointly pushed spatial pressure inward. Ordinary residents lacked the ability to migrate or adjust property relations, and mainly adapted passively through co-residence, subdivision, mezzanine use, and functional superimposition. Community organizations maintained the internal order of religion, education, self-governance, and charity, while the Ospedale di Carità controlled property ownership and spatial adjustment rights. Together, these three forces produced a spatial pattern that was externally enclosed and internally complex.

In the emancipation and restoration stage, institutional loosening changed the possible actions available to different actors, but did not eliminate the capacity differences caused by social stratification. Wealthy residents were able to translate institutional opening into outward migration, property purchase, or rental behavior; poor residents continued to remain due to dependence on low rents and community support; and external low-income groups entered the former block. Community resources at this stage were no longer only a force maintaining an enclosed living system, but were transformed into social resources that influenced population retention, departure, and spatial attachment.

In the modern and contemporary stage, institutional factors shifted from compulsory segregation to urban integration; cultural factors shifted from the organization of daily life to

historical memory and heritage identification; and the actor structure shifted from a relatively concentrated community–property relationship to a multi-actor pattern involving private owners, residents, commercial operators, municipal institutions, and market investors. Multi-actor participation increased the possibility of local renewal, but also raised the difficulty of coordinating comprehensive renewal, giving the block an evolutionary character in which local renewal and morphological continuity coexist.

The mechanism of block evolution in historic districts is not a linear effect of a single spatial factor, but a process in which social institutions, community life, and individual actors' capacities operate together across different stages, and are continuously transformed into spatial morphological outcomes through population movement, spatial pressure, property adjustment, and spatial redistribution.

4.6.3 Explanatory Boundaries of the Mechanism Model

The construction of the driving mechanisms of the B.Amedeo block in this study remains an explanatory induction based on a single case. In this study, System Dynamics is mainly used as a tool for expressing mechanism relationships, in order to present the causal transmission and feedback relations among population stock, spatial capacity, spatial pressure, institutional constraints, property structure, and social actors, rather than to establish a precise numerical simulation model. Therefore, the mechanism model proposed in this study does not aim to exhaust all types of historic district evolution, but to provide an analytical path for transforming complex historical materials into structured explanation.

In this sense, the reinforcement, re-agglomeration, and non-synchronous adjustment mechanisms observed in the B.Amedeo block have certain analytical implications, but their specific modes of operation are still influenced by Turin's historical institutions, the structure of the Jewish community, property relations, and conditions of urban renewal. Future research still needs to conduct comparative tests in more historic district cases, in order to further determine whether these mechanisms have explanatory power across different contexts and to refine their applicable boundaries under different institutional environments, property conditions, and urban morphological structures.

Chapter 5 Conclusions and Prospects

5.1 Main Research Conclusions

The B.Amedeo block in Turin has a clear and long-lasting evolutionary trajectory. Its morphological changes are reflected not only in the adjustment of physical space, but also in the long-term interaction among the institutional environment, community structure, property relations, and patterns of use. The study shows that the evolution of this block was not a linear change of a single spatial element, but a socio-spatial process formed under the combined influence of institutional constraints, social differentiation, economic conditions, property relations, and spatial capacity. This study analyzes the long-term evolution of the B.Amedeo block from three levels: morphological evolution, driving factors, and driving mechanisms. Based on the evolutionary review in Chapter 2 and the mechanism analysis in Chapter 4, the following main conclusions are drawn.

5.1.1 Characteristics of Block Morphological Evolution

1. Overall Evolutionary Path

The morphological evolution of the B.Amedeo block presents a basic trajectory from an enclosed segregated space to an open urban space. In its early period, under institutional constraints, the block formed a spatial unit with clear boundaries, tight internal organization, and relatively self-sufficient functions, which can be regarded as a relatively independent “micro-urban system.” With the loosening and abolition of the segregation system, the restructuring of external social relations, and the continued penetration of modern urban functional systems, the original logic of enclosure was gradually broken down, and the block eventually transformed into an ordinary urban block unit embedded in the overall urban structure. This evolutionary process can be summarized into four stages. First, the establishment stage was the period in which the enclosed spatial structure was formed. The Jewish ghetto system confined a specific community within clearly defined boundaries, giving the block an inward-oriented spatial organization characterized by controlled entrances, internal courtyards, and mixed functions. Second, the maintenance stage was a period of internal reinforcement of the enclosed structure. As the population continued to grow while the spatial boundary could hardly expand, the block mainly absorbed population pressure through internal additions, spatial stacking, functional mixture, and subdivision of use, forming a high-density and functionally complex spatial condition. Third, the transition stage was a transitional period in which institutional loosening and renewed restriction coexisted. The institutional opening during the French occupation provided possibilities for population migration and spatial mobility, but social stratification and differences in economic capacity meant that this opening did not directly translate into overall relief. Instead, a complex condition emerged within

the block, in which outward migration, continued residence, and re-entry coexisted. Fourth, the renewal stage was the period in which the block became embedded in the urban system and underwent gradual restructuring. After the abolition of the segregation system, the block was gradually incorporated into a unified system of urban governance and the market; its original community functions gradually receded, and ordinary residential, commercial, service, and entertainment functions became dominant. From the perspective of morphological hierarchy, the evolution of the block was not completed through comprehensive demolition and reconstruction, but unfolded gradually through continuous adjustments at the levels of buildings, courtyard spaces, functional organization, and property relations, while the existing spatial framework remained generally stable. The street network, block boundary, and basic plot pattern showed strong continuity, whereas building transformation, spatial subdivision, functional replacement, and property fragmentation changed more frequently.

