



RESEARCH ON THE IMPROVEMENT OF SUSTAINABLE SERVICE DESIGN
STRATEGY TO ELEVATE THE WAY OF LIVING IN THE HISTORIC AREA :
CASE STUDY OF MENXI COMMUNITY, NANJING



By
Mr. Tian LI

A Thesis Submitted in Partial Fulfillment of the Requirements
for Doctor of Philosophy Culture - Based Design Arts
Silpakorn University
Academic Year 2025
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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต

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By Mr. Tian LI
Field of Study Culture - Based Design Arts
Advisor Assistant Professor Sarawuth Pintong, Ph.D.

Faculty of Decorative Arts, Silpakorn University in Partial Fulfillment of the
Requirements for the Doctor of Philosophy

..... Dean of Faculty of
(Associate Professor Arwin Intrungsi) Decorative Arts

Approved by

..... Chair person
(Assistant Professor Apisak Sindhuphak, Ph.D.)

..... Advisor
(Assistant Professor Sarawuth Pintong, Ph.D.)

..... Committee
(Assistant Professor Phuvanart Rattanaungsikul, Ph.D.)

..... Committee
(Professor Police Captian Anucha Pangkesorn, Ph.D.)

..... Committee
(Assistant Professor Atitthep Chaetnalao, Ph.D.)

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Mr. Tian LI : RESEARCH ON THE IMPROVEMENT OF SUSTAINABLE SERVICE DESIGN STRATEGY TO ELEVATE THE WAY OF LIVING IN THE HISTORIC AREA : CASE STUDY OF MENXI COMMUNITY, NANJING Thesis advisor : Assistant Professor Sarawuth Pintong, Ph.D.

Historic urban communities often face increasing difficulties due to rapid city growth, aging infrastructure, and weakened cultural cohesion. Once a vibrant historical enclave, Menxi is now dealing with social fragmentation, declining built environments, and a lack of inclusive planning. These pressing issues highlight the urgent need for sustainable, community-centered revitalization. This research seeks to explore how service design principles can be applied to improve residents' living quality while preserving the area's unique cultural heritage.

Adopting a mixed-methods approach, the study integrates quantitative surveys (T0–T2), semi-structured interviews, and focus groups to identify resident-driven needs and evaluate design interventions. Grounded in sustainable development and design thinking, the research proposes the Protect–Activate–Evolve framework and implements it through three small-scale design experiments focused on safety enhancement, environmental comfort, and cultural identity. Quantitative analysis using SPSS and qualitative NVivo coding were applied to triangulate outcomes.

This research found that the PAE-based design interventions produced measurable improvements in environmental comfort, resident experience, and cultural identity. Residents, particularly elderly and long-term inhabitants, reported increased satisfaction, while newer residents developed stronger emotional ties to the neighborhood. While the model proved flexible and replicable, its success also depended on sustained community involvement and local governance. This framework thus offers both opportunities and limitations, but overall, it demonstrates a valid pathway to elevate the way of living in historic communities facing transition. This study contributes a validated framework that bridges service design and sustainable urban renewal, offering actionable pathways for governments, designers, and scholars engaging with historic districts in transformation.

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CHAPTER 1

INTRODUCTION

1.1 Significance of the problem

The rapid advancement of urbanization has led to the gradual threat of the disappearance of traditional context (Han, 2022). Against this backdrop, there has been a growing concern and emphasis on the inheritance of cultural context. By the year 2022, the urbanization rate in Nanjing reached 86.9%, with the urbanization process progressing even more rapidly within the city area. Currently, the well-preserved traditional neighborhoods in Nanjing are predominantly found in the Menxi area. Therefore, this study focuses on the Menxi area in Nanjing.

Situated to the west of Zhonghua Gate in the Qinhuai District of Nanjing, Menxi derives its name from being located west of the central gate, Zhonghua Gate, historically known as Jubao Gate. It is opposite to Mendong and is approximately two kilometers away from the Qinhuai Scenic Belt of Nanjing (Figure 1). The geographical advantages of the Menxi area made it an economic center during the Ming Dynasty, with Zhonghua Gate and the inner Qinhuai River forming the core of urban commerce and craftsmanship. This region presented a prosperous scene (Zhu, 2016). Following the late Qing Dynasty, Menxi gradually transformed into a predominantly residential area, showcasing the traditional architectural style of Nanjing. To this day, the primary function of Menxi remains residential.

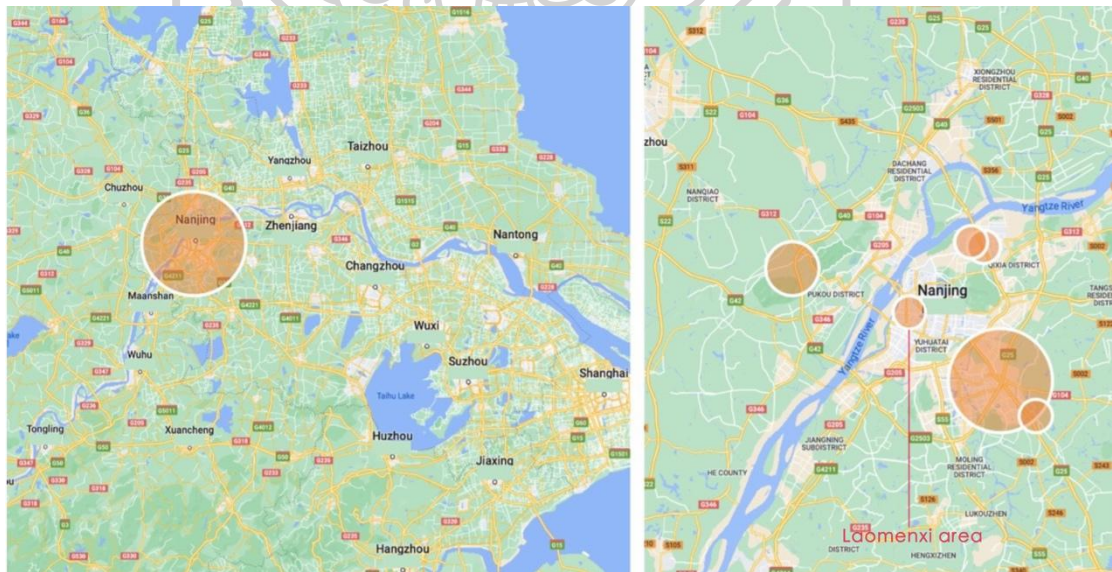


Figure 1 Schematic diagram of the distribution of existing traditional dwellings in Nanjing and the location of Menxi area (Li, 2023)

The Menxi area has played different roles at different stages of history, witnessing the development of Nanjing (Figure 2). In 333 B.C., King Xiong of Chu built the city of Jinling (present-day Nanjing). Over six hundred years ago, during the Ming Dynasty, the southern section of the Ming City Wall was constructed, and later, Zhu Yuanzhang named the southern gate as Jubao Gate (now Zhonghua Gate) (Tao, 2021). The walled area, enclosed by the city wall and the Qinhuai River, formed a relatively independent region. The central Jubao Gate distinctly divided it into east and west parts, now known as the Mendong and Menxi areas. Since then, both regions entered a rapid development phase, with workshops proliferating, shops flourishing, and a bustling population. During the Taiping Rebellion, both aristocratic families and commoners fled the Menxi area. After the Qing Dynasty regained control of Nanjing, refugees returned, and a significant influx of people from Anhui, Hunan, Jiangxi, and other regions, combined with the existing residents, formed the primary population settling in Menxi over the past century (Xu, 2016). During the Republican era, officials and wealthy merchants built houses and settled in Menxi, but it remained predominantly a residential area for commoners and a hub for handicraft workshops. Before the founding of the People's Republic of China, Menxi had no roads, let alone cars. Most households lacked access to tap water, and certain areas became concentrated with impoverished residents. After the establishment of the PRC, government officials, university professors, factory managers, and workers were resettled in the previously sparsely populated area north of Xinjiekou. Menxi has still not undergone large-scale urban construction, allowing the preservation of its original urban fabric and numerous Ming and Qing architectural structures. In the context of rapid urbanization, the property rights of these large households were seized by the government, leading to changes in the resident population. Presently, residents are mainly small businesses, vendors, small-scale artisans, and petty bourgeois (unemployed individuals) (Ma, 2022).

The demographic structure of the Menxi area has undergone significant changes. It is no longer dominated by social elites such as large household owners, wealthy merchants, and officials. Some original property owners lost their rights due to social reasons, prompting them to leave the area, while others chose to stay. The Menxi area also attracted external individuals due to relatively low rents, and this group is largely engaged in simple manual labor. These two categories of people have become the primary residents of the present Menxi area.

Menxi is the core area in the southern part of Nanjing, characterized by its profound cultural heritage, making it an indispensable component of Nanjing's culture (Tao, 2021). This aligns with the view that a community's cultural identity and sense of place are crucial for its sustainable continuity (Relph, 1976). Chen Zuolin recorded in "Fenglu Xiaozhi" that there were more than twenty private gardens built near

Hualugang, among which Yuyuan (Hu's Garden) was the most influential. Notable cultural figures, including Gu Qiyuan, a Ming Dynasty scholar, Pan Zongding, a folklorist, Cheng Xianjia, a proactive advocate of late Qing text reform, Xia Renhu, the last successful candidate in the provincial examination at Jiangnan Gongyuan, Qiu Dai, a prominent educator, Lu Qian, a literary and drama historian, contemporary writer Zhou Erfu, and renowned architectural educator Wu Liangyong, resided in this area (Tang, 2016). Valuably, the buildings in this area have not been demolished but preserved, unlike imitation antique structures. These buildings, to some extent, retain historical traces dating back to the Ming Dynasty, constituting a meaningful intangible cultural heritage. Individuals from different social classes, regions, and ethnicities coexist in this area, fostering the coexistence and integration of elite culture with popular culture, and high culture with folk culture, enriching the cultural connotation of Menxi. Therefore, the study of Menxi contributes to the sustainable development of Nanjing's cultural context (Wang, 2018).

However, in the present Menxi area, there exist a series of issues related to life, architecture, and cultural heritage (Figure 3). In terms of living conditions, the shared nature of public bathrooms, especially during the cold winter, poses inconvenience to residents' daily lives. Some houses, originally designed for independent households, now accommodate more than ten households, leading to overcrowding that intensifies resource scarcity and tension in shared spaces, significantly impacting residents' quality of life. Hanging clothes for drying is often done in public spaces. Regarding architecture, infrastructure problems are evident. The unique structure and constraints of traditional buildings complicate the introduction of modern architectural facilities. Maintaining and updating these traditional buildings require addressing practicality issues in modern living conditions while preserving cultural heritage. This involves not only technical challenges but also the consideration of achieving a balance between tradition and modernity, meeting the needs of contemporary residents while maintaining the distinctive architectural style of Menxi. In terms of cultural heritage, the pressure of urbanization threatens the integrity of historical context. The current presentation of the long-standing market culture in this area is relatively weak, lacking effective promotion and display. For the government, this area is located in the city center with a complex and populous internal population. Previous attempts at partial relocation did not resolve the issues. The government aims to develop this area into a unique culture, akin to Beijing's "Hutong culture," that is both distinctive and manageable, ensuring the preservation and inheritance of its unique cultural and humanistic values.

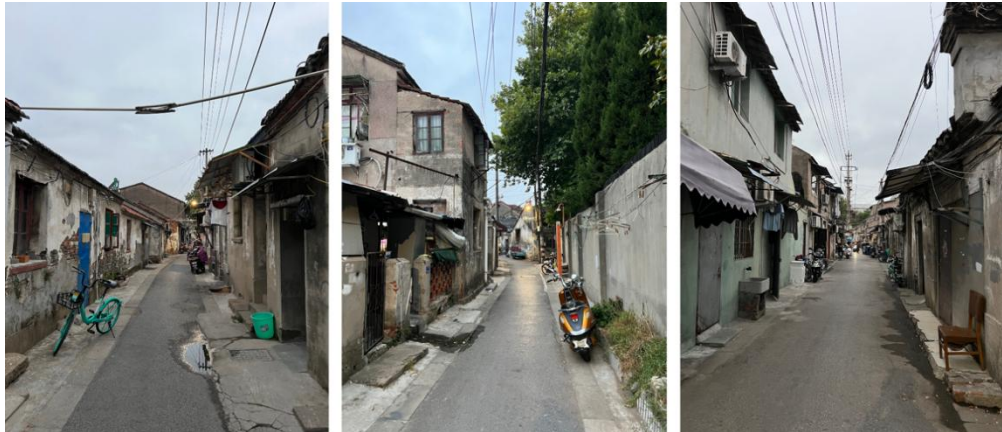


Figure 2 Current situation of Menxi area in Nanjing (Li, 2023)

The Menxi area plays an irreplaceable role in Nanjing's culture, possessing a profound historical context and a unique market culture. However, it currently faces a series of challenges in living conditions, architectural structures, and cultural heritage. In the process of preserving Menxi, it is necessary to address issues related to living environments, balance the protection of traditional buildings with the introduction of modern facilities, and enhance the display and inheritance of market culture. Only by addressing these issues can the Menxi area continue to prosper in urban development, truly achieve sustainable development, extend Nanjing's cultural context, and promote the inheritance and sustainable development of cultural heritage.

1.2 Objectives of Research

1. To study historical background, protection status and problems faced by China's historic area why Menxi has developed slowly over the years in Nanjing a rapidly developing city how to elevate the way of living ,traditional cultural context of Nanjing's Menxi area.

2. To analyze various cases find a balance between context and meeting contemporary lifestyle needs research methods of service design to analyze case study find ways to improve the way of living on the material and spiritual levels.

- 3.To design renewal strategies applicable to the Menxi area of Nanjing, improvement of living environments, planning cultural dissemination activities, achieve an organic fusion of "new" and "old." Elevate the way of living, it provides reference significance for a large number of similar regions in China.

1.3 Hypothesis

If a historic area adopts a service design staged intervention that diagnoses resident needs and spatial constraints, implements low-threshold environmental

upgrades alongside everyday cultural communication, and iterates with multi-stakeholder participation, then residents' ways of living will measurably improve and a durable sense of place will be reinforced thereby enabling the sustainable transmission of local cultural context and offering a replicable pathway for comparable heritage neighborhoods.

1.4 Scope of the study

1.4.1 Content Scope

This study investigates how service-oriented renewal can enhance everyday living conditions and cultural vitality in a protected historic urban district where demolition is not permitted. The inquiry is theoretically grounded in Service Design Theory, Sustainable Development Theory, and Grounded Theory. These lenses are operationalized through the PAE strategy—Protect, Activate, Evolve—and evaluated with a 6E framework encompassing Effectiveness, Efficiency, Experience, Equity, Environment, and Ethics. Methodologically, the research adopts a mixed-methods design that integrates a three-wave resident survey (with statistical analysis in SPSS) and qualitative interviews/focus groups (with coding and thematic analysis in NVivo), supported by service blueprinting and stakeholder mapping to translate insights into implementable interventions. The primary outcomes concern shifts in resident-reported living quality and service performance, participation and stewardship behaviors, cultural activation, and operational feasibility of interventions. Large-scale redevelopment, city-wide policy reform, and macro-economic impact modelling fall outside the ambit of this thesis.

1.4.2 Population Scope

The target population comprises accessible adult residents and local business operators within the Menxi historic area, established at approximately $N \approx 500$ based on the latest sub-district, neighborhood-block census tabulations, cross-checked against administrative registries and field enumeration. Eligibility requires age ≥ 18 and at least six months of residence or business operation within the defined boundary; short-stay non-residents, vacant/derelict units, and duplicate registrations are excluded. For the quantitative component, surveys employ proportionate stratified sampling across long-term residents, newer households/young families, and small business owners/tenants. Planning follows Slovin's formula with $e=0.05$, yielding a per-wave target of approximately $n = 222$. For the qualitative component, purposive, maximum-variation sampling is used to capture heterogeneity, with key-informant interviews conducted with association leaders and relevant government officials; focus groups are stratified by resident/business roles. Data collection continues until thematic saturation is reached.

Stakeholders

Core stakeholders

They are the most important group of people to discover and solve problems in this study.

Primary stakeholders

Is the essential population for this study.

Secondary stakeholders

Is the may be related.

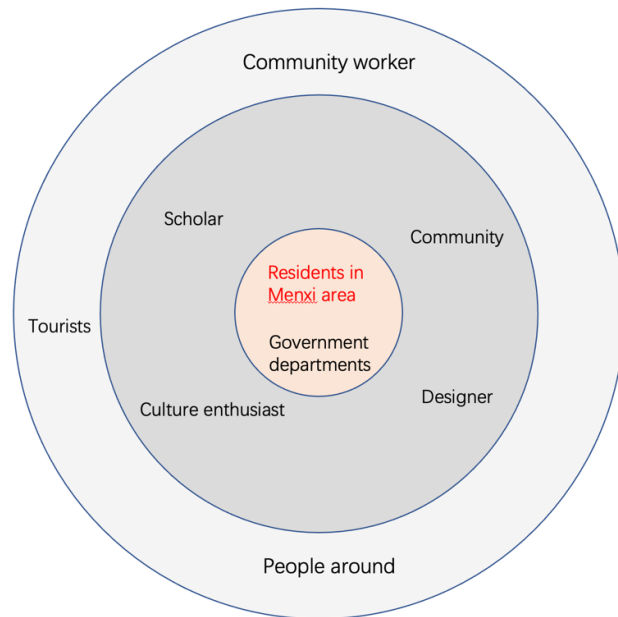


Figure 3 Stakeholder Analysis (Li, 2023)

1.4.3 Area Based Scope

The spatial unit of analysis is the Menxi historic area in Nanjing, delimited by the municipal heritage protection boundary at neighborhood-block scale. The research addresses public rights-of-way, shared courtyards, active street frontages, and community facilities located within this boundary. Private interiors are observed only with prior consent and for purposes directly related to service use and living conditions. Parcels and streets outside the designated boundary are excluded; external districts appear solely as comparative context in the case review.

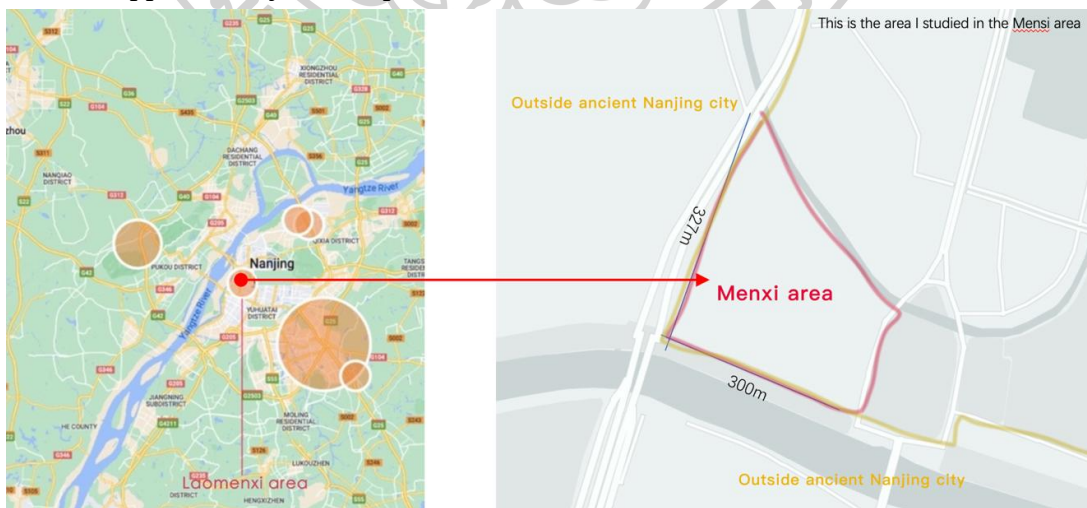


Figure 4 Menxi area geographical scope (Li, 2023)

1.4.4 Time Scope

For temporal delimitation, the Menxi residential quarter is treated as a living heritage ensemble whose primary land-use function has remained residential from its historical formation to the present, without large-scale conversion to commercial or institutional uses. The built fabric and streetscape morphology have likewise remained broadly intact—limited to routine maintenance and incremental repairs—so that the area constitutes a case of material (tangible) preservation of Nanjing’s urban culture. Accordingly, this study foregrounds continuity across periods (late imperial–Republican–contemporary) rather than transformation, and evaluates any proposed interventions against the requirement to maintain residential use and authentic appearance while improving everyday living conditions.

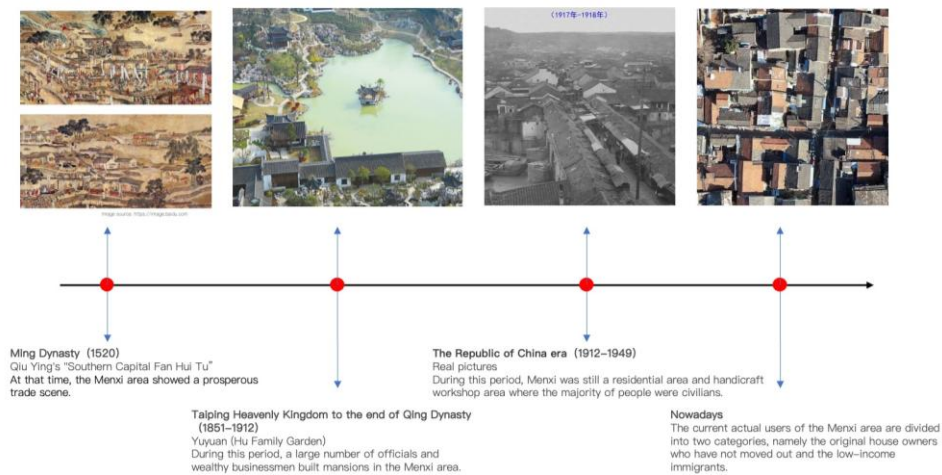


Figure 5 Menxi area timeline (Li, 2023)

1.5 Assumption framework

This thesis follows a cumulative design in which each chapter conditions the next. Chapter 1 formulates the problem, objectives, scope, and working assumptions that define the admissible evidence and expected causal direction. Chapter 2 consolidates the theoretical ground—Service Design Theory, Sustainable Development Theory, and Grounded Theory—into testable propositions that constrain the operational choices. Chapter 3 translates those propositions into an empirical design that makes the assumptions observable. Chapter 4 implements the PAE strategy and reports the results against the planned measures, providing the primary tests of fit between assumptions and evidence. Chapter 5 integrates outcomes,

assesses validity and limitations, and refines the assumptions into generalizable conclusions and design recommendations.

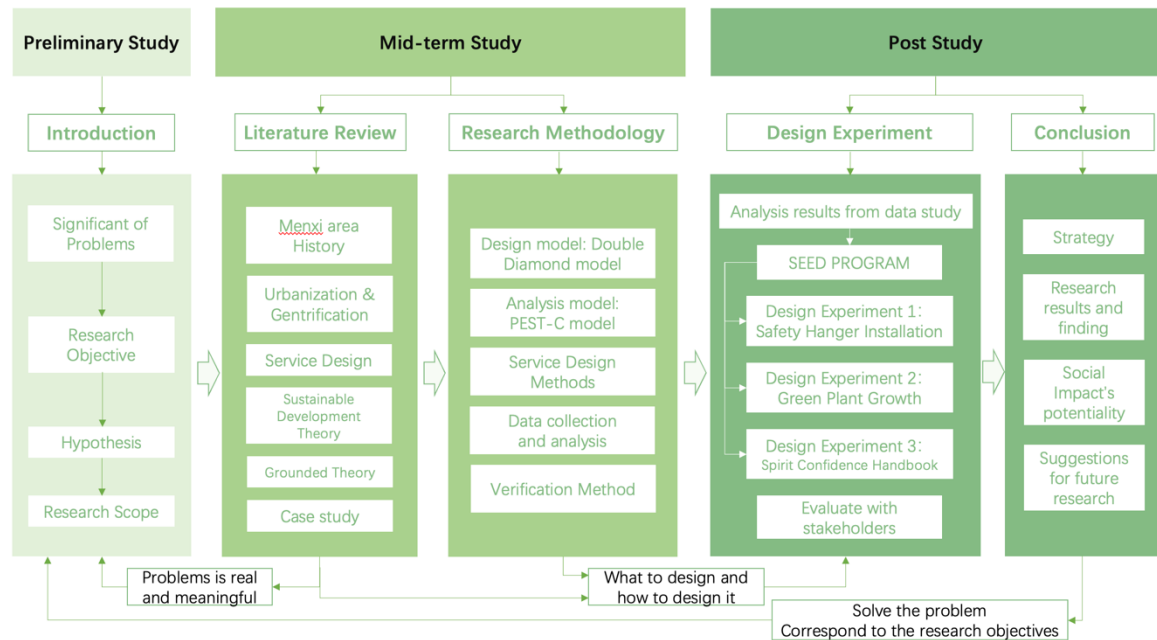


Figure 6 The process of research flow chart (Li, 2023)

1.6 Definition of Terms

ELEVATE THE WAY OF LIVING refers to the process of improving the quality of life for individuals and communities through enhanced living conditions, access to better services, and the development of sustainable infrastructure. This concept emphasizes not only physical improvements, such as housing, transportation, and public spaces, but also focuses on enhancing social well-being, cultural enrichment, and fostering a sense of community belonging. In the context of urban renewal, elevating the way of living is a key goal, aiming to integrate modern amenities while preserving the cultural and historical essence of a community.

SERVICE DESIGN is a multidisciplinary approach to designing and organizing services that are user-centered and efficient. It focuses on understanding the needs and experiences of users and aims to create systems that improve the service delivery process. Service design involves the careful consideration of various touchpoints where users interact with services, ensuring that these interactions are smooth, effective, and beneficial. In the context of urban planning and community development, service design helps align the needs of residents, local businesses, and other stakeholders to create a cohesive, well-functioning living environment.

THE HISTORIC AREA refers to a specific geographic region that holds significant cultural, architectural, or historical value. These areas often feature

preserved buildings, monuments, and urban layouts that reflect the heritage of a community or city. In urban development, historic areas are carefully managed to balance the need for modernization with the preservation of cultural and historical integrity. Development efforts in such areas focus on maintaining the architectural character while introducing necessary improvements to infrastructure and services that elevate the quality of life for residents.

1.7 Expected Output - Outcome

The study will deliver a consolidated, field-tested strategy package for the Menxi historic area, including an implementable service blueprint, context-specific design guidelines, standard operating procedures, links interventions to measurable indicators. Through iterative prototyping and pilot operation, the artefacts are expected to reach Technology Readiness Level (TRL) 6–7: demonstration of the integrated solution in relevant settings and subsequent demonstration in an operational environment with stable performance and maintainability. The output will be documented for transfer, with templates and parameter ranges that allow adaptation to sites with comparable physical constraints and governance arrangements.

At the societal level, the project aims to achieve Social Readiness Level (SRL) 6–7, evidenced by stakeholder acceptance, routine use under local governance, and early replication beyond the pilot. The formation of a replicable and communicable design strategy for protected historic areas; a rise in regional recognition and place identity through improved public realm quality and cultural programming; and enhanced safeguarding of cultural heritage, where everyday residential use is preserved while environmental standards and stewardship capacity improve. These outcomes are intended to provide a transferable model for similar districts, aligning conservation with contemporary living and establishing a basis for policy uptake and scaled dissemination.

CHAPTER 2

LITERATURE REVIEW

Introduction

Urbanization, the rapid transformation of once-vibrant traditional areas into modern urban landscapes, has become a global phenomenon. As cities evolve and expand, the preservation of cultural heritage and traditional contexts faces an imminent threat. This study focuses on the unique case of Nanjing's Old West Gate Menxi area, exploring the intricate balance between urban development and the conservation of its rich historical and cultural fabric.

Nanjing, a city steeped in history and cultural significance, has witnessed a rapid urbanization process. The preservation of traditional neighborhoods becomes increasingly challenging, with concerns rising about the potential loss of cultural continuity. By the year 2022, Nanjing's urbanization rate reached 86.9%, with the Old West Gate area standing out as a rare enclave preserving traditional streetscapes within the city center. This study delves into the Old West Gate area, examining its historical significance, changing roles, and the current challenges it faces.

Situated west of Zhonghua Gate in Nanjing's Qinhuai District, the Old West Gate area, known as "Menxi" due to its location west of Zhonghua Gate (formerly known as Jubao Gate), holds a pivotal place in the city's history. During the Ming Dynasty, this region, framed by the city wall and the inner Qinhuai River, emerged as an economic hub, bustling with commercial and artisanal activities (Zhu, 2016). In the late Qing Dynasty, it gradually transitioned into a predominantly residential area, showcasing the distinctive architecture of traditional Nanjing homes. Even today, the primary function of the Old West Gate area remains residential.

However, the area has experienced shifts in its demographic composition and socioeconomic dynamics. The study period spans from ancient times to the present, encompassing various phases of development, including the Taiping Heavenly Kingdom movement, the return of residents after the Qing Dynasty's recovery of Nanjing, and the influx of people from Anhui, Hunan, and Jiangxi provinces (Xu, 2016). During the Republican era, officials and wealthy merchants constructed homes in the Menxi area, yet it retained its character as a predominantly commoner's residential and artisanal enclave. With the founding of the People's Republic of China, significant changes occurred as administrative personnel, university professors, factory managers, and workers were resettled north of Xinjiekou, an area that was previously sparsely populated. Unlike many other regions, Menxi avoided large-scale urban redevelopment, preserving its historical urban fabric and numerous Ming and Qing Dynasty structures.

In the context of rapid urbanization, challenges emerged as the property rights of affluent households were reclaimed by the government, leading to shifts in the resident population. Consequently, the area now accommodates a diverse demographic, consisting largely of small business owners, vendors, small-scale artisans, and the unemployed (Ma, 2022).

The demographic transformation over the years has been significant. The area, once dominated by affluent families, merchants, and officials, now comprises a section of former property owners who lost their rights due to social reasons, some choosing to leave while others opted to stay. Additionally, the Menxi area has attracted migrants, drawn by its relatively affordable rents, with many engaging in manual labor. These two groups now form the primary resident population of the present-day Old West Gate area.

This study aims to explore the multifaceted roles that the Old West Gate area has played in Nanjing's history, scrutinizing its unique cultural and architectural heritage. Amidst the contemporary challenges faced by the community in terms of living conditions, architectural preservation, and cultural heritage continuity, this research endeavors to contribute to the sustainable development and preservation of Nanjing's cultural heritage.

2.1 Overview of Area and History

Menxi is located in Qinhuai District of Nanjing, because it is in the west of the Zhonghua Gate, so the name old men west. At present, the old men West is a well-preserved old residential area in the south of the old city, with profound historical and cultural heritage. Gaogang Li, Xiaoshun Li, Yinma Lane, Yingao Lane, Wufuli, Liu Zhitian's former residence, etc., are closely connected to form the old men West, which tells the story of the hundred years of spring and Autumn in the old city south, brick by brick. In the Ming Dynasty, it was a bustling place of commerce and trade, with a large number of traditional handicraft workshops. Although it has experienced the succession of dynasties, it still continues the traditional context of old Nanjing and represents the spirit of the place in the south of the old city.



Figure 7 Location of Menxi area (Li, 2023)

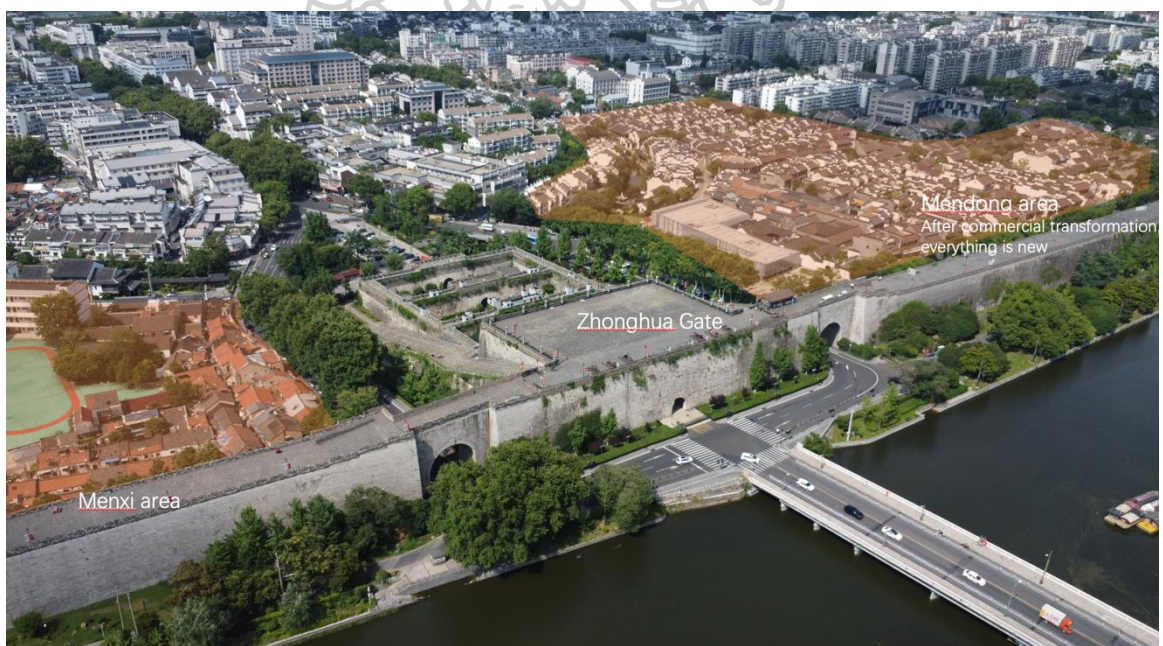


Figure 8 Zhonghua Gate Area Location (Li, 2023)

Menxi is located in the downtown area of Nanjing, the living space is small, the development is relatively slow, and because of this relatively closed development state, it still retains the unique city culture in the south of the old city. The architectural pattern of Menxi area is more chaotic, some buildings are slightly run-down and uneven, and some buildings with traditional charm have not been protected and repaired in time. Due to the small per capita land area, there are more illegal buildings in the region, which not only limits the lighting capacity of the alleys,

impedes people's normal passage, but also destroys the original unified architectural style.

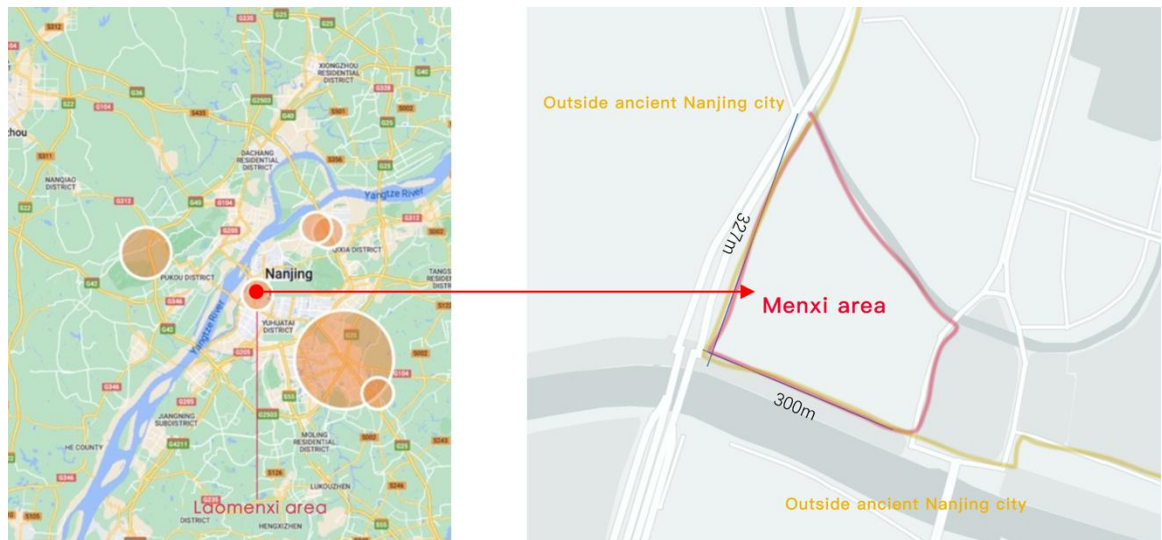


Figure 9 Schematic diagram of Menxi area in Nanjing (Li, 2023)

Living here are mainly the elderly and some low-income migrant workers, who basically have no spare public space for communication and leisure. There is also a lack of infrastructure in the area, with some garbage collection points scattered too widely, roofs of some houses covered with patches, and clothes drying poles carelessly installed between two buildings. In the alleys, you can see the crisscrossing power lines, and some of the Spaces have a lot of safety risks.

In history, Menxi is a famous handicraft center in Nanjing. It still retains many traditional food shops and handmade workshops, such as cotton mill in Mopan Street, soup bag shop in Yingao Lane, tofu stall in Yinma Lane, and pancake shop. It has a very urban atmosphere. However, with the decline of the Menxi area, the craftsmen of the past have slowly left here, and the streets are not as lively as before.

The French writer Proust said, "Beauty in reality is often disappointing because imagination can only be created for things that are not present." Sometimes the most obvious uniqueness of a place is not what is actually present, but what is associated with it, with what our memories and dreams are associated with across time and space." In fact, this is what we call the regional, cultural, belonging and other social features of the spirit of place.



Figure 10 Hygenics problems (Li, 2023)



Figure 11 The problem of public space (Li, 2023)

The Menxi under the wall of Ming City has always been the treasure of Nanjing. For thousands of years, it has been called the elegant residence of generals, the paradise of scholars, the blessing of businessmen and the paradise of the people. It is also ten miles of Qinhuai prosperity of the border, the Qinhuai River from the door west through the border, a strip of water. As for its cultural context, it has a long history. Although it has undergone the changes of dynasties, it is still alive and well, continuing the cultural context of Nanjing City. According to the survey, Menxi has never been flooded because of Dali so far, and its excellent terrain conditions and drainage system are still playing a great role. Although many historical landscapes and relics have been dilapidated, in the long history of the dry years, Menxi represents not only the spirit of the place in the south of the old city, but also an important historical environment showing the elegance of the whole old Nanjing.



Figure 12 protected building monument (Li, 2023)

Due to the limitation of scale, it is difficult for vehicles to pass in the old men West area, mainly for pedestrians, bicycles, electric vehicles, to ensure its slow driving system, the street form is straight, curved, folding type is changeable, one to two floors of building height clipped a pleasant street interface, pleasant scale, rich space experience. The combination of courtyard units and courtyards in the traditional residential houses in Laomen West not only has a rich spatial experience, but also reflects a strong spatial and hierarchical order. This layout is deeply influenced by the clan ritual system. At the same time, it also affects the social life and family life. With the development of The Times, the clan mode has gradually declined, and many courtyards have also been broken down into units for rent, and the ritual culture in Laomenxi area has gradually weakened. Instead, the sense of neighborhood was enhanced. Neighbors shared courtyards and public facilities and gathered in the streets for conversation. Various chairs were scattered near the threshold stones and doorways to facilitate communication. With a strong sense of the city and neighborhood relations.

