THE ADAPTABILITY OF BAI TRADITIONAL RESIDENTIAL BUILDINGS IN RELEVANT TO CHINESE MODERN LIFESTYLE

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ABSTRACT

This thesis firstly explains the background and significance of the study, pointing out that Bai Traditional Residential Buildings in Dali, as an important part of the architectural culture of ethnic minorities, are facing the dual challenges of preservation and renovation in the process of modernisation. In order to explore this complex topic in depth, the study adopts a qualitative research method, combining semi-structured interviews and fieldwork to collect and analyse detailed primary data.

At the methodological level, the thesis elaborates the whole process of qualitative analysis, covering the three core stages of coding and categorisation, thematic analysis and theory construction. Based on the rooting theory, open coding of the interview texts was carried out in order to extract the concepts and themes closely related to the research topic, and on this basis, the thematic analysis and theoretical construction were further carried out in an attempt to comprehensively reveal the intrinsic mechanism of the influence of modern lifestyles on the transformation of Bai Traditional Residential Buildings. Through the coding results, the thesis systematically analyses the four aspects of the status quo of traditional dwellings, the living habits of residents, the demands of modern life and the law of spontaneous construction and their interrelationships