It can therefore be seen that the essence of the morphological evolution of the study block was not a simple renewal of physical spatial elements, but a structural transformation of the block from internal self-organization toward open urban embedding.

2. Physical Morphological Characteristics

The evolution of the B.Amedeo block shows significant hierarchical differences and characteristics of gradual renewal. The street network, block boundary, and basic plot pattern, as the spatial framework formed in the early period, maintained strong continuity throughout long-term evolution. By contrast, additions, reconstruction, vertical extension, subdivision, and reorganization at the building level occurred more frequently, while courtyard spaces were continuously reduced through densification and internal adjustment. This indicates that morphological change in historic blocks is usually not completed through comprehensive demolition and reconstruction, but unfolds gradually through continuous adjustments at the building level and in internal spatial relationships, while the existing structural framework remains generally stable. Different morphological levels therefore show clear non-synchronization in their evolutionary rhythms.

3. Use-Form Characteristics

The B.Amedeo block as a whole experienced a process from high-density mixed use under enclosed conditions toward mixture, differentiation, and reorganization under open conditions. In the early period, under the combined effects of institutional segregation and limited spatial resources, the block formed a complex system based on residence and superimposed with religious, educational, commercial, and self-governing functions, showing strong internal integration and functional self-sufficiency. With changes in the institutional environment, residents' migration, and the intervention of the urban functional system, the original logic of use was not completely replaced, but was continuously adjusted and reorganized within the existing spatial structure, eventually forming a modern residential-commercial mixed block. The current high-density use pattern, vertical functional division, and internal spatial utilization of the block still retain deep

traces formed in historical stages, indicating that the evolution of its use form has a clear path-dependent character.

4. Property-Form Characteristics

From the perspective of property form, the B.Amedeo block underwent a continuous transformation from centralized control toward fragmentation and marketization. In the early period, the property ownership of the block was concentrated under a single public institution, forming a property structure that combined unified ownership, rental use, and internal management, while the allocation of spatial resources was mainly subject to institutional constraints. With the gradual loosening of the segregation system, the progressive introduction of market mechanisms, and the continuous transformation of social structure, the property system began to shift from domination by public institutions to the involvement of private capital, and further developed into a dispersed ownership pattern involving multiple actors. The transformation of the property structure not only reflects the combined effects of legal institutions and market forces, but also largely influenced the specific ways in which building transformation, spatial subdivision, and functional reorganization took place. It therefore constitutes one of the important foundational mechanisms driving the continuous morphological evolution of the block.

5.1.2 Characteristics of the Driving Factors of Block Evolution

This study attempts to establish a hierarchical framework for identifying the driving factors of the evolution of the B.Amedeo block. It distinguishes the driving factors of block evolution into external and internal factors, and further divides them, according to their depth of influence and mode of transmission, into fundamental, intermediary, and direct driving factors. Through this classification, this study can more clearly explain the position of different factors in the evolution of the block, as well as how they were gradually transformed from macro-level institutional conditions into concrete spatial morphological outcomes.

External driving factors mainly refer to factors originating from outside the block that constrain or promote the direction of its evolution, including the segregation system, legal policies, modes of urban governance, the market environment, and changes in the urban functional system. Such factors are usually not directly manifested as spatial morphological changes, but they determine the basic boundaries, legitimacy conditions, and possibilities for adjustment in the development of the block. For example, the early segregation system restricted the residential range and spatial expansion of the Jewish community, placing the block from the outset within an institutional framework of enclosure, high density, and inward-oriented development. Later institutional loosening, the abolition of segregation, and the introduction of market mechanisms changed the relationship between the block and the overall urban system, providing new conditions for population movement, property transfer, and functional reorganization.

Second, internal driving factors mainly refer to factors that gradually accumulate and continue to operate within the block system, including population stock, spatial capacity, spatial pressure, property structure, use demands, the composition of social actors, and their spatial practices. Compared with external driving factors, internal driving factors more directly reflect the block's own carrying condition and adaptive capacity. The high-density residence, internal courtyard system, complex functional organization, and complex property relations formed in the long-term evolution of the B.Amedeo block were not simply prescribed by external institutions, but were the accumulated results of internal processes such as population growth, spatial shortage, functional superimposition, and property adjustment under external constraints.

On the basis of external and internal driving factors, this study further extracts the hierarchical relationship among fundamental, intermediary, and direct driving factors. Fundamental driving factors mainly determine the overall conditions and structural boundaries of block evolution, typically including the institutional environment, legal restrictions, modes of governance, and the overall conditions of urban development. Intermediary driving factors are located between macro-level conditions and spatial outcomes, mainly including social structure, economic capacity, property relations, and population composition. They transform external conditions into the migration capacity, spatial choices, and patterns of use of different groups. Direct driving factors are the concrete processes that ultimately act upon morphological outcomes, including population inflow and outflow, rising spatial pressure, internal additions, room subdivision, functional mixture, spatial redistribution, and local renewal.