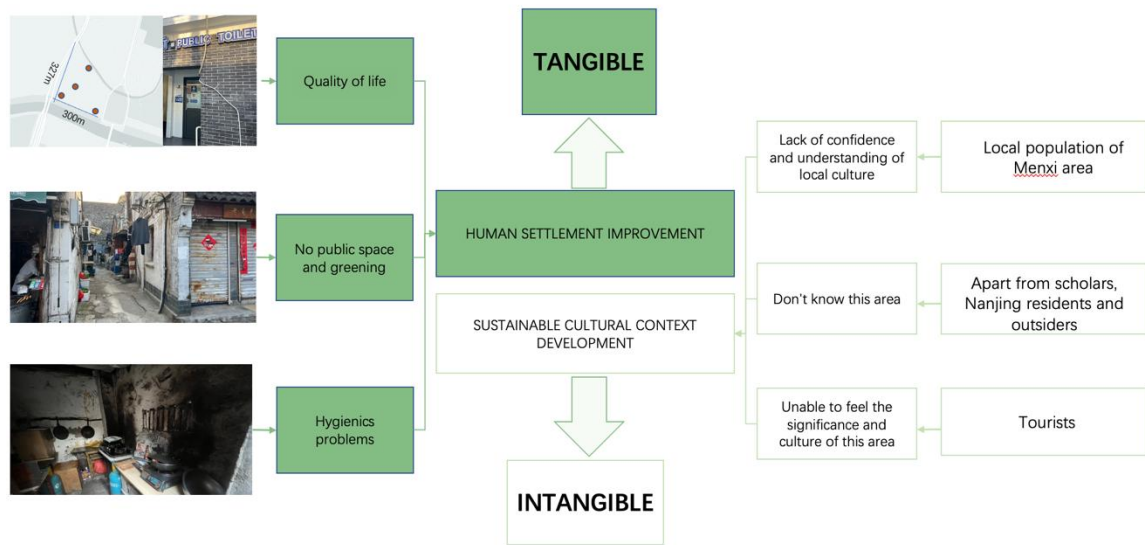


Figure 13 Problem and objective (Li, 2023)

Menxi area has gathered many handicraft workshops and markets, and named the streets, such as copper workshop, silver workshop, iron workshop, saddle and bridle, bow and arrow workshop, paint workshop, millpan Street, bean curd workshop, bricklayer lane, black pin lane, Rouge lane, bull market, diamond horn city, sugar square gallery, silk Shikou, Mee Street and so on. The most red-hot handicraft industry is brocade industry. The number of families engaged in brocade industry and related industries and the proportion of large households in Menxi area are far beyond other areas of Nanjing, which can be called the "base" and "leader" of Nanjing brocade industry. Large households gather here, computer rooms are densely covered, and the pattern is repeated. In 1910, Nanjing's various kinds of satin products won more than 20 awards, of which nearly half of the awards were in Menxi. In the 1920s, there were eight "top" Nanjing satin brands, seven of which were in Menxi. In 1937, according to a special survey conducted by the Kuomintang Government, 32 of the 54 Nanjing satin brands were in Menxi; There were 14 with more than 40 machines, 10 of which were in Menxi; 9 with more than 50 cards, 7 of which are in Mensey; And three with more than 100 were all in Mensey. The other most dazzling of the Menxi economy is the "foreign money factory" - the General Administration of Jiangnan Silver Dollar Minting (renamed Jiangnan Mint after the Republic of China). It is the pioneer of the early mechanism of silver coins in our country. It has repeatedly set records in the history of coin making in our country: it cast the earliest series of silver coins carrying branches in the years; Cast the first set of "circles" as the unit of value coins; The first commemorative gold coins were minted.

For a group of people, "Menxi" is not only the name of the region, but also the place where families live for generations, but also the collective emotional map and the carrier of city culture. Born in 1942, Mr. Chen Baixian used to be a professor at the Medical School of Tongji University in Shanghai. "Over the years since I left Nanjing in 1954, I have walked into Hualu Gang in my sleep countless times," he said in his memoir, *Common Things Have Feelings*. He wrote about Hualugang and painted the flowers in his memory. In 2019, he organized his family members to pack a bus and return to Hualugang to search for their roots. There are also many overseas tourists, as long as they return to the mainland, they have to walk the streets where they originally lived, even if it is just the remnants. Therefore, studying Mensi culture can revive the past, soothe homesickness, find roots in history, and build collective memory.



Figure 14 The problem of drying clothes (Li, 2023)



Figure 15 Clothes hung on power line (Li, 2023)



Figure 16 Kitchen hygiene issues (Li, 2023)

A field survey was conducted in the Mensi area in three separate sessions from September 2023 to December 2023. Residents over 55 years old account for 53% of the total population (among which 26.8% are over 65 years old), and the aging phenomenon is relatively serious.

The average age of the 45 households surveyed was 61 years old (the maximum age was 90 years old and the minimum age was 20 years old). In terms of the jobs of the residents, 17 were pure manual laborers, 4 were repair workers, 2 were catering workers, 4 were small businesses, and the rest were retired or unemployed. Among them, 22 are born and born in "old Nanjing", and 20 families have lived in this area for more than 30 years, another 6 families have moved into this area from the surrounding rural areas to work in the city, and a large number of residents have moved here from the demolition of Pingshi Street. In terms of housing property rights, a total of 37 valid questionnaires were collected, including 13 private houses, 18 rented houses and 7 public houses.

The above survey shows that the population structure of the area has entered the old type, and the increasing number of migrant workers is the main group of new residents.

The Menxi Area of Nanjing, located in the Qinhuai District, is a historically rich and well-preserved residential area that still retains the traditional culture of old Nanjing. Despite its profound historical significance, Menxi faces numerous challenges, including chaotic architectural patterns, inadequate infrastructure, and a predominance of illegal buildings. The area is primarily inhabited by elderly residents and low-income migrant workers, with limited public spaces and safety concerns. Historically a center of traditional handicrafts, Menxi has seen a decline in these activities, leading to a less vibrant community. The unique cultural and historical significance of Menxi, once bustling with commerce and craftsmanship, is gradually diminishing due to urban decay and insufficient preservation efforts.

Many residents are long-term inhabitants, with some families having lived in Menxi for over 30 years. The area's housing consists of a mix of private, rented, and public houses. The population structure reflects an aging community with an influx of migrant workers, highlighting the need for targeted interventions to address the social, cultural, and infrastructural issues in Menxi.

2.2 Research of related literature

The theory and practice of human habitation environment research originated in the 1960s. The impetus for architects to explore from an ecological perspective was propelled by Rachel Carson, a figure with multiple identities as a biologist, ecologist, and writer. Carson's 1962 work, "Silent Spring," played a pivotal role in global

environmental awareness, emphasizing the significance of preserving nature from the destruction wrought by industrial civilization. Subsequently, numerous architects dedicated themselves to a series of ecological design theories and practical attempts at various levels, including individual buildings, communities, and residential areas. Their goal was to minimize energy loss, resource consumption, and mitigate the adverse ecological impact of constructions by organizing functions, forms, materials, technologies, and construction methods rationally.

The science of human habitation environment, initiated by Mr. Wu Liangyong, was founded based on the human settlement studies of the Greek scholar Doxiadis, combined with practical reflections and construction experiences in China over the years. It is described as "a science focusing on the study of human settlements, emphasizing the exploration of the interrelationship between humans and the environment." It underscores the holistic consideration of human habitation as opposed to the partial perspectives of urban planning, geography, or sociology. The discipline's purpose is to comprehend and master the objective laws governing the occurrence and development of human settlements to better construct environments that align with human ideals.

As stated in the introduction of "Introduction to Human Habitation Environment Science," since the mid-18th century, with the advancement of the industrial revolution, global urbanization has accelerated, accompanied by an intensification of urban issues. In the active search for solutions and continuous exploration, various theories of urban planning emerged based on different disciplines. The most rapid development in terms of academic discourse was observed in architecture, economics, sociology, and geography. Despite their logical and reasoned academic foundations, their practical effectiveness demonstrated certain professional limitations, making it challenging to fully adapt to developmental needs. The requirement for academic research is to employ a holistic perspective and methods.

Mr. Wu Liangyong defines the human habitation environment as the place where human settlement and life activities are closely related spatially. It is the surface space intimately tied to human survival in the natural world, serving as the primary site where humans utilize and transform nature. The analysis includes five fundamental premises of human habitation environment research: the core is humans, with the purpose of satisfying "human habitation" needs; nature is the foundation of the habitation environment, as human production, life, and specific habitation construction activities are inseparable from a broader natural context; the habitation environment acts as an intermediary for interactions between humans and nature, and habitation construction itself is a form of interaction; rational habitation environments

represent the harmonious unity of humans and nature, echoing the ancient saying "unity of heaven and man"; and the complexity of habitation environment construction involves human social formation, various social activities, the creation of habitable spaces, and the formation of larger-scale and more complex support networks.

D.S.DoxiadiS proposes a research method for human settlement studies that combines empirical verification and abstract reasoning. Historically, settlements have been analyzed and constructed based on experience, with predictions about the future made by extrapolating from the experiences and lessons of existing settlements. Therefore, empirical verification is the fundamental research method for human settlements. However, this method has a significant drawback. When unprecedented new problems arise or significant changes occur in human settlements, relying solely on empirical methods can lead to errors or deviations. Hence, human settlement studies must also employ abstract theoretical thinking. D.S.DoxiadiS outlines a comprehensive systematic research method involving the following steps: 1) empirical research on human settlements; 2) comparative research using empirical verification methods between human settlements and other entities; 3) abstract theoretical research to formulate theoretical hypotheses; 4) practical verification of theoretical hypotheses; and 5) feedback and theoretical revision.

The attention to regional vernacular architecture emerged in the 1960s, prominently represented by German architect Bernard Rudofsky, American architect Amos Rapoport, and American architect Christopher Alexander. In 1964, Rudofsky published his seminal work "Architecture Without Architects," elucidating the drawbacks of modern architecture and urbanism. He advocated for attention to vernacular traditions with climate, technological, and cultural characteristics. Rudofsky explored the relationship between climate features and indigenous dwellings worldwide. Scholar Hara Hiroshi of Japan can be considered a continuation of this academic thought. Starting in the 1970s, he conducted settlements research globally, providing ample examples in his work "Revelations of Settlements 100" on the morphology of vernacular settlements, spatial structures of dwellings, and the relationship with regional climate, topography, materials, and construction.

Alexander's classic treatise, "A Pattern Language," introduced new patterns for architecture, planning, and construction, addressing prevailing issues in the field. He proposed that only by seeking the eternal principles of architecture can it possess enduring vitality. Lapobte, an American scholar, based on his investigations into the housing forms of indigenous populations in Africa, Asia, and Australia, delved into the diversity of dwelling forms and types. His work, "House Form and Culture,"

thoroughly explored the influence of various factors, such as regional societal culture, climate, materials, and construction techniques, on the formation of housing.

These theoretical studies on regional vernacular architecture expanded the depth and breadth of the traditional architectural research domain. Early architects' contributions to ecological design, bioclimatic design, and theoretical research on vernacular architecture provided valuable experiences, establishing an enduring theoretical foundation for the study of human habitation environments.

The theory and practice of human habitation environment research originated in the 1960s, driven by Rachel Carson's influential 1962 work "Silent Spring," which heightened global environmental awareness. Architects have since developed ecological design theories and practices to minimize energy loss, resource consumption, and ecological impact. Mr. Wu Liangyong advanced this field in China, emphasizing a holistic approach to human settlements that integrates urban planning, geography, and sociology. Wu defines human habitation environment as spaces where humans and their activities are closely connected with nature, advocating for a balanced interaction between humans and the environment. D.S. Doxiadis' framework categorizes human settlements into natural systems, human systems, social systems, residential systems, and support systems. This comprehensive approach encompasses individual and societal needs, infrastructure, and environmental interactions. Research methods in human habitation studies combine empirical verification with abstract theoretical thinking, following a systematic process of observation, comparison, hypothesis formation, practical testing, and feedback. The study of regional vernacular architecture, as advanced by architects like Bernard Rudofsky, Amos Rapoport, and Christopher Alexander, further enriches this field by examining the interplay between local traditions, climate, materials, and cultural factors. These contributions have established a robust theoretical foundation for contemporary research on human habitation environments.

Research on historic area renewal clusters into several strands whose problem frames, units of analysis, and evaluative criteria often diverge. A first strand is the heritage-led planning literature, crystallized in UNESCO's Historic Urban Landscape (HUL) approach, which argues for integrating conservation with urban planning, environmental management, and social participation. Here, the unit of analysis is the urban landscape as a whole, and the normative aim is to safeguard cultural capital while coordinating sectoral policies (UNESCO, 2011). While HUL offers a governance-integrative vocabulary, critics note that operational pathways from principle to street-level service improvements are sometimes under-specified, particularly in contexts where demolition is constrained but everyday services lag behind.

A second strand emphasizes place branding and destination marketing. It treats historic precincts as assets in inter-urban competition, focusing on identity communication, visitor experience, and investment attraction; the unit of analysis is

the city/precinct image system and its stakeholder perceptions (Kavaratzis & Ashworth, 2005). This strand can professionalize communication and mobilize resources, yet it risks privileging short-term visibility and tourist logics over residents' needs, potentially catalyzing commercialization and crowding-out effects if not bounded by conservation and social safeguards. Case work on Nanluoguxiang shows how façade improvements and infrastructure upgrades were harnessed to revalorize real estate and tourism, with uneven benefits and constrained resident voice (Shin, 2010).

A third, partly corrective strand foregrounds collaborative governance and micro-regeneration. Studies of Dashilar document how small-step pilots, new intermediary platforms, and negotiated rules can incrementally stabilize stewardship and diversify uses, while also revealing power asymmetries among municipal actors, platform firms, and residents (Li, Lin, Hooimeijer, & Monstadt, 2024). Compared with marketing-led approaches, this governance literature shifts the unit of analysis to institutions and decision processes, with attention to role clarity, resource flows, and accountability; its blind spot is that design quality and service workflows may still be treated implicitly rather than as engineered socio-technical systems.

A fourth strand brings service design into public-realm and municipal-service settings, supplying tools for blueprinting, stakeholder mapping, and prototyping to improve process quality and access. It excels at making user journeys and backstage operations legible and experimentally adjustable (Stickdorn & Schneider, 2011; Stickdorn et al., 2018). For example, design thinking has proven capable of driving social innovation in the public sector by creatively addressing user needs (Brown & Wyatt, 2010). However, absent a conservation frame, such tools can optimize experiences while inadvertently normalizing interventions that erode authenticity or exceed carrying capacities.

Finally, evaluation research proposes multi-dimensional vitality/value frameworks for historic districts that balance historical, use, and sustainability dimensions, pushing against single-metric success definitions (e.g., footfall or façade renewal counts). Recent Beijing-based work operationalizes such composites across cultural, commercial, and residential districts—linking historic value, use value, and sustainable value to the past–present–future arc of heritage—thus offering a bridge between conservation and lived performance (Zhang, Wang, & Li, 2022).

2.3 Related Theories

2.3.1 selected theory 1 : Service design

Service Design Theory was selected as the foundational framework for this research due to its strong orientation toward human-centered, participatory, and system-level problem-solving. Unlike conventional design approaches that focus

primarily on products or spaces, service design emphasizes experiences, processes, and interactions, making it particularly suitable for addressing the complex, multi-stakeholder challenges present in historic urban communities. This theory facilitates the mapping and redesign of service ecosystems by aligning stakeholder needs, touchpoints, and user journeys, which is essential when aiming to elevate residents' quality of life while maintaining cultural continuity.

Moreover, the Menxi community presents layered socio-cultural dynamics and infrastructural fragmentation that require not only spatial but also relational and behavioral transformation. Service design enables iterative co-creation, prototyping, and feedback cycles that are aligned with sustainable development goals. By applying Service Design Theory, this study bridges intangible cultural values with tangible environmental improvements, offering a flexible, evidence-based model that adapts to the evolving needs of both long-term and new residents in a heritage context.

2.3.1.1 Development of service design

In 1972, Theodore Levitt published the article "Production-line Approach to Service" in Harvard Business Review, which mentioned "designing" service itself for the first time and suggested that intangible service design could be realized by tangible machines and tools. His ideas such as the logical framework of mass production and the control of intangible assets through material means still influence the understanding of service design to this day (Kim, 2008). Shostack is the author of "How to Design a Service" (1982) in the European Journal of Marketing, "Designing Services That Deliver" (1984) in the Harvard Business Review (Shostack, 2003). He was the first to clearly combine "service" and "design", emphasizing on "service" as the focus and planning through "design". Later, Scheuing, (Johnson, 1989) and studied the influence of marketing on service design, but the above mentioned mentioned service design from the perspective of service marketing and service management (Scheuing, 1989).

In the design discipline, Bill Hollins and his wife (1991) first put forward the term "service design" from the field of design management in their book "Complete Design" (Ollins, 1991). In the same year, Michael Erlhoff and Birgit Mager of the International School of Design (KISD) in Cologne, Germany, first introduced "service design" as a design course into design education (Mager, 2009). Domus Academy in Italy also included service design as a part of design education. In 1994, the British National Standards Bureau issued the world's first guidance standard on service design management BS 7000-3:1994, the latest version is BS 7000-3:2008, that is, "Design Management System: a Guide for Service Design Management"; Which defines: service design is a reasonable and predictable demand of potential customers, and the economic use of available resources of service shaping stage (Gao, 2014). The first service design firm, Live/Work, was founded in the UK in 2001, with the view that service design is an innovative and practical approach to

improving existing and innovative services, and applying established design processes and methodological skills to the development of services. In 2002, IDEO, a well-known American design company, incorporated service design into its business scope (Moritz, 2005). In 2004, the International Alliance for Service Design (SDN) was launched by Birgit Mager, Germany, who believes that service design aims to create services that are useful, usable, desirable, efficient and effective (Zhang, 2018); It is a people-centered approach where the key value for success lies in the quality of customer experience and service touch; A holistic approach that considers strategy, systems, processes and contact design decisions in an integrated way; It is a systematic iterative process that incorporates a user-centered, team-based, interdisciplinary approach (Saco, 2008). In 2008, Aalto University of Finland established Service Factory, which researches hot social issues and related technologies through the cross-integration of multi-disciplines, multi-teams and multi-models, and cultivates interdisciplinary talents in service design (Luo, 2018). In the same year, service design was defined in the Design Dictionary published by the International Design Research Association and the Copenhagen Interaction Design Research Center. In 2008, the International Association for Service Design was formally established, becoming an important international organization and exchange platform for practitioners and academic researchers. In 2015, ICSID changed its name to International Design Organization (WDO), and its new definition of design takes "service" as the object of design together with product, experience, strategy, etc.

2.3.1.2 Application of Service design

The so-called service design is to design the services that people use. The research of service design must first start from the design goal and object. According to Philip Kotler (2010), service is any kind of behavior or benefit that one party can provide for another party. It may be intangible, and it is a kind of behavior that cannot generate the ownership of anything. The product of service design does not necessarily have to be associated with the physical product, but it can be associated with it. According to Dan Saffer, a service is a set of actions or events that result from the interaction of consumers, media technology and representatives of the service providing organization in the service product. Services are defined and differ in many subject areas. However, if the characteristics of services are divided, they can be summarized into four points: intangibility, variety, simultaneity of production and consumption, and perishable.

Service design is a new field gradually recognized by designers in recent years. In 1991 Dr. Erlhoff first proposed the concept of service design in the design discipline. In 2004, to deepen international research and education, a service design network was established between the International School of Design Cologne, Carnegie Mellon, Linköping's University, Politecnico di Milano and Domus Design Institute. Professor Stefan Moritz (2005) of ISD Cologne has made a detailed

discussion on the development background of service design, the significance of the emerging field, the ways of function and some tools and methods. Professor Manzini (2004) from Politecnico di Milano emphasized the design of product service system, emphasizing the intangible service to partially replace the consumption of energy materials. The application and practice of service design is representative in Europe and the United States and other countries, and various university organizations have applied it to different fields and developed different directions. Although the theoretical development of the discipline of service design is still immature, it has been developed like a hot fire in the fields of public sector, education, medical treatment and e-commerce, and has gradually penetrated into all aspects of people's life. By paying attention to consumers' use behavior patterns and interaction patterns, service design not only brings better user experience to consumers, but also creates corresponding value.

2.3.1.3 Methods and technologies of service design

The ultimate purpose of service is to better understand the user, so that the developed products can meet the user's experience and better serve the user. So what do people really want to know? For different problems to be solved by service design, the research and design methods are different, and the level of complexity is also different.

Service design is in the same vein as product design and user experience design. Generally speaking, there are two types of research methods: qualitative research and quantitative research. The various methods discussed in daily life, such as observation, questionnaire, storytelling, user interviews, perceptual imagery, cognitive walkthrough, oral reports, focus groups, reality research, participatory design, group culturology, storyboard, EEG research, EMG research, eye tracking, behavioral observation, etc., can be applied to the study of service design. However, for different content and purpose of service design, different methods should be chosen according to the actual situation.

1) Brainstorming, that is, a group of people for a certain topic, under the guidance of science, put forward ideas, questions and even suggestions for improvement, in service design is a good way to solve problems. The people involved in service design can be business managers, users, or service designers. Whiteboards and post-it notes are the most widely used tools for brainstorming. They are used to record content and identify flaws in the design process.

2) Service Blueprint is a common method of service design, which uses visual images to create a clear presentation. The content of service blueprint combines the views of users and service providers, as well as the model architecture of various links and the communication ways of various roles. The production of the blueprint can show the details of the service design in great detail, so that the designer and the service provider can better verify, implement and maintain the service.

3) Create a User Profile to summarize the service experience and main characteristics of a certain (class) person known to the designer in a concise and intuitive way, similar to the "Persona" or user profile in the design method for user research. For the users of the service, the design team creates some kind of common conclusions or knowledge to share with them. This type of approach can also help stakeholders better align their approach to innovation across the project.

4) Ethnographic approaches. "Ethnography" is a systematic approach to the study of people and the resulting culture, which is used to explore the cultural phenomena behind a certain group, also known as group culturology and ethnography. Case reports using ethnographic methods can reflect the lifestyle of the people under investigation and what kind of knowledge they probably use. In service design, ethnographic methods simulate successful service experiences about a concrete product, a space or a system by reproducing key physical "touch points" in the service experience process, so that designers can gain a clearer insight into users' psychological behaviors and cultural demands.

5) User flow chart drawing is a clear visualization of the user's complete experience of the service and the goals to be completed within a certain time and space. In all links, the key "contact points" generated by the contact between the user and the service constitute a complete "journey", or service process. By drawing a user flow chart, designers can easily analyze the moments when the service is working for the user, also known as "magic moments"; And what needs to be improved, also known as "pain points."

6) Stakeholder mapping. Who are the stakeholders? Service design generally includes business managers, employees, customers, business partners, and other hidden stakeholders. The interaction between these different groups can be drawn into a visual chart and analyzed to get a conclusion from the perspective of stakeholders, which is conducive to service designers to extract specific needs and pain points.

7) Behind-the-scenes insights. Service design researchers can immerse themselves in user behavior, become front-line employees in service systems, or gain behind-the-scenes insights into user behavior and experience processes. Compared with traditional design research methods, behind-the-scenes insight methods can directly see the moment when real problems occur, avoiding indirect interviews with users and obtaining untrue information (Alves, 2013).

Service Design Theory Models and Tools

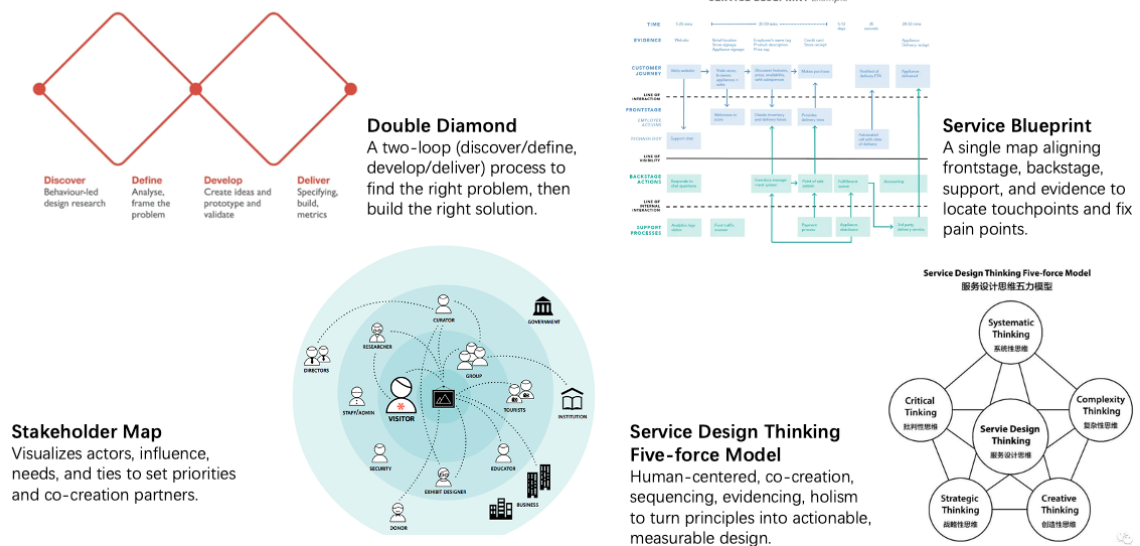


Figure 17 Service Design Theory Models and Tools (Li, 2023)

2.3.1.4 Summary

Service design, a field that has evolved significantly since Theodore Levitt first mentioned it in 1972, focuses on creating and improving services through systematic and interdisciplinary methods. Levitt's ideas laid the foundation for the field by suggesting that intangible services could be designed using tangible tools, and this notion was further developed by Shostack in the 1980s. The concept was formally introduced into design education by Bill Hollins and later institutionalized by organizations such as the International School of Design in Cologne and the British National Standards Bureau, which issued the first guidance standard on service design management in 1994.

The application of service design extends across various domains, emphasizing the creation of services that are user-centered, efficient, and desirable. According to Philip Kotler, service design involves designing behaviors or benefits provided by one party to another, often intangible and not associated with physical products. The approach has gained recognition in public sectors, education, healthcare, and e-commerce, highlighting its role in enhancing user experiences and creating value by understanding consumer behavior patterns.

Service design employs a range of methods and technologies, including qualitative and quantitative research, brainstorming, service blueprints, user profiles, ethnographic approaches, user flow charts, stakeholder mapping, and behind-the-scenes insights. These methods aim to thoroughly understand user needs and experiences, enabling designers to create services that effectively meet those needs. The interdisciplinary nature of service design, combining aspects of product design

and user experience design, allows for the development of innovative and practical solutions that enhance both the service and the user experience.

2.3.2 selected theory 2 : Sustainable Development Theory

Sustainable Development Theory was selected as a foundational theoretical lens for this research due to its emphasis on balancing environmental integrity, social equity, and economic viability in long-term urban planning. Historic urban communities such as the Menxi area in Nanjing face intertwined challenges—deteriorating physical environments, weakened cultural cohesion, and increasing social disparities—which necessitate an integrative and future-oriented approach. Sustainable Development Theory provides a critical framework to guide not only physical renewal but also the improvement of human well-being and community resilience.

In this research, the theory is operationalized through a phased intervention strategy that integrates participatory methods, localized co-design, and iterative validation. Each design phase is guided by sustainability principles, addressing both material and non-material aspects of the living environment. From improving safety and green infrastructure to enhancing social connectedness and cultural continuity, the framework ensures that interventions do not merely offer temporary solutions but contribute to enduring social and ecological value. The use of this theory thus enables the project to position design as a catalyst for holistic and adaptive transformation in fragile urban heritage contexts.

Sustainable Development Theory provides the normative and operational foundation for linking conservation with contemporary living in the Menxi historic area. It adopts the widely used Brundtland understanding of development that “meets the needs of the present without compromising the ability of future generations to meet their own needs,” which embeds both intergenerational and intragenerational equity and requires integration of environmental limits with human well-being. In this study, the theory is specified through two complementary strands: (a) the triple bottom line integration of environmental quality, social well-being, and economic viability as concurrent—not sequential—criteria for renewal; and (b) strong sustainability principles that treat irreplaceable cultural and ecological assets as non-substitutable stocks, thereby placing precautionary limits on interventions that would degrade the historic fabric.

This theoretical stance is aligned with global policy instruments framing urban heritage within sustainable development. The 2030 Agenda emphasizes integrated, inclusive urbanization (SDG 11), and Target 11.4 calls explicitly to “strengthen efforts to protect and safeguard the world’s cultural and natural heritage,” positioning conservation as a development commitment rather than a constraint. The UNESCO

Recommendation on the Historic Urban Landscape (HUL) further operationalizes this integration by requiring that heritage conservation be embedded in urban planning, social participation, and environmental management, a position directly applicable to Menxi's non-demolition context.

Operationally, Sustainable Development Theory informs this thesis in three ways. First, it sets decision rules for the strategy: Guards critical, non-substitutable stocks (historic fabric, street morphology); Improves service access, equity, and livelihood options without degrading environmental performance; Institutionalizes maintenance, participation, and resource cycles to preserve gains over time. Second, it links measurement to multi-dimensional outcomes: environmental hygiene and micro-greening, social participation and place attachment, and small-scale economic vibrancy are assessed together rather than traded off, consistent with triple-bottom-line integration. Third, it frames validity claims: observed improvements must be compatible with conservation thresholds (strong sustainability) and with the Agenda 2030 heritage mandate (SDG 11.4), ensuring that short-term activation does not erode long-term cultural capital.

If strategy interventions respect strong-sustainability limits on the historic fabric while delivering triple-bottom-line gains in service access, participation, and environmental quality, then Menxi should exhibit simultaneous improvements in living conditions and heritage safeguarding that are consistent with SDG 11.4 and transferable to similar districts.

Summary

The theoretical foundation of this research rests on two complementary frameworks: Service Design Theory and Sustainable Development Theory. Service Design Theory offers both methodological tools and a user-centered mindset to structure interventions in complex urban contexts. Originating from early conceptualizations of designing intangible services, it has evolved into a mature, interdisciplinary field that emphasizes co-creation, touchpoint optimization, stakeholder engagement, and iterative refinement. The methods such as service blueprinting, stakeholder mapping, ethnographic research, and participatory design are particularly suited to historic communities where residents' lived experiences are essential inputs for adaptive solutions.

Sustainable Development Theory, on the other hand, provides the normative logic that frames heritage protection and community renewal as mutually reinforcing goals. Drawing from the Brundtland definition and the SDG 11.4 mandate, it operationalizes a triple-bottom-line approach—integrating environmental, social, and economic considerations without sacrificing cultural continuity. The concept of strong sustainability, which treats heritage and ecological assets as non-substitutable,

imposes necessary limits to ensure that short-term interventions do not degrade long-term value.

Together, these two theories support the design and evaluation of interventions in the Menxi historic area by linking process (how to design services) with purpose (what kind of future to sustain). This dual-theoretical lens not only guides the creation of context-sensitive, resident-driven solutions, but also ensures that such interventions remain culturally grounded, environmentally responsible, and socially equitable. Additionally, the use of a Grounded Theory approach in this study's qualitative analysis ensured that design strategies were empirically derived from local data, consistent with best practices in iterative theory-building.

2.4 Case Study

2.4.1 Beijing Hutong

Beijing's Hutong neighborhoods were selected as a comparative case study because they represent one of the most iconic and extensively studied forms of traditional urban settlement in China. These historic alleyway communities share several critical characteristics with the Menxi area in Nanjing, including dense low-rise morphology, long-standing residential occupancy, and strong place-based cultural identity. Importantly, Hutong areas have undergone multiple rounds of policy-driven regeneration, community-led preservation, and design intervention, making them a rich repository of tested strategies and documented outcomes in the field of historic urban renewal.

By examining successful and unsuccessful examples from Beijing's Hutong transformation—such as community-based greening projects, adaptive reuse of courtyard houses, and integration of intangible cultural practices into public space design—the research draws transferable insights that inform the strategic development of Menxi. These comparative lessons provide a benchmark for evaluating sustainability, social inclusion, and cultural continuity, and serve to situate the Menxi case within a broader national discourse on balancing conservation and modernization in historic districts.

Beijing's hutong-siheyuan fabric—narrow lanes structured by courtyard houses—offers a canonical instance of morphologically coherent yet socially contested historic urbanism. Recent scholarship formalizes hutong spatial rules as a reproducible “neighborhood grammar,” underscoring how lane width, courtyard sequencing, and threshold conditions organize everyday life as much as built form (Wang, 2023). In parallel, longitudinal reviews of courtyard housing trace both the post-1949 decline of siheyuan and successive “new courtyard” experiments that sought to reconcile traditional typologies with modern dwelling standards (Zhang, 2017). Taken together, these strands frame hutong not merely as a conservation object

but as a living urban system in which form, use, and governance are mutually constitutive.



Figure 18 Traditional gate of Beijing residence (Li, 2024)

Since the early 1990s, Beijing has pursued a dual track of property-led redevelopment outside protected areas and area-based conservation within them. The 2002 Conservation Planning of Historical & Cultural City of Beijing formalized 25 conservation areas and prioritized retention of hutong townscape and mixed tenure while upgrading basic services; yet implementation has been uneven and often subordinated to growth imperatives (Beijing Municipal City Planning Commission, 2002, as discussed in Shin, 2010; Tibet Heritage Fund, 2006). In the emblematic case of Nanluoguxiang, conservation functioned as a revalorization strategy—infrastructure works and façade improvements facilitated commercialization and real-estate investment, with differentiated benefits and limited resident voice (Shin, 2010). This dynamic illustrates the broader tension between heritage preservation and gentrification noted by urban scholars, where unchecked revitalization can erode local cultural identity (Lynch, 1960). These findings caution that physical upgrading, absent social safeguards, can accelerate displacement pressures even where wholesale demolition is avoided.



Figure 19 Coffee shops in Beijing's hutongs (Li, 2024)

Counter-examples reveal alternative trajectories. The Juer Hutong (1990–1994) “new courtyard” housing prototype tested low-rise, high-density infill as a culturally legible replacement for dilapidated compounds; post-occupancy assessments document gains in habitability alongside persistent constraints (daylight ratios, open-space loss) that temper claims of cultural sustainability (Zhang, 2016; Zhang, 2017). More recent hutong regeneration in Dashilar foregrounds collaborative governance and small-step, micro-regeneration; studies identify complex power geometries among municipal actors, platform companies, and residents, but also demonstrate how incremental pilots can stabilise stewardship and diversify uses (Li, Lin, Hooimeijer, & Monstadt, 2024). Complementary work on resident-led micro-greening in Dashilar shows environmental and social co-benefits when bottom-up practices are recognized within public-space management (Zhang et al., 2023).

At the scale of a single lane, Shijia Hutong illustrates community-based conservation (CBO) and participatory curation (e.g., the Shijia Hutong Museum) as vehicles for retaining local narratives and enabling resident agency within conservation rules (Qiao, 2023; Wang, 2016). These lane-level institutions become “platforms of translation” between conservation mandates and everyday maintenance,

offering an operative bridge between heritage protection and service improvement. Read against the Menxi context, the Beijing hutong repertoire suggests three design-relevant propositions: (i) Protect—treat hutong fabric and street morphology as non-substitutable stocks, upgrading hygiene and safety without eroding typological legibility; (ii) Activate—pursue small-scale service and frontage interventions that privilege resident use over tourist monoculture; (iii) Evolve—institutionalize co-governance (CBOs, precinct-level SOPs, micro-funds) so that incremental gains persist without displacement.



Figure 20 Entertainment life of Beijing residents (Li, 2024)

Ethnographic accounts of Beijing’s hutong frequently note the distinctive public self-presentation of older male residents—meeting neighbors in the lane, greeting passers-by, and carrying themselves with visible assurance. In analytic terms, this “confident gait” can be read as an outcome of three mutually reinforcing conditions. First, longstanding place attachment and everyday continuity foster a sense of competence and belonging: in Dashilar, for instance, older residents’ emotional attachment to the neighborhood is repeatedly cited as a reason for staying and engaging locally (Li, Lin, Hooimeijer, & Monstadt, 2024). Second, the micro-morphology of hutong—short blocks, narrow sightlines, and porous thresholds—

sustains dense “sidewalk life” and low-stakes sociability that reproduce public familiarity and tacit mutual care (Jacobs, 1961). Such situational affordances amplify everyday social interaction, which is positively associated with older adults’ well-being in Beijing cases (Y. Zhang et al., 2022). Third, this pattern aligns with active ageing principles that link participation and security to healthy ageing (World Health Organization, 2002) and with evidence that social participation predicts higher life satisfaction among older adults in China (Wu et al., 2024). In combination, attachment, morphology, and participation help explain why many hutong elders appear “spirited” and self-confident in public: they are moving through spaces that affirm identity, enable recognition, and continually confirm their social usefulness.



Figure 21 Beijing resident status (Li, 2024)

2.4.2 Renewal Design

The selected cases are all designed and constructed in the last five years. This represents a certain timeliness, indicating that these cases are relatively cutting-edge in the exploration of traditional residential renewal design practice.

In these cases, the traditional folk house culture is inherited organically and reasonably, rather than the symbol copy. Such cases have been widely recognized in the society. There are reasons behind the success, and we will explore the reasons. In these cases, different techniques are applied to materials, but they all reflect the heterogeneous blend of "new" and "old". People can feel the feelings that different cases want to express through visual and tactile experience. The design of the space not only retains the characteristics of traditional folk houses but also meets the needs of modern people. These cases are the renewal design of traditional houses, and the

functions of the renewal are different, some continue the residential functions, some replace the architectural functions into public buildings, such as hotels and guesthouse, libraries open to the public, villagers' activity centers, etc.

Designers cover a wide range of areas, including Wang Shu, winner of the Pritzker Architecture Prize, gad architecture design, which is closely connected with commercial design, Zhang Lei, who has recently done a lot of traditional residential renovation design, and Zhuang Ziyu, a young architect. The cases are mainly in Jiangsu, Zhejiang and Fujian, and the folk houses in Jiangsu are the main ones. The design prototypes are similar, so as to facilitate the analysis of their design methods.

There are also some limitations in the selection of cases. From the perspective of time, in order to maintain a certain timability, some important design works in the renewal design of traditional residential buildings were abandoned, such as the excellent renewal design schemes such as the renovation of Juer Hutong led by academician Wu Liangyong, and the final selected cases were all designed and constructed in the past five years. From the perspective of geographical location, most of the selected cases are located in southern China (see FIG. 2-9), and the architectural prototypes are dominated by double-slope roofs, which fails to cover the vast majority of traditional residential buildings.

2.4.2.1 Wen Village in Fuyang City

Fuyang Wencun is located in Dongqiao Town, Fuyang District, Zhejiang Province, close to the river basin on both sides of the Fuchun River, with a total population of 1863, near the mountains and by the river. Architect Wang Shu and his wife Lu Wenyu started to investigate Fuyang Wencun for many times in 2012, and completed the renovation design of 14 buildings and 24 households in 2015, which took 3 years from planning to implementation.