The morphological evolution of the B.Amedeo block was not the result of the direct effect of any single driving factor, but the result of the continuous transmission of multi-level driving factors. Institutional restrictions do not automatically generate high-density space; rather, they first affect population movement through residential boundaries and social identity restrictions, and then drive internal spatial intensification through population accumulation and spatial pressure. Institutional opening does not directly lead to the relief of the block either; instead, it must pass through intermediary processes such as social stratification, differences in economic capacity, and the absorptive effect of low-cost space, ultimately resulting in re-agglomeration characterized by the coexistence of outward migration, continued residence, and re-entry. The intervention of modern market mechanisms and urban governance also needs to be mediated through property differentiation, interest coordination, and renewal costs before it can be transformed into spatial outcomes characterized by the coexistence of local renewal and overall continuity.

The main conclusion of this study regarding the multiple factors driving block evolution is that: **The driving forces of morphological evolution in historic districts are complex and hierarchical. External driving factors provide institutional and urban environmental conditions, while internal driving factors reflect the carrying state and adaptive capacity of the block system itself. Fundamental driving factors define the boundaries of change,**

intermediary driving factors complete the process of transmission and translation, and direct driving factors concretely promote changes in spatial form. This analytical approach helps avoid simply attributing the evolution of historic blocks to a single policy, event, or spatial factor. Instead, it understands such evolution as the result of the continuous transmission, mutual amplification, and stage-specific transformation of multiple driving factors across different levels.

5.1.3 Characteristics of the Mechanisms of Block Evolution

The evolution of the B.Amedeo block was shaped by multiple driving factors, including institutional, social, and economic forces, and gradually formed relatively stable driving mechanisms through continuous transmission and feedback. In terms of levels of action, this mechanism is a structure composed of fundamental, intermediary, and direct driving factors: institutional factors determine the basic boundaries and overall direction of block evolution; social and economic factors then play roles of transmission, amplification, or regulation; and finally, these forces act concretely upon block morphology through processes such as population movement, spatial pressure, spatial redistribution, and functional adjustment.

From the perspective of mechanism structure, block evolution is essentially a process in which institutional change is transmitted through social differentiation and property adjustment, and further acts upon population change, spatial pressure, and spatial reorganization. Institutions shape external conditions through residential restrictions, property rules, and modes of urban governance; social factors act upon space through population movement, changes in community structure, class differentiation, and shifts in use demands; and economic factors influence the direction and extent of spatial adjustment through market mechanisms, rental relations, and development intensity. In this process, population stock, spatial capacity, and spatial pressure constitute the core relational structure of block evolution: population change leads to changes in spatial pressure; spatial pressure promotes additions, subdivision, redistribution, and functional reorganization; and spatial adjustment in turn affects the block's capacity to accommodate population and activities. The block's morphology continuously evolves cumulatively through this causal transmission and cyclical feedback.

The driving mechanisms of the B.Amedeo block show distinct stage-specific characteristics.

First, the establishment and maintenance stage was mainly characterized by a reinforcing feedback mechanism under enclosed conditions. Under the combined effects of institutional enclosure and socio-economic constraints, the population continued to accumulate within limited space and was continuously transformed into spatial pressure. Since the block boundary could hardly expand, the spatial system mainly increased its carrying capacity through internal additions, spatial superimposition, room subdivision, and functional mixture. This formed a feedback relationship among population accumulation, rising spatial pressure, internal spatial intensification, and continued population absorption.

Second, the emancipation and restoration stage was mainly characterized by a re-agglomeration mechanism under open conditions. Although institutional loosening provided possibilities for population movement and spatial choice, this openness was constrained by social stratification and differences in migration capacity. Groups with economic capacity and social resources could move out or enter the broader urban spatial market, while resource-constrained groups continued to remain, and external low-income groups entered the block through leasing, subletting, and other means. As a result, population movement did not produce effective relief, but instead formed a new pattern of re-agglomeration through the absorptive effect of low-cost space and spatial redistribution.

Third, the modern and contemporary stage after the abolition of the ghetto was mainly characterized by a non-synchronous adjustment mechanism. After institutional constraints were largely removed, population movement, functional transformation, and urban governance conditions changed relatively quickly, while the block boundary, plot pattern, building fabric, and property relations retained strong stability and could not be adjusted synchronously. Since social and functional changes occurred faster than changes in physical space and property relations, the process of block renewal appeared as a complex condition in which local repair, functional replacement, property restructuring, and overall morphological continuity coexisted.

Overall, the driving mechanisms of the block evolved from reinforcement, to re-agglomeration, and then to non-synchronous adjustment, while its systemic relationships also gradually shifted from a relatively simple cycle to a more complex structure of multiple relationships.

5.1.4 Importance of the Dimension of Social Actors

This study further finds that the morphological evolution of the B.Amedeo block must incorporate the dimension of social actors, that is, the role played by specific groups with different identities, statuses, economic capacities, migration capacities, and patterns of spatial use.

In the early stage, the Jewish community, as a specific group subject to institutional restrictions, had its residential, religious, educational, commercial, and everyday activities compressed within a limited space. Therefore, population concentration was not merely the result of numerical growth, but also the spatial manifestation of the combined effects of social identity and institutional exclusion. The functional mixture, spatial superimposition, and inward-oriented organization within the block were precisely the result of the continuous living practices and self-adaptation of specific social actors under constrained conditions. After institutional loosening, differences among social actors further influenced the direction of the block's spatial evolution. Groups with greater economic capacity and social resources had the possibility of moving out and participating in the urban spatial market, while poor groups and external low-income populations relied more heavily on the low-cost and high-density residential spaces within the block. As a result, institutional

opening did not lead to homogeneous population movement, but instead produced a differentiated process of migration, continued residence, and re-entry.

Social actors are an important intermediary connecting institutional change and spatial morphological change. Institutions and markets do not automatically change spatial form; rather, they operate through the spatial choices, residential strategies, and use practices of specific groups. **Incorporating social actors into the analysis of the evolution of historic districts helps to reinterpret historic blocks not merely as objects of physical heritage, but as socio-spatial systems jointly constituted by institutional relations, social actions, and spatial structures.**

5.2 Main Research Contributions

The research contributions of this study are mainly reflected in three aspects: methodological approach, theoretical understanding, and practical implications. Its core contribution does not lie in making an empirical summary of a single case, but in proposing an analytical approach that, through the long-term evolutionary analysis of the B.Amedeo block, traces back from morphological outcomes to the structure of driving factors, and further identifies mechanism relationships.

5.2.1 Methodological Contributions

This study constructs a research path of “evolution analysis–driving factor identification–mechanism construction,” advancing the study of historic district morphology from the description of spatial characteristics to the explanation of evolutionary mechanisms.

1. Proposing a Mechanism-Oriented Analytical Path

This study constructs a research framework of “evolution analysis – driving factor identification–mechanism construction,” advancing morphological research from the description and classification of spatial morphological characteristics to the explanation of morphological evolution. This path first uses typo-morphological methods to examine the long-term changes of the block in terms of physical form, use form, and property form; then further identifies driving factors related to institutions, society, economy, and property; and finally, drawing on the basic ideas of System Dynamics, structurally expresses the relationships among population stock, spatial capacity, spatial pressure, and spatial adjustment. This method enables the study of historic districts to further explain how different driving factors are transformed into spatial outcomes through continuous processes and feedback relationships. This study does not use System Dynamics as a precise quantitative simulation tool, but rather as a language for mechanism expression, in order to enhance the structural clarity and logical readability of complex evolutionary processes.

2. Introducing the System Dynamics Method

By incorporating population, space, and institutions into a unified variable system, and by using process variables such as population movement and spatial adjustment to describe their

dynamic changes, this study introduces the analytical thinking of System Dynamics into morphological research. Compared with traditional outcome-oriented analysis, this method can reveal the feedback relationships among variables and their evolutionary processes, allowing block morphology to be understood as a continuously adjusting dynamic system, thereby improving the structural clarity and expressive capacity of mechanism analysis.

3.Strengthening Multi-Level Relational Analysis

This study connects different morphological levels, such as streets, plots, and buildings, with institutional, social, and economic factors, establishing a cross-level explanatory path. The study shows that different levels have different degrees of stability and response speeds in the evolutionary process. These hierarchical differences not only affect the ways in which morphological change occurs, but also determine the specific pathways through which mechanisms operate. This analysis helps overcome the limitations of single-scale research and enables morphological studies to establish clearer logical connections across different spatial levels.

5.2.2 Cognitive Contribution

The cognitive contribution of this study lies in further demonstrating that the evolution of residential historic districts is not merely a change in physical space, but the result of the combined effects of the institutional environment, property structure, social actors, economic conditions, and spatial capacity. The case of the B.Amedeo block shows that physical forms such as streets, plots, and buildings have strong continuity, while their patterns of use, population structure, and property relations are continuously adjusted across different periods and influence spatial outcomes at different rhythms. Particular attention should be paid to the role of social actors in morphological evolution. The identities, economic capacities, migration capacities, and spatial-use patterns of different groups influence population movement, residential density, functional mixture, and spatial subdivision. Therefore, historic blocks should not be understood as static heritage spaces, but as dynamic systems shaped by long-term institutional constraints, social differentiation, property translation, and spatial adaptation. This understanding is conducive to promoting the sustainable development of historically significant “living urban spaces.”

5.2.3 Practical Implications

This study provides a referential preliminary analytical method for the renewal of residential historic districts. The conservation and renewal of historic districts should not move directly from current problems to design strategies, but should first identify the evolutionary mechanisms behind existing spatial conditions. For residential historic districts, many real problems are not formed in the short term. Issues such as spatial overcrowding, complex property relations, functional mixture, differentiated resident needs, and difficulties in renewal coordination are often the result of the long-term interaction among institutional, social, and property structures.

1.Focus on Variable Relationships Rather than Single Factors

The study shows that changes in block morphology are usually not directly driven by a single policy or planning measure, but are gradually realized through the interaction among population movement, spatial adjustment, and institutional conditions. Therefore, in actual renewal processes, intervention should begin with variable relationships and action pathways, rather than focusing only on the local adjustment of a single factor, so as to improve the effectiveness of renewal strategies.

2.Emphasize the Gradual Nature of Spatial Adjustment

Changes in spatial form are often constrained by property structure, development conditions, and the interests of multiple actors, and their adjustment shows clear stages and delays. This means that urban renewal should not aim at one-time transformation, but should proceed in a phased and gradual manner, while continuously coordinating the relationships among different actors in the process, so as to achieve more stable spatial transformation.