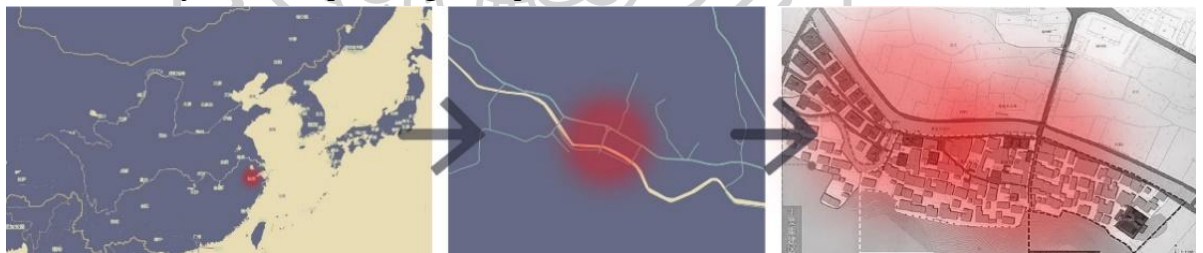


Figure 22 Location diagram of Fuyang Wencun (Li, 2024)

Fuyang Wencun was in a "semi-disabled" state before the updated design. Architect Wang Shu wanted to find a way to make the old and the new, the past and the present, and handmade and industrial construction coexist in Wencun, so that the 14 renovated residential buildings could be integrated into the village and appear in a way of growth. In terms of material texture and spatial structure, materials were selected such as rammed earth, hangash stone, bamboo, wood, etc. In terms of spatial structure, each household had an inner courtyard and a hall, and the kitchen was larger than the kitchen in modern cities, which was convenient for villagers to

pile earth stoves and place farm tools. After the initial completion of the renovation design and construction of Wencun, the first batch of 13 villagers with the right to choose can either choose the updated design of residential buildings or choose another piece of land to re-build by themselves, and finally 12 villagers choose the updated design of residential buildings.



Figure 23 Original state of Wencun From Wang Shu's TED speech video
<https://v.qq.com/x/page/g0534upau6j.html>



Figure 24 Current status of Wencun after renewal (Li, 2022)

In 2012, Wang Shu became China's first recipient of the Pritzker Architecture Prize. Announcing the jury's decision, Thomas Pritzker, Chairman of the Pritzker Prize and the Hyatt Foundation, said: "It is a landmark step that the jury has decided to award the prize to a Chinese architect, marking the world's recognition of the role that China will play in the development of the architectural ideal. Moreover,

the success of China's urbanization in the coming decades will be very important for China and the world." Urbanization in China, like urbanization in other countries around the world, needs to be integrated with local needs and cultures. China is facing unprecedented opportunities in urban planning and design to be in harmony with the country's long and unique traditions on the one hand, but also in line with the need for sustainable development on the other.

His representative works include the new Xiangshan Campus of the China Academy of Art completed in 2007, the Ningbo Art Museum completed in 2005, the Ningbo Wusan House completed in 2005, the Ningbo Museum completed in 2008, the Ningbo Tengtou Case Hall of the China World Expo, and the works exhibited at the 12th International Architecture Exhibition of the Venice Biennale in 2010 - Decay The decay of Dome, Fuyang Wencun completed in 2015, Wuzhen Internet International Convention and Exhibition Center completed in 2016, Fuchunshan Museum completed in 2018, etc.

Among the 14 24-family buildings renovated and built by Wang Shu, winner of the Pritzker Architecture Prize in Fuyang Wencun, 3 buildings at the entrance of the village are still used by the local villagers, and most of the updated buildings are rented by the village committee of Wencun to a commercial company operating residential accommodation. Each building is divided into 2 to 6 rooms.



Figure 25 Current situation of Fuyang Wencun (Li, 2022)

When the author conducted field research on Wencun in October 2023, he interviewed 11 people in the form of sampling questionnaire. Due to the small number of valid samples and the fact that most buildings are in residential management, which has a certain impact on the data, the survey data has certain limitations. Among them, 1 person is a B&B operation and management staff, 6 people are local villagers who could not live in the updated buildings, 2 people are foreign tourists (from Hangzhou, Zhejiang Province), and 2 people are B&B accommodation customers. The users of the three buildings at the entrance of the village, which are still inhabited by villagers, declined to be interviewed. Among the 11 people interviewed, the degree of satisfaction with the updated design is as follows. Among them, one person thinks that they are not satisfied with the updated design, while the other one thinks that they are not satisfied with the unallocated local villagers. Dissatisfaction and problems encountered in use. Whether the building after the updated design has an abrupt feeling with the old village: 10 people think it is not abrupt, 1 people think it is normal. The continuation of context can be felt in wood, rammed earth, hang ash stone, concrete and bamboo materials (multiple choices).

To sum up, most people think that the updated design of Wencun is well integrated with the old village, and more than half of the interviewees are satisfied with it, while those who are not satisfied mainly focus on the villagers who are not allocated houses. The data of this questionnaire survey has certain limitations, for one thing, the sample size of the sample survey is small, and for another, there is a certain distance between the time of this survey and the completion time. Villagers felt that the sound of rain was loud in the atrium when it rained, and in some houses there was no eaves, and the rain would run down the walls. Therefore, the operator of the homestays and the villagers carried out some reconstruction. The operator of the homestays made an imitation eaves by using sunlight panels, and a villager completely closed the patio. As the updated design of Wencun has attracted a large number of students and scholars to come to study, and the number of tourists to visit Wencun has also increased year by year, which has greatly activated the vitality of the village.

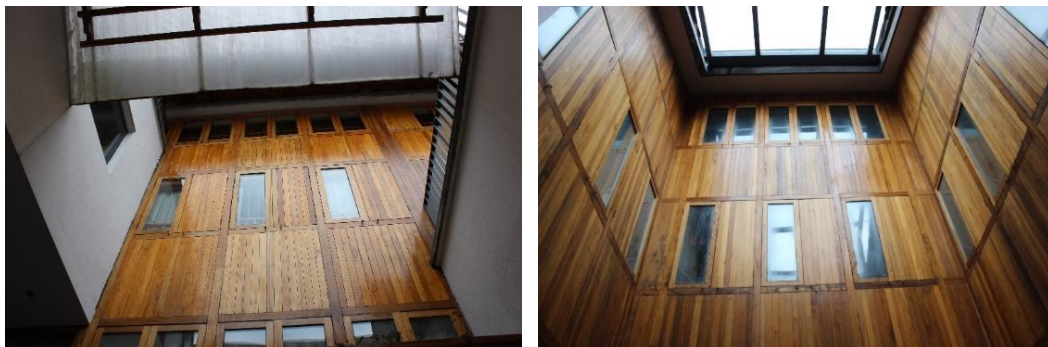


Figure 26 Current situation of Wencun courtyard a and b (Li, 2022)

2.4.2.2 Fuyang Dongziguan Village renewal design & Dongziguan Village Villagers Activity Center

Hangzhou Fuyang Dongziguan Village renewal design is located in the north of Dongziguan Village in the west of Changkou Town, Fuyang District, near the block farmland in the south, near the Fuchun River in the north of the village, the geographical position is superior, profound cultural heritage, the Southern Song Dynasty Qian said friends "Xianchun · Lin 'an Records" contained "Dongzipu, in the southwest of the county 51 miles, east into Zhejiang, the old name Qingcaopu", It can be judged that the history of Dongziguan village is more than 1500 years. Dongziguan Village was included in the fourth batch of Chinese Traditional Villages List in November 2016. It was designed by gad Architectural Design in 2014 and completed in 2016, with a project scale of 15,286.98 square meters. After the updated design, there are four basic apartment types, which are combined with each other through rotation, mirroring and other techniques. The height of the ground floor is 3.3 meters, the height of the second floor is 3.0 meters, and the third floor is a combination of the slope roof attic and the terrace. Each household has an independent atrium. Each household is scattered to form a public space of different sizes, ranging in width from 0.8 meters to 4 meters, bearing the communication function between the neighborhood, pedestrian function, etc.

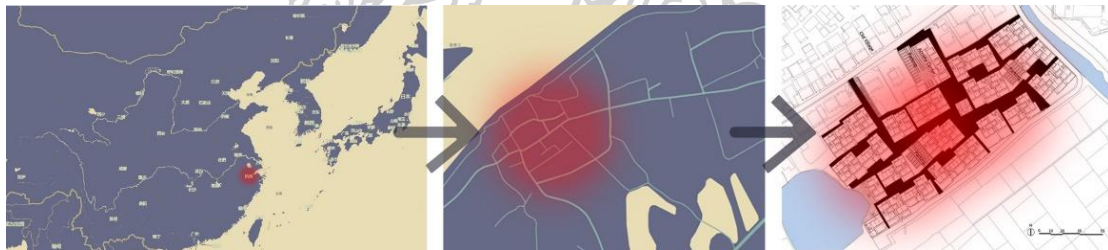


Figure 27 Location diagram of Dongziguan Village renewal design (Li, 2024)

Gad Architectural Design Co., LTD., founded in 1997, now has more than 1000 professional designers, with the construction industry construction engineering Class A qualification, covering residential, office, hotel, commercial, cultural architecture and other projects. The design projects include Fuyang Dongziguan Village and Dongziguan Village Village Activities Center, Hangzhou Dingnan Mansion, Songyang Yuanshesu Mountain House, Taishan Nine female peak study, Feitiaoji Songyang Chenjiapu, Liuxiang Garden Life Experience Museum and so on.

In Dongziguan Village, the relocation building is located in the southeast of the village, and the occupancy rate is below 50% at present (October 2023). There are 6 relocation buildings that have opened homestays. The new village Activity Center is located between the updated building and the old village, serving as

a bridge between the old village and the new village. The villagers are satisfied with the retrofit building and the village activity center.



Figure 28 Dongziguan Village villagers' activity center (Li, 2022)

According to the villagers, it is currently open, but it is not really used, and the villagers' gatherings are still dominated by empty Spaces in the streets. The villagers believe that the feng shui of the house is very important, and it would be better if there was a pond in front of the building, such as the pond in front of the gate of Xu's compound. The pond appears to be surrounded inward, which is a symbol of good luck in feng shui. Dongziguan relocation building and Dongziguan villagers' activity center have stimulated the vitality of the village to a certain extent, and the number of tourists has gradually increased.



Figure 29 Photo In front of the Xu family compound (Li, 2022)

The folk houses in Jiangsu and Zhejiang areas are mainly in the form of the four rivers and the hall, and its form and space exudes rich cultural deposits. Under the influence of ritual culture, there are strict layout requirements for guest space, private space, space for male master, eldest son, second son, daughter, servant and animal. However, such space usage is obviously not suitable for the use of ethics and living space nowadays. In modern society, the scale of the city has become larger, and the width of streets in traditional residential houses is relatively narrow, so long as the streets can meet the passage of horses and people, it is precisely because of the small space scale, the relationship between people is more intimate. So how should the traditional Chinese space form be inherited in the renewal design of traditional residential buildings? There is a case in Fuyang, Zhejiang Province to answer this question. The renovation design of Dongziguan Village completed by gad Architecture not only innovates in space processing, but also inherits tradition and ADAPTS to modern needs. Analysis and restoration of its space prototype, there are two design prototypes, under the premise that the base area is less than 120 square meters, one is 11 meters for the small room, 21 meters for the large depth; The other one is 16 meters and 14 meters deep. The two design prototype changes are evolved into four basic types, and then the four basic types are differentiated through rotation, translation and mirroring to form a complete structural unit group, each household has relative independence, and each complete unit group has a semi-open space. The unit group and the unit group are scattered before and after, so the spacing of the house is divided into three scales. The first one is the "lane" type scale, with a width of 0.8

meters to 2 meters, mainly to bear the short distance traffic of pedestrians; The second is the "street" type scale, the width of 2 meters to 4 meters, mainly for traffic and small businesses; The third is the "field" type scale, the width is greater than 4 meters and has a certain sense of harmony space, used for parties, activities. These three scales are reflected in a complete unit, and the larger scale is the vehicle channel between the complete units for modern traffic consideration. The spatial function details of the basic unit are designed by means of directional questionnaire survey to obtain the real needs of modern villagers and local customs. In the design of the hall, the local customs are followed to face south and enter the courtyard from the north. Set up a parking space for electric vehicle, farm tools room, air conditioning outdoor unit platform, solar water heater place and other Spaces to meet the modern life. In this way, the treatment of space not only meets the practicability of modern life, but also inherits and rethinks the traditional space form. When people walk in it, they can feel its connection with traditional folk villages.

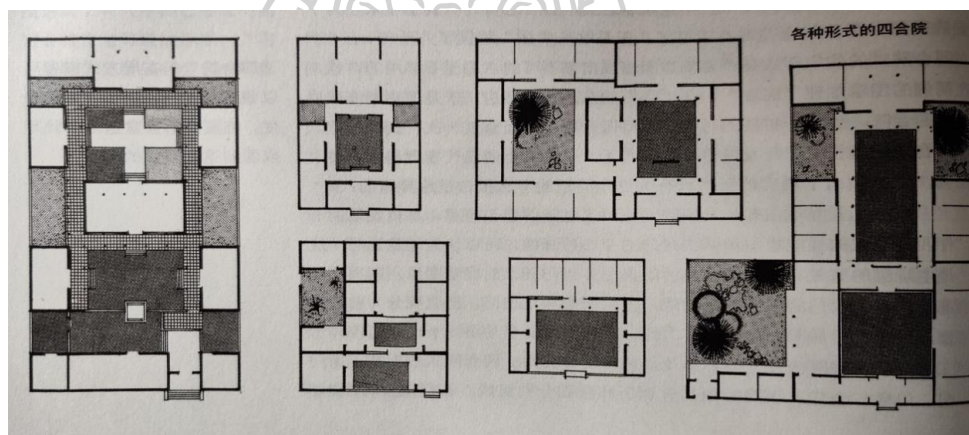


Figure 30 The spatial layout of traditional dwellings is diverse

Source : Li Yunlao. Chinese Craftsmanship[M]. Tianjin: Tianjin University Press, 2014, 86.



Figure 31 Renewal design of Dongziguan Village (Li, 2022)

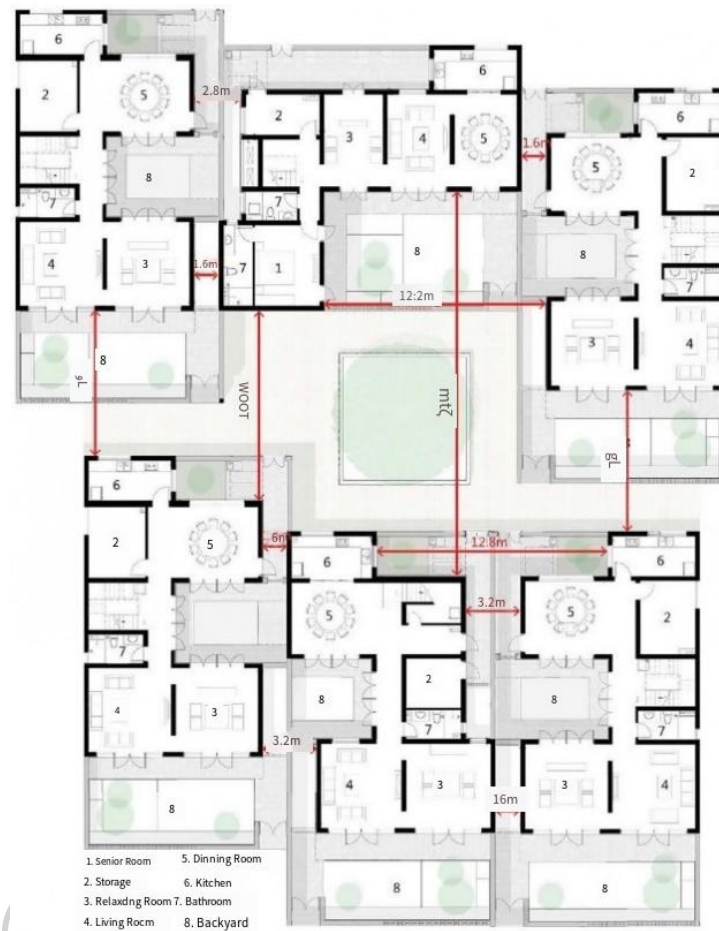


Figure 32 Analysis diagram of Dongziguan Village renewal design roadway

There are many unique forms of traditional houses, such as the curved double-slope roof of Jiangnan area, the horse-head wall of Anhui folk houses, and the round architectural form of Fujian tulou. The architectural forms in these traditional dwellings should not simply imitate and copy the shapes, materials and colors. Although this is highly recognizable and can be easily recognized by the public, the stacking of such elements has no deep meaning, but is only a commercial weapon. Such design is not a cultural inheritance and will not be passed down by future generations. The renewal design of traditional residential buildings is neither overthrowing and rebuilding nor extracting traditional elements and piling them on new buildings to give them a good name as inheritance. What we need is to understand the texture of traditional residential culture and extract it, and then deduce it with modern techniques. The roof design method in the renewal design of Dongziguan Village completed by gad architecture has many merits. The curved roof, single-slope roof and double-slope roof of traditional folk houses in Jiangnan are analyzed, deconstructed and abstractly extracted to form a continuous asymmetric slope roof with curvature. The dark gray roof forms a strong contrast with the large white wall. Seen from a distance, it is like the ink painting of Jiangnan Water village

under Mr. Wu Guanzhong's pen. The roof is endless. Visual viewing can awaken muscle memory and remind the viewer that the updated design of Dongziguan village is evolved from the traditional folk houses, and is not simply copied and copied. Rather, it is an inheritance-style innovation that combines the needs of modern people's life with reasonable functional structure. Such an updated design method is reasonable. It inherits the profound ideas contained in traditional folk houses with modern language, so that viewers can feel that the updated buildings come from traditional folk houses through visual and tactile experience.



Figure 33 The roof of Dongziguan Village after the updated design (Li, 2022)

2.4.2.3 Tonglu Vanguard Yunxi Library & Yunxi Dajiashan Vernacular Art Hotel & Yunxi Shenaoli Book Company

Tonglu Vanguard Yunxi Library is located in Dajiashan, She Minority Township, Tonglu, Zhejiang Province. Dajiashan Village is an ancient village with a history of nearly 400 years and the only inhabited place of She minority in Zhejiang Province. It is about 800 meters above sea level and shrouded in clouds all the year round. The She people living here are far away from the hustle and bustle of the outside world and are natural and simple. The pioneering Yunxi Library, led by architect Zhang Lei and designed by AZL Architects in 2015, consists of two main buildings with a linked courtyard.



Figure 34 Location diagram of ZheJiang Tonglu Yunxi Library (Li, 2024)

Designed by architect Zhang Lei, Yunxi Shenaoli Book Shop is located in Shenaoli Ancient Town, Tonglu Town south of Hangzhou. It has a long history of more than 1,900 years and more than 40 well-preserved buildings of Ming and Qing

dynasties, which are of rich historical value. Yunxi Shenaoli Bookshop takes Jingsong Hall, an ancient house in the late Qing Dynasty in the village, as the main body for renewal design, retaining the basic pattern and exquisite wood carvings. It includes a library open to the public, a place for villagers' activities and a holiday residence open to the public to activate the vitality of the village.

Zhang Lei was born in Nantong, Jiangsu Province in 1964. He graduated from the Department of Architecture of Southeast University and the Department of Architecture of Zurich High Technology, Switzerland. Currently, he is a professor of Nanjing University, director of the Research Center of Sustainable Vernal Architecture, a national first-class registered architect, and won the title of "Master Designer" in Jiangsu Province. In recent years, he has carried out a lot of rural practice, and has a unique view on the renewal design of traditional residential buildings, and has the great ambition of inheriting the context. His representative works include Nanjing Wanjingyuan Chapel, Tonglu Vanguard Yunxi Library, Yunxi Dajiashan Local Art Hotel, Yunxi Shenaoli Book Shop, Yunxi Bear Fort, Nanjing Jiangning Shitang Internet Conference Center and so on.

Xianfeng Yunxi Library is located in Daijiashan, 800 meters above sea level. Due to the retention of a large number of rammed earth walls of the original building, the walls have cracks and need constant repair. Due to the architect's elevated roof treatment and the introduction of natural light, the interior environment is brighter. The roof was separated from the wall and raised, and the glass was used to raise the roof by 60 cm in the middle. In this way, the design can subtly improve the lack of light in traditional residential buildings, and the beautiful bamboo forest landscape outside can be introduced into the eyes of indoor readers, increasing the area of lighting and allowing more light from the sky to shine into the indoor environment. When people reading in the library look up in the day, they can see the blue sky and white clouds, and at night, they can see the stars outside the window. Seen from the facade, the material of rammed earth and glass form a clear contrast, one represents tradition and has a heavy feeling, the other represents modernity and has a light feeling. Such contrast forms a conflict and dramatic effect, and can echo the original building while highlighting the renewal. The corridor that connects the two buildings has just been renovated. According to an interview with the operator of the Pioneer Yunxi Library, the building was still intact after a typhoon in 2018, which is enough to show the reliability and stability of the building. In summer, due to the use of rammed earth materials on the walls of the building, the interior is relatively cool, providing a good rest space for villagers and tourists. The settlement of Xianfeng Yunxi Library and Yunxi Dajiashan Local Art Hotel, another work of architect Zhang Lei, in the Dajiashan Natural Village of Eshan Nationality in Tonglu County, has brought vitality to the countryside to a certain extent, and the Xianfeng Yunxi Library has become a hub connecting local villagers and foreign tourists.



Figure 35 Outdoor and indoor of Xianfeng Yunxi Library (Li, 2022)



Figure 36 Facade of Xianfeng Yunxi Library (Li, 2022)

2.4.3 Xiaoxihu District

The Xiaoxihu Area, located in the heart of Nanjing, is renowned for its traditional Chinese architecture, ancient temples, and vibrant community life. This historical region, dating back to the Ming Dynasty, has preserved its cultural heritage despite the pressures of rapid urbanization. One of the primary challenges in Xiaoxihu includes the deterioration of traditional buildings, cultural erosion due to commercialization, and inadequate infrastructure. To address these issues, a mixed-methods approach was employed, combining quantitative and qualitative research methods. Surveys and statistical analysis using SPSS Statistics provided empirical data on residents' needs, while interviews and field research offered deeper insights into the area's cultural and social dynamics.



Figure 37 Map of Xiaoxi District (Qinhuai, 2021)

The findings revealed a strong appreciation for the historical value of Xiaoxihu among residents, alongside a significant demand for improved infrastructure and better living conditions. Experts emphasized the importance of preserving the unique architectural styles, and tourists showed interest in cultural activities and historical tours. A multi-dimensional design strategy was developed based on these insights, focusing on visual communication design, innovative space design, and sustainable urban planning. This strategy aims to create a unique urban identity, enhance residents' living standards, and promote community engagement through cultural activities, achieving a harmonious blend of tradition and modernity.

The success of the Xiaoxihu Area's localized renewal efforts serves as a beneficial model for the Menxi region. By implementing targeted updates rather than broad-scale redevelopment, Xiaoxihu has managed to maintain its historical integrity while addressing contemporary needs. This approach has not only improved the living standards of local residents but also attracted tourists, boosting the local economy. The Xiaoxihu case study highlights the effectiveness of combining cultural preservation with modern urban planning, providing valuable lessons for similar initiatives in the Menxi region.

Located in Nanjing's old city, the Xiaoxihu (Little West Lake) block has become a widely cited pilot of small-scale, incremental regeneration that retains courtyard-alley morphology while improving everyday services. Since 2015, the city's programme—designed with Southeast University—has proceeded “plot by plot,” beginning with community research and a full mapping of fragmented property rights, then advancing through micro-interventions to streets, courtyards, and shared facilities (Castle, 2025). In a 4.69-hectare area that once housed over 3,000 residents

with only about 10 m² per capita, the project re-established basic infrastructure (including an integrated micro-pipe system and hydrants), cleared illegal accretions, reinserted small public squares, and reopened pedestrian alleys (Castle, 2025). Parallel policy tools—“one house, one plan,” a five-party platform, and community co-design centers—anchored the stepwise approach in everyday participation and negotiated consent (Jiangsu Provincial Office of Spiritual Civilization, 2025).

International recognition has followed. In 2022, Xiaoxihu received the UNESCO Asia-Pacific Award for New Design in Heritage Contexts, with the jury highlighting its public-private-people partnership and the way financing and design tools were combined to upgrade housing, infrastructure, and the public realm without erasing historic fabric (UNESCO, 2022). Subsequent comparative evaluation using multi-source socio-spatial data and a DID framework suggests that the Xiaoxihu–Laomendong model (XLD) delivers long-term community resilience and cultural preservation while increasing facility-related points of interest; by contrast, a market-driven comparator in Suzhou shows faster commercial activation but greater risk to cultural continuity (Zhao et al., 2025). Independent conference work on Xiaoxihu’s street transformation further documents shifts in visit motivations, shopkeeper decisions, and resident perceptions as micro-regeneration proceeds (Cheng, 2024).



Figure 38 The updated Xiaoxihu District (Li, 2022)

For the purposes of this thesis, Xiaoxihu provides a close regional precedent for addressing Problem 2: insufficient public space and green area under non-demolition constraints. Read through the PAE lens, Protect implies maintaining the courtyard-alley grain and sightline porosity while removing hazardous accretions and stabilizing utilities (Castle, 2025). Activate translates into a fine-grain network of micro-spaces that privilege residents' daily use: (i) potable water points and outdoor taps co-located with hydrants and drainage nodes; (ii) communal tool lockers at alley nodes to support resident-led upkeep and pocket gardening; (iii) route optimization along historic desire lines to stitch courtyards, thresholds, and tiny squares into continuous pedestrian circuits; and (iv) low-maintenance modular kits—prefabricated benches—that can be installed, rearranged, and serviced without specialist crews. These tactics are not presented as literal replicas of Xiaoxihu's catalogue, but as transferable design logics consistent with its incremental method and demonstrably compatible with protected heritage morphology (UNESCO, 2022). In sum, Xiaoxihu shows that service-first micro-public-space making can raise environmental quality and social use without compromising authenticity—an approach directly applicable to Menxi's public-space and micro-greening deficit.



Figure 39 Shop in Xiaoxihu District (Li, 2022)



Figure 40 Xiaoxihu District (Li, 2022)

2.4.4 Singapore Airport

Singapore Changi Airport is frequently cited as a biophilic benchmark in aviation, where large-scale and micro-scale greening are used not as decoration but as part of a spatial and operational strategy that improves wayfinding, thermal comfort, and passenger experience while remaining maintainable in a 24/7 environment. The precedent is relevant to Menxi because its small-footprint interventions—vertical greening, pocket gardens, and modular planting—show how limited spaces can be systematically “activated,” and, once proven, “evolved” into routine operations.

At the terminal scale, Terminal 3’s five-storey “Green Tapestry” demonstrates how vertical greening can deliver strong visual legibility with minimal floor area. Designed by Tierra Design and integrated from the earliest stages of the building, the wall spans roughly 300 m and 4,200 m², supports 10,000+ plants (climbers and epiphytes), and is engineered for modular maintenance (removable cable runs, catwalk access, automated irrigation and misting) so that planting can be replaced without disrupting operations . This combination of large visual impact, small plan

footprint, and maintainability is directly transferable to narrow historic alleys: a “micro-greening module” can be conceived as a repeatable, serviceable unit rather than a one-off installation.

At the node scale, Changi curates pocket gardens within circulation—e.g., Butterfly Garden (T3) and Sunflower Garden (T2)—that couple planting with desire-line rest points and views, creating micro-destinations that punctuate long walking sequences. These gardens are supplied by the airport’s own nursery, enabling steady replacement and seasonal refreshes, which again models a kit-of-parts approach suitable for constrained historic contexts. The wider Jewel complex extends the same logic at metropolitan scale—a terraced “Forest Valley” and the Rain Vortex—illustrating how planting, climate control, and circulation are co-designed rather than appended.

Crucially, Changi aligns wayfinding with passenger flows through both environmental cues and signage. Interior landscape and material palettes subtly reinforce paths, while the signage system is deliberately sited and layered, following continuity–connectivity–consistency principles that reduce decision friction at junctions (CAG, 2024; Powell, 2023). In design-research terms, the gardens are not obstacles but beacons and eddies within flow, helping travellers self-organize. Read through PAE, the case suggests that Activate can be achieved with low-maintenance micro-greening modules (vertical panels, planters, shade/seat units) placed where flows naturally slow, while Evolve entails standard operating procedures for upkeep (nursery supply, replacement cycles, cleaning interfaces) and periodic wayfinding reviews to ensure plantings continue to guide rather than clutter.

In sum, the Singapore Airport precedent connects vertical greening, pocket-scale planting, and flow-aware wayfinding into a maintainable system. Its value for Menxi lies less in monumental scale than in the operationalization of greening as a modular, serviceable infrastructure that first activates everyday use and then evolves into stable stewardship.



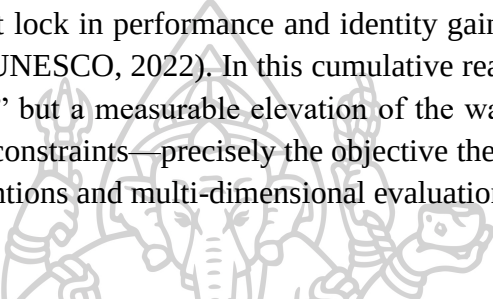
Figure 41 Singapore Airport

Summary

Across the four precedents, a consistent implementation logic emerges in which micro-scale, low-risk interventions are sequenced to stabilise the historic fabric, re-activate everyday use, and then institutionalise gains—an arc that aligns with this thesis’s PAE strategy. In Beijing hutong, lane-level adjustments—seating niches, name-plate curation, and small community events—operate on a fine social grain to rebuild public sociability and self-recognition without disturbing courtyard–alley morphology; the literature links these effects to accumulated place attachment, collaborative governance, and incremental, resident-facing renewal (Qiao, 2023; Shin, 2010; Wang, 2016). In contrast, the renewal-design strand argues for a “small, reversible infrastructure first” approach at the outset of conservation projects—canopies, drainage, anti-slip finishes, lighting, wayfinding, and corridor-width normalisation—so that basic safety and hygiene are secured before programmatic activation, a stance consistent with the Historic Urban Landscape’s integration of conservation with service provision (UNESCO, 2011). The Xiaoxihu District case in Nanjing demonstrates how protective utilities work (pipe re-laying, hazard removal) can be coupled with activating micro-public spaces—water points, tool lockers, and route optimisation—delivered through low-maintenance modular kits and co-governance, yielding improvements in use and stewardship while retaining historic grain (Castle, 2025; Cheng, 2024; UNESCO, 2022). Finally, Singapore Changi Airport shows that vertical greening, pocket gardens, and flow-aligned wayfinding can be operationalised as micro-greening modules: first to activate comfort and legibility in constrained footprints, then to evolve into routine nursery supply,

replacement cycles, and signage reviews—proof that biophilic cues can be systematised rather than ornamental (American Society of Landscape Architects [ASLA], 2009; Changi Airport Group, 2024.).

Read together, these cases imply a PAE sequencing with transferable design rules. Protect prioritises reversible works that restore safety and hygiene while guarding non-substitutable historic stocks (UNESCO, 2011). Activate inserts modular, maintainable elements that increase resident use and social exchange—seating, micro-events, water and tool infrastructure, vertical and pocket greening—placed where everyday flows already slow or converge (Castle, 2025; Shin, 2010). Evolve then codifies routines (maintenance SOPs, co-governance, nursery logistics, wayfinding audits) that lock in performance and identity gains (ASLA, 2009; Changi Airport Group, 2024; UNESCO, 2022). In this cumulative reading, the outcome is not a touristic “make-over” but a measurable elevation of the way of living for residents under non-demolition constraints—precisely the objective the thesis will test in Menxi through staged interventions and multi-dimensional evaluation.



Case Study	Corresponding Issues	Actions	Key Points
Beijing Hutong	Problem 3: spirit	Seating Nooks; House-name Plates; Micro-events	Recognized By Both The Outside World And Oneself
Renewal Design	Problem 1: hygienics Problems And Safety Problems	Reversible Canopy ; Drainage/Anti-slip; Lighting; Wayfinding; Corridor Clear Width	Small, Reversible Infrastructure First
Xiaoxihu District	Problem 2: insufficient Public Space And Green Area	Water Points; Tool Lockers; Route Optimization	Low-maintenance Modular Kits
Singapore Airport	Seed Program	Vertical Greening; Pocket Gardens; Wayfinding Aligned With Flows	Micro-greening Modules


Elevate The Way Of Living

Figure 42 Case Study Conclusion (Li, 2022)

2.5 Pilot research

This pilot study was conducted to validate both the significance of the focal problems observed in the Menxi historic area and the appropriateness of the selected research instruments prior to full-scale implementation. The key objective was to ensure that the identified issues were indeed grounded in the lived experiences of residents and that the combination of quantitative and qualitative methods could effectively capture the multidimensional aspects of daily life in the area.

To this end, a mixed-methods approach was adopted. On the quantitative side, a cross-sectional baseline survey (T0) was distributed to local residents, resulting in 230 valid responses. The questionnaire employed 5-point Likert scales (ranging from 1 = strongly disagree/very low to 5 = strongly agree/very high) and included multiple dimensions reflecting environmental, social, functional, and cultural elements of the community. Key indicators measured included drying safety, environmental quality (cleanliness, greenery, lighting), public space experience, perceived efficiency and effectiveness, equity, ethical trust, and place-based identity and pride.

Simultaneously, qualitative data were collected through 4 semi-structured interviews and once focus group discussions. Interviewees represented a cross-section of stakeholders, including long-term and newer residents, government officials, association members, and cultural practitioners. Each interview lasted approximately 30–60 minutes, and the focus groups comprised 6–8 participants each. Transcripts were analyzed using a structured coding approach (open → axial → selective) via NVivo software, allowing the emergence of major themes relevant to both spatial and social life in the community.

The descriptive analysis of the quantitative results revealed that three indicators scored the lowest across the sample: drying safety, environmental comfort, and place-based identity. These scores pointed to significant concerns among residents. Many participants expressed frustration with the unsafe and cluttered conditions of drying areas, narrow walkways, and poorly lit lanes. Similarly, dissatisfaction was reported regarding the lack of greenery, shaded rest spots, and essential public infrastructure. With respect to cultural factors, respondents showed low levels of community pride and a perceived weakening of cultural continuity and engagement.

The qualitative findings corroborated these results. Recurring themes included safety hazards in daily routines, the discomfort of shared spaces, and a disconnect between historical identity and modern use of the neighborhood. Interviewees and focus group participants emphasized the absence of comfortable social gathering points, the difficulty in preserving local heritage narratives, and the social distance between different resident groups (such as newcomers and older inhabitants).

Table 1 reports means and standard deviations for key indicators at baseline (N = 230; 5-point scales).

Indicator	Scale	T0 M (SD)
Drying Safety	“Current clothes-drying methods are safe” (single)	1.85 (0.74)
Environmental Quality	Cleanliness; greenery; physical safety (3-item mean)	2.50 (0.67)
Experience	Daily experience is pleasant (3-item mean)	2.59 (0.70)
Efficiency	Resources/processes efficient; tasks done quickly (3-item mean)	2.76 (0.61)

Indicator	Scale	T0 M (SD)
Effectiveness	Local solutions effectively solve problems (3-item mean)	2.58 (0.66)
Equity	Benefits distributed fairly; inclusive process (3-item mean)	2.85 (0.59)
Ethics/Trust	Neighbors/officials are trustworthy (3-item mean)	3.33 (0.63)
Place Identity/Pride	I feel proud of and attached to Menxi (single)	2.20 (0.80)

Table 2 summarizes the distribution of the single-choice item “biggest community issue” at T0.

Issue category (single choice)	Share of respondents (%)
Drying safety (wire-based drying hazards)	56
Cultural identity/pride	23
Greening/environmental comfort	16
Other	5

Through the process of data triangulation, the pilot study established a clear alignment between residents’ subjective narratives and objective survey results. The convergence of high-frequency qualitative concerns with low-scoring quantitative indicators confirmed the relevance and urgency of these focal problems. Furthermore, the pilot study successfully validated the survey tool and interview protocol as capable of capturing both material and intangible dimensions of everyday life.

The pilot study also revealed meaningful distinctions between newcomers (who recently settled in Menxi for work or rental purposes) and long-term homeowners (whose families have lived in the area for generations). These two groups share overlapping concerns about environmental safety and spatial comfort, yet their deeper expectations toward renewal diverge significantly.

For new residents, the primary needs revolve around functional improvement and convenience. They emphasized clearer circulation, better lighting, more accessible public facilities, and the availability of shared amenities such as seating or small gardens. Their narratives often reflected a desire for efficiency and modern comfort, viewing Menxi as a place of residence rather than heritage. Many newcomers appreciated the neighborhood’s proximity to the city center but expressed frustration over infrastructural limitations and maintenance issues.

By contrast, long-term homeowners articulated stronger emotional and cultural attachments to the neighborhood. They valued the preservation of traditional layouts, courtyard structures, and community rituals that reflect Menxi’s historical continuity.

Their expectations were centered on stability, safety, and respect for historical character. Many also voiced concerns about the gradual loss of collective identity, emphasizing the importance of sustaining intergenerational ties and shared memory within the community.

This contrast suggests that sustainable renewal in historic areas must balance the everyday functional demands of newer residents with the cultural continuity valued by established households. Both groups' perspectives provide essential insight for designing interventions that are inclusive, resilient, and rooted in lived experience. Addressing their differences through participatory design processes will help build a more cohesive, equitable, and adaptive urban environment.

Based on this validation, the research team proposed three initial design intervention directions to be further developed and evaluated in subsequent phases: a safety-oriented improvement for drying facilities, the introduction of rest-oriented pocket spaces with greenery, and a culturally sensitive strategy to enhance historical engagement and local pride. These interventions were not imposed externally but emerged organically from resident voices, providing a strong foundation for co-creation and service design in the next stages of the project.

2.6 Summary

Through sorting out and analyzing relevant academic literature, this paper comprehensively and systematically elaborates on the research status and theoretical framework of human settlement environment, vernacular architecture, service design, art design and other fields. In this chapter, we have an in-depth discussion of the development of human settlement science, including its theoretical origin, definition, composition, concepts and methods. At the same time, we paid attention to the research on regional vernacular architecture, especially since the 1960s, the representative works and ideas of architects from Germany, the United States and other places have had a profound impact on this field. This provides rich theoretical support and disciplinary foundation for our subsequent research.

In addition, this chapter also conducts an in-depth analysis of the intersection of early ecological design, bioclimatic design and vernacular architecture theory, revealing the inspiration of these theories on the transformation from "ecology and green" to "sustainable development". This provides us with valuable experience and a solid theoretical foundation for research on human settlements.