3.Respond to the Needs of Different Groups

Different social groups have significantly different needs and patterns of spatial use, and these differences can accumulate over time and produce long-term effects in the spatial structure. Therefore, in the process of block renewal and governance, the residential and activity needs of different groups should be fully considered. Spatial transformation should avoid being oriented toward a single function or a single group, so as to maintain the diversity and stability of the spatial structure. Therefore, before formulating renewal strategies, it is necessary to determine which spatial elements originate from long-term structural constraints, and which adjustments would involve deeper changes in property relations, users, and social relations. For residential historic districts in China, this preliminary mechanism analysis can help avoid replacing complex governance merely with façade improvement or commercial development, while also helping to respond to residents' living needs and pressures for gradual renewal while preserving the historic urban fabric.

5.3 Research Limitations and Prospects

This study still has the following limitations.

First, this study is based on the single case of the B.Amedeo block. This helps reveal its morphological evolution and internal mechanisms in depth, but the conclusions are closely related to specific historical and institutional contexts. The formation and development of this block were deeply influenced by Turin's urban structure, the Jewish community system, and the local property system. These conditions may not be fully present in other cities or blocks. Therefore, the applicability of the mechanism structure identified in this study to different contexts still requires further examination. Its generalizability lies more in the relationships among variables than in specific paths of action.

Second, in terms of methodology, the mechanism construction in this study mainly relies on

qualitative analysis. By reviewing historical materials and conducting logical inference, the study identifies the relationships among population, space, and institutions. This helps build a holistic understanding, but it has not yet entered the stage of precise quantitative simulation. As a result, the current model is more of a structural explanatory framework than an analytical tool that can be directly used for simulation and prediction. Due to the incompleteness of historical materials and the discontinuity of data, it is difficult to obtain continuous data for all variables, such as population size, spatial capacity, property changes, and intensity of use. Therefore, this study places greater emphasis on identifying relationships among variables and feedback structures, rather than on numerical prediction. Future research may further combine qualitative mechanism models with quantitative data in cases where data conditions are more sufficient.

Third, although this study has incorporated social actors into the analytical perspective and emphasized the influence of ethnic identity, social status, and economic capacity on spatial form, the relevant analysis remains relatively macro-level. It does not further unfold the differences among different groups in specific behavioral decisions or their cumulative effects in space. The role of the social dimension within the mechanism still needs to be deepened. Future research may further combine interviews, historical population data, residential records, and surveys of spatial use to analyze how different social actors continuously influence spatial form through migration, renting, subdivision, business operation, and maintenance.

The construction of the dynamic mechanism of historical block evolution in this study remains an initial exploration. The proposed mechanism model mainly serves as an analytical tool for organizing and explaining complex processes of morphological evolution, rather than as a final conclusion. The formation and transformation of urban form are highly complex, and mechanism structures may vary significantly under different institutional backgrounds and social conditions. The analytical path proposed in this study should therefore be regarded as an open research framework, which needs to be continuously tested, revised, and deepened through more cases, more methods, and interdisciplinary research. Through continuous comparison and expansion, it may be possible to gradually form a more explanatory and applicable model of block evolution mechanisms, thereby providing a more solid theoretical foundation for the study of historical blocks and urban renewal practice.

In view of this, research on historical blocks may be expanded in the following aspects:

1. Deepening mechanism construction

Future research may further refine the internal variables, levels of action, and interrelationships within the mechanism. It may distinguish the specific roles of different institutional factors, social actors' behaviors, and property changes in block evolution, and clarify their dominant degrees and transmission paths in different historical stages. This would make the mechanism model more complete and better able to explain the complex and nonlinear changes in the evolution of historical areas. Alternatively, on the basis of existing qualitative analysis, future research may introduce

multi-source data and quantitative methods to describe the relationships among population movement, spatial use, and property structure in greater detail. System dynamics models or multi-agent simulation methods may also be used to dynamically verify the operation of the mechanism, thereby improving the explanatory accuracy and application potential of the analysis.

2.Expanding case support

Comparative studies may be carried out in different cities and different types of historical blocks to conduct cross-case testing of the mechanism structure constructed in this study. This would help identify its general applicability and contextual differences, and further clarify the modes of action and relative weights of different variables under different conditions. Through historical map overlay, property data organization, archival and documentary analysis, field research, and interviews, future studies may identify common variables and specific paths in the evolution of different blocks, and compare the differences among cases in terms of institutional background, community structure, spatial form, and renewal process. The accumulation of cases would help improve the explanatory power of the mechanism model and more clearly identify its boundaries of applicability.

3.Promoting verification in domestic projects

The mechanism analysis framework proposed in this study particularly needs to be transferred and tested in Chinese historical block cases. Many historical areas in China also combine heritage value with actual residential functions, and commonly face problems such as complex property relations, diverse residents' needs, limited spatial capacity, and strong pressure for incremental renewal. Therefore, priority may be given to historical areas that still mainly serve residential functions, have relatively complex property relations, and are not undergoing one-time comprehensive redevelopment, but instead show long-term incremental adjustment. These cases can be used as comparative objects to test whether the framework of driver identification and mechanism analysis proposed in this study has cross-context applicability.

Future research may focus on traditional residential blocks, modern lilong districts, ordinary historical areas within old cities, and historical and cultural blocks with continuous residential functions. The research focus should not remain only on the comparison of morphological similarities. Instead, it should further examine whether similar paths of action can be formed among institutional conditions, property structures, social actors, spatial capacity, and renewal pressure in different cases. For example, future studies may test whether there is a continuous transmission relationship between external constraints and internal responses, whether the hierarchical classification of fundamental, intermediate, and direct drivers is applicable to domestic cases, and whether mechanism types such as reinforcing feedback, re-agglomeration, and asynchronous adjustment can explain the gradual evolution of Chinese historical blocks.

Through such transfer verification, the mechanism model proposed in this study can move from single-case explanation toward cross-case comparison. On the one hand, this can test its

boundaries of applicability under different institutional backgrounds, property conditions, and social structures. On the other hand, the realistic complexity of domestic cases can also be used to revise and supplement the variable settings, mechanism types, and paths of action. In this way, future research may gradually develop a mechanism analysis framework that is more suitable for the conservation and renewal of residential historical areas in China, providing a more explanatory preliminary analytical basis for balancing conservation, residential improvement, property coordination, and incremental renewal in historical blocks.

The mechanism model proposed in this study should be regarded as an open analytical tool. Its value does not lie in providing fixed conclusions, but in offering an analytical path for historical area research: tracing driving relationships from morphological results and further identifying mechanism structures. Future research may further test and revise the applicability of this framework through transfer verification in Chinese historical block cases, so that it can better serve the dynamic conservation and incremental renewal practices of residential historical areas.

Statement on the Use of AI Tools

Under the premise of strictly complying with academic norms and ethics, this study made reasonable and standardized use of artificial intelligence (AI) tools to assist the research process. The specific scope of application is as follows:

Literature retrieval and review: AI tools were mainly used to assist with the preliminary retrieval of Italian-language literature, keyword comprehension, and content translation, in order to improve the efficiency of reading foreign-language materials and organizing information. All relevant content was selected, verified, and finally confirmed by the author.

Assisted data processing: None.

Academic language polishing and format optimization: AI tools were used to assist in polishing selected Chinese and English expressions, translating the abstract, and checking formatting, so as to improve the accuracy, standardization, and readability of the thesis.

Research idea inspiration and learning of frontier methods: None.

Assisted creation of works: AI tools were used only to assist in checking and optimizing some figures and tables. All final figures and tables were drawn by the author, with no AI tools involved.

This study did not use AI tools in the core conceptualization, formulation of main arguments, or key processes of argumentation of the degree thesis and practical outcomes. These parts were completed independently by the researcher, reflecting the originality and core contribution of the research.

All AI-generated content has been strictly reviewed, evaluated, and, where necessary, revised by the researcher, and has been clearly indicated in the corresponding sections according to the actual situation. This study has established and preserved a complete and traceable electronic record of AI use, detailing the types of AI tools used, usage scenarios, input and output examples, and processing methods, for future inspection.

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Sources of Figures and Tables

Chapter 1

Figure 1-1 Drawn by the author.

Figure 1-2 Left: Geoportale Città di Torino

Center: PRG Relazione Illustrativa, Volume 1993; Right: drawn by the author.

Figure 1-3 Left: Google Earth;

Right: drawn by the author.

Chapter 2

Figure 2-1 Drawn by the author.

Figure 2-2 Photographed by the author.

Figure 2-3 Photographed by the author.

Figure 2-4 Scanned historical map from the Turin Archives, No. TD 64.1.24.

Figure 2-5 Drawn by Mario Passanti.

Figure 2-6 Drawn by Mario Passanti.

Figure 2-7 Cited from Scarzzella G. (ed.). *Torino nell'Ottocento e nel Novecento: Ampliamenti e trasformazioni entro la cerchia dei corsi* [M]. Torino: Celid, 1995: 183.

Figure 2-8 Left: cited from *L'isolato del Beato Amedeo nel 1661–70* (BORGONIO G.T., 1661–70). Right: cited from *L'isolato del Beato Amedeo nel 1682* (BORGONIO G.T., 1682). Both originals are held in the Turin Historical Archives (ASCT).

Figure 2-9 Cited from Cavallari Murat A. *Forma urbana ed architettura nella Torino barocca* [M]. Torino: UTET, 1968, 1(3): 117.

Figure 2-10 Base map cited from Garzino G., La Franca R. *Architettura judaica in Italia: ebraismo, sito, memoria dei luoghi* [M]. Palermo: Flaccovio, 1994; partially redrawn.

Figure 2-11 Photographed by the author.

Figure 2-12 Cited from Cavallari Murat A. *Forma urbana ed architettura nella Torino barocca* [M]. Torino: UTET, 1968, 1(3): 117.

Figure 2-13 Cited from Sacerdoti A., Tedeschi Falco A. (eds.). *Piemonte: itinerari ebraici: i luoghi, la storia, l'arte* [M]. Venezia: Marsilio; Torino: Regione Piemonte, 1994: 138.

Figure 2-14 Cited from *Manifesti e stampati relativi ai tentativi di vendita del Ghetto, 1812–1813*, File No. 20, Part I, Charity Hospital Archives (ASCT).