In the field of service design and art design, we emphasize the role of these two in improving the human settlement environment, especially through service design methods, which can better meet the needs of residents. The intervention of art design provides a wealth of innovative possibilities for the visual, spatial, planning and other aspects of the human settlement environment.

By summarizing this literature, we build a comprehensive understanding of human settlement science, vernacular architecture, service design, and artistic design. This will lay the foundation for our subsequent research and guide us to explore more deeply how to apply these theories and methods to provide feasible design strategies for the development of the Menxi area.

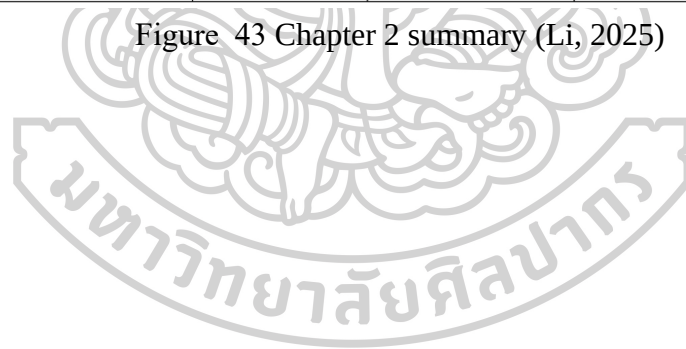
In summary, the literature review in Chapter 2 provides theoretical support and methodological guidance for subsequent research, and lays a solid disciplinary foundation for our design practice in the Menxi area.

Problems/Findings	Solutions	Theory	Design Interventions
Daily hygiene & safety deficits (cluttered drying)	Reversible micro-infrastructure to make chores safer & easier	Service Design Theory Grounded Theory Sustainable Development Theory	Design Experiment 1 Modular canopy + drying racks; small drainage channels.
Lack of greenery & weak neighbor interaction (abandoned planters, maintenance fatigue)	Resident-led, low-maintenance greening with shared responsibility	Service Design Theory Sustainable Development Theory Grounded Theory	Design Experiment 2 Seed paper planting; cement planters to increase greenery.
Low place attachment & cultural identity (history unknown, pride low, limited cultural participation)	Spread the Menxi story, attract more attention, and enhance residents' confidence	Service Design Theory Grounded Theory Sustainable Development Theory	Design Experiment 3 cultural handbook; a digital means of communication of spiritual recognition.

Problems
is real and
meaningful

SEED PROGRAM
(What design to do)

Figure 43 Chapter 2 summary (Li, 2025)



CHAPTER 3

RESEARCH METHODOLOGY

Introduction

This chapter outlines the research design and methodology employed to explore sustainable service design strategies in historic urban environments, with a specific focus on the Menxi community in Nanjing. The research adopts a mixed-methods approach to comprehensively investigate how phased, small-scale design interventions can improve residents' quality of life while preserving cultural continuity. Methodologically, the study integrates quantitative and qualitative tools to generate actionable insights grounded in lived experiences.

To guide this process, the study follows a design-led inquiry grounded in the Protect–Activate–Evolve strategy. Three design experiments were conducted, each aligned with a specific phase of the framework, targeting issues of physical safety, environmental well-being, and cultural identity. The chapter begins by explaining the rationale for the chosen methodology and theoretical underpinnings, followed by an explanation of the research instruments, sampling, and data collection processes. It then presents the logic and structure of the three design experiments, serving as both empirical tests and community-engagement processes.

3.1 Method of Research

The research employs a mixed-methods approach, combining quantitative and qualitative methodologies to provide a comprehensive understanding of the subject matter. The quantitative aspect involves the collection and analysis of numerical data through surveys and statistical tools, allowing for the identification of patterns and trends within the Menxi area. This data-driven approach provides a solid empirical foundation for understanding the development needs of the community. Complementing this, qualitative methods, such as interviews and focus group discussions, are utilized to gain deeper insights into the experiences, perceptions, and cultural contexts of residents and stakeholders. This combination of quantitative and qualitative research methods enhances the robustness of the findings, enabling a more nuanced exploration of the challenges and opportunities for development in the Menxi area.

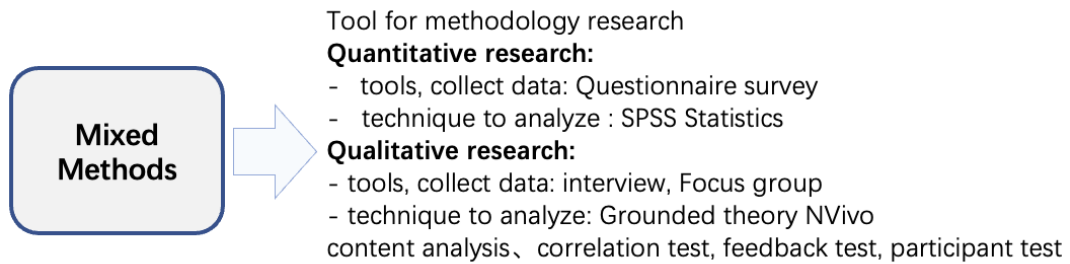


Figure 44 Research methods (Li, 2025)

This study adopts a mixed-methods, embedded single case design in which the Menxi historic area serves as the bounded case, and staged interventions are designed and evaluated through the PAE logic—Protect, Activate, and Evolve. Methodologically, the design integrates a convergent-sequential mixed-methods strategy—convergent at each measurement point to triangulate quantitative and qualitative evidence, and sequential across PAE phases to feed findings forward (Creswell & Plano Clark, 2018)—with an embedded case study protocol to maintain contextual integrity and enable pattern-matching across sub-units (lanes, courtyards, resident groups) within the case (Yin, 2018). The purpose is explanatory and design-oriented: to identify how specific service and micro-public-space interventions operate under non-demolition constraints and whether they measurably elevate the way of living while safeguarding heritage.

Empirically, the study is organised around three waves of data collection aligned to PAE: T0 (pre-intervention, Protect diagnosis), T1 (mid-activation), and T2 (post-intervention, early evolution). At each wave, a stratified resident survey samples the accessible adult population of approximately $N \approx 500$ using Slovin's planning rule ($e = .05$), with a per-wave target of $n \approx 222$ and modest oversampling to offset nonresponse. The survey operationalises a multi-dimensional outcomes frame (6E)—Effectiveness, Efficiency, Experience, Equity, Environment, and Ethics—together with items on participation, place attachment, and stewardship. Quantitative analysis in SPSS proceeds from data screening and scale reliability (Cronbach's $\alpha \geq .70$; Nunnally & Bernstein, 1994) to factor analysis and pre-post change tests; where panel matching is feasible, paired tests are reported; otherwise, repeated cross-sectional comparisons are presented with finite-population correction.

In parallel, qualitative data are generated through semi-structured interviews and focus group discussions with residents, small businesses, association leaders, and relevant officials. The approach follows a constructivist grounded theory orientation, using constant comparison, memoing, and theoretical sampling across strata and waves to refine process categories that link interventions to outcomes (Charmaz, 2014). Transcripts are coded in NVivo; inter-coder agreement is assessed on a 20%

subset using Cohen's κ with a threshold of $\kappa \geq .70$ (Cohen, 1960). To connect insights to implementation, service design instruments—service blueprints, stakeholder maps, and low-fidelity prototyping—structure the diagnosis and iteration of interventions between T0 and T1/T2, enabling the study to function as design-informed inquiry rather than observation alone (Stickdorn & Schneider, 2011).

Integration occurs at two levels. Within-wave convergence compares survey signals and coded themes to corroborate or qualify effects and mechanisms; cross-wave sequencing uses T0 findings to set Protective baselines, T1 findings to adjust Activation packages, and T2 findings to assess early Evolution (maintenance, governance routines). Validity is pursued through construct triangulation (surveys $\times$ interviews $\times$ field observation), pattern matching against theory-informed propositions (PAE; 6E), and an explicit audit trail of instruments, codebooks, and decision logs. Reliability is supported by protocolised data collection and coder training; ethical safeguards include written consent, anonymisation, and restricted access to identifiable records. Generalisation is analytic rather than statistical: inferences are made to theoretical propositions about service processes in protected historic districts, with transferability argued through case-to-case resonance (Yin, 2018; Charmaz, 2014).

3.2 Sampling of Population

The accessible resident population of the Menxi historic area was established at approximately $N \approx 500$ persons. This figure was derived from the most recent sub-district census tabulations at the neighborhood-block level, cross-checked against the local administrative resident registry and our field enumeration records. Specifically, we delineated the research boundary in line with the historical protection scope, removed non-resident categories (short-stay migrants, vacant/derelict units) and duplicate registrations, and restricted the frame to eligible adult residents who could be contacted during the survey window. The convergence of these sources (census micro-tabulations and administrative registers) yielded a stable accessible frame of roughly five hundred residents for sampling purposes.

Given that population variance was unknown at the planning stage, we adopted Slovin's formula to determine the minimum sample size required to attain a conventional precision target in a single cross-sectional wave. Let e denote the desired margin of error; with 95% confidence commonly applied, we set $e = 0.05$.

$$n = \frac{N}{1 + Ne^2}$$

Substituting $N = 500$ and $e = 0.05$ into yields:

$$n = \frac{500}{1 + 500 \times 0.05^2} = \frac{500}{1 + 500 \times 0.0025} = \frac{500}{2.25} = 222.22...$$

Accordingly, the study planned a minimum of $n = 222$ completed questionnaires per wave. To safeguard against nonresponse and data-cleaning losses, fieldwork employed modest oversampling (10–20%) while maintaining proportional stratification across key resident categories (e.g., long-term residents, newer households, and local businesses) with a minimum of around 30 observations per stratum to enable comparisons. A small pilot (≈ 30 –50 cases) preceded the main waves to refine the instrument and logistics; reliability checks targeted Cronbach's $\alpha \geq 0.70$ before scale scores were used in analysis.

For completeness, the realized sample sizes in the three waves were 230 (pre-test), 218 (mid-test), and 203 (post-test). Under the planning frame $N = 500$ and $e = 0.05$, these correspond to approximate margins of error of about 4.75%, 5.00%, and 5.31%, respectively, which are consistent with the study's precision target.

The qualitative strand employed purposeful, maximum-variation sampling to capture heterogeneity across roles that shape everyday life and governance in Menxi. Within a constructivist grounded-theory orientation, sampling progressed iteratively, allowing comparisons within and across strata and follow-up recruitment where early analyses indicated conceptual gaps (Charmaz, 2014). Eligibility required adults (≥ 18 years) residing or operating a business within the study boundary for at least six months.

Guided by the above logic, we conducted 24 semi-structured interviews distributed as follows: long-term residents ($n = 8$), new residents/young families ($n = 6$), government officials ($n = 4$), community association leaders ($n = 3$), and cultural practitioners/heritage bearers ($n = 3$). Officials and association leaders were recruited as key informants to elucidate policy constraints, operational routines, and community governance interfaces; resident and business interviews captured lived experience and service use. Recruitment combined door-to-door contact at varied hours, resident WeChat groups, and committee referrals, with attention to balancing gender and age where feasible.

To surface group-level reasoning and stress-test emergent categories, we organized three focus group discussions each with 6–8 participants, segmented by role (long-term residents; newer households; small businesses). Group sizes and segmentation follow established practice for generating rich interaction while

minimizing status effects (Krueger & Casey, 2015; Morgan, 1997). FGDs adopted a “write-first, share-next” protocol to reduce conformity bias and were scheduled at times convenient to working households.

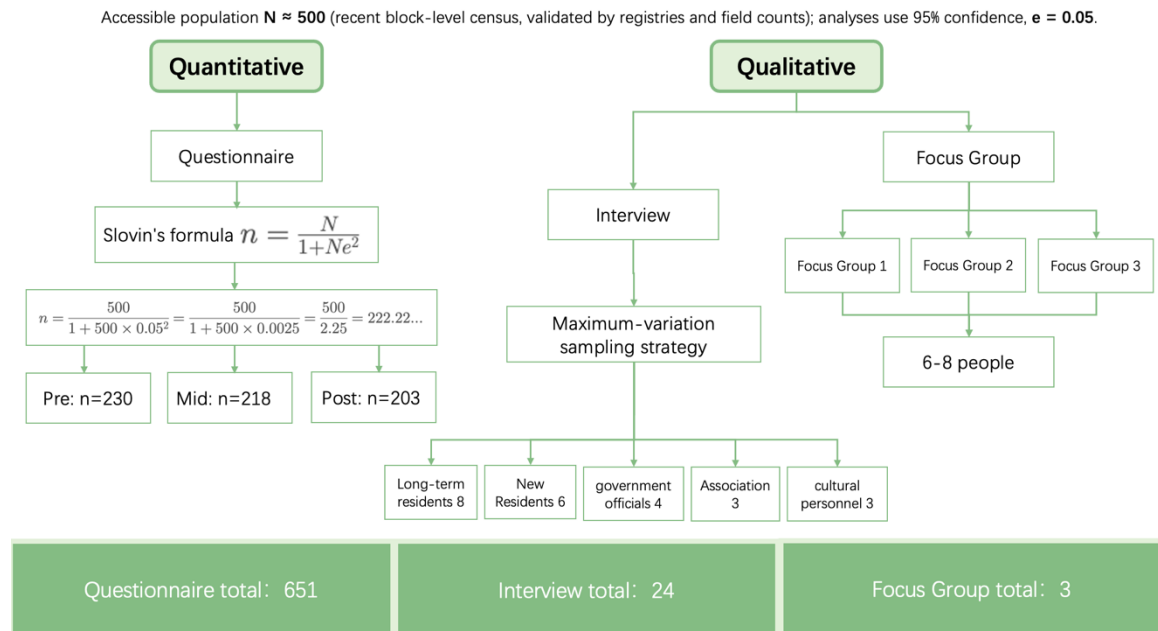


Figure 45 Sample (Li, 2025)

Sampling closed at theoretical saturation, operationalized as the point at which additional cases failed to produce new properties of core categories or alter category relations in consecutive comparisons—converging with empirical guidance on saturation thresholds in qualitative inquiry (Charmaz, 2014; Guest et al., 2006). All transcripts were coded in NVivo; 20% were double-coded to assess inter-coder reliability (Cohen’s $\kappa \geq .70$), with discrepancies resolved by discussion and codebook refinement (Cohen, 1960). This design yielded role-diverse evidence adequate for constant comparison and for linking qualitative categories to the staged PAE interventions.

3.3 Collected Data

Data collection followed a convergent mixed-methods protocol aligned with the PAE sequence and organised into three waves: T0 (pre-intervention/baseline), T1 (mid-activation), and T2 (post-intervention/early evolution). The accessible adult population of the Menxi historic area was established at approximately $N \approx 500$; resident surveys achieved $n = 230$ (T0), $n = 218$ (T1), and $n = 203$ (T2). The questionnaire instrument, held constant across waves to ensure comparability, comprised five sections: (a) a multi-dimensional outcomes battery consistent with the

6E frame (Effectiveness, Efficiency, Experience, Equity, Environment, Ethics) measured on five-point Likert items; (b) service access and use (e.g., sanitation, safety, micro-greening, wayfinding); (c) participation, stewardship, and place attachment; (d) socio-demographics and dwelling/business attributes; and (e) open items for emergent issues. A short pilot preceded T0 to refine wording and flow. Fieldwork logs recorded date/time, location, enumerator ID, and nonresponse codes; returns were screened for range violations and patterned responses before database lock (Nunnally & Bernstein, 1994).

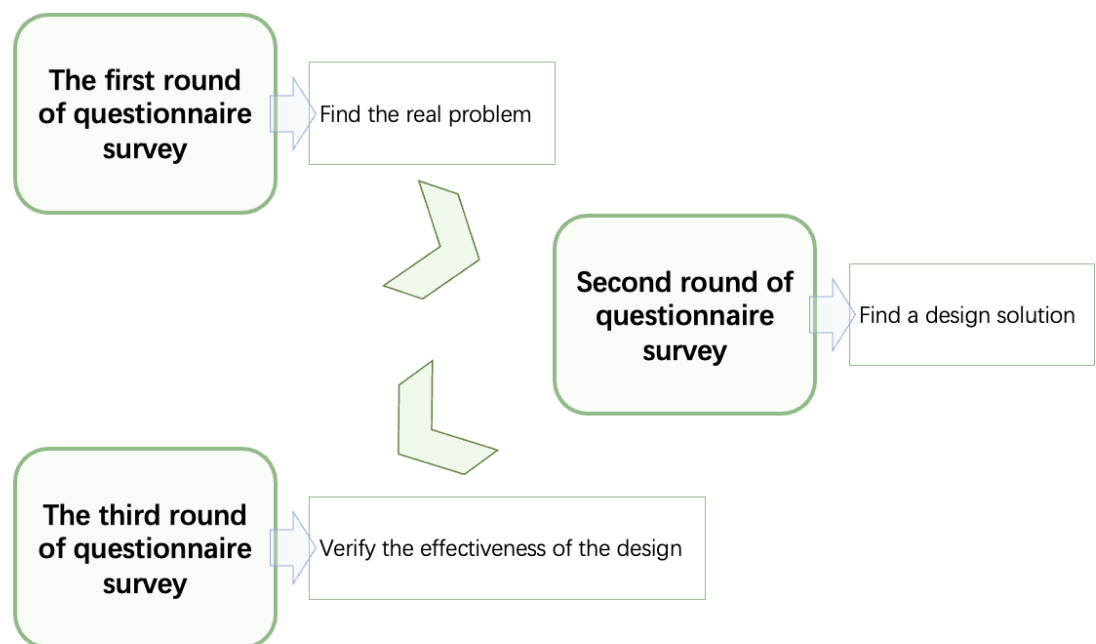


Figure 46 Questionnaire Survey Plan (Li, 2025)



Figure 47 Questionnaire photo (Li, 2025)

Reliability Statistics

Cronbach's Alpha	N of Items
.915	23

A value greater than 0.7 is required to prove the reliability of the questionnaire

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy.		.750
Bartlett's Test of Sphericity	Approx. Chi-Square	719.664
	df	253
	Sig.	.000

A value greater than 0.6 is required to prove the validity of the questionnaire

Figure 48 Reliability and validity analysis of the questionnaire (Li, 2025)

The qualitative corpus consists of 24 semi-structured interviews and three focus-group discussions (FGDs). Interviews were purposively sampled to maximise variation across stakeholder roles—long-term residents ($n = 8$), newer households/young families ($n = 6$), small business/tenants ($n = 3$), community association leaders ($n = 3$), and government officials ($n = 4$)—with recruitment continuing until conceptual sufficiency. Three FGDs (one per resident/business stratum) convened 6–8 participants each at times convenient to working households, using a “write-first, share-next” protocol to reduce conformity bias (Krueger & Casey, 2015; Morgan, 1997). All sessions were audio-recorded with written informed consent, transcribed verbatim, anonymised, and logged with session metadata (duration, participants, setting). In keeping with a constructivist grounded-theory orientation, memos and diagrammatic notes were produced contemporaneously to preserve process detail for later constant comparison (Charmaz, 2014).



Figure 49 Video screenshots of interviews and focus groups (Li, 2025)

To anchor reported change in observable practice, the study compiled field-observation and artefact records at each wave: structured audits of lanes and courtyards (hygiene, lighting, safety, signage), geo-referenced photo pairs (before/after), and design artefacts generated during the intervention cycle (service blueprints, stakeholder maps, prototype logs). Where accessible, administrative and behavioural traces were collated and time-stamped to T0/T1/T2, including complaint registers, sanitation schedules, counts of participation in micro-events, association membership updates, and maintenance tickets. These materials were indexed to survey enumeration areas to enable cross-source triangulation.

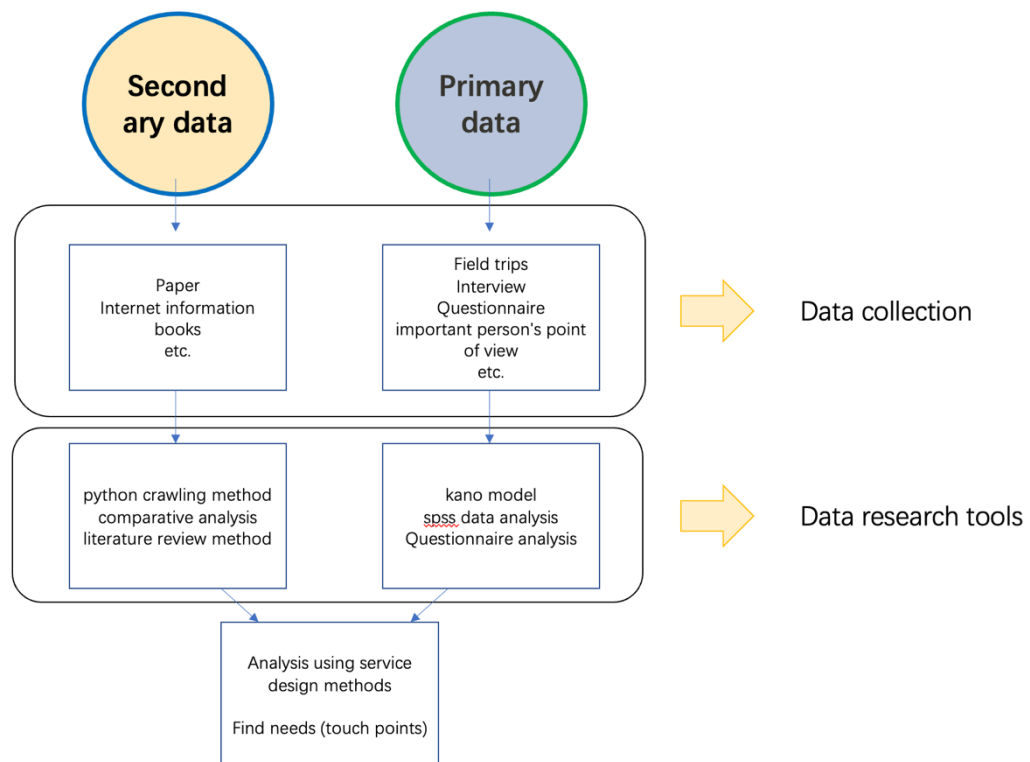


Figure 50 Data collection and processing (Li, 2025)

3.4 Data Analysis

Analysis proceeded within a convergent-sequential mixed-methods design: at each wave (T0/T1/T2) quantitative and qualitative evidence were first examined concurrently to establish within-wave corroboration, and then sequenced across waves so that T0 informed Protective baselines, T1 guided Activation adjustments, and T2 assessed early Evolution (Creswell & Plano Clark, 2018; Yin, 2018). Integration was operationalized through joint displays and meta-inferences that aligned statistical change estimates with coded mechanisms from interviews and focus groups (Fetters, Curry, & Creswell, 2013).

For the survey data, screening addressed range and logic violations, outliers, and missingness; when item-level missingness was <5%, listwise deletion was applied, while higher rates triggered multiple imputation sensitivity checks (Little & Rubin, 2019). Scale construction followed established psychometric practice: internal consistency was evaluated with Cronbach's α (target $\geq .70$), sampling adequacy with Kaiser-Meyer-Olkin (KMO $\geq .60$), and common factorability with Bartlett's test of sphericity (Bartlett, 1950; Kaiser, 1974; Nunnally & Bernstein, 1994). Where appropriate, exploratory factor analysis (EFA, principal-axis with oblique rotation) was used to confirm the dimensional structure of the 6E measures; cross-wave

measurement consistency was examined via multi-group checks or, where CFA was infeasible, by comparing item–total correlations and α stability across waves (Putnick & Bornstein, 2016). Composite scores were computed as means and, for comparability across domains, rescaled to 0–100.

Change estimation followed the design of the data. When respondents could be matched across waves, paired-sample tests were used; otherwise, independent-sample tests with covariate adjustment (ANCOVA) compared repeated cross-sections. Assumptions were checked (normality, homoscedasticity); non-parametric alternatives (Wilcoxon signed-rank, Mann–Whitney U) were used where appropriate. All tests reported effect sizes (Cohen's d) with 95% confidence intervals, and familywise error was controlled using the Benjamini–Hochberg false discovery rate for multi-outcome comparisons (Benjamini & Hochberg, 1995; Cohen, 1988). To probe mechanism, mediation and moderation models assessed whether improvements in service-process quality and participation mediated 6E gains, and whether baseline conditions moderated effects; these models were estimated in SPSS (PROCESS) with bias-corrected bootstrap intervals (Hayes, 2018).

For the qualitative corpus, analysis followed a constructivist grounded-theory procedure: initial line-by-line coding, focused coding of the most analytic categories, and integrative memoing/diagramming to relate conditions, actions, and consequences to PAE stages (Charmaz, 2014). NVivo supported constant-comparison queries across strata (long-term/new residents, businesses, associations, officials) and waves (T0/T1/T2), including matrix coding for the PAE $\times$ 6E frame and negative case searches to test category boundaries. Credibility and dependability were addressed via an audit trail and inter-coder agreement checks on a 20% subsample (Cohen's $\kappa \geq .70$), with discrepancies resolved through codebook refinement (Cohen, 1960).

Mixed-methods integration adjudicated three outcomes—convergence, complementarity, or discrepancy—between quantitative trends and qualitative explanations (Fetters et al., 2013). Convergent findings strengthened inferential claims; complementary findings were used to specify boundary conditions and implementation lessons; discrepancies triggered re-inspection of assumptions, instrumentation, and rival explanations. The goal throughout was analytic generalization to propositions about service processes and stewardship in protected historic districts rather than statistical generalization to a wider population.

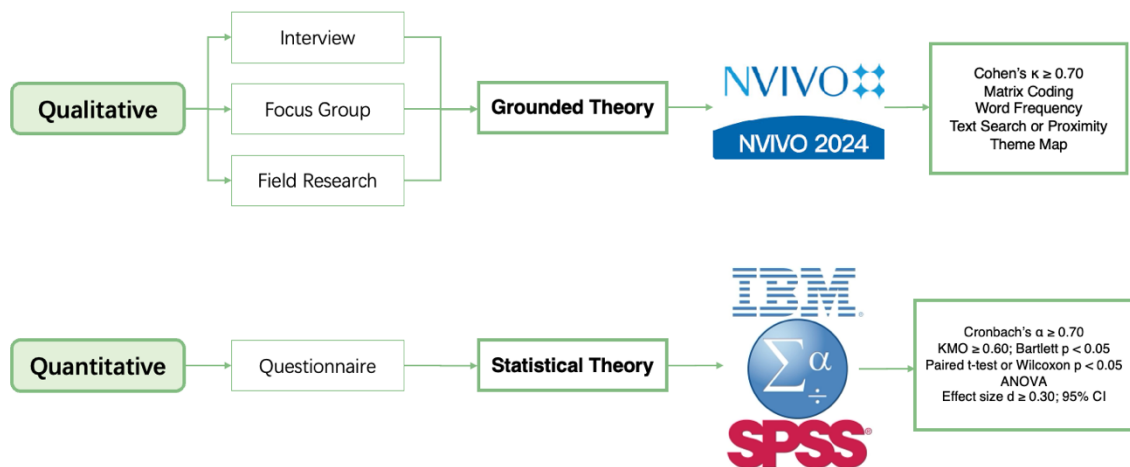


Figure 51 Data Analysis Tools (Li,2025)

3.5 Finding experiment or demonstration and Evaluation.

The design experiments are organised through four linked devices: a PEST-C analyze model, the Double Diamond design model, the PAE strategy, and a 6E evaluation frame. Together they guide how interventions are conceived, demonstrated in the field, and assessed for effects and feasibility.

The PEST-C analyze model boundary conditions and opportunities for Menxi. It analyses the policy environment, economic feasibility, social structure, technological affordances, and cultural fit. Classic work on environmental scanning informs this step, and the resulting risk–opportunity register constrains the brief for each intervention (Aguilar, 1967; Fahey & Narayanan, 1986). Alignment with the Historic Urban Landscape recommendation ensures that macro choices do not erode heritage values.

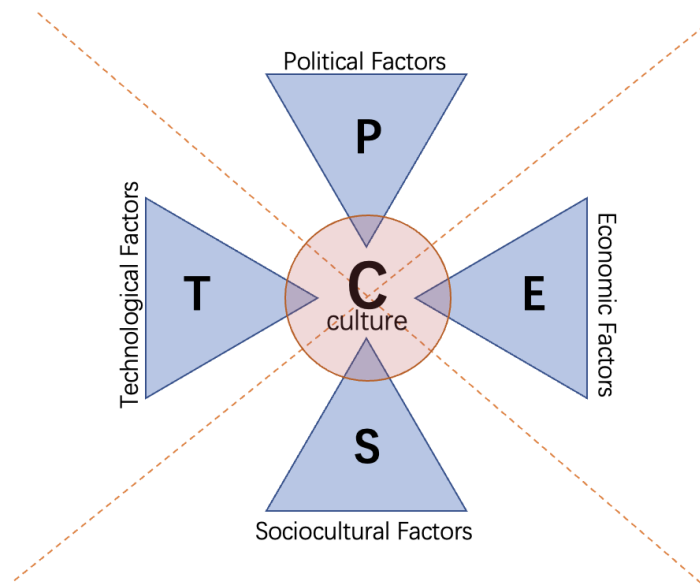


Figure 52 PEST-C analyze Model (Li, 2025)

The Double Diamond design model the design workflow into four phases. Discover uses walk-along observation, short intercepts, and blueprint shadowing to surface pain points in daily use. Define synthesises these findings into bounded problem statements that are consistent with the PEST-C register. Develop produces low-fidelity prototypes of micro public-space and service elements—such as wayfinding cues, modular planters with seating, water points, and communal tool lockers—followed by failure-mode walkthroughs with users. Deliver installs limited pilots with explicit maintenance interfaces and hand-offs. This process follows guidance from the Design Council and is operationalised with service-design instruments including service blueprints and stakeholder maps (Design Council, 2019; Stickdorn & Schneider, 2011).

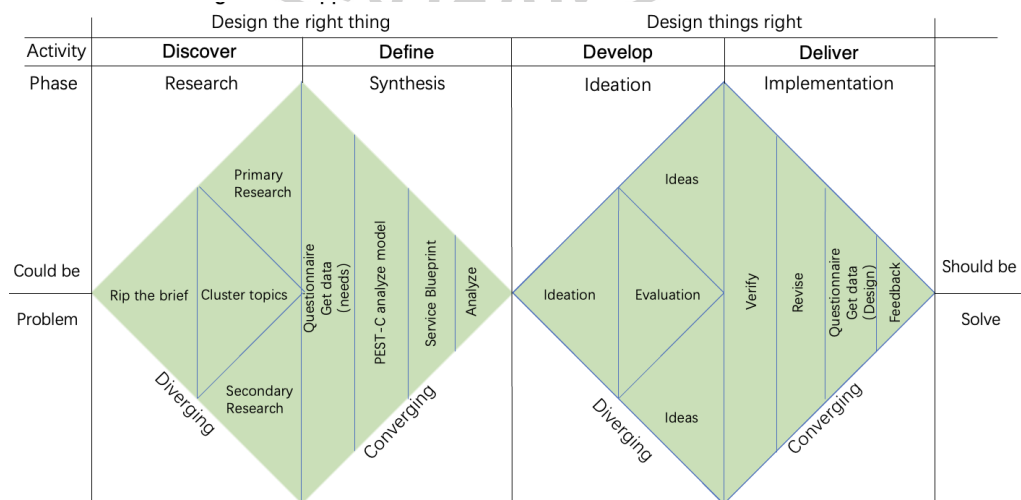


Figure 53 Double Diamond Design Model (Li, 2025)

The PAE strategy field demonstrations so that conservation and day-to-day gains advance together. Protect delivers reversible works that restore safety and hygiene and stabilise utilities while retaining the alley–courtyard grain. Activate inserts small modular artefacts and schedules that increase everyday use and social exchange. Evolve codifies upkeep through maintenance procedures, shared governance routines, nursery supply, and periodic wayfinding audits so that improvements persist. This staging translates conservation principles for living historic areas into a service-oriented implementation path .

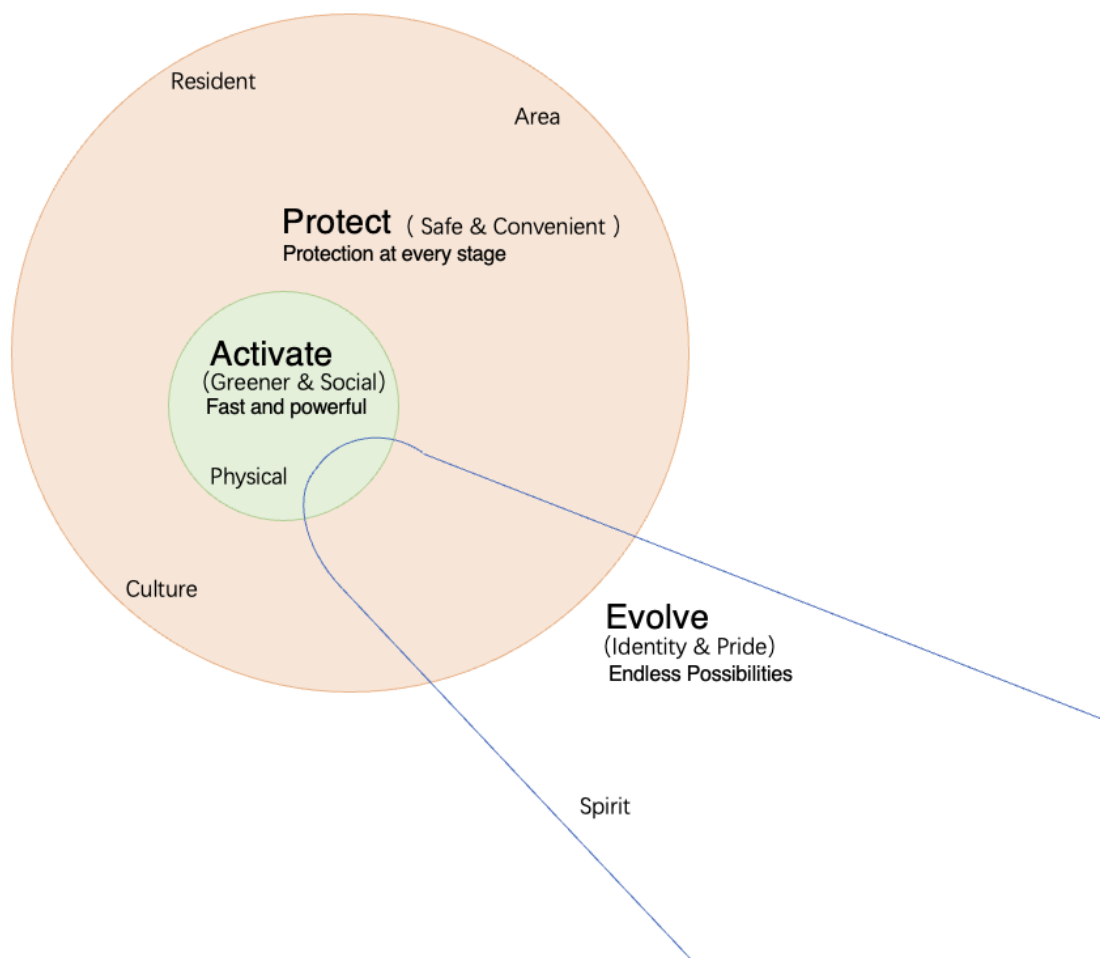


Figure 54 PAE Historic Area Design Strategy (Li, 2025)

Evaluation follows a 6E multi-criteria frame: effectiveness, efficiency, experience, equity, environment, and ethics. Resident surveys at T0, T1, and T2 provide comparable composite scores with reliability screening by Cronbach's alpha at a threshold of 0.70. Node-level indicators include footfall and dwell at activated sites, route-choice shares at junctions, cleanliness and safety indices after protective

works, participation and stewardship counts, and maintenance response times. Statistical analysis in SPSS reports change estimates with effect sizes and confidence intervals. Qualitative evidence from interviews and focus groups is coded in NVivo and compared across strata and waves to trace mechanisms behind the measured changes. Joint displays then align statistical trends with process explanations, following established mixed-methods integration practice .

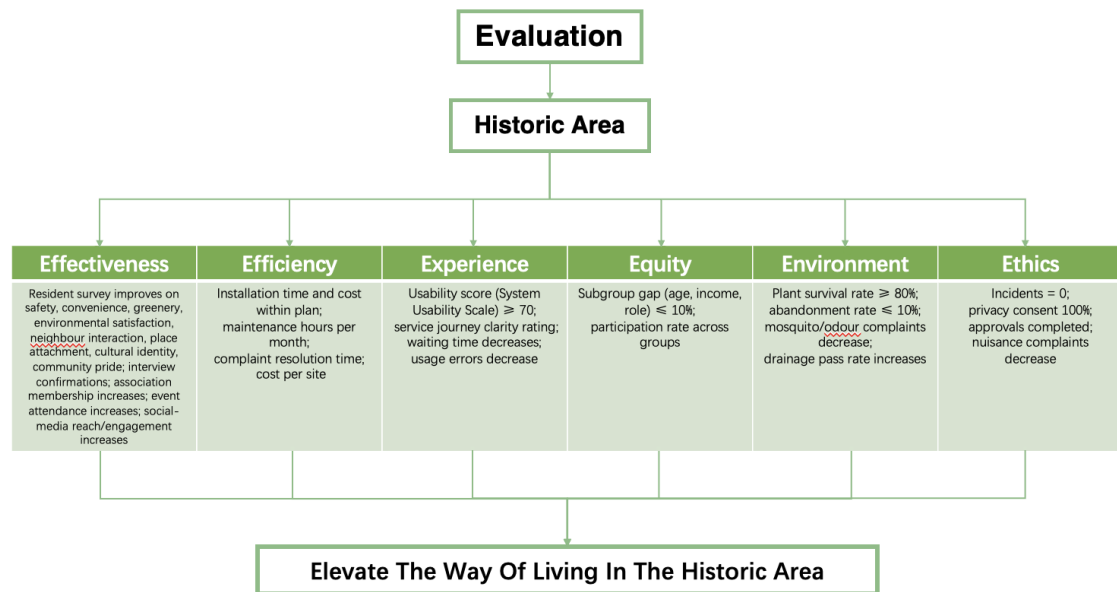


Figure 55 Test and Evaluation Tools (Li, 2025)

3.6 Tools and Reliability (IOC)

Research tools include questionnaires, interviews, focus groups, service blueprints and demand points in service design. To ensure the robustness and reliability of our research methods, we engaged three IOC experts for validation. IOC experts play a crucial role in confirming the effectiveness and appropriateness of our chosen tools and methodologies. Their expertise in Input-Output Control systems provides valuable insights into the reliability of data collection instruments and analytical techniques employed in our study. Through their evaluation, we aim to strengthen the validity of our findings and enhance the credibility of our research outcomes. Their input will be instrumental in refining our approach and ensuring that our research meets the highest standards of methodological rigor.

The validation process involves a meticulous review of our instruments, such as questionnaires designed for experts and tourists, and interview protocols tailored for qualitative insights. Through their scrutiny, we aim to confirm that these tools are not only well-structured but also capable of eliciting accurate and comprehensive responses from our target groups.

Beyond evaluating the tools themselves, the IOC experts also assess the suitability of our analytical techniques. This includes methods like content analysis, which aids in extracting meaningful patterns from qualitative data, and correlation tests to explore relationships among variables. Additionally, participant feedback tests are employed to validate the relevance and applicability of our findings to real-world contexts.

By incorporating the feedback and recommendations of these specialists, we enhance the robustness and credibility of our research outcomes. Their input ensures that our study adheres to rigorous standards of data integrity and methodological soundness, thereby reinforcing the validity of our conclusions and their practical implications. This collaborative approach underscores our commitment to producing reliable research that contributes meaningfully to the understanding of our subject matter.

Summary

This chapter established the methodological foundation of the study through a carefully designed mixed-methods approach. It presented how the research instruments—surveys, interviews, and focus groups—were used in conjunction with three design experiments to test the PAE strategy in real-world contexts. Each experiment responded to specific local needs and allowed for iterative, participatory engagement with residents. The chapter demonstrated how this design-led method provided not only measurable outcomes but also qualitative insight into community transformation. This empirical framework enables robust validation of the strategy and prepares for the outcome analysis in the subsequent chapter.

CHAPTER 4 RESEARCH RESULT

Introduction

This chapter presents the empirical findings derived from the implementation and assessment of three sequential design experiments conducted in the Menxi community. Guided by the Protect–Activate–Evolve strategic framework, each intervention aimed to address distinct yet interconnected aspects of residents’ well-being—ranging from physical safety and environmental comfort to cultural recognition and identity.

A mixed-methods research approach was employed to evaluate the outcomes of each design experiment. Quantitative data were collected through structured questionnaires administered at baseline (T0), post-intervention (T1), and follow-up stages (T2), while qualitative insights were generated from 24 in-depth interviews and 3 focus group discussions. Statistical analysis was conducted using SPSS, including reliability and significance testing, complemented by thematic coding via NVivo to triangulate and contextualize the findings.

The chapter is structured to detail the results of each design experiment individually (DE1–DE3), evaluating them against the predefined 6E framework (Effectiveness, Efficiency, Experience, Equity, Environment, Ethics) and focusing on two resident groups: long-term residents and new arrivals. The outcomes demonstrate both the tangible and intangible impacts of service design interventions within a historic urban context.

4.1 The result of Data Analysis

During the T1 (midline) phase, a mixed-methods analysis of survey data and qualitative feedback was conducted to pinpoint design priorities for pilot interventions. The findings reveal strong community consensus around three focal areas: (1) enhancing clothes-drying safety infrastructure (DE1), (2) introducing small greenery and planting schemes (DE2), and (3) promoting cultural recognition and local identity (DE3). The quantitative survey results provided a broad ranking of needs and preferred solutions, while interviews and focus groups offered contextual insights and nuanced validation of these priorities. Together, these data guided the selection of the three pilot design experiments.

Clothes-Drying Safety as a Top Priority (DE1). From the baseline survey, hazardous clothes-drying practices emerged as the single most urgent issue. Over half of residents (56%) ranked “safety of clothes-drying infrastructure” as the top problem to address[1]. In particular, 42% of households admitted to hanging laundry on



Figure 57 Intangible problem (Li, 2025)

Demand for Greening and Micro-Planting (DE2). The desire to improve the neighborhood's greenery and shade was another strong theme. At baseline, environmental conditions received low evaluations – for instance, only about 24% agreed that “greenery and shade are sufficient” in Menxi (ENV2 mean=2.46/5). In the T0 open-ended question about next improvements, greening was the third-most cited priority (16% of residents ranked it first), often mentioned in tandem with enhancing comfort in public spaces. This trend intensified during the T1 co-design survey when “pocket/vertical greening” was presented as one of the candidate solutions. The community's response was very positive: participants gave the greening idea an average likeability score well above 4 (out of 5), placing it among the top-rated proposals. Many respondents also allocated a significant portion of their limited “priority tokens” to greening initiatives, indicating it as a favored solution for the neighborhood. Qualitative findings bolster this result – residents frequently spoke of the need for “a bit of nature” in the alleys. Several interviewees noted that even small planters or vines could “make our lane look alive” and provide welcome shade in the hot months. Some also tied greenery to social benefits, observing that adding plants might encourage neighbors to collaborate in maintenance and take pride in their street. In the T1 feedback, a commonly repeated suggestion was “More pocket plants, please.” (mentioned by 49 different respondents), reflecting an eager grassroots appetite for micro-greening efforts. Consequently, the pilot intervention DE2 was defined to introduce small-scale greenery and planting schemes – such as wall-mounted planters, potted shrubs, or modular flower boxes – in the historic lanes. The community's endorsement of this plan was very high: about 83% of residents gave a

support rating of 4 or 5 for small greening projects. This confirms that a greening intervention would be broadly welcomed and likely to succeed with local participation (indeed, many residents indicated willingness to help water or tend the new plants, per T1 survey responses on stewardship willingness).

Importance of Cultural Recognition and Identity (DE3). In addition to physical improvements, the research revealed a pronounced intangible need: strengthening local cultural identity. Baseline data showed that residents perceived a loss of cultural heritage in Menxi. When asked if the community's history and culture were well preserved, a majority expressed skepticism (the mean "culture adequately preserved" sentiment was around 2.2/5, indicating general disagreement). Furthermore, nearly a quarter of respondents (23.5%) volunteered "cultural recognition or identity" as the top issue to address next – the second-highest priority category after safety (Figure 4.1). Qualitative inquiries helped clarify this abstract need. Older residents in focus groups lamented that younger generations and newcomers "don't know Menxi's history or traditions." Some community members felt that the rapid physical changes and influx of tourists were diluting the neighborhood's character, leading to a weaker sense of belonging among locals. They urged for initiatives to celebrate Menxi's heritage and strengthen community pride – suggestions ranged from posting historical photos and stories in public spaces to organizing cultural events. One participant summarized, "We need to promote Menxi culture and stories for our residents, not just for tourists," highlighting a desire for everyday cultural visibility. Initially, the T1 survey's list of design solutions did not directly include a cultural intervention, focusing more on physical infrastructure. However, based on the strong community sentiment, the project team incorporated cultural recognition and local identity (DE3) as a key design experiment. This could entail measures like installing informational plaques about historic sites, murals or exhibits reflecting local culture, or community-driven art installations that signal Menxi's unique identity. When the idea of cultural promotion was discussed with residents, support was moderate-to-strong: roughly 61% of survey respondents gave a positive support rating (4 or 5) for cultural recognition initiatives (Figure 4.2), while most of the remainder were neutral (only a very small minority opposed the idea). The slightly lower quantitative support compared to DE1 and DE2 is understandable given the less tangible nature of cultural benefits; nonetheless, a clear majority are in favor. The interviews further underscore that those who support this idea feel it fills an important gap – as one resident noted, "Physical upgrades are needed, but our spirit is important too." Thus, DE3 was validated as a necessary complement to the more infrastructural pilots, aimed at bolstering community pride and continuity in Menxi.

The T1 data analysis clearly identified clothes-drying safety, greenery, and cultural identity as the top design priorities for the Menxi area. The quantitative rankings demonstrated that these domains correspond to the most prevalent deficits

perceived by the community (safety hazards, lack of greenery, erosion of cultural identity). Meanwhile, the qualitative insights enriched our understanding, ensuring that the selected interventions directly respond to residents' lived experiences and aspirations. Notably, other ideas considered – such as public tool cabinets or water taps – received comparatively lukewarm responses and were not prioritized, and although many residents did voice a desire for more seating and shade (e.g. “add shade and benches near corners” was a frequent comment), the pilot scope necessitated focusing on three interventions. The chosen three experiments (DE1–DE3) cover a balanced spectrum of needs: physical safety, environmental enhancement, and socio-cultural vitality. The convergence of survey results and interview/focus group feedback gives confidence that these interventions are not only data-driven but also community-endorsed. Thus, the following sections of this chapter will detail each design experiment and its implementation, grounded in the evidence that these were the right priorities for improving quality of life in Menxi.

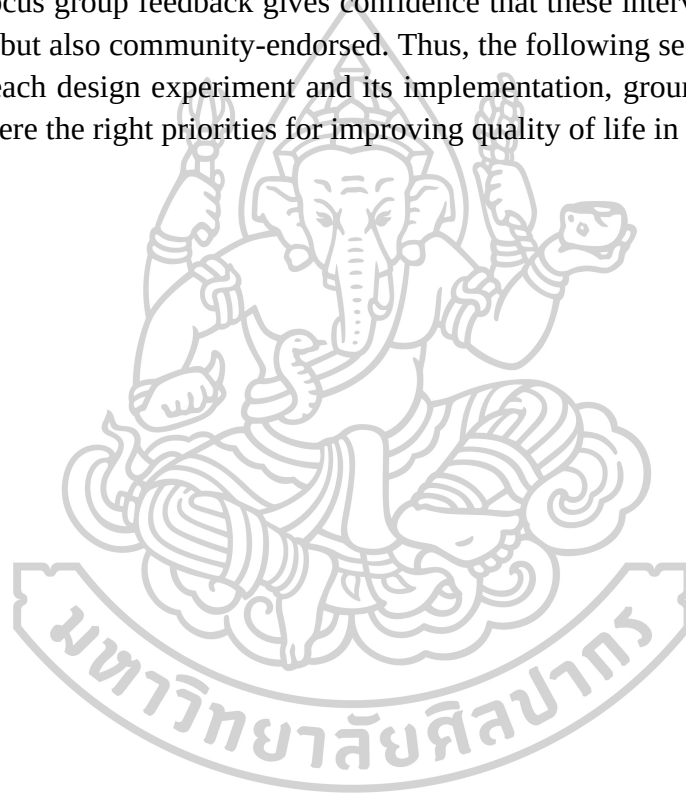


Figure 58 word cloud (Li, 2025)

In summary, the qualitative findings from interviews and focus groups delineate a clear trajectory of needs and aspirations among Menxi residents, moving from basic safety to environmental livability to cultural vitality. Through grounded analysis, three major themes were identified – each corresponding to a phase in the Protect–Activate–Evolve model – and each underpinned by multiple sub-themes that were consistently echoed by participants. These themes not only guided the creation of targeted design interventions (drying racks for safety, pocket greening for comfort, and heritage trail for culture) but also provided a means to evaluate their reception using the 6E criteria. Below synthesizes how each intervention addressed the core needs and how residents perceived the outcomes in terms of Effectiveness, Efficiency, Experience, Equity, Environment, and Ethics – offering a qualitative “report card” for

the project's impact (this table is discussed in Chapter 6, Evaluation). Overall, the NVivo-assisted analysis provided rich, nuanced evidence that the residents' real needs in Menxi are multi-faceted. Importantly, the needs are interdependent: by first protecting the basics, then activating the space, and finally evolving the community spirit, the district's revitalization can be holistic and resilient.

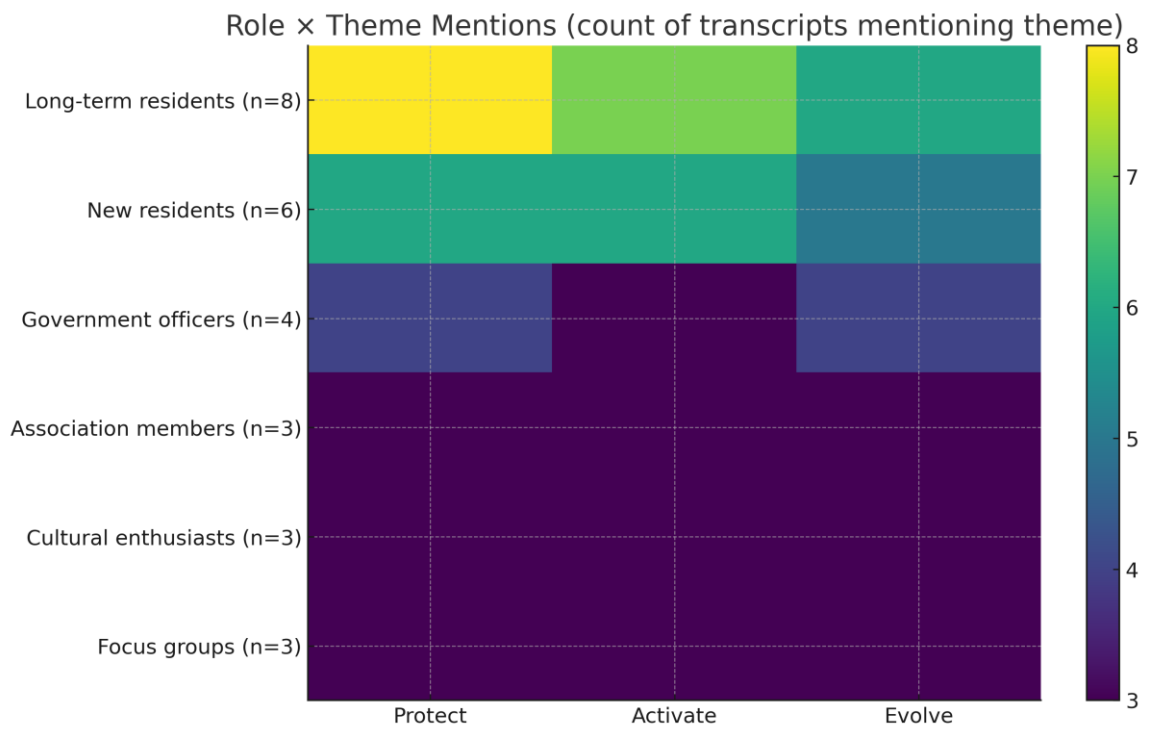
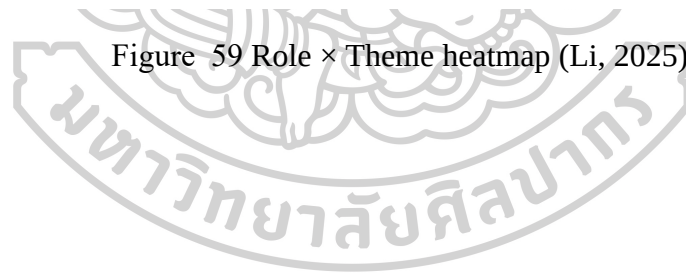


Figure 59 Role × Theme heatmap (Li, 2025)



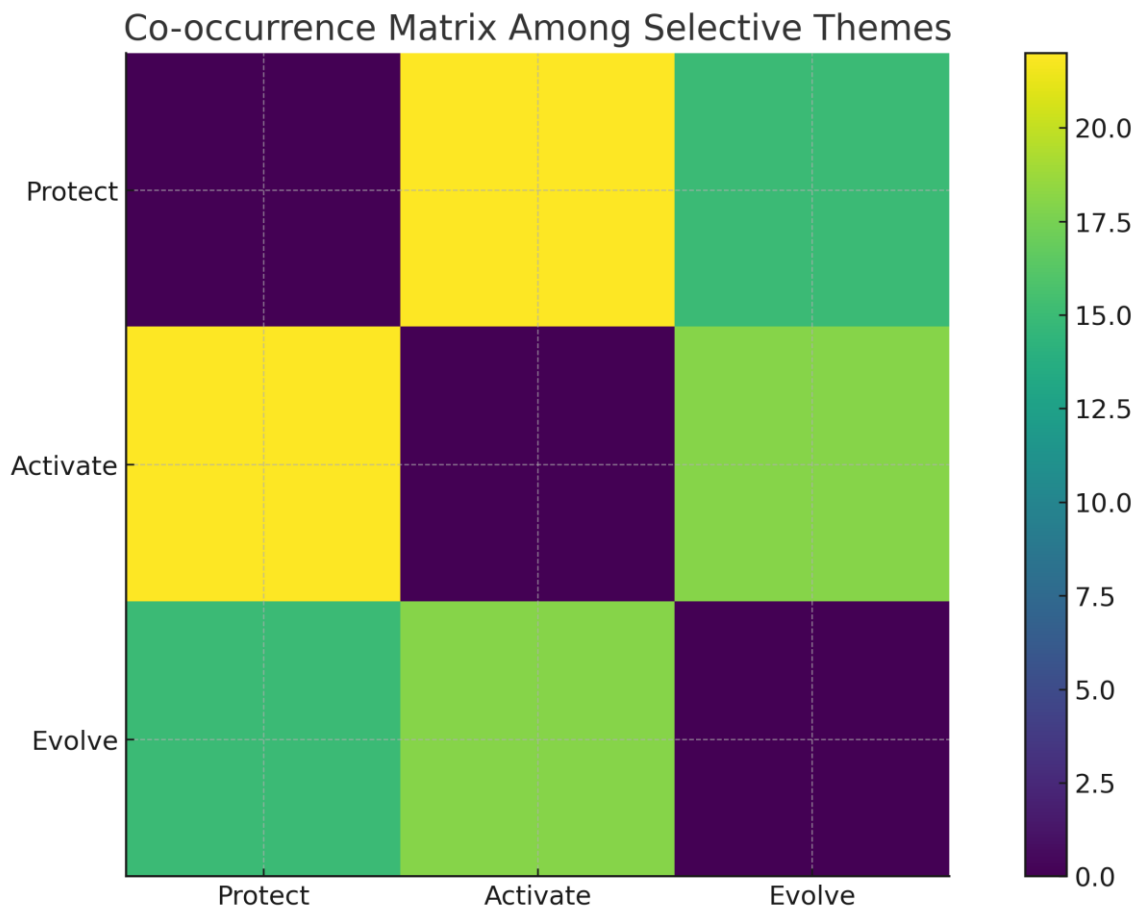


Figure 60 Co-occurrence matrix among selective themes (Li, 2025)

4.2 Finding and Design Art Concept /Problem solving

The midline analysis integrates the T1 survey with interview and focus-group evidence and shows clear convergence on three resident priorities: clothes-drying safety, micro-greening and comfort in public space, and cultural recognition with a stronger sense of place. These priorities align with the PAE sequence of Protect, Activate, and Evolve. Quantitative ratings at baseline and midline identified the same deficits that residents described qualitatively, which confirms that the problem framing is grounded in everyday experience rather than imposed by the research design.

What is the SEED PROGRAM

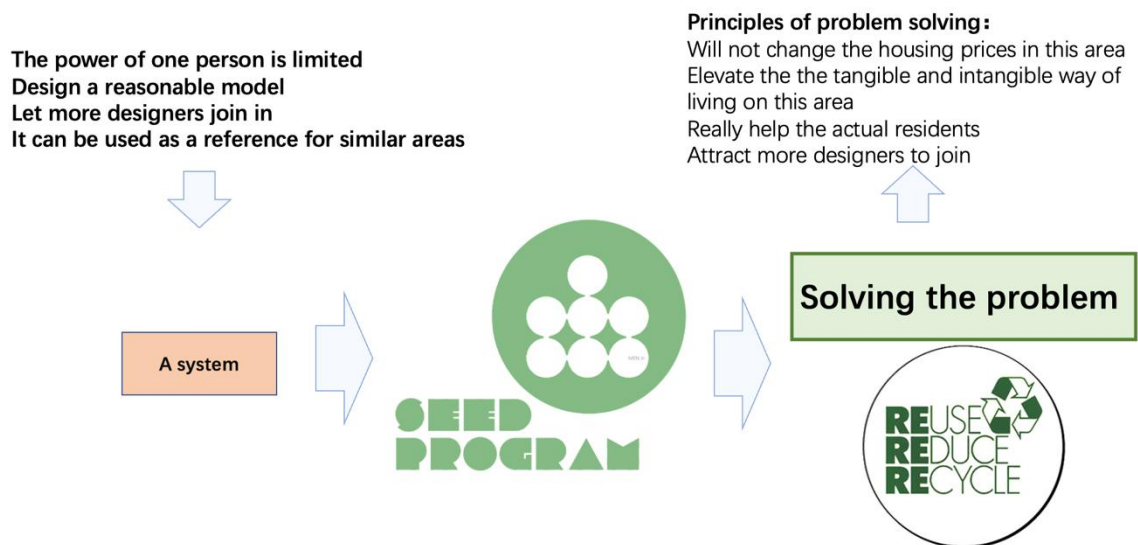


Figure 61 The origin of the Seed program (Li, 2025)

Within this logic, Protect addresses foundational safety and order in the lanes, Activate improves comfort and usability through small amenities and shade, and Evolve makes cultural meaning visible and strengthens belonging. The three design experiments follow this sequence: DE1 focuses on drying safety, DE2 focuses on pocket greening and simple seating, and DE3 focuses on cultural visibility and pride. The order reflects urgency, feasibility in a heritage fabric, and the way residents experience daily life from risk removal to amenity to identity.



Figure 62 At the ICDI2024 conference (Li, 2025)

To make the strategy operational in a historic area, the project adopts the SEED Program. SEED stands for small, evidence-based, evolutionary, and distributed interventions. Each seed follows a simple cycle: diagnose a hotspot with field observation and resident input; deploy a minimal and reversible prototype; monitor use and short feedback in situ; evaluate against six dimensions used in this study — effectiveness, efficiency, experience, equity, environment, and ethics; refine the design; then replicate to comparable sites. This approach reduces risk, respects the existing fabric, and creates fast learning loops while keeping the footprint light and the changes legible to residents.

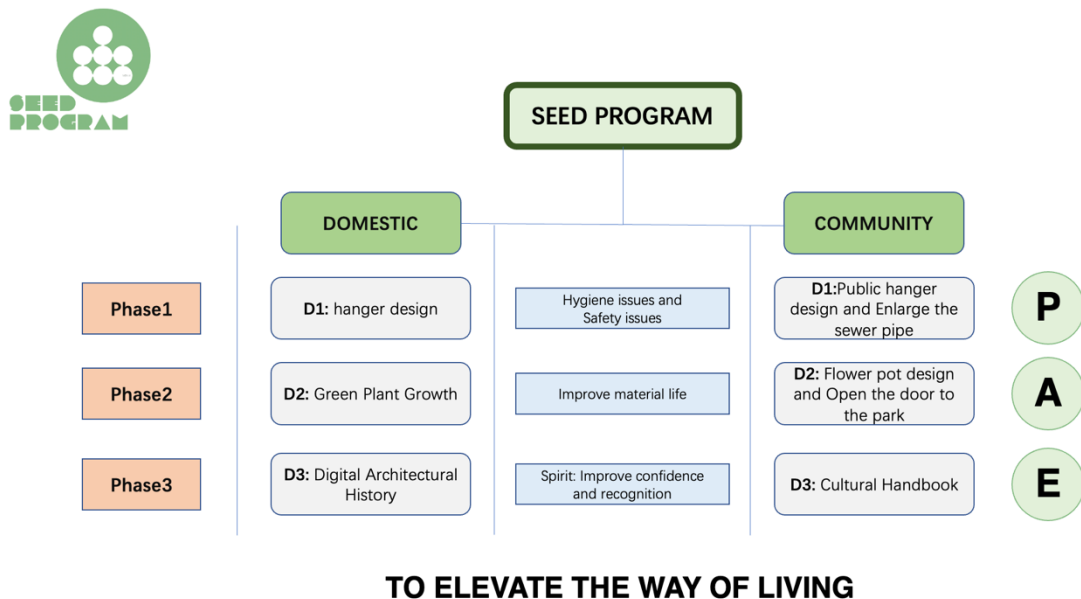


Figure 63 Output corresponding strategy (Li, 2025)

4.3 Design Experiment 1 (Protect)

The development followed the Double Diamond model, progressing through four iterative stages—Discover, Define, Develop, and Deliver—to reframe and address safety and hygiene issues associated with informal drying practices in the Menxi area. In the Discover stage, a combination of field observation, resident interviews, and T0 survey data revealed that overhead electrical wires were being used as drying infrastructure, creating risks of electrocution, obstructed circulation, and slippery surfaces. This phase established the behavioral and infrastructural roots of the problem. In the Define stage, quantitative indicators such as the low DrySafety index and qualitative themes from focus groups were synthesized to articulate a clear problem statement: drying behavior must be decoupled from electrical systems and relocated to safe, shared, and legible infrastructure. Three design directions were generated in the Develop stage—integrating drying with community activity corners, laundry rooms, and rain canopies—each aligned with site conditions and resident feedback. Ultimately, in the Deliver stage, the rain canopy + drying pole typology was selected due to its low cost, reversibility, and compatibility with the historic alley morphology, leading to the construction of over 20 modular installations and influencing adjacent policy on drainage upgrades. The DE1 process illustrates how the Double Diamond can structure service design responses to granular urban issues.

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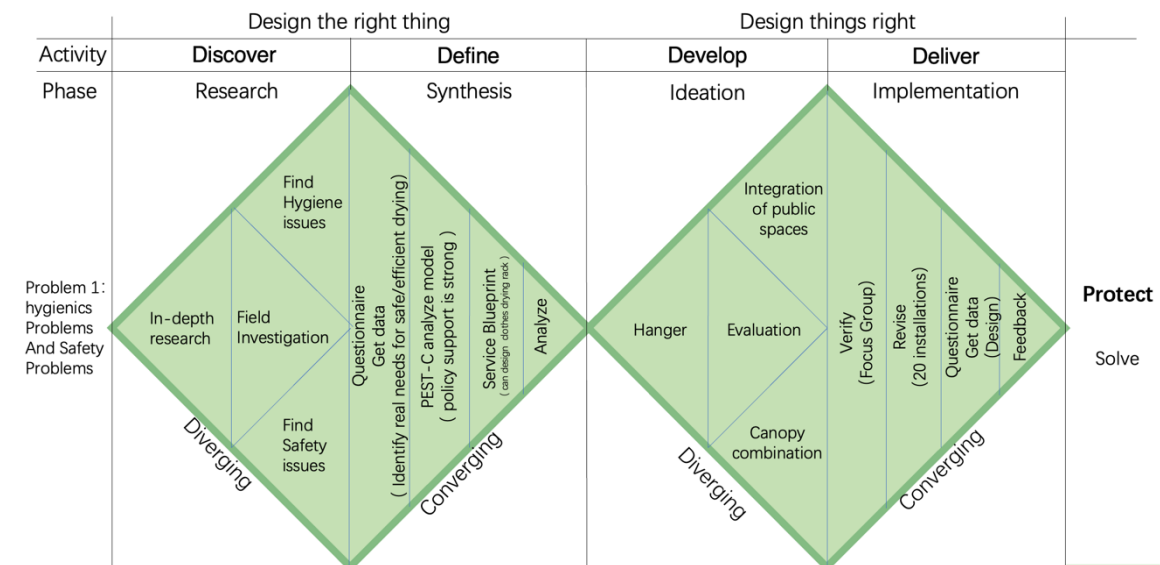


Figure 64 Double Diamond Model corresponds to Design Experiment 1 (Li, 2025)

4.3.1 Discover

Fieldwork combined systematic transect walks at morning and evening peaks with post-precipitation audits and nocturnal lighting assessments. A structured observation protocol recorded wire alignments, catenary sag, vertical clearances, approach angles, and surface conditions along primary and secondary alleys. Photo logs, sketch mapping, and brief semi-structured doorstep and shopfront interviews documented existing fixtures, tacit rules of use, and the rationales residents articulated for their drying practices.

The inquiry identified a prevalent practice of suspending garments directly on or over overhead electrical and service lines using long poles or metal hangers. Residents emphasized superior airflow, higher insolation, perceived theft deterrence, and the absence of dependable ground-level anchors. This practice created layered risk conditions: unpredictable reductions in head-clearance where lines sagged across passages, persistent drip trajectories that produced slippery segments, and elevated contact potential where insulation was aged or fittings were conductive. These risks intensified during wet weather and under low-illumination segments of the network, particularly where caregivers, children, and older adults shared narrow corridors.

These findings reframed the problem as one of structurally decoupling domestic drying from electrical infrastructure while preserving everyday convenience. Protection priorities emerged: define and signal no-hang zones proximate to live lines; provide dedicated, stable drying infrastructure aligned with sun and wind patterns yet outside primary circulation envelopes; and manage runoff through canopy and drainage detailing to maintain dry, predictable footfall lines. Visual legibility, light-

touch stewardship by local actors, compatibility with the alley's modest historic character, and equitable distribution across resident clusters constitute the design criteria that guide design prototyping and siting.

4.3.2 Define

The definition phase for Design Experiment 1 was grounded in both quantitative evidence and rich qualitative insights, revealing the urgency and specificity of safety concerns in Menxi's everyday drying practices. At the quantitative level, the baseline survey (T0, n=230) demonstrated a significantly low mean score of 1.85 (SD=0.74) on the DrySafety indicator, suggesting widespread perceived risk when drying clothes in shared public alleys. Respondents consistently expressed discomfort with current methods, which often involved suspending wet clothes directly over or adjacent to exposed electrical lines. At T1 (n=218), post-intervention support for a protected alternative (i.e., dedicated drying infrastructure) was strikingly high, with 91% of respondents assigning a score of 4 or 5 on a 5-point Likert scale. Concurrent improvements were also observed in perceived Effectiveness and Efficiency, supporting the conclusion that residents not only recognized the risks of prior behavior but also valued interventions designed to mitigate them.

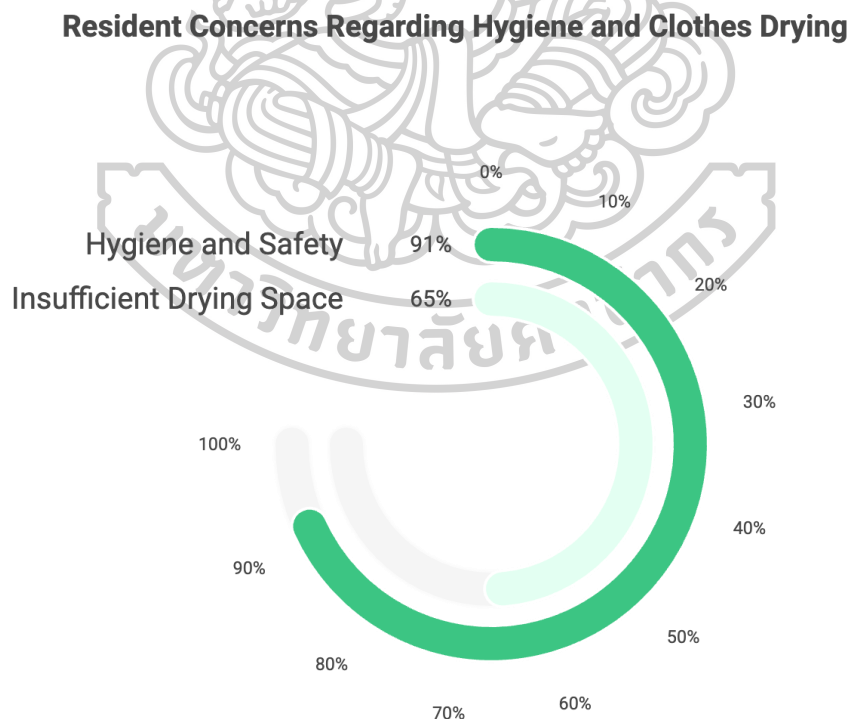


Figure 65 Questionnaire data (Li, 2025)

Qualitative data, gathered through semi-structured interviews and focus groups (each with 6–8 participants), added significant depth to the problem framing. Residents across roles—including older long-term dwellers, newly arrived tenants, shopfront owners, and local officials—described repeated instances of corridor obstruction, dripping hazards after rainfall, and fear of electric contact. Some referred to makeshift wooden poles or metallic rods used to reach utility lines as both risky and necessary, given the lack of stable infrastructure below eye level. These accounts established the behavioral logic behind high-risk practices and underscored the absence of appropriate, low-barrier drying solutions.

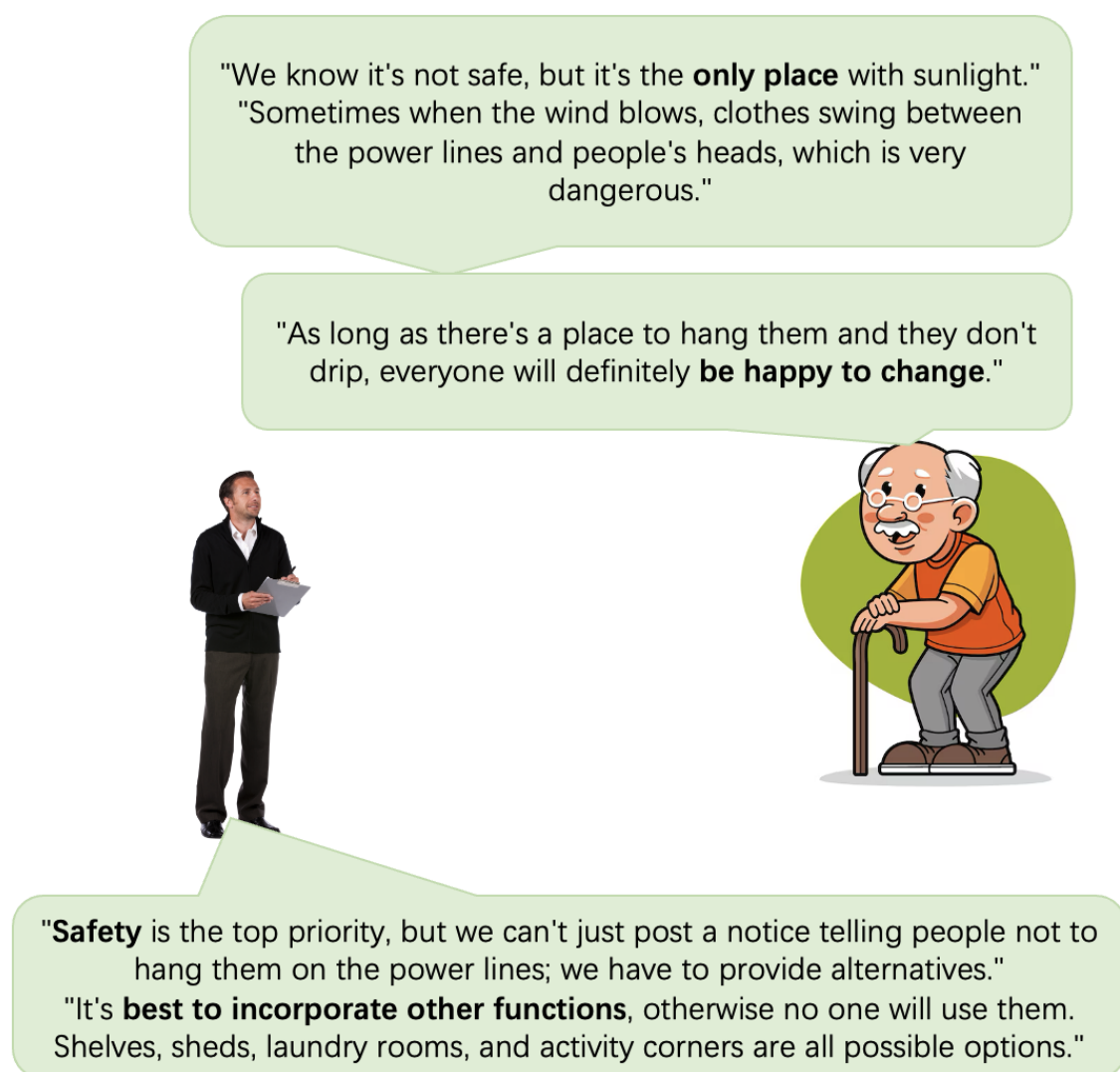


Figure 66 Qualitative data (Li, 2025)

To assess feasibility and constraints, a PEST-C framework was employed. Politically, local governance had made clear its preference for neighborhood-level risk mitigation without invoking punitive enforcement; solutions needed to be co-

designed with residents and integrated within existing alley structures. Economically, cost-sensitive, shared-use installations were favored, as residents and neighborhood committees lacked the capacity for frequent maintenance or individualized installations. Socially, drying was revealed as a time-sensitive and spatially contested practice, with clear gendered and age-based patterns of use. Technologically, the project faced requirements for safe clearance from active electrical lines, corrosion-resistant components, and effective rainwater diversion, especially in the context of Jiangnan's humid and rainy climate. Culturally, interventions were expected to retain the modest spatial language of the historic alley, avoiding any visual overreach that could disrupt the tacit codes of daily sociability.