Figure 2-15 Cited from Pellegrini M. *Le aree segregate: Approcci teorici e un caso storico. Il ghetto ebraico di Torino* [M]. Torino: CELID, 1979: 183.

Figure 2-16 Drawn by the author.

Figure 2-17 Left: cited from the Charity Hospital Archives, Drawings and Design Archives, 68.1.1 (ASCT, Tipi e disegni, 68.1.1); right: cited from the Charity Hospital Archives, Drawings and Design Archives, 68.1.2 (ASCT, Tipi e disegni, 68.1.2).

Figure 2-18 Cited from the Charity Hospital Archives (ASCT), bombardamenti aerei. Schede di Censimento edifici danneggiati o distrutti, sezione di censimento 94, zona statistica 3, città di Torino, redatta il 3.7.1947, inventario n. 94, cartella 2, fascicolo 23, fondo UPA, Distruzioni belliche 1944–45.

Figure 2-19 Left: cited from VOLPIANO C., Archive No. 146, March 29, 1972, Building Project Archives, 1880–1941, Charity Hospital Archives (ASCT); right: cited from VOLPIANO C., 1972, Archive No. 518, supplemented on February 9, 1973 to April 30, 1971, Building Project Archives, 1880–1941, Charity Hospital Archives (ASCT).

Figure 2-20 Photographed by the author.

Figure 2-21 Cited from Sacerdoti A., Tedeschi Falco A. (eds.). Piemonte: itinerari ebraici: i luoghi, la storia, l'arte [M]. Venezia: Marsilio; Torino: Regione Piemonte, 1994.

Figure 2-22 Drawn by the author.

Figure 2-23 Drawn by the author.

Figure 2-24 Drawn by the author.

Figure 2-25 Drawn by the author.

Figure 2-26 Drawn by the author.

Figure 2-27 Photographed by the author.

Figure 2-28 Drawn by the author.

Figure 2-29 Cited from Colonnario delle Mutazioni di proprietà, Catasto Gatti, Charity Hospital Archives of the City of Turin (Isola n. 20 del Borgo di Po, Colonnario delle Mutazioni di proprietà, Catasto Gatti, ASCT).

Figure 2-30 Drawn by the author.

Table 2-1 Information in the table is based on field investigation.

Table 2-2 Information in the table is based on field investigation.

Table 2-3 Information in the table is extracted from historical maps.

Table 2-4 Summarized by the author.

Table 2-5 Summarized by the author.

Chapter 4

Figure 4-1 Drawn by the author.

Figure 4-2 Drawn by the author.

Figure 4-3 Drawn by the author.

Figure 4-4 Drawn by the author.

Figure 4-5 Drawn by the author.

Figure 4-6 Drawn by the author.

Figure 4-7 Drawn by the author.

Figure 4-8 Drawn by the author.

Figure 4-9 Drawn by the author.

Table 4-1 Summarized by the author.

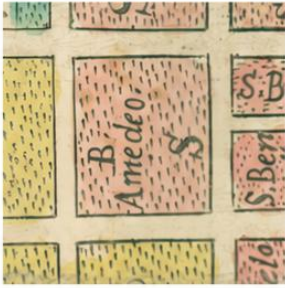
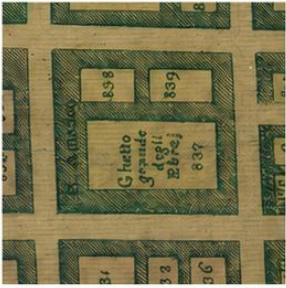
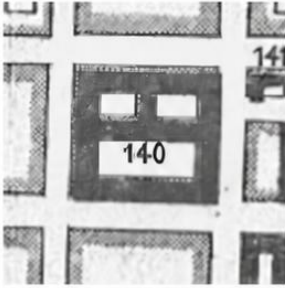
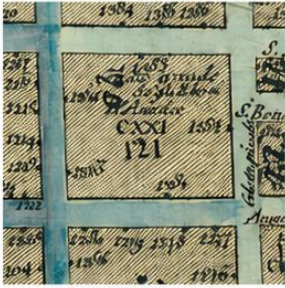
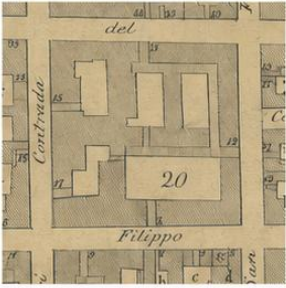
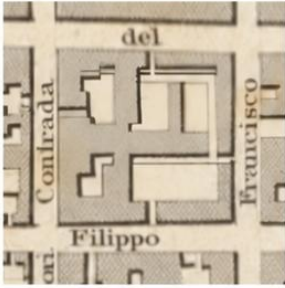
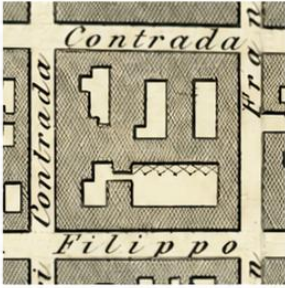
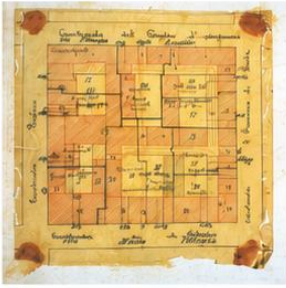
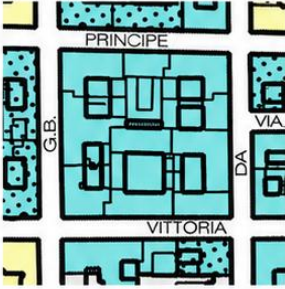
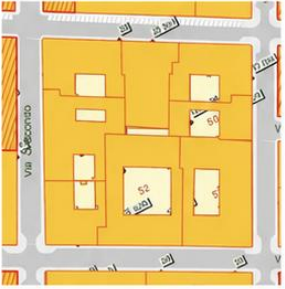
Table 4-2 Summarized by the author.