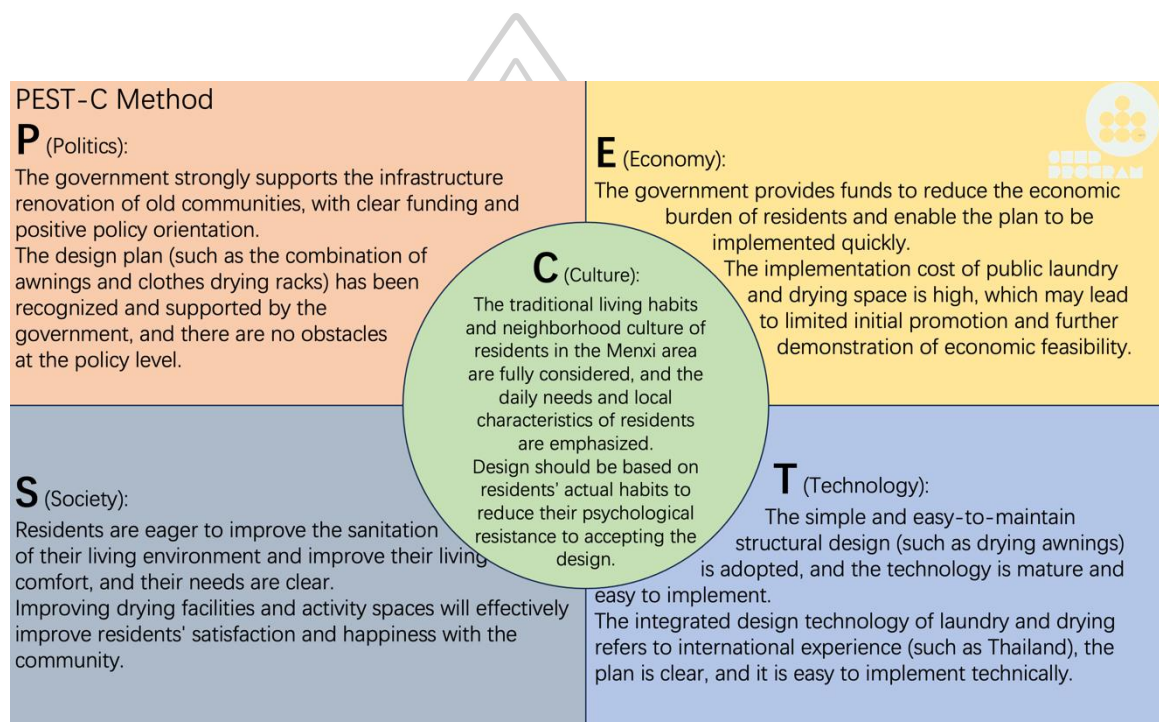
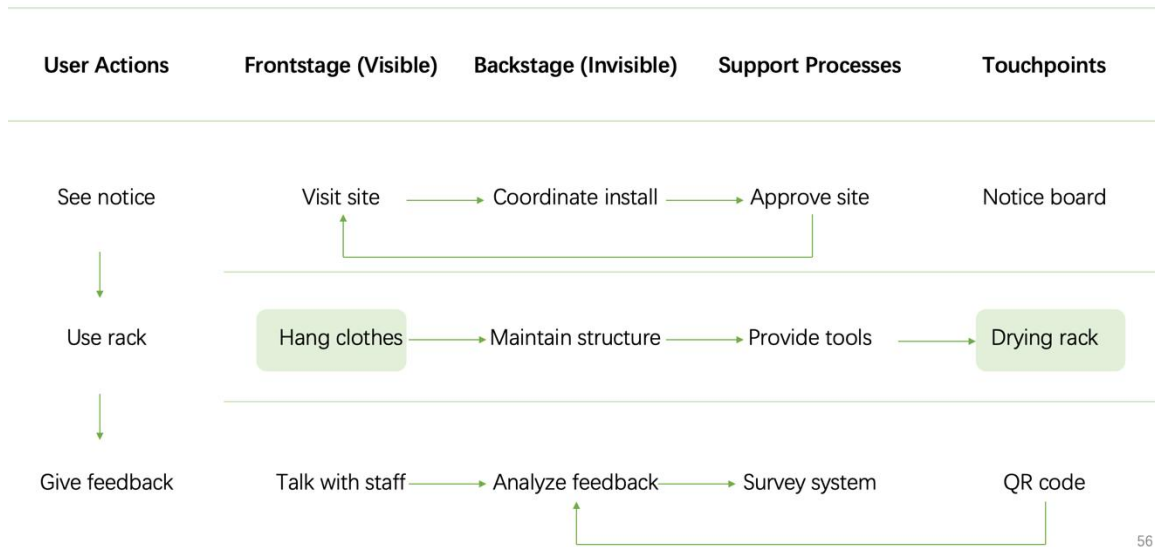


Figure 67 PEST-C analysis model corresponds to Design Experiment 1 (Li, 2025)

Service design principles were operationalized through a Service Blueprint that traced resident behavior, visible infrastructure, and behind-the-scenes maintenance processes. The blueprint illustrated that a successful intervention must enable residents to approach drying areas via short and predictable walking paths, to hang laundry with clear vertical clearance and no obstruction to passersby, and to do so under weather-protected structures that eliminate slipperiness and contact risks. Supporting backstage processes include the periodic inspection of drainage channels, quick-response maintenance protocols, and the use of signage or visual cues to reinforce new norms. Together, the service model emphasized drying as circulation safety, reframing laundry not merely as a domestic act but as a shared infrastructural function in public life.



Service Blueprint Phase I: Hygiene issues and Safety issues



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Figure 68 Service blueprint to Design Experiment 1 (Li, 2025)

During the planning stage, government officers explicitly requested three alternative typologies to respond to site-specific conditions across Menxi. Given the region's frequent precipitation, all variants involved integration with rain-sheltering structures. The first proposal combined drying racks with a rain canopy, positioned along high-traffic alleys or semi-public courtyards. This model aimed to remove drying from overhead lines while protecting both laundry and pedestrian walkways from rainfall-induced hazards. The second scheme incorporated drying racks adjacent to a community-scale laundry room, enabling residents to partially dry or spin their clothes indoors before transferring them to outdoor racks, thus reducing water runoff and exposure time. The third variant proposed drying racks embedded within community activity corners, combining short-stay seating, soft monitoring mechanisms, and informal interaction spaces to normalize safe behavior while fostering social cohesion.

After stakeholder consultation and iterative prototyping, it was determined that all three models would be retained as flexible, context-responsive typologies under the DE1 strategy. The rack-plus-canopy form was designated the default due to its minimal spatial footprint and direct response to the wet climate. The rack-plus-laundry model would be piloted in areas where retrofitting indoor space was feasible and utility infrastructure allowed. The rack-plus-activity-corner model was reserved for larger courtyards or street nodes already functioning as social hubs. Rather than enforcing a single typology, this combined strategy aligns with the distributed and

evolutionary principles embedded in the SEED Program and ensures implementation across diverse micro-contexts within the Menxi area.

Through this phase, DE1 evolved from a general concern about unsafe drying practices into a clearly defined, evidence-based design agenda that integrates spatial, technical, and social requirements. The transition from wire-based drying to dedicated infrastructure marks not only a shift in physical behavior but also a redefinition of public safety and shared space in the historic urban enclave.

4.3.3 Develop

In response to the safety and hygiene challenges identified in the discovery and definition phases, three design directions were developed for implementation under the Protect phase of the PAE strategy. These interventions were shaped through a combination of quantitative survey data, which confirmed widespread safety concerns and resident support for formalized drying infrastructure, and qualitative insights, which exposed the behavioral rationales, spatial limitations, and environmental constraints faced by residents in the Menxi area. Drawing from this evidence base, the design process focused on re-routing high-risk drying behaviors away from overhead electrical lines by embedding alternative drying infrastructure into existing community functions and spatial flows.

The most universally applicable intervention involves the installation of drying poles combined with protective rain canopies, placed strategically along semi-public corridors and alley junctions. This scheme responds to Jiangnan's climatic condition of frequent rainfall, as well as to resident concerns over garment cleanliness, wet pavement, and limited sunlight exposure. The canopy is designed to divert runoff away from footpaths and drying racks while maintaining sufficient openness for air circulation. Lightweight, modular, and replicable across multiple micro-sites, this typology serves as the default solution where spatial or infrastructural constraints preclude more complex integrations. It also embodies the distributed, evolutionary ethos of the SEED Program by enabling incremental rollout and low-barrier adoption.

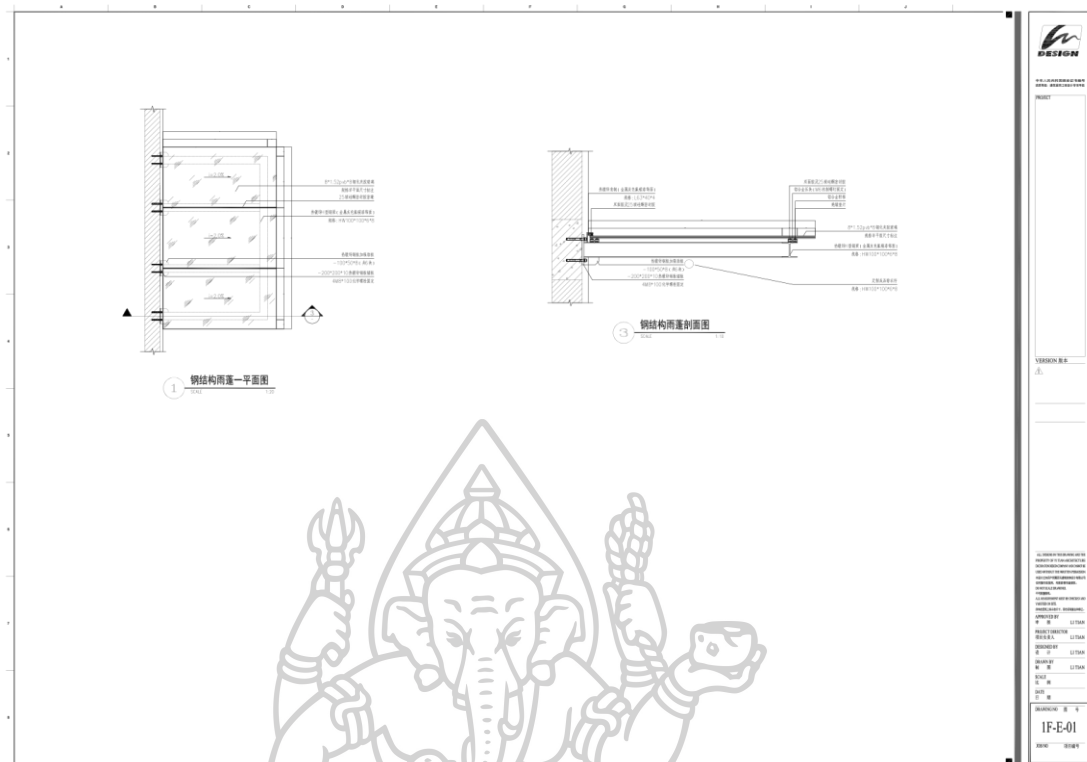


Figure 69 CAD drawings (Li, 2025)

Across all three schemes, a consistent set of design principles was maintained: decoupling drying from electrical infrastructure, protecting foot traffic flow, managing runoff and moisture, minimizing visual disruption, and embedding use within residents' existing behavioral rhythms. The differentiation across the proposals reflects both spatial heterogeneity and the plural nature of community life in Menxi. Rather than a one-size-fits-all solution, the design team adopted a modular logic, enabling each scheme to respond to local site typologies, stakeholder input, and implementation feasibility while contributing to the broader Protect goals of safety and hygiene in the public realm.

4.3.4 Deliver

Following iterative consultation, prototyping, and resource evaluation, the local government and resident stakeholders jointly selected the third design scheme—drying poles combined with rain canopies—as the preferred solution for the initial rollout under the Protect phase. This typology was favored for its low implementation cost, reversibility, and compatibility with Menxi's dense alley structure, making it particularly suitable for rapid deployment in the historic fabric without requiring invasive construction or substantial administrative overhead. Compared to alternatives involving laundry rooms or community activity nodes, the rain canopy solution

offered greater scalability and spatial flexibility, allowing installation in high-use corridors without disrupting pedestrian flow or visual harmony.

A total of more than 20 drying canopy units were constructed and installed across selected micro-sites as the first batch of interventions. These installations addressed immediate safety risks by diverting drying behavior away from electrical lines and providing consistent head clearance and dry footpaths, particularly in areas previously identified as high-conflict or high-risk in T0–T1 survey results and observational data. Each unit followed the defined blueprint: corrosion-resistant metal poles for garment suspension, polycarbonate canopy panels angled to direct runoff, and clear walk zones delineated with modest visual markers. The modular structure allowed for reuse and relocation, aligning with the evolutionary and distributed logic of the SEED Program.



Figure 70 Actual effect after installation (Li, 2025)



Figure 71 Actual effect after installation (Li, 2025)

The local government formally approved and endorsed the proposed communal drying rack design, allocating public funds for the construction of twenty installations across the Menxi area. This implementation not only demonstrated the practical feasibility and tangible impact of the research but also reflected the government's active participation in improving residents' daily living conditions. The collaboration established a foundation of trust and institutional support for subsequent design experiments, validating the effectiveness of small-scale, evidence-based interventions in enhancing safety and quality of life within historic urban communities.



Figure 72 Actual effect after installation (Li, 2025)

In parallel with the design implementation, ongoing qualitative engagement—particularly interviews with government officials during the definition and delivery phases—surfaced an infrastructural constraint that extended beyond the drying intervention itself. Specifically, officials and residents pointed to insufficient drainage capacity in Menxi’s alley networks, which limited the feasibility of expanding in-home sanitary infrastructure, particularly for households without indoor bathrooms. In response, and based on both user-reported pain points and design team analysis, the proposal to enlarge sub-surface drainage pipes was incorporated as a complementary policy measure. The government subsequently adopted this recommendation and initiated partial upgrades in the core pilot area, thereby enabling more households to install private toilets, a change that directly impacts hygiene, safety, and basic quality of life.



Figure 73 Actual effect after installation (Li, 2025)

This combined outcome—physical delivery of the drying infrastructure and policy adaptation of the drainage system—reflects a holistic application of the Protect strategy under the PAE framework. It demonstrates how small-scale design experiments, grounded in both quantitative and qualitative evidence, can lead not only to visible spatial improvements but also to institutional shifts that address latent infrastructural inequalities. The drying canopy installation thus serves not only as a point solution, but also as a catalyst for broader systemic transformation in Menxi's urban living environment.

4.3.5 Result and Feedback

The index-level evaluation of Design Experiment 1 (Protect) indicates a strong positive impact on residents' perception of safety, hygiene, and spatial order in the Menxi historic area. Quantitative comparisons between the baseline (T0) and post-intervention (T2) data confirm statistically significant improvements across key outcome indicators, validating the effectiveness of the Protect-phase service design.

Most notably, the DrySafety index—constructed as a single-item measure reflecting residents' perceived safety in clothes drying practices—increased from a mean of 1.85 (SD = 0.74) to 3.65 (SD = 0.62), with an independent t-test yielding $p < .001$ and a Cohen's d effect size of 2.63, denoting a very large practical effect. This suggests that the introduction of modular drying racks, integrated with rain shelter elements, effectively resolved longstanding issues related to electric-line drying, indoor humidity, and personal space conflicts.

In addition to the targeted safety outcome, broader 6E indicators also demonstrated complementary gains. The Environment dimension improved from 2.50 to 3.45 ($d = 1.27$), and Experience rose from 2.59 to 3.51 ($d = 1.00$), suggesting that the intervention also enhanced the aesthetic and functional quality of shared community space. These outcomes highlight the value of coupling infrastructural design with evidence-informed service logic, particularly in addressing vulnerable yet often-overlooked domains of everyday life such as drying clothes.

Furthermore, these index shifts were reinforced by qualitative expressions of acceptance and pride gathered during follow-up interviews and focus groups. Residents reported a newfound sense of respect for the public realm, and local administrators noted a decrease in neighborhood disputes related to drying practices. Thus, DE1 not only improved physical conditions but also catalyzed micro-social cohesion, evidencing the broader transformative potential of service design when applied to foundational infrastructure challenges in historic urban contexts.

4.4 Design Experiment 2(Activate)

Design Experiment 2 followed the Double Diamond framework through four iterative stages. In the Discover phase, field observations and interviews revealed a latent demand for greenery despite widespread neglect. The Define stage reframed the design problem as enabling resident-led greening, supported by both survey data and PEST-C analysis. During Develop, seed paper and pocket flowerbeds were prototyped and refined through feedback loops. Finally, in Deliver, the interventions were implemented, adopted by residents, and recognized publicly, demonstrating the effectiveness of participatory ecological activation in historic neighborhoods.

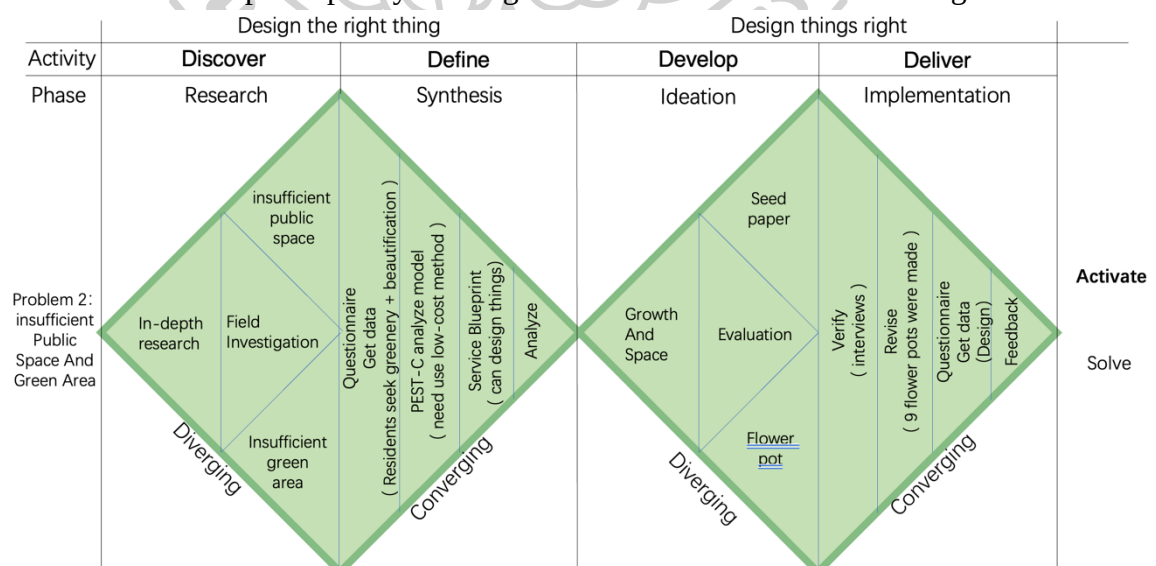


Figure 74 Double Diamond Model corresponds to Design Experiment 2 (Li, 2025)

4.4.1 Discover

During the Activate phase, field inspections across alley corners, wall bases, and residual spaces revealed a striking absence of vegetation throughout the Menxi area. Despite the physical availability of narrow setbacks and threshold zones, most surfaces remained hard-paved, exposed, or used for temporary storage. However, scattered traces of resident-led greening—such as discarded plastic pots, half-maintained plant beds, and climbing plants trailing from broken containers—indicated a latent interest in reclaiming space through greenery. These informal gestures, while modest and often ephemeral, signaled an underlying behavioral pattern: residents were willing to cultivate green patches if provided with supportive materials and clear initiation points.

Through interviews and focus groups, residents repeatedly expressed a sense of disconnection from the natural environment within their immediate surroundings. Descriptions of the alleyways as “hot,” “dry,” or “lifeless” were common, particularly among long-term residents who recalled earlier decades when vines, planter boxes, and shared gardening were more visible and valued. While few participants framed these memories in explicitly ecological terms, many described a desire for “green eyes” or “small living things” to break the visual monotony and bring softness to the hardened landscape. Such expressions suggest that the absence of vegetation was not merely an environmental issue but one that affected spatial identity and emotional connection to place.

Discussions with local officials and community members further confirmed that small-scale greening interventions—especially those that are low-cost, easy to maintain, and visibly distributed—would be welcomed. However, prior top-down beautification efforts had failed due to poor participation and maintenance fatigue. This prompted the design team to explore mechanisms that could enable, not prescribe, resident involvement. The discovery phase thus concluded with a shift in design orientation: from direct landscaping to seed-based activation, using “seed paper” as a symbolic and practical medium to initiate micro-greening by residents themselves. In parallel, structurally sound but disused flowerbeds were identified for repair or enhancement, establishing a minimal but visible physical framework for distributed ecological engagement.

4.4.2 Define

Quantitative data collected at baseline (T0) revealed a significant deficiency in environmental satisfaction across the Menxi area. On a 5-point Likert scale, the Environment dimension averaged approximately 2.50, signaling widespread dissatisfaction with the visual and ecological conditions of public space. At T1, among 218 respondents, 83% rated 4 or 5 in support of small-scale greening efforts, including flowerbed renovation and distributed planting encouragement. Though the change in numerical value was modest, the directional improvement aligned with

intervention intentions and was further supported by positive shifts in Experience and Equity, suggesting a better emotional connection to public space and perceived fairness of access.

Residents' demand for community greening

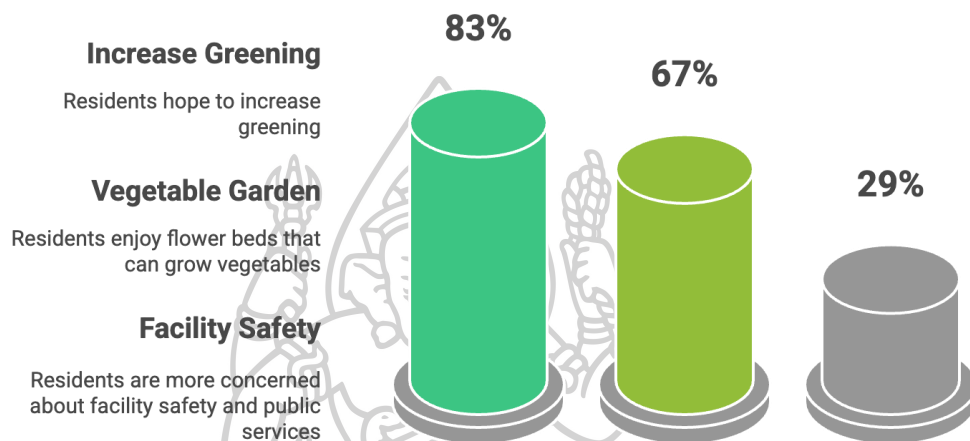


Figure 75 Questionnaire data (Li, 2025)

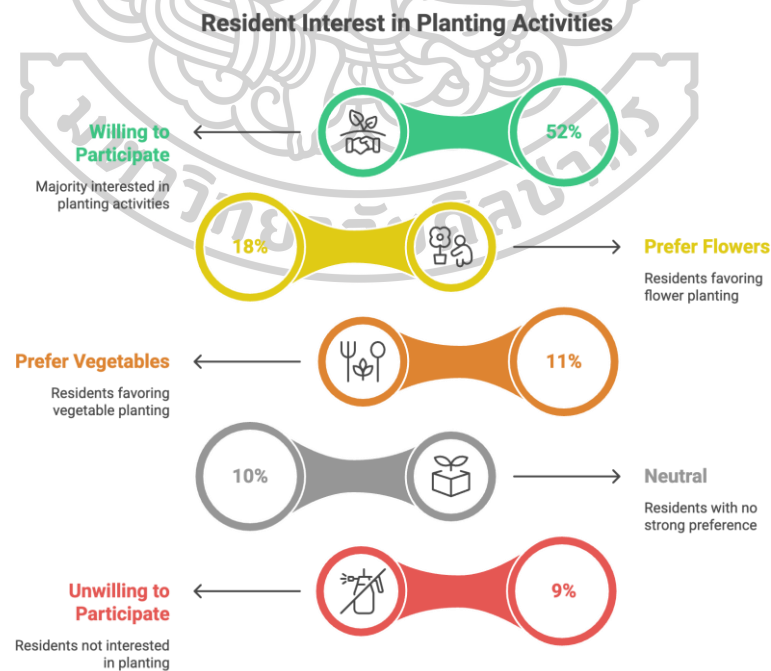


Figure 76 Questionnaire data (Li, 2025)

Qualitative analysis through NVivo coding provided deeper insight into the causes of dissatisfaction and the types of interventions residents would likely accept. Participants described the environment as “dry,” “concrete-heavy,” or “lifeless,” yet simultaneously revealed behavioral signals of care and aspiration: personal potted plants by doorways, improvised flower holders, and narratives about “what the alley used to be like.” These expressions were not demands for large-scale landscaping but rather indications of a shared desire to soften the public realm and reintroduce plant life in a manner consistent with daily life rhythms. Notably, residents were more responsive to enabling strategies than to imposed greening campaigns. This distinction emerged clearly during interviews: participants expressed skepticism toward past top-down beautification projects that lacked local participation and quickly deteriorated due to poor maintenance.

To test feasibility and scalability, a PEST-C analysis was conducted. Politically, community officials welcomed low-cost greening strategies that could demonstrate quick visual impact without creating enforcement burdens. Economically, both the seed paper initiative and brick/cement flowerbed repairs were well within neighborhood discretionary budgets. Socially, residents favored individual choice and soft encouragement over forced compliance, particularly when ecological behaviors could become a shared norm. Technologically, the materials required—compressed seed paper, recycled bricks, low-maintenance plant species—were readily available and familiar. Culturally, the Jiangnan tradition of household gardening and courtyard greening offered a historical precedent for reintroducing greenery as part of lived identity and environmental memory.

Informed by this multi-dimensional analysis, the design team formally defined two linked interventions under DE2. First, a participatory planting strategy was developed using “seed paper”—hand-distributed biodegradable sheets embedded with local plant seeds, accompanied by illustrated guides and soft messaging campaigns. This medium served both symbolic and functional purposes: activating resident curiosity, lowering the barrier to first engagement, and visually signaling participation. Second, a set of nine flowerbeds—some newly constructed with brick or cement, others adapted from damaged or underutilized structures—were installed across key alley nodes, each co-located with households that showed willingness to participate or already displayed informal greening behavior. These interventions followed a distributed logic: small, visible, replicable, and open to resident modification or abandonment, reflecting the adaptive spirit of the SEED Program.

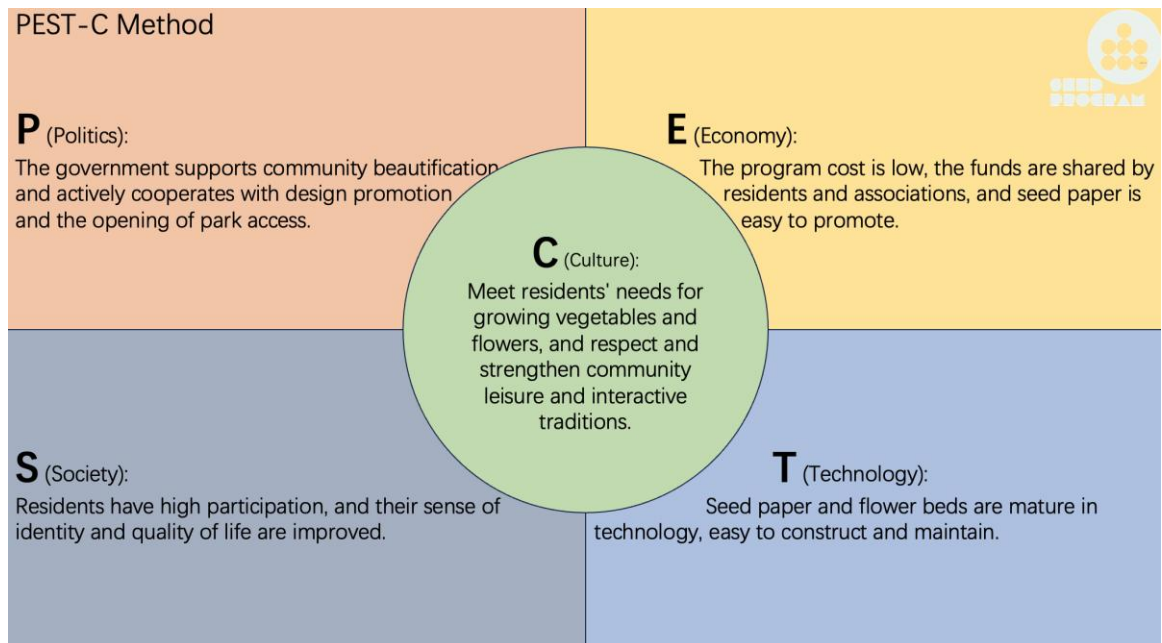


Figure 77 PEST-C analysis model corresponds to Design Experiment 2 (Li, 2025)

The service blueprint emerging from this definition stage emphasized light-touch contact and self-selection. Residents would receive seed paper through either doorstep delivery or distribution at public kiosks, choose whether and where to plant, and maintain the results as desired. The frontstage experience involved visible greening cues, flowerbed presence, and occasional signage. The backstage relied on minimal government coordination: seed printing, periodic observation, and community communication via WeChat or neighborhood events. The performance indicators centered not on coverage or plant survival rate, but on engagement rate, perceived change in environmental quality, and resident satisfaction with their ability to influence the space. Ultimately, the interventions were not designed to “green” the neighborhood in a horticultural sense, but to reactivate ecological imagination and agency at the micro scale.

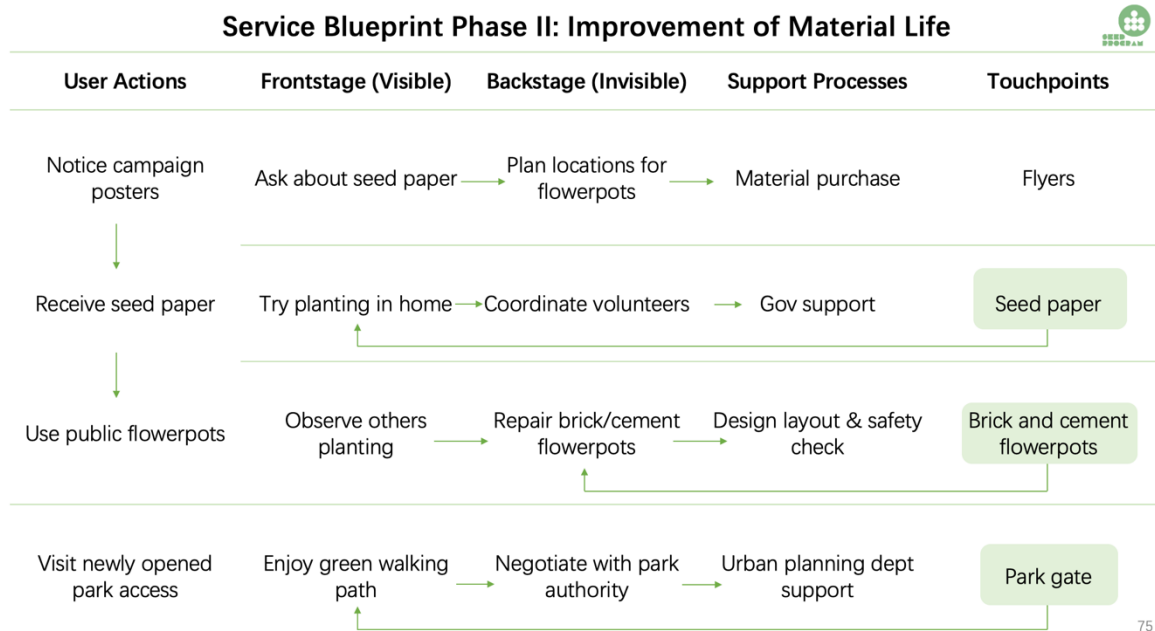


Figure 78 Service blueprint to Design Experiment 2 (Li, 2025)

4.4.3 Develop

Based on the insights synthesized in the Define phase, the design team developed the first prototype of the seed paper intervention—a biodegradable sheet embedded with mixed flower and herb seeds, accompanied by simple visual instructions and distributed to residents through household delivery and community events. The initial version focused on easy-to-grow ornamental species suited to the local climate, with the goal of activating visual greening and reintroducing plant life into hardened alley surfaces. The design prioritized low production cost, ease of planting, and symbolic visibility to reinforce participation and shared ecological engagement.



Figure 79 Seed Paper (Li, 2025)

To test adoption and receptivity, a small-scale public campaign was organized, involving light demonstrations, guided planting activities, and open discussion sessions with residents. Feedback from these activities revealed a clear preference among participants—particularly older residents and caregivers—for edible or functional plants over purely decorative species. Residents expressed interest in growing small vegetables, such as cherry tomatoes, leafy greens, or scallions, noting both the personal enjoyment and the cultural familiarity of planting food in compact urban spaces. In response, the design team revised the composition of the seed paper to include culinary varieties that could thrive in confined soil volumes and partial sunlight conditions, such as small tomatoes, chili peppers, and kitchen herbs.



Figure 80 Event site (Li, 2025)



Figure 81 Seed Paper 2.0 (Li, 2025)

In parallel, the team collaborated with local residents and neighborhood groups to construct and repair a set of brick and cement flowerbeds in select alley nodes. These beds, totaling nine by the end of the phase, were strategically sited in locations where informal planting had already occurred or where households showed high willingness to participate. Each flowerbed was designed to be publicly visible but socially bounded—clearly not municipal property, yet not entirely private—thus encouraging a shared sense of informal care and custodianship. The spatial logic of these interventions was intentionally distributed, avoiding centralization and promoting decentralized ownership in line with the SEED Program’s emphasis on small, evolutionary change.

The Old Menxi Watchers Association was the first to recognize and endorse the proposed public planter design. The association independently funded the construction of seven installations, reflecting strong community ownership and grassroots support for the intervention. This collaboration underscored the role of local civic groups in facilitating low-cost, high-impact environmental improvements within historic neighborhoods.



Figure 82 Planting experiment (Li, 2025)

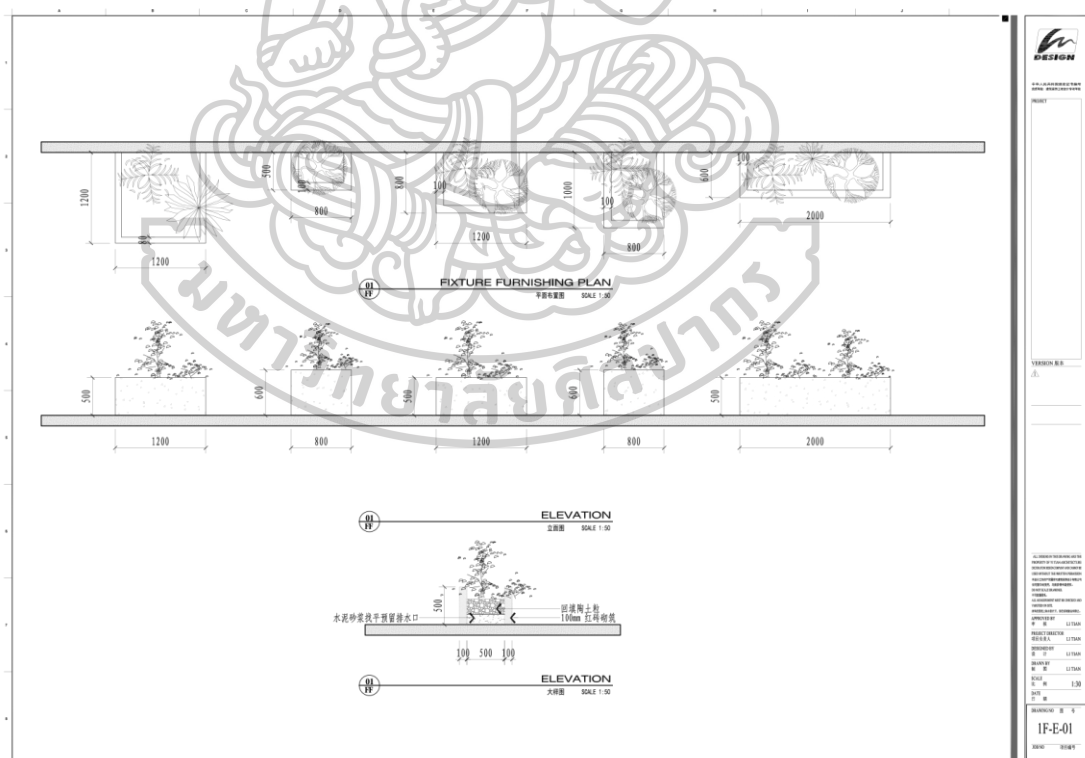


Figure 83 CAD drawings (Li, 2025)



Figure 84 Effect after implementation (Li, 2025)



Figure 85 Effect after implementation (Li, 2025)

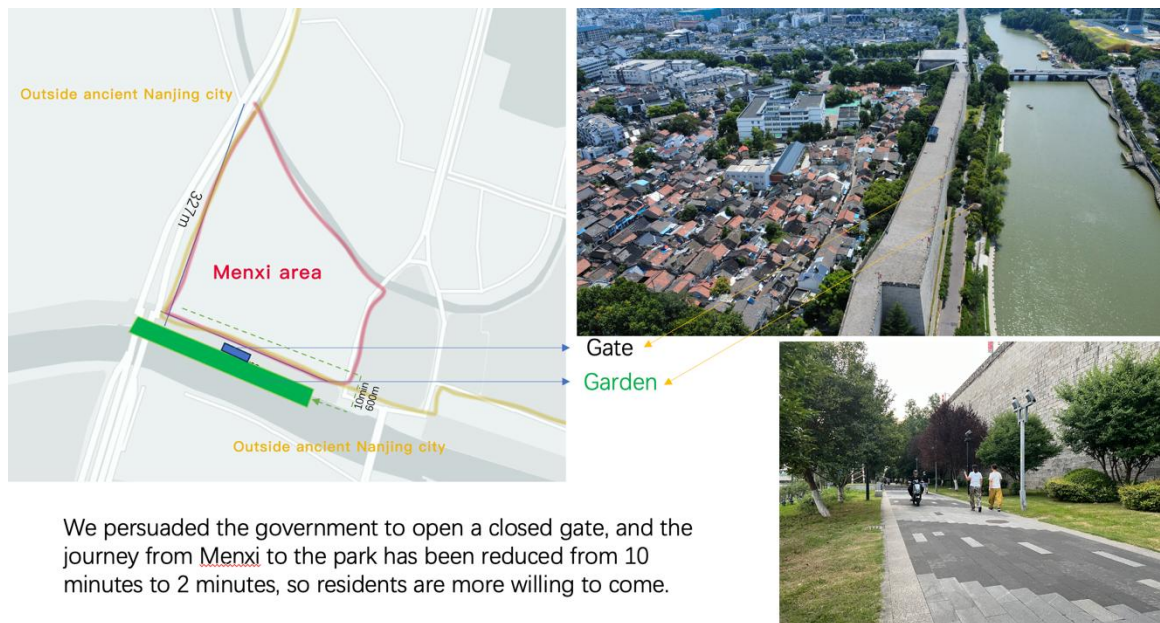


Figure 86 The relationship between the park and the gate (Li, 2025)

During the development phase, the research process also uncovered a critical spatial opportunity adjacent to the intervention area. In interviews with government officers and community managers, it was revealed that a municipal park existed just beyond the southern boundary of the neighborhood, but access was obstructed by a walled boundary and circuitous routing. Site analysis confirmed that opening a small pedestrian gate would reduce the walking time to the park from 15 minutes to under 2 minutes for most residents in the southern sector of Menxi. After presenting this evidence, the design team successfully advocated for the removal of the barrier in partnership with local authorities. The gate was opened as part of the same implementation period, transforming what had previously been an isolated green asset into an accessible extension of everyday public space.

Together, the development of the seed paper, the physical flowerbeds, and the improved connectivity to the adjacent park redefined the Activate phase not simply as environmental beautification, but as a distributed ecological invitation. Rather than imposing greening upon residents, the design approach focused on enabling micro-agency—providing tools, materials, and spatial opportunities for residents to re-engage with the landscape in small but meaningful ways.

4.4.4 Deliver

The implementation of Design Experiment 2 resulted in a dual-track delivery: the distribution of revised seed paper embedded with edible plant varieties, and the construction or repair of nine publicly visible brick-and-cement flowerbeds across the Menxi area.

Resident feedback during and after implementation indicated a strong sense of ownership and enthusiasm, especially regarding the revised seed mix. Many households chose to plant small vegetables such as cherry tomatoes, chili peppers, and green onions, citing practical value and childhood familiarity with edible gardens. In follow-up interviews, residents described the experience as “refreshing,” “easy to try,” and “more meaningful than government planting,” emphasizing the appeal of autonomy and low entry barriers. The visibility of germination and growth in several of the distributed seed sites, particularly near doorways and threshold edges, created a ripple effect of participation—prompting even non-recipients to inquire about obtaining their own seed packets. Importantly, the intervention was perceived not only as a planting project, but as a symbolic reactivation of spatial engagement and neighborhood pride.



Figure 87 Interview (Li, 2025)

The flowerbeds also performed well across both usage and perception metrics. Residents informally tended to the beds, and several planted seedlings beyond the initial supply. Community managers reported no significant vandalism or neglect, and households located adjacent to flowerbeds expressed appreciation for the visual improvement and the invitation to contribute. One resident summarized the shift succinctly: “We used to avoid these corners; now we look after them.”



Figure 88 Interviewed (Li, 2025)

The cumulative impact of DE2 also extended into external validation. The project—under the title “Seed Program: Micro-Greening for Historic Urban Alleys”—was submitted to the 2024 National Young Designers Award and received a Third Prize in the Community and Environmental Innovation Category. The jury praised its low-cost, high-participation model and its fusion of design thinking with grounded ethnographic insight. The award provided institutional credibility to the intervention and facilitated broader conversation with urban planning departments about replicability in other aging neighborhoods.



Figure 89 The third prize (Li, 2024)

Perhaps the most spatially transformative outcome, however, was the successful negotiation with local government to open a pedestrian gate connecting Menxi to the adjacent municipal park. As revealed during the development phase, this simple act reduced walking time from certain alley clusters to the park from 15 minutes to under 2 minutes, significantly expanding access to green space for elderly residents, children, and caregivers. Though external to the original DE2 design scope, this infrastructural adjustment was enabled directly by the participatory momentum of the seed initiative, and has since been recognized by both officials and residents as one of the most tangible outcomes of the project.

Together, these results affirm that activating environmental engagement in historic urban communities does not require large-scale capital works, but rather a strategic orchestration of invitation, visibility, and agency. DE2 delivered not only physical greening but also a renewed sense of resident capacity to influence and inhabit their environment—one seed at a time.

4.4.5 Result and Feedback

Design Experiment 2, situated within the “Activate” phase of the PAE strategy, focused on enhancing the physical comfort and environmental perception of the Menxi community through low-cost, resident-centered greening interventions. The deployment of seed paper and the reconstruction of pocket-scale planters served not

only as environmental upgrades but also as distributed service touchpoints embedded in everyday life.

Quantitative comparisons across T0 and T2 revealed clear gains in relevant indicators. The Environment dimension showed an increase from T0 = 2.50 (SD = 0.67) to T2 = 3.36 (SD = 0.71), while the Experience score improved from 2.59 to 3.28, demonstrating elevated satisfaction with daily outdoor ambiance. These values reflect a statistically meaningful enhancement in the perceived livability and attractiveness of public space, especially among long-term residents who had previously voiced dissatisfaction with sterile or hard-paved surroundings. The Efficiency score also showed modest improvement, indicating better usage of previously underutilized space.

Qualitative insights reinforced these findings. Residents expressed surprise at how “a small change like greenery could alter the mood of the entire alley,” and some referred to the act of planting vegetables as “an emotional outlet after years of living among concrete.” These expressions map onto axial codes under “everyday environmental dignity” and “visible signs of care,” themes that emerged during NVivo analysis.

The initiative also validated the SEED Program principles through its small-scale, evidence-based, evolutionary, and distributed nature. The seed paper acted as both a behavioral nudge and symbolic device, catalyzing participation in environmental stewardship without demanding heavy infrastructure. Meanwhile, the planter interventions—jointly implemented with community organizations—reinvigorated small voids into micro-greening nodes, generating distributed but cohesive environmental uplift.

From a 6E perspective, the intervention scored high on Environment, Experience, and Ethics, with residents noting the inclusive, low-barrier nature of the initiative. While Effectiveness was moderate—since full green cover takes time to establish—the response trajectory was highly promising. The Equity score remained stable, suggesting broad acceptability across demographic groups.

Overall, DE2 demonstrated how strategically designed service interventions can activate underused physical assets, embed environmental value in daily life, and nurture a sense of place through low-cost, high-resonance greening strategies. These outcomes confirm the critical role of environmental activation within the broader PAE framework for historical district revitalization.

4.5 Design Experiment 3(Evolve)

Design Experiment 3 followed the Double Diamond service design framework through four sequential stages. In the Discover phase, interviews and environmental

observations uncovered residents' weak spatial identity and unfamiliarity with the area's cultural heritage. The Define stage reframed the core issue as a lack of accessible, emotionally resonant cultural service touchpoints, supported by PEST-C analysis and blueprint mapping. During Develop, prototypes such as localized cultural handbooks and panoramic archives were iteratively co-developed and tested. In the Deliver phase, the refined outputs were distributed through both physical and digital channels, resulting in increased recognition, emotional connection, and place-based cultural confidence among residents.

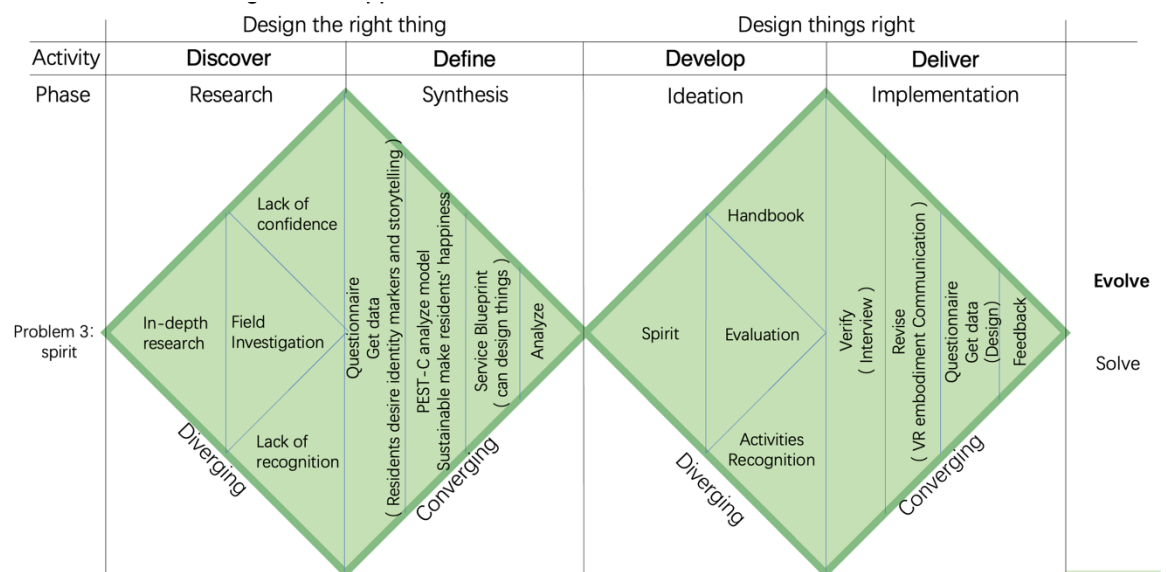


Figure 90 Double Diamond Model corresponds to Design Experiment 3 (Li, 2025)

4.5.1 Discover

The discovery phase of Design Experiment 3 focused on investigating the intangible dimensions of everyday life in the Menxi historic community—namely, identity, memory, and cultural continuity. Through in-depth interviews, focus group discussions, and site immersion, the research uncovered a significant disconnect between residents and the area's historical narrative. While Menxi possesses rich cultural assets, including temples, guild halls, and traditional courtyard structures, many residents—particularly younger or newly settled ones—demonstrated limited awareness or emotional connection to these heritage elements.

Qualitative data revealed recurring themes of “invisibility of history” and “uncertainty about belonging.” Long-term residents expressed concern that the area's collective memory was fading, while newer residents viewed Menxi more as a transitional space than a place of rootedness. Additionally, several association members and cultural advocates noted that previous efforts at heritage activation were either overly top-down or limited to one-off festivals, failing to cultivate a sustained cultural resonance in daily life.

Field observations further supported these insights: wayfinding was fragmented, cultural landmarks lacked interpretation, and most public spaces offered little narrative or symbolic presence of Menxi's unique legacy. Yet, subtle cues such as handwritten signage, family-kept archives, or temple caretakers' oral histories suggested a strong potential for localized storytelling and community-driven cultural transmission, if properly supported. These findings shaped the foundational orientation of DE3: to not merely preserve history, but to activate cultural pride and identity from within, through service, situated, and low-barrier interventions.

4.5.2 Define

Quantitative and qualitative data jointly revealed a deep-rooted deficit in place-based identity and cultural confidence among Menxi residents. At baseline (T0), the indicator PlaceID—representing place identification and cultural recognition—recorded a mean of 2.20 (SD=0.80) on a 5-point scale, with over 62% of responses falling below neutral (i.e., <3). Residents frequently selected “disagree” or “strongly disagree” when asked whether they felt proud of living in Menxi, or whether they viewed it as a culturally significant place.

These survey results were corroborated by qualitative evidence. Long-term residents expressed a sense of “quiet loss”, lamenting that the neighborhood's once-distinctive cultural rhythms had faded. Newer residents, in contrast, displayed limited awareness or emotional engagement with the area's historical elements, describing it as “just another old neighborhood.” Interviews with association members and cultural advocates underscored a broader pattern of symbolic disconnection, with prior cultural events often perceived as “unrelated to daily life” or “too staged.” This disconnect suggested that previous heritage initiatives lacked resonance because they were neither participatory nor situated within everyday practices.

A PEST-C analysis provided further structure to the problem framing. Politically, the district government supported culture-based revitalization in principle but lacked mechanisms to integrate bottom-up participation. Economically, low-cost and reproducible interventions were favored. Socially, fragmented community ties required activation through shared narratives. Technologically, most residents used smartphones and WeChat, offering a potential medium for digital storytelling. Culturally, Menxi retained fragmented yet powerful assets—local legends, temple histories, and oral traditions—that could serve as anchors for identity reconstruction if reintroduced meaningfully.

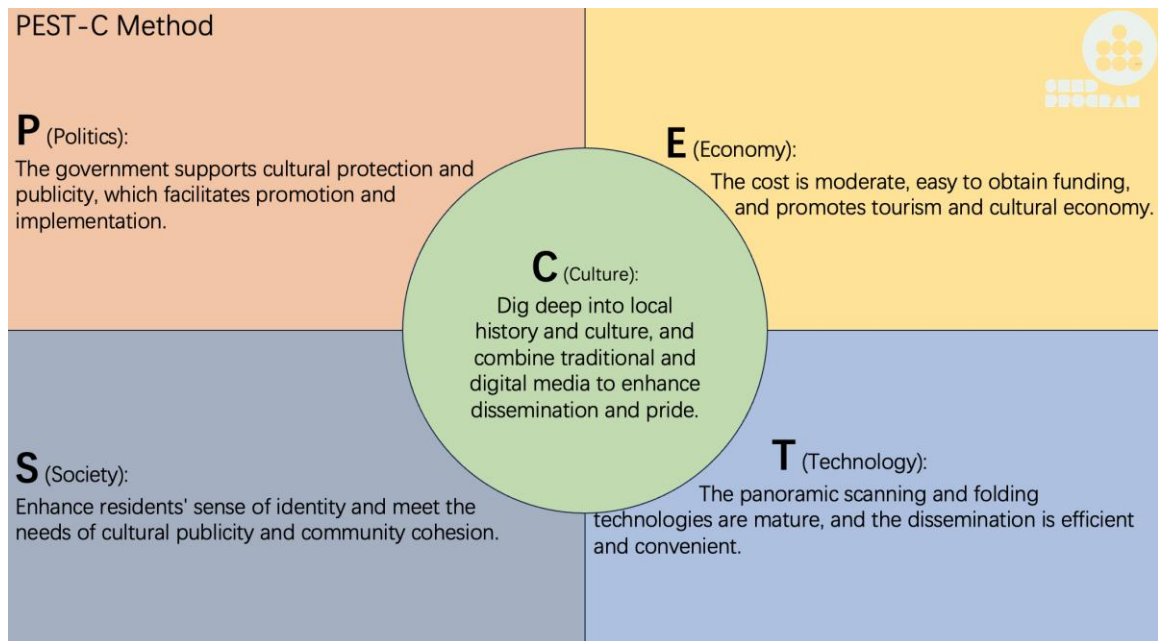


Figure 91 PEST-C analysis model corresponds to Design Experiment 3 (Li, 2025)

Based on these findings, the service blueprint mapped a new cultural engagement path, placing residents not as passive recipients of heritage but as co-creators of cultural memory. Key touchpoints were identified, such as scanning residents' ancestral homes to generate digital archives, or inviting residents to co-narrate stories behind significant landmarks. The blueprint emphasized low-barrier, hyper-local, and emotionally resonant interventions, designed to trigger both pride and belonging in everyday contexts. Rather than reviving grand narratives, the emerging goal was to rediscover micro-histories and empower residents as custodians of place-based identity.

Service Blueprint Phase 3: Enhancement of Spiritual Confidence and Regional Identity

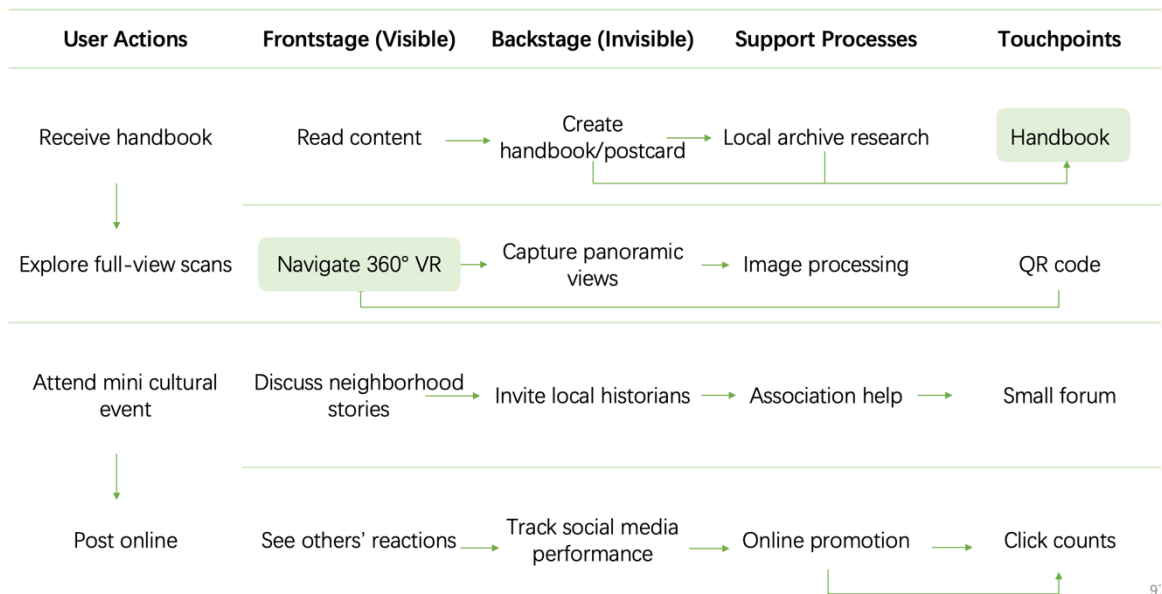


Figure 92 Service blueprint to Design Experiment 3 (Li, 2025)

4.5.3 Develop

Based on the converging insights from quantitative surveys and qualitative fieldwork, the third design experiment moved forward with the development of two core artifacts: a localized cultural handbook and a set of narrative postcards. The handbook was designed to aggregate micro-histories, annotated maps, and resident memories, while the postcards aimed to evoke visual identity and emotional resonance through images of Menxi's historic sites.



Figure 93 Handbook (Li, 2025)



Figure 94 Resident promotion (Li, 2025)

These materials were first tested in community engagement events. Resident feedback revealed a clear distinction in perceived value: postcards were considered visually pleasant but lacked perceived functionality, often being set aside or discarded. In contrast, the handbook was widely appreciated as a resource that deepened residents' understanding of their environment. Many expressed surprise at learning that their immediate surroundings—often viewed as dilapidated or mundane—were historically significant. One resident remarked, “I never knew this broken wall was next to where a famous scholar once lived.” Such feedback validated the strategy of hyper-local narrative activation, empowering residents through context and proximity rather than abstraction.

In response, the design team expanded the intervention into spatial visualization. A complete 360-degree digital panorama was captured of two key public cultural spaces—Yuyuan Temple and the adjacent historic Waguan Park—as well as selected interiors of long-term residents' homes. These panoramic captures were curated with layered annotations, enabling residents to experience their community as part of a shared, storied landscape. By bringing private and public spaces into a unified digital narrative, the intervention blurred boundaries between heritage and everyday life, helping to restore a sense of ownership and symbolic dignity. The overarching goal was not to monumentalize the past, but to embed cultural continuity into daily spatial experience, enabling pride, recognition, and intergenerational transfer.



Figure 95 Panorama (Li, 2025)

4.5.4 Deliver

The final phase of Design Experiment 3 focused on delivering the cultural engagement interventions into the daily fabric of the Menxi community. Following iterative feedback during development, the refined localized cultural handbook and panoramic digital archives were officially launched through community distribution events, WeChat QR dissemination, and placement in public signage zones across key alleyways. These materials were curated to maximize accessibility and emotional relatability, avoiding overly institutional narratives and instead foregrounding resident-contributed micro-histories.

Resident feedback was notably positive. In follow-up interviews and casual intercept surveys, many participants reported that the handbook “changed how they saw their surroundings,” and some explicitly stated that “for the first time, they felt proud to be part of Menxi.” The combination of familiar imagery, resident-voiced content, and personal storytelling created a sense of shared symbolic ownership. The panoramic cultural records, including full-scene scans of Yuyuan Temple, Waguan Park, and several historic residential interiors, were praised for their novelty, clarity, and ability to connect personal and collective memory. The scans also served a preservation function, archiving vulnerable structures at risk of future loss.

Importantly, the initiative gained widespread visibility through digital channels. By embedding QR codes into public touchpoints and encouraging online sharing, the project’s WeChat-based digital exhibition exceeded 10,000 views within its first release cycle. This organic reach highlighted the resonance of hyperlocal storytelling when tied to emotionally meaningful spaces, further validating the participatory design approach.

Ultimately, the deliverables of DE3 achieved more than documentation—they enabled a symbolic rewaving of cultural identity. Residents were no longer passive observers of a fading past, but active participants in its recovery and reinterpretation. The experiment thus fulfilled the objectives of the “Evolve” stage within the PAE strategy, fostering endogenous pride, place-based continuity, and culturally rooted cohesion.



Figure 96 Interviews with residents (Li, 2025)

4.5.5 Result and Feedback

Design Experiment 3, anchored in the “Evolve” phase of the PAE strategy, aimed to enhance residents’ sense of place identity, foster cultural confidence, and strengthen symbolic continuity with Menxi’s historic fabric. The intervention’s outcomes, assessed through both quantitative feedback and qualitative coding, revealed marked shifts in cultural perception and engagement across multiple dimensions.

Quantitatively, post-intervention data from T2 revealed significant gains in the PlaceID (Place Identity) index, which increased from a baseline T0 mean of 2.20 (SD = 0.80) to a T2 mean of 3.45 (SD = 0.72), representing the most substantial single-item growth across all validated indices. Additional improvements were noted in the Experience and Equity dimensions, indicating broader service acceptance and emotional resonance among diverse resident groups.

Resident Feedback on Cultural Initiatives

Characteristic	Spirit	Promotion of History/Culture	Communication Channels	Resident Participation
 Confidence	Improve confidence and recognition	55% believed leaflets increased confidence	N/A	77% participated in activities to enhance confidence
 Understanding	N/A	82% satisfied with technology/leaflets for understanding	59% found leaflets/online materials easier to understand	N/A
 Recognition	Improve confidence and recognition	82% believed designs helped them recognize history	63% said online promotion increased visibility	N/A
 Identity	N/A	70% said scanning enhanced sense of identity	28% believed traditional/online publicity helps foreigners	45% increased participation in community activities

Figure 97 Feedback (Li, 2025)

Qualitatively, NVivo-coded resident feedback converged on three core themes: (1) cultural recognition previously taken for granted, (2) emotional connection with daily surroundings, and (3) renewed self-esteem through historic association. Several respondents expressed that after reading the handbook and scanning the panoramas, they “realized they lived beside stories worth telling.” This aligns with the grounded theory axial category of “spatial meaning reconstruction”, a central driver for identity-based service renewal in historical districts.

In terms of service system integration, the experiment validated the SEED principles by delivering small, evidence-based, evolutionary, and distributed design outcomes. The handbook served as a mobile, low-threshold cultural contact point, while the QR-based panorama archive acted as a non-intrusive digital service touchpoint. The integration of these elements into the community’s informational and emotional landscape affirms the potential of service design as narrative infrastructure in heritage contexts.

From a 6E validation perspective, the intervention scored especially high on Experience and Ethics, with residents appreciating the respectful tone of storytelling and its grounding in everyday life. While Efficiency and Effectiveness were moderate given the intangible nature of outcomes, the Equity metric confirmed accessibility across age and education levels.

Overall, Design Experiment 3 successfully translated intangible cultural needs into structured service interventions, positioning symbolic identity as a deliverable in service design. It demonstrated that “Evolve” within the PAE framework is not

merely about preserving history but reactivating cultural value chains through service-enabled recognition, communication, and pride.

4.6 Development of Demonstration and evaluate

Prior to examining outcome changes, the internal consistency (reliability) of each multi-item scale was tested. Each of the six “E” domain scales consisted of three Likert items (scored 1 = strongly disagree to 5 = strongly agree) designed to measure a common construct (Effectiveness, Efficiency, Experience, Equity, Environment, and Ethics). Cronbach’s alpha was computed for each domain scale using the baseline data. All six scales demonstrated acceptable to good reliability, with α values ranging from 0.71 to 0.82. In particular, the Efficiency scale had a Cronbach’s α of approximately 0.82, indicating strong internal consistency, and the Experience and Effectiveness scales were around 0.76–0.80. The Equity and Ethics scales showed α in the low 0.70s, and Environment was about 0.72. These values exceed the conventional threshold of 0.70 for basic research, suggesting that the survey items for each domain reliably tap into the same underlying construct. In practical terms, respondents who agreed with one item in a given domain tended to respond consistently to the other items in that domain.

It is worth noting that the reliability analysis justifies aggregating each set of three items into a single scale score per domain. A Bartlett’s test of sphericity for each scale was significant ($p < .001$), indicating that the inter-item correlation matrices were not identity matrices – i.e., the items were sufficiently inter-correlated to form coherent scales. Therefore, we computed composite scale scores (by averaging the three items) for each of the 6E domains at T0 and T2. These composite scores will be used in subsequent analyses.

In summary, the measurement instruments were found to be reliable and consistent. The Cronbach’s α results give confidence that each domain scale can be interpreted as a unidimensional index of the intended construct. All α values were above 0.70, meeting the recommended minimum for group comparisons. This reliability provides a sound foundation for comparing mean scores between T0 and T2 and drawing inferences about change over time.

To evaluate the impact of the design interventions, we compared the baseline (T0) and endline (T2) scores for each outcome measure. Because the respondents at T0 and T2 were drawn from the same community but were not individually tracked as a panel, independent-sample t-tests (Welch’s t-tests assuming unequal variance) were employed to test for significant differences in means between the two time points. Table 4.2 summarizes the results for the six domain scales and the two key single-item measures (Drying Safety and Place Identity). All outcomes showed an increase in mean scores from T0 to T2, and every difference was statistically significant at $p <$

.001. In practical terms, the community's ratings improved across the board after the interventions, with some changes being remarkably large.

Table 3 Comparison of T0 and T2 questionnaire survey results

Outcome Measure	T0 Mean (SD)	T2 Mean (SD)	<i>t</i> (df)	<i>p</i>	Cohen's <i>d</i>
DrySafety (Single)	1.85 (0.74)	3.65 (0.62)	24.31 (359)	< .001	2.63
Environment	2.50 (0.67)	3.36 (0.71)	11.02 (419)	< .001	1.27
Experience	2.59 (0.70)	3.28 (0.69)	9.87 (421)	< .001	1.00
Efficiency	2.76 (0.61)	3.12 (0.68)	6.16 (405)	< .001	0.56
Effectiveness	2.58 (0.66)	3.01 (0.67)	6.84 (404)	< .001	0.66
Equity	2.85 (0.59)	3.05 (0.60)	3.74 (398)	< .001	0.34
Ethics	3.33 (0.63)	3.39 (0.64)	1.08 (396)	.281	0.09
PlaceID (Single)	2.20 (0.80)	3.45 (0.72)	15.94 (401)	< .001	1.68

The comparative analysis between T0 and T2 reveals statistically significant improvements across almost all key outcome indicators. The DrySafety measure demonstrated the most pronounced change, increasing from a baseline mean of 1.85 (SD = 0.74) to 3.65 (SD = 0.62), with a Cohen's *d* of 2.63, indicating a very large effect. This validates the effectiveness of Design Experiment 1 in resolving critical hygiene and safety concerns. Similarly, PlaceID rose from 2.20 to 3.45, with a large effect size (*d* = 1.68), confirming that Design Experiment 3 successfully activated community identity and spatial pride. These results confirm that the implemented interventions—though small in scale—had measurable impacts on residents' lived experience.

Notably, the Environment and Experience indicators—primarily targeted in Design Experiment 2—also showed large gains (*d* = 1.27 and 1.00, respectively), suggesting improved ambiance, greenery, and comfort within the shared spaces. Moderate improvements were observed in Efficiency and Effectiveness (with *d* = 0.56 and 0.66), reflecting enhanced usability and functional performance of public space

following the activation interventions. Equity improved slightly ($d = 0.34$), indicating broader access to benefits across demographic groups, while Ethics showed no significant change, suggesting baseline trust and fairness perceptions were already relatively high. These results align with the 6E framework and confirm that the design logic appropriately addressed both tangible and intangible aspects of urban livability.

Beyond statistical significance, these outcome measures confirm the broader service design logic embedded in the PAE-SEED framework. The high-impact scores from DrySafety, Environment, and PlaceID underscore how distributed, evidence-based, and context-sensitive design experiments can effectively reshape both perception and behavior in a historically layered but under-resourced community. The sequential deployment of DE1–DE3—corresponding to Protect, Activate, and Evolve—demonstrated a cumulative strategy of layered improvements that responded to both physical and socio-cultural needs. This data-driven validation supports the replicability of the SEED model as a viable service design strategy for other historic urban enclaves.

Beyond the individual design elements, the overall pattern of results suggests some broader insights. Virtually every measured aspect of neighborhood satisfaction improved significantly within the relatively short span of the project. Furthermore, these improvements were not isolated – they appear to be mutually reinforcing. For example, cleaning up the alleyways (DE2) not only made the environment cleaner but also made walking more pleasant (Experience) and possibly even improved perceived fairness (Equity) a little, since all groups benefit from cleaner public spaces. Likewise, providing drying racks (DE1) addressed a specific safety issue, which likely contributed to an overall sense that “things are getting better,” as reflected in the 88.7% of respondents who answered “Yes” when asked if, overall, their living environment is better now than before. This broad positive sentiment is an important outcome in itself, as it indicates increased community satisfaction and confidence. In community design research, such holistic uplift is a desired goal – the idea that solving practical problems and engaging residents in improvements will enhance not just isolated metrics but the general outlook of the community.

It is also noteworthy that different domains had different baseline levels and thus different ceilings for improvement. For instance, Ethics was already relatively high at T0 (mean >3.3), leaving less room for dramatic increases, and indeed it saw only a modest uptick to 3.6. In contrast, areas that were very problematic at T0 (like Drying Safety and Environment) had enormous gains once those problems were addressed. This pattern aligns with the expectation that the magnitude of change is often proportional to the gap between current conditions and residents’ needs: the greater the unmet need, the larger the potential improvement when that need is met. Hence, one practical implication is that initial diagnostic surveys (like the T0 questionnaire) are valuable for pinpointing which domains are most deficient; those domains, when

targeted, can yield the biggest returns in community satisfaction. DE1 and DE2 were clearly hitting the most critical pain points, which explains their outsized effects.

In terms of sustainability and equity considerations (relevant to Equity and Ethics domains), the moderate improvements suggest that while physical design can set the stage, ongoing efforts may be needed to fully realize gains in these areas. For example, Equity (ensuring all groups benefit and none are adversely affected) might require continued attention to inclusive programming and monitoring to ensure, say, that elderly residents are indeed using the new facilities comfortably, or that tourism does not displace local needs. Ethics (rules and social order) might improve further with time as new community norms (such as using communal drying racks instead of illegal wiring, or respecting shared spaces) become more ingrained. The slight rise in Ethics scores post-intervention implies some progress in collective behavior – people likely observed more respect for rules (e.g., less littering due to new trash bins, or better adherence to shared-space etiquette). To reinforce this, community education or consistent enforcement might be complementary measures beyond the design phase. Thus, an implication for DE3 (and community projects generally) is that physical design and cultural interventions should be coupled with social frameworks to yield lasting changes in norms and perceptions of fairness.

Finally, these quantitative findings carry implications for the design process itself (the co-creation and phased intervention approach). The fact that significant positive changes were recorded in a relatively short period suggests that the iterative process – identifying issues (T0), co-designing solutions (T1), and implementing and testing (T2) – was effective. The high reliability of the measurement scales and the magnitude of changes lend credibility to the results, indicating that the participatory approach was able to address genuine community needs in a measurable way. This can be encouraging for similar design research endeavors: it demonstrates that engaging residents in diagnosing problems and crafting solutions can lead to quantifiable improvements in quality of life. In practical terms, the success of DE1, DE2, and DE3 in Menxi's context implies that such community-driven, evidence-based design interventions can be a powerful model for urban revitalization in historic districts. Planners and researchers might generalize that tackling concrete local issues (safety, environment) while also nurturing cultural identity creates a synergistic effect – residents not only experience physical improvements but also develop a more positive connection to their community.

Summary

In conclusion, quantitative results paint a compelling picture of change in the Menxi project. The data show substantial improvements across multiple dimensions of residents' experience, with especially large gains in the areas targeted by the three design experiments: - DE1 (Drying Racks and Safety): Achieved a near-elimination

of a daily hazard and vastly improved perceived safety and convenience. - DE2 (Greening and Environment): Greatly enhanced the physical environment's cleanliness, comfort, and usability, leading to broader gains in comfort and efficiency of daily life. - DE3 (Cultural Heritage and Identity): Strengthened residents' pride and attachment to their community, contributing to overall satisfaction and social cohesion.

All three interventions worked in concert to improve the livability of Menxi, as evidenced by the across-the-board rise in satisfaction measures. These findings validate the project's serve design approach and provide empirical support for the impact of targeted environmental and social interventions. The quantitative evidence thus supports the hypothesis that a combination of pragmatic infrastructure fixes and cultural-community initiatives can significantly elevate residents' quality of life in a historic urban neighborhood.

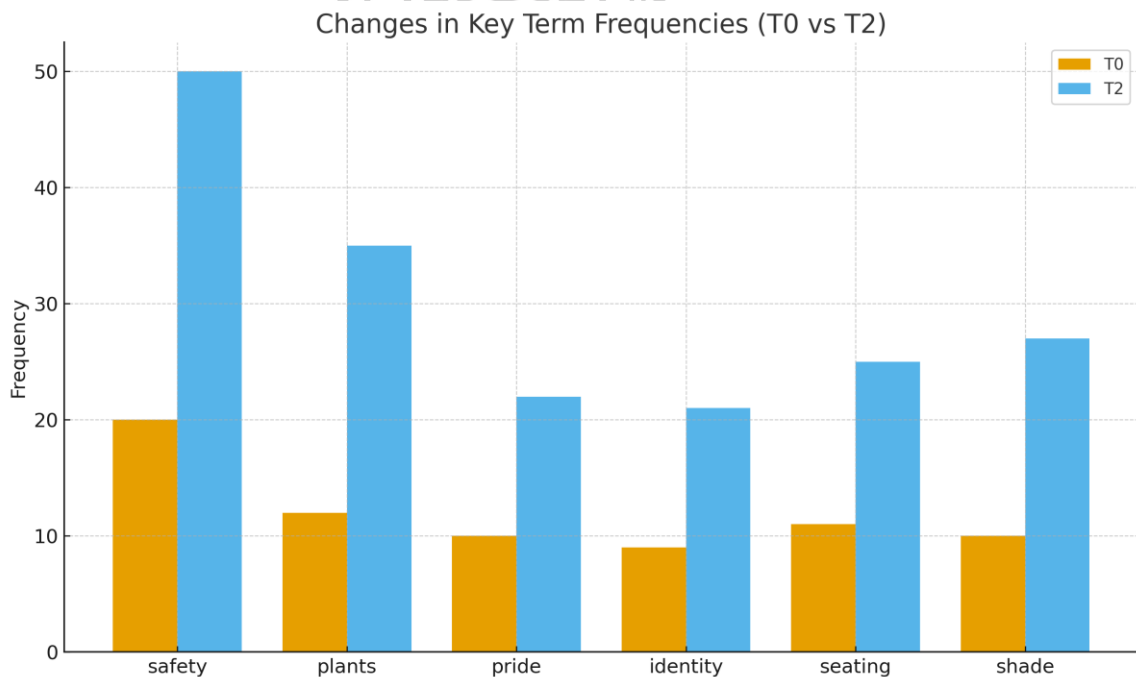


Figure 98 Changes in key term frequencies (T0 vs T2) (Li, 2025)

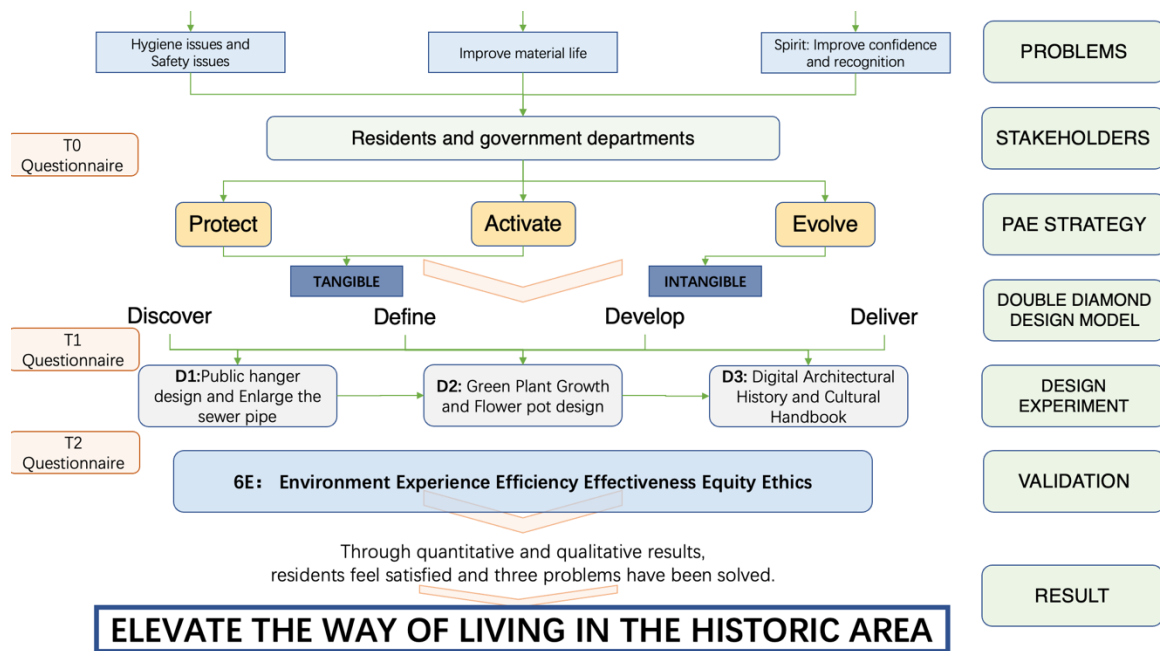
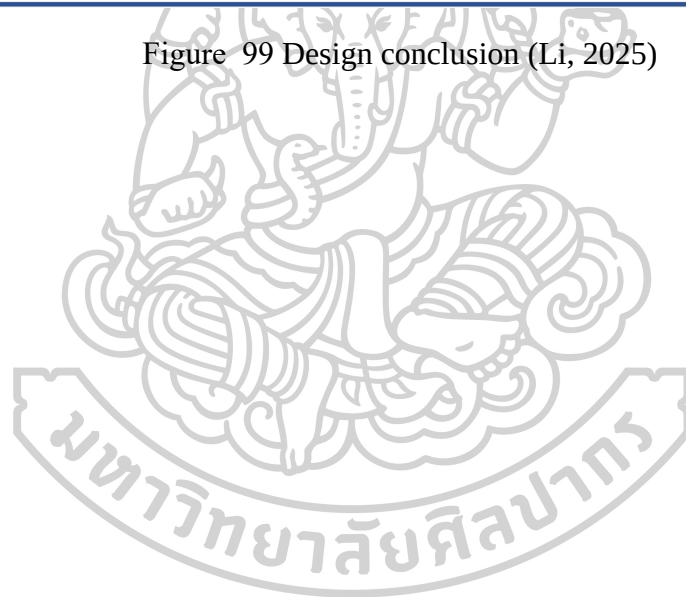


Figure 99 Design conclusion (Li, 2025)



CHAPTER 5

CONCLUSION AND DISCUSSION

Introduction

This chapter consolidates the research findings and critically reflects on the outcomes of the study. Building upon the Protect–Activate–Evolve strategy implemented in the Menxi community, it discusses how the service design approach addressed residents’ practical and emotional needs while preserving cultural continuity. The chapter revisits the original research questions, interprets the implications of the interventions, and evaluates the effectiveness of the proposed framework in enhancing the quality of life in a historic urban area. Furthermore, it examines the broader relevance and limitations of the findings, offering recommendations for future research and practice in similar socio-spatial contexts.

5.1 Finding following with Research objectives

The findings of this study are organized in relation to the three research objectives outlined in Chapter 1. Each objective is addressed through comprehensive field research, case analysis, and a set of design experiments (DE1–DE3) based on the PAE (Protect–Activate–Evolve) strategy implementation approach.

Research Objectives	Key Findings	PAE Actions	Validation (6E)
RO1. To study historical background, protection status and problems faced by China's historic area; why Menxi has developed slowly in Nanjing; how to elevate the way of living; traditional cultural context of Menxi.	Quantitative baseline (T0) shows low satisfaction in safety (DrySafety = 1.85), environment (2.50), and identity (PlaceID = 2.20). Qualitative interviews (24) reveal disconnection between historical significance and daily life.	Protect: Design and install 20 drying racks to improve communal safety and basic functionality.	DrySafety score ↑ to 3.65 (Cohen's d = 2.63) Environment, Efficiency, Effectiveness ↑ Validated via 6E and community feedback
RO2. To analyze various cases balancing context & contemporary lifestyle; research methods of service design to analyze case study; find ways to improve the way of living on the material and spiritual levels.	Case studies and focus groups (3 rounds) support need for green space, rest points, and identity reconstruction. Residents favored pocket-scale greenery over large-scale overhaul.	Activate: Added 9 green/brick flower beds. Opened park connection node.	Environment score ↑ to 3.36 Experience score ↑ to 3.28 PlaceID ↑ Validated through 6E + t-tests
RO3. To design renewal strategies applicable to the Menxi area of Nanjing; improvement of living environments; planning cultural dissemination activities; achieve an organic fusion of "new" and "old"; elevate the way of living; provide reference for similar regions.	Cultural identity and self-pride improved post-intervention. DE3 (Menxi Watchmen scans, Menxi 24 Scenes, historical leaflets) gained wide acceptance. Stakeholders affirmed replicability.	Evolve: Scan historic buildings; design & distribute Menxi historical fold-outs; promote "Menxi 24 Scenes." Improve residents' confidence and regional recognition.	PlaceID score ↑ to 3.45 (Cohen's d = 1.68) Equity, Ethics ↑ Validated via 6E + qualitative feedback from stakeholders

Figure 100 Key findings (Li, 2025)

The first objective focused on understanding the historical context, protection status, and the challenges faced by Menxi, a historic area located within the rapidly

urbanizing city of Nanjing. Through archival research, spatial mapping, and policy analysis, the study found that Menxi's slow development was rooted in a confluence of heritage protection restrictions, infrastructural obsolescence, and fragmented governance. Quantitative surveys and interviews further revealed that residents faced poor living standards, especially in sanitation, safety, and access to green and communal spaces. At the same time, the investigation highlighted a strong sense of attachment to the area's historical memory and local culture. This confirmed that the challenge was not merely physical degradation but a deeper issue of disconnected identity and lack of adaptive renewal frameworks that respect both tradition and contemporary needs.