Table 4-3 Summarized by the author.

Table 4-4 Summarized by the author.

Appendix

Appendix A: Summary of Historical Maps of the Study Block

			
16th Century	16th Century	1790	1796
Turin Archives Map No.: TD 64.1.18	Turin Archives Map No.: TD 64.2.15	Turin Archives Map No.: TD 64.2.13	Turin Archives Map No.: TD 64.2.18
			
17th–18th Century	1800	1808	1823
Turin Archives Map No.: TD 64.1.23	Turin Archives Map No.: TD 64.3.2	Turin Archives Map No.: TD 64.3.10	Turin Archives Map No.: TD 64.4.5
			
1833	1840	1881	19th Century
Map Drawn by W. B. Clarke	Turin Archives Map No.: TD 64.4.17	Turin Archives Map No.: TD 64.3.21	Gatti Cadastral Atlas (catasto Gatti)
			
1911	1995	2024	2025
Turin Archives Map No.: TD 64.6.2	From Turin Urban Master Plan (PRG), 1995 Edition	Map from the Official GIS Website of the City of Turin	Google Earth Map

Appendix B: Population Change Data of the City of Turin

Source: <https://www.museotorino.it/>. The data are derived from official population censuses of the Kingdom of Sardinia, the Kingdom of Italy, and the Italian Republic, with the original data compiled by Pietro Castiglioni.

Table 1.

Turin's population census.

Source: data from the official censuses of the Kingdom of Sardinia, of the Kingdom of Italy and of the Italian Republic processed by Pietro Castiglioni.

<i>Year</i>	<i>Turin's population</i>	<i>Year</i>	<i>Turin's population</i>
1400	4000	1840	92 159
1560	20 000	1857	104 355
1631	36 649	1861	204 715
1704	37 306	1871	212 644
1715	44 906	1881	252 832
1720	47 816	1901	329 691
1730	54 764	1911	393 112
1740	58 832	1921	495 025
1750	58 128	1931	613 342
1760	63 202	1936	640 205
1770	66 721	1951	725 667
1780	69 894	1961	994 089
1790	76 504	1971	1 190 688
1800	61 446	1981	1 143 378
1810	67 162	1991	991 870
1820	71 078	2001	864 671
1830	90 845		

Acknowledgements

I would like to express my sincere gratitude to my supervisor, Professor Han Dongqing, as well as to Professor Dong Yinan and Professor Song Yacheng, for their patient guidance and valuable suggestions throughout the writing of this thesis. Their rigorous academic attitude, profound scholarship, and responsible and kind supervision have greatly benefited me and will continue to influence my future studies and work. I would also like to thank the anonymous reviewers for their detailed and constructive comments, which have provided important support for the improvement of this thesis.

I am also grateful to the two professors who guided me during my studies in Italy, Prof. Marco Trisciuglio and Prof. Mario Artuso. Their care and support in academic communication, research development, and my life abroad have enabled me to gain new perspectives and growth through cross-cultural learning and research.

In addition, I would like to thank the friends who studied with me in Turin, especially Liu Jingrou, Ambra Wang, Huang Zichen, Yu Hao, and Dino. Thank you for your help and encouragement during my studies abroad, my adaptation to life in a foreign country, and the difficult moments in my research. I am especially grateful to Anthea Liu, for always being by my side, supporting me, and giving me strength when I felt anxious and doubtful of myself.

Finally, I would like to thank my parents. You have always given me understanding and affirmation, and respected every choice I have made. Your unconditional love and tolerance have been the most reassuring foundation for me throughout this journey.

With this thesis, I would like to express my sincerest gratitude to everyone who has helped, supported, and accompanied me.

List of Graduation Thesis Defense Committee Members in South East University

Title of Graduation Thesis		MORPHOLOGICAL EVOLUTION AND DYNAMIC MECHANISMS OF THE B. AMEDEO BLOCK IN THE HISTORIC DISTRICT OF TURIN		
Author		Sun Zhitong (孙之桐)		
Major:		Architecture		
Research Direction		Urban Design		
Supervisor		Han Dongqing, Trisciuglio Marco		
Composition of the Defense Committee	Name	Professional Title	Discipline/Major	Affiliation
	Hu Youpei (Chair)	Associate Professor	Architecture	Nanjing University
	Song Yacheng	Associate Professor	Architecture	Southeast University
	Chen Ke	Senior Engineer	Urban Planning	Jiangsu Provincial Planning and Design Group, Provincial Planning Institute
	Tang Bin	Associate Professor	Architecture	Southeast University
	Dong Yinan (Secretary)	Associate Research Fellow	Architecture	Southeast University