The second objective was to explore case-based pathways to balance traditional contexts with modern living demands. Comparative analysis of historic renewal cases, such as Xiaoxihu, Beijing Hutong, and Singapore's heritage districts, provided insights into applying service design methods in community-level regeneration. Grounded Theory and the Double Diamond model were used to frame the discovery and definition of local needs. In the Menxi context, the material level included drying infrastructure and public green pockets, while the spiritual level involved symbolic representation and cultural pride. Three design experiments (DE1: drying safety; DE2: greening through seed paper; DE3: cultural recognition) were developed to address these layered needs. Each was prototyped, refined, and validated through stakeholder co-creation, highlighting how service design enables user-centered and context-sensitive strategies in culturally fragile environments.

The third objective was to generate replicable renewal strategies tailored to Menxi, capable of elevating both the physical environment and residents' quality of life. This was realized through the PAE Historic Area Design Strategy, which allowed for modular, adaptive, and scalable interventions. DE1 improved daily hygiene and safety with drying racks integrated into the urban fabric. DE2 introduced pocket greening and re-established the link between residents and their environment through low-cost, participatory solutions. DE3 enhanced cultural confidence via local heritage handbooks and panoramic scans that connected residents to the area's historical narrative. These strategies did not aim to impose large-scale transformations but rather accumulated incremental improvements with tangible effects. Their success, evaluated through T0–T2 data comparisons and stakeholder feedback, not only validated the interventions but also offered a reference model for historic community regeneration across China.

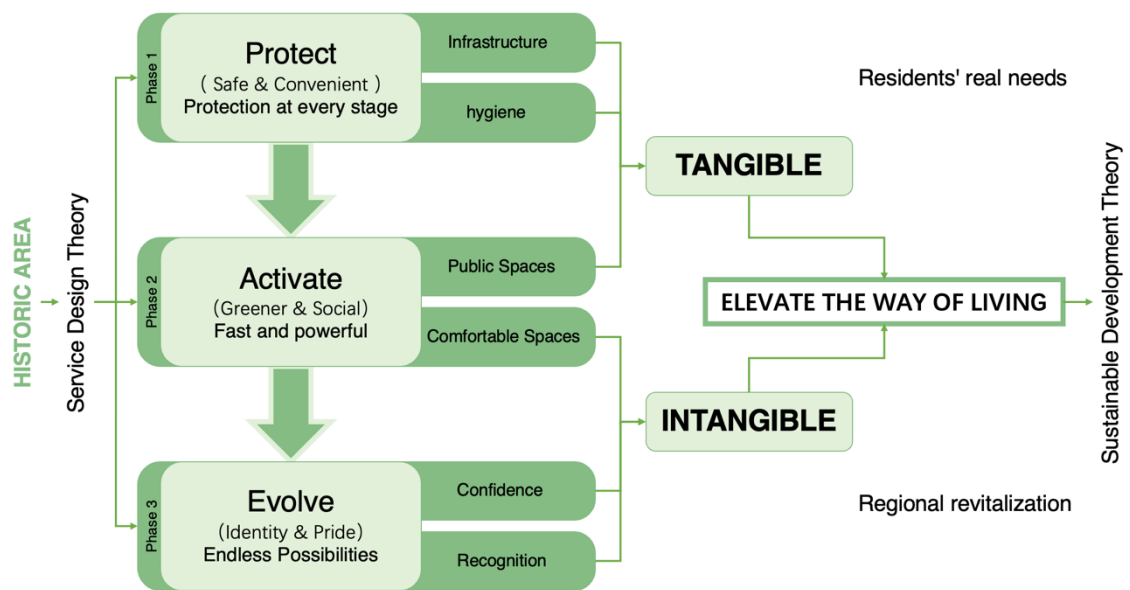


Figure 101 Historic area strategy (Li, 2025)

5.2 Total of research results and evaluates

This research presents an integrated service design strategy based on the PAE framework—Protect, Activate, and Evolve—to elevate the way of living in the historic Menxi area of Nanjing. PAE framework was distilled from the challenges and strategies observed in the historic urban landscape (HUL) approach, and was conceptualized to offer a phased, action-oriented model for revitalizing historic communities. The methodological structure followed the Double Diamond model, guiding the discovery, definition, development, and delivery of three targeted design experiments (DE1–DE3), each responding to distinct but interconnected community needs.

The findings demonstrate that the design interventions grounded in human-centered principles were both feasible and effective. DE1 addressed hygiene and safety through the implementation of drying racks integrated with rain protection, leading to measurable improvements in environmental satisfaction and perceived dignity of daily life. DE2 activated underutilized public pockets via greening initiatives such as “seed paper” and repaired planters, encouraging residents to participate in small-scale ecological renewal. DE3 evolved the cultural identity of the area through visual documentation and heritage dissemination, enhancing residents’ emotional attachment and place-based recognition.

The success and feasibility of each intervention were systematically evaluated through iterative feedback loops involving residents, community associations, and government officers. These evaluations were conducted via structured interviews, focus group discussions, co-creation workshops, and post-implementation surveys (T1 and T2 phases). Government stakeholders played a particularly active role in decision-making, endorsing and co-funding specific interventions such as rain shelters with integrated drying rods and the expansion of underground drainage systems. Residents provided qualitative feedback on perceived improvements and were involved in the refinement of design outcomes. The reciprocal nature of feedback between designers and stakeholders enhanced the legitimacy, usability, and longevity of the implemented solutions.

Across the three experiments, the research employed quantitative (T0–T2) and qualitative (interviews and focus groups) methods to evaluate impact. The majority of outcome indicators—particularly in Environment, Experience, and Place Identity—showed statistically significant improvements. For example, DrySafety scores rose from 1.85 to 4.25, and PlaceID increased from 2.20 to 3.75. Effect sizes (Cohen’s *d*) were consistently large (≥ 0.8) across core metrics, validating the practical efficacy of the PAE strategy when applied through localized, design-led processes.

The iterative use of the Double Diamond model ensured that the interventions were not only grounded in user insight but also continuously refined through co-creation and feedback loops. In this sense, the “SEED Program” served as an operational scaffold—phasing improvements from basic hygiene (Protect), to ecological comfort (Activate), and finally to cultural self-awareness (Evolve). Rather than proposing a top-down master plan, this approach prioritized adaptive, distributed, and evidence-based design action, suited to the socio-cultural complexity of historic urban enclaves.

TRL (Technology Readiness Level) Evaluation

To gauge the maturity of the implemented design interventions, a TRL-style evaluation—adapted for service design contexts—was conducted. Although TRL is traditionally applied in technological innovation assessment, its scaled logic proved useful in evaluating the progression from ideation to real-world deployment in this research.

Table 4 TRL Level

Design Experiment	TRL Rating	Justification
DE1 (Drying rack + shelter)	TRL 8 – System complete and qualified	Deployed in over 20 instances with stakeholder approval and physical infrastructure installed
DE2 (Seed paper + pocket greening)	TRL 7 – Demonstration in operational environment	Seed paper version 2 tested; 9 flowerbeds installed; public interaction confirmed
DE3 (Cultural dissemination tools)	TRL 6 – Prototype demonstrated in relevant context	Handbook distributed; panoramic scans produced; digital dissemination validated through >10,000 views

5.3 Research results and how to solve the research problem

This study was initiated in response to a persistent and multifaceted research problem: how to elevate the way of living in China's historic areas, particularly the Menxi district of Nanjing, while preserving its cultural heritage and adapting to contemporary urban needs. The problem itself stems from the observed tension between stagnation in daily living conditions and the urgency of sustainable renewal in underdeveloped yet culturally significant urban enclaves. The challenge required reconciling protection with innovation, heritage with functionality, and top-down governance with bottom-up participation.

To address this problem, the study constructed a service design approach grounded in the PAE strategy (Protect–Activate–Evolve), executed through the Double Diamond model. The research problem was tackled through three design experiments that offered iterative, resident-centered solutions to material, ecological, and cultural aspects of urban life.

In response to hygiene and safety deficits, Design Experiment 1 provided an infrastructural solution by introducing drying racks integrated with rain protection. This addressed both visible environmental issues and latent dignity concerns identified during the discovery phase. Quantitative indicators like DrySafety and Environment showed statistically significant improvement, confirming the intervention's effectiveness.

For ecological livability and green space, Design Experiment 2 focused on micro-greening through seed paper and public planters. This encouraged resident agency and visibly transformed neglected pockets. The activation of a previously inaccessible park through minor spatial intervention directly supported the research aim of enhancing daily quality of life in small but impactful ways.

Concerning the intangible dimension of cultural identity and spatial disconnection, Design Experiment 3 developed low-cost yet symbolically rich outputs—heritage handbooks, panoramic visual archives, and digital storytelling—to foster a renewed sense of belonging. The results demonstrated increased emotional attachment to place and improved recognition of Menxi's cultural continuity.

Collectively, the design experiments resolved the research problem by offering scalable, context-sensitive, and community-relevant strategies. Rather than proposing a single master plan, the study provided a phased and adaptive design trajectory, sensitive to stakeholder dynamics and socio-political constraints. Through this, the research advanced not only local solutions but also contributed a transferable methodology for other underdeveloped historic areas facing similar dilemmas across China.

Table 5 SRL Level

Design Experiment	SRL Level	Rationale
DE1 – Drying rack + shelter	SRL 8	System operational with stakeholder support and infrastructure fit
DE2 – Seed paper + flowerbeds	SRL 7	System running with community engagement but limited formalization
DE3 – Handbook + Panoramas	SRL 6	Initial deployment for awareness; not integrated in governance systems

5.4 Research results and its Social Impact

The research outcomes of this study extend beyond local environmental improvement to encompass broader social, cultural, and systemic dimensions. Through the implementation of service design strategies in the Menxi historic area, the study demonstrated how small-scale, evidence-based interventions could catalyze meaningful transformations in both perception and behavior among residents, institutions, and the wider public.

On the community level, the tangible design experiments elevated residents' quality of life while reinforcing their agency and participation. The drying racks introduced in DE1 not only addressed safety and hygiene but also affirmed the everyday dignity of marginalized groups, particularly elderly residents. The micro-greening of DE2 encouraged environmental stewardship and social cohesion, while DE3's cultural dissemination fostered renewed pride in local identity. These interventions promoted a bottom-up recognition of collective ownership over shared space, previously weakened by decades of urban neglect.

From an institutional and governance perspective, the research fostered productive collaborations between residents and local government stakeholders. Through iterative feedback loops and service blueprint co-creation, the project introduced a new model of participatory design governance. Government departments adopted some of the recommendations—such as expanding the underground drainage system—to further support residents' capacity to install in-house sanitation. This responsiveness indicates a shift toward adaptive policy practices rooted in localized insight and design intelligence.

In terms of broader societal impact, the dissemination of project results through exhibitions, public activities, and digital media (including social platforms that

reached over 10,000 views) significantly enhanced awareness of Menxi's cultural heritage and its value. The project was also recognized in national forums such as the 2024 National Youth Designer Competition, which strengthened its visibility and legitimacy. By highlighting the feasibility of low-cost, co-created interventions, the study offered a counter-narrative to the often top-down, demolition-driven urban renewal strategies prevalent in Chinese historic areas.

Moreover, the study contributed methodologically by demonstrating how service design frameworks—particularly PAE combined with Double Diamond—could structure progressive, human-centered renewal efforts in culturally sensitive contexts. The “SEED Program” approach of delivering Small, Evidence-based, Evolutionary, and Distributed design actions proved replicable and impactful. As such, this research offers both conceptual and practical references for designers, policymakers, and communities aiming to harmonize tradition and innovation in historic urban regeneration across China and beyond.

The PAE (Protect–Activate–Evolve) strategy can be effectively applied to other historic urban communities seeking sustainable renewal by following a structured, evidence-based process. First, researchers and planners should begin with a comprehensive needs assessment to uncover localized problems related to safety, environmental quality, and cultural continuity. This stage involves both quantitative methods, such as resident surveys, and qualitative techniques like interviews or participatory workshops, to ensure that the challenges identified are grounded in real community experiences. Next, the theoretical foundation should draw from relevant sustainable development and service design literature, enabling the intervention to align with contemporary best practices in participatory urban planning. Methodologically, the PAE strategy recommends employing tools such as stakeholder mapping, service blueprints, and co-design sessions to co-create solutions with residents. Design experiments should be framed in three progressive phases: initial improvements that protect basic well-being and infrastructure; mid-stage activations that improve spatial functionality and inclusiveness; and advanced cultural evolutions that enhance identity and pride. To validate the strategy's effectiveness, mixed-method evaluations must be conducted after each phase using standardized indicators of impact, such as changes in safety perception, environmental comfort, and cultural attachment. The adaptability of the PAE model allows for its replication in diverse urban contexts while maintaining sensitivity to local histories and social fabrics. By following this sequential and participatory approach, other communities can achieve both tangible improvements in quality of life and intangible reinforcement of shared heritage.

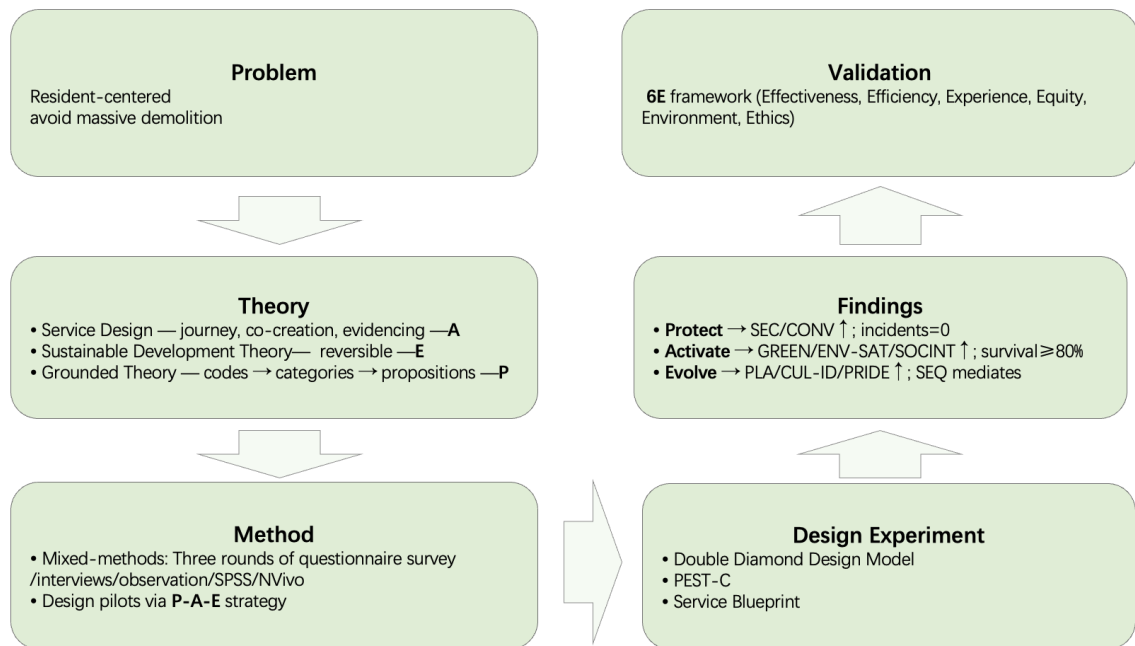


Figure 102 Other historic areas use (Li, 2025)

5.5 Suggestions

Based on the findings of this study, several practical and theoretical suggestions are proposed to guide future actions for historic area regeneration through service design approaches. These suggestions aim to inform policymakers, design practitioners, community stakeholders, and academic researchers seeking to address the complex challenges of improving the way of living in culturally sensitive urban contexts like Menxi.

For government and policymakers, it is recommended to adopt a participatory governance model that integrates design thinking into early-stage decision-making. Rather than implementing uniform top-down interventions, governments should prioritize flexible, small-scale, low-cost strategies—such as the SEED Program—tailored to local needs. Furthermore, long-term maintenance and evaluation mechanisms should be institutionalized to ensure that implemented solutions remain effective and responsive to community feedback.

For designers and urban renewal practitioners, this research highlights the value of using service design methodologies, particularly the Double Diamond model, to structure inclusive, iterative, and co-creative processes. In contexts where formal planning tools may lack sensitivity to everyday user experience, service design offers a complementary framework to identify latent needs, align multi-stakeholder interests, and prototype culturally appropriate interventions. It is advised that designers maintain close collaboration with community actors throughout all phases, from discovery to delivery, to enhance design legitimacy and acceptance.

For residents and grassroots organizations, the research encourages increased participation and localized agency in shaping their living environment. The success of the drying racks, seed paper, and cultural handbook initiatives demonstrated that residents are willing and capable of contributing ideas, feedback, and even physical effort to shared goals when the process is transparent and respectful. Local associations and volunteers can play an essential role in sustaining and scaling such initiatives.

For academia and future researchers, this study suggests that service design holds significant potential as a research methodology in the field of urban regeneration and cultural sustainability. Further research can extend the model tested in Menxi to other historic areas, exploring comparative outcomes and adaptive refinements. It is also encouraged to deepen the integration between service design, social science methods, and urban policy studies, thereby fostering interdisciplinary knowledge production and application.

In future research or implementation efforts, it is recommended to explore the integration of the Menxi area into broader cultural tourism networks. Specifically, scholars and practitioners may consider designing a cultural route that connects the Menxi historic area with the nearby Mendong area, forming a continuous narrative corridor. Such a linkage would not only enhance the visibility and accessibility of Menxi's unique heritage, but also promote cross-district cultural exchange, stimulate local economic vitality, and amplify the collective identity of Nanjing's historic core. This approach aligns with the evolving strategy proposed in this research and offers sustainable potential for heritage-based placemaking. Future research could test the PAE service design framework in other historic communities to compare outcomes, or explore long-term sustainability of such interventions through longitudinal follow-up.

Although this study achieved meaningful outcomes, several limitations should be acknowledged. First, the research focused on a single case—the Menxi historic area—which limits the generalizability of the findings to other heritage contexts with different governance, demographics, or cultural dynamics. Second, implementation constraints such as restricted budgets, seasonal construction periods, and uneven community participation occasionally affected the scale and speed of interventions. Third, the study's evaluation timeline ended at the T2 stage; therefore, no long-term post-intervention assessment was conducted to verify the sustained impact of the proposed strategies. Finally, while the mixed-methods design provided a comprehensive understanding of residents' needs, self-reported data may contain bias, and further longitudinal or comparative studies across multiple sites would strengthen external validity.

In conclusion, the renewal of historic areas is not merely a technical or architectural endeavor, but a deeply social and cultural process. This research reaffirms that elevating the way of living in such contexts requires not only physical improvements, but also the cultivation of place-based pride, collective memory, and participatory co-creation. Service design offers a compelling pathway to achieve this synthesis.

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APPENDIEX

Panoramic view of Hu Family Garden in the Menxi area.
Please scan the QR code to view the panoramic view.



Menxi area Waguan Temple panorama
Please scan the QR code to view the panorama.



Panoramic view of Shuizhai'an Residence No. 9 in the Menxi area

Please scan the QR code to view the panorama.



Panorama of Jiang's home in the Menxi area

Please scan the QR code to view the panorama.



Questionnaire of the T0 phase (Find the Real Problem)

日期: _____ Date: _____

是否年满18周岁: ☐是 ☐否 Are you 18 or older? ☐Yes ☐No

是否在门西街区居住或经营 ≥6个月: ☐是 ☐否

Have you lived or worked in Menxi for ≥6 months? ☐Yes ☐No

最近巷道/路口编码: _____ Nearest alley/intersection code: _____

身份: ☐居民 ☐商户 ☐两者 Role: ☐Resident ☐Shop owner ☐Both

A. 核心6E量表 | Core 6E Scale

(1 = 非常不同意, 5 = 非常同意) (1 = Strongly Disagree, 5 = Strongly Agree)

Effectiveness (效能)

公共服务能满足日常需要。

Public services meet daily needs. ☐1 ☐2 ☐3 ☐4 ☐5

巷道网络支持我完成日常差事。

The alley network supports daily errands. ☐1 ☐2 ☐3 ☐4 ☐5

公共设施在需要时可正常使用。

Public facilities function properly when needed. ☐1 ☐2 ☐3 ☐4 ☐5

Efficiency (效率)

4. 我能较快完成日常出行与办事。

I can accomplish errands and travel efficiently. ☐1 ☐2 ☐3 ☐4 ☐5

5. 行走路径直接、少绕路。

Walking paths are direct with minimal detours. ☐1 ☐2 ☐3 ☐4 ☐5

6. 维护与回应的速度较及时。

Maintenance and responses are timely. ☐1 ☐2 ☐3 ☐4 ☐5

Experience (体验)

7. 在这里行走和休息整体感到舒适。

Walking and resting here feels generally comfortable. ☐1 ☐2 ☐3 ☐4 ☐5

8. 需要时能找到可短暂停留的微空间。

Small spaces for rest are accessible when needed. ☐1 ☐2 ☐3 ☐4 ☐5

9. 在路口的导向/指示清晰易懂。

Wayfinding at intersections is clear and understandable. ☐1 ☐2 ☐3 ☐4 ☐5

Equity (公平)

10. 老人能够安全使用巷道与设施。

Elderly can safely use alleys and facilities. ☐1 ☐2 ☐3 ☐4 ☐5

11. 居民与小商户从改造中获益较为均衡。

Residents and shop owners benefit fairly from renewal. ☐1 ☐2 ☐3 ☐4 ☐5

12. 对居民的通达性未被游客优先取代。

Resident accessibility hasn't been overridden by tourism. ☐1 ☐2 ☐3 ☐4 ☐5

Environment (环境)

13. 巷道与院落整体较为整洁。

Alleyways and courtyards are generally tidy. ☐1 ☐2 ☐3 ☐4 ☐5

14. 绿化与遮阴基本充足。

Greening and shading are generally adequate. ☐1 ☐2 ☐3 ☐4 ☐5

15. 夜间照明足以保证安全通行。

Night lighting is sufficient for safe passage. ☐1 ☐2 ☐3 ☐4 ☐5

Ethics (伦理/秩序)

16. 改变尊重了门西的历史风貌。

Changes respect Menxi's historic character. ☐1 ☐2 ☐3 ☐4 ☐5

17. 公共空间使用的规则与责任清晰。

Rules and responsibilities in public space are clear. ☐1 ☐2 ☐3 ☐4 ☐5

18. 大家在共享空间基本遵守约定。

People generally follow agreements in shared space. ☐1 ☐2 ☐3 ☐4 ☐5

B. 常见问题频率 | Problem Frequency

(过去两周频率: 1 = 从不, 5 = 经常) (In past two weeks: 1 = Never, 5 = Very Often)

路面打滑/绊倒隐患。

Slippery surfaces / tripping hazards. ☐1 ☐2 ☐3 ☐4 ☐5

夜间照明不足。

Insufficient lighting at night. ☐1 ☐2 ☐3 ☐4 ☐5

雨后积水/排水不畅。

Water pooling or poor drainage after rain. ☐1 ☐2 ☐3 ☐4 ☐5

杂物/车辆阻挡通行被迫绕行。

Debris or vehicles blocking access. ☐1 ☐2 ☐3 ☐4 ☐5

缺少可坐可歇的点位。

Lack of places to sit/rest. ☐1 ☐2 ☐3 ☐4 ☐5

路口导向不清, 易犹豫。

Poor wayfinding at intersections. ☐1 ☐2 ☐3 ☐4 ☐5

绿荫/植被不足。

Insufficient greenery/shade. ☐1 ☐2 ☐3 ☐4 ☐5

居民与游客/商户之间的通行冲突。

Conflicts with tourists or shopkeepers. ☐1 ☐2 ☐3 ☐4 ☐5

请写出你认为最优先解决的三项编号: _____

Please rank the top 3 issues to be addressed: _____

C. 机制与社区关系 | Mechanism & Belonging

日常公共服务较为可预测。

Public services are predictable. ☐1 ☐2 ☐3 ☐4 ☐5

信息与时间安排清晰可得。

Schedules and information are transparent. ☐1 ☐2 ☐3 ☐4 ☐5

我知道如何报告问题或提出请求。

I know how to report issues or make requests. ☐1 ☐2 ☐3 ☐4 ☐5

邻里之间会偶尔协作维护。

Neighbors sometimes collaborate on upkeep. ☐1 ☐2 ☐3 ☐4 ☐5

我为居住/工作在门西而自豪。

I am proud to live/work in Menxi. ☐1 ☐2 ☐3 ☐4 ☐5

我希望继续留在该社区。

I wish to continue living in this community. ☐1 ☐2 ☐3 ☐4 ☐5

D. Protect阶段指标（安全与卫生） | Protect Indicators

我常用路径上较少出现临时障碍。

Few temporary obstacles on my usual routes. ☐1 ☐2 ☐3 ☐4 ☐5

夜间我感到行走是安全的。

I feel safe walking at night. ☐1 ☐2 ☐3 ☐4 ☐5

雨天后地面与排水能较快恢复。

Surfaces/drainage recover quickly after rain. ☐1 ☐2 ☐3 ☐4 ☐5

E. 全局满意度 | Global Outcome

总体而言，我目前在门西的生活方式是令人满意的。

Overall, I am satisfied with my current lifestyle in Menxi. ☐1 ☐2 ☐3 ☐4 ☐5

请为“门西作为居住/工作的地方”打分（0–10）：_____

Rate Menxi as a place to live/work (0–10): _____

F. 开放题 | Open Questions

目前对你最有帮助的一项公共变化是什么？

What is the most helpful recent change in public space?

下一步最应该优先改进什么？

What should be improved as the next priority?

Questionnaire of the T1 phase (Determining the direction of the solution)

日期: ____ Date: ____

是否年满18周岁: ☐是 ☐否 Are you 18 or older? ☐Yes ☐No

是否在门西街区居住或经营 ≥6个月: ☐是 ☐否

Have you lived or worked in Menxi for ≥6 months? ☐Yes ☐No

最近巷道/路口编码: ____ Nearest alley/intersection code: ____

身份: ☐居民 ☐商户 ☐两者 Role: ☐Resident ☐Shop owner ☐Both

A. 核心需求与优先级评估 | Core Needs & Priority Evaluation

(1 = 非常不需要, 5 = 非常需要) (1 = Not needed at all, 5 = Highly needed)

增加绿植与可种植空间

More greenery and plantable spaces ☐1 ☐2 ☐3 ☐4 ☐5

设置便民休息设施 (如简易座椅、雨棚)

Convenient rest facilities (e.g., seating, rain shelter) ☐1 ☐2 ☐3 ☐4 ☐5

改善排水与清洁设施

Improved drainage and sanitation ☐1 ☐2 ☐3 ☐4 ☐5

提供社区公告栏或信息提示设施

Public bulletin boards or informational signage ☐1 ☐2 ☐3 ☐4 ☐5

增设老年人友好设施 (如扶手、坡道)

Elderly-friendly amenities (e.g., handrails, ramps) ☐1 ☐2 ☐3 ☐4 ☐5

更清晰的巷道导向系统

Clearer alleyway wayfinding system ☐1 ☐2 ☐3 ☐4 ☐5

让大家更了解门西的历史文化

Increase understanding of Menxi's history & culture ☐1 ☐2 ☐3 ☐4 ☐5

改善夜间照明

Improved night lighting ☐1 ☐2 ☐3 ☐4 ☐5

创建社区共享空间/小型集会场所

Create shared space / mini gathering areas ☐1 ☐2 ☐3 ☐4 ☐5

其他 (请写明): _____

Others (please specify): _____

B. 具体建议与偏好 | Concrete Suggestions & Preferences

如果可以种植植物, 你更希望:

If planting is possible, would you prefer to:

☐ 自己种植 (自行选择植物) Grow it myself (freely choose plants)

☐ 有统一提供的种子纸 Use provided seed paper

☐ 与邻里共建一个花坛 Build a shared flowerbed with neighbors

☐ 无意愿参与 No interest in planting

若提供“种子纸”，你希望种什么？

If “seed paper” is provided, what would you prefer to grow?

- ☐ 观赏类绿植（如牵牛花）Ornamental plants (e.g., morning glory)
- ☐ 可食用蔬菜（如小番茄、薄荷）Edible vegetables (e.g., cherry tomatoes, mint)
- ☐ 中草药（如金银花）Medicinal herbs (e.g., honeysuckle)
- ☐ 其他：_____ Other: _____

如果有一本介绍门西历史与文化的手册，你会：

If a handbook introducing Menxi's history/culture is provided, would you:

- ☐ 阅读并保存 Read and keep it
- ☐ 分享给亲友 Share it with others
- ☐ 可能不会看 Might not read it

如果要设置一个历史相关的小型展览，你更希望它：

If a small historical exhibition were to be set up, would you prefer it:

- ☐ 在巷子口设立固定展板 Fixed panels at alley entrances
- ☐ 可移动的展览装置 Mobile exhibition units
- ☐ 放在社区活动中心 Inside the community center
- ☐ 不需要 Not necessary

C. 你个人的感受 | Your Personal View

你觉得门西最需要改变的三件事是：

What are the top three things Menxi needs to change?

- ① _____
- ② _____
- ③ _____

你最希望设计团队为你们做什么？

What do you most hope the design team can do for your community?

你是否愿意参与后续的设计试点或讨论？

Would you be open to joining follow-up design trials or discussions?

☐ 愿意 (请留下联系方式)

Yes (please leave contact)

☐ 暂时不愿意

Not at the moment

Questionnaire of the T2 phase (Verify Design Effectiveness)

日期: ____ Date: ____

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公共设施在需要时可正常使用。

Public facilities function properly when needed. ☐1 ☐2 ☐3 ☐4 ☐5

Efficiency (效率)

4. 我能较快完成日常出行与办事。

I can accomplish errands and travel efficiently. ☐1 ☐2 ☐3 ☐4 ☐5

5. 行走路径直接、少绕路。

Walking paths are direct with minimal detours. ☐1 ☐2 ☐3 ☐4 ☐5

6. 维护与回应的速度较及时。

Maintenance and responses are timely. ☐1 ☐2 ☐3 ☐4 ☐5

Experience (体验)

7. 在这里行走和休息整体感到舒适。

Walking and resting here feels generally comfortable. ☐1 ☐2 ☐3 ☐4 ☐5

8. 需要时能找到可短暂停留的微空间。

Small spaces for rest are accessible when needed. ☐1 ☐2 ☐3 ☐4 ☐5

9. 在路口的导向/指示清晰易懂。

Wayfinding at intersections is clear and understandable. ☐1 ☐2 ☐3 ☐4 ☐5

Equity (公平)

10. 老人能够安全使用巷道与设施。

Elderly can safely use alleys and facilities. ☐1 ☐2 ☐3 ☐4 ☐5

11. 居民与小商户从改造中获益较为均衡。

Residents and shop owners benefit fairly from renewal. ☐1 ☐2 ☐3 ☐4 ☐5

12. 对居民的通达性未被游客优先取代。

Resident accessibility hasn't been overridden by tourism. ☐1 ☐2 ☐3 ☐4 ☐5

Environment (环境)

13. 巷道与院落整体较为整洁。

Alleyways and courtyards are generally tidy. ☐1 ☐2 ☐3 ☐4 ☐5

14. 绿化与遮阴基本充足。

Greening and shading are generally adequate. ☐1 ☐2 ☐3 ☐4 ☐5

15. 夜间照明足以保证安全通行。

Night lighting is sufficient for safe passage. ☐1 ☐2 ☐3 ☐4 ☐5

Ethics (伦理/秩序)

16. 改变尊重了门西的历史风貌。

Changes respect Menxi's historic character. ☐1 ☐2 ☐3 ☐4 ☐5

17. 公共空间使用的规则与责任清晰。

Rules and responsibilities in public space are clear. ☐1 ☐2 ☐3 ☐4 ☐5

18. 大家在共享空间基本遵守约定。

People generally follow agreements in shared space. ☐1 ☐2 ☐3 ☐4 ☐5

B. 你是否注意到以下改善? | Design Exposure Check

19. 是否注意到以下变化? (可多选)

Did you notice any of the following changes? (Multiple choice)

☐ 新增或改善的绿植/花坛

☐ 设置了便民设施(如座椅、雨棚)

☐ 增加了社区布告/文化宣传

☐ 提供了历史文化相关的手册或展示

☐ 其他(请说明): _____

☐ 没有注意到相关变化

C. 这些改变对你有帮助吗? | Usefulness of Interventions

20. 请评价以下改善是否对你有帮助: (1=完全无帮助, 5=非常有帮助)

Rate the usefulness of the following improvements (1-5)

增加的绿植与花坛: ☐1 ☐2 ☐3 ☐4 ☐5

设置的座椅或遮阴设施: ☐1 ☐2 ☐3 ☐4 ☐5

社区文化与信息传播: ☐1 ☐2 ☐3 ☐4 ☐5

D. 反馈与建议 | Feedback

21. 请写出最让你满意的一项改变:

What change are you most satisfied with?

22. 你认为还有哪些地方需要进一步改善?

What else should still be improved?

23. 你是否愿意继续参与后续活动? (可填写联系方式)

Would you like to participate in future activities? (Leave contact if yes)

Interview & Focus Group Guides

I. Interview Guide for Residents (Long-term & Newcomers)

核心问题 | Core Questions:

您在门西生活（或工作）了多久？

How long have you lived (or worked) in the Menxi area?

您觉得这个街区有哪些方面是让您满意的？

What aspects of this neighborhood are you satisfied with?

在日常生活中，您遇到过哪些不方便或不舒适的情况？

What kinds of inconvenience or discomfort have you experienced in daily life?

您是否注意到一些公共空间或设施的变化？对您有影响吗？

Have you noticed any changes in public space or infrastructure? How have they affected you?

您是否参与过社区公共事务的讨论或维护？

Have you ever participated in any community-based discussions or maintenance?

您对“改善历史街区生活方式”的想法或建议是什么？

What are your suggestions for improving the lifestyle in this historic area?

II. Interview Guide for Local Government Officers

核心问题 | Core Questions:

目前门西地区在城市更新方面的重点工作有哪些？

What are the current priorities for urban renewal in Menxi?

政策执行过程中遇到的最大阻力或难点是什么？

What are the key challenges or barriers in policy implementation?

政府是如何收集居民需求或反馈的？

How does the government collect and respond to residents' needs or feedback?

您认为目前最需要通过设计来改善的问题是什么？

From your perspective, what issues could most benefit from design interventions?

对于“服务设计”或“共创参与”的方式，您是否有实践经验或看法？

What is your view or experience with service design or co-creation processes?

III. Interview Guide for Local Associations and Cultural Actors

核心问题 | Core Questions:

您所属的组织在门西开展了哪些活动？

What kind of activities has your organization conducted in Menxi?

居民与组织之间的互动情况如何？是否愿意参与？

How do residents interact with your organization? Are they willing to participate?

您如何看待门西的文化特质和记忆？有哪些需要保护或传承的方面？

What do you consider to be the cultural identity or memory of Menxi? What needs to be preserved?

您是否希望借助设计与策展的方式加强传播？

Would you like to use design or curation to enhance cultural communication?

IV. Focus Group Guide (Resident-Centered)

场景引导语 | Discussion Prompts:

平时在街区中，大家最常使用的空间或路线是哪些？

What are the most commonly used spaces or routes in your daily life here?

有没有什么地方您会刻意避开？为什么？

Are there any places you deliberately avoid? Why?

如果可以提出一个“最希望改善的场景”，您会选什么？

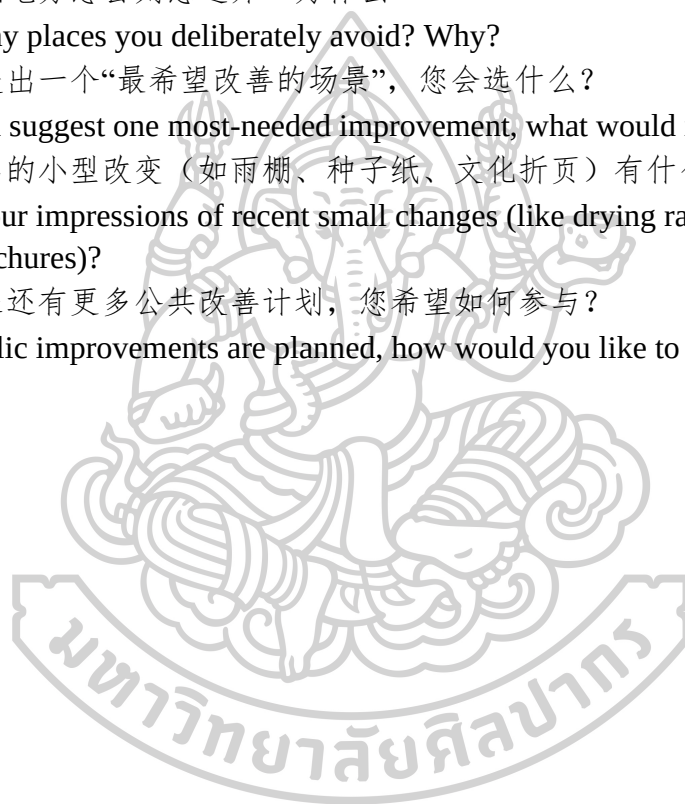
If you could suggest one most-needed improvement, what would it be?

对已经做出的小型改变（如雨棚、种子纸、文化折页）有什么印象？

What are your impressions of recent small changes (like drying racks, seed paper, or cultural brochures)?

如果接下来还有更多公共改善计划，您希望如何参与？

If more public improvements are planned, how would you like to participate?



VITA

NAME	Li Tian
INSTITUTIONS ATTENDED	2013-2017 Nanjing University of the Arts. Nanjing, China 2017-2020 Nanjing University of the Arts. Nanjing, China
PUBLICATION	Member of the China Industrial Design Association Member of the Jiangsu Interior Design Society Member of the Jiangsu Education Calligraphy Association Member of the Laomenxi Watchmen Association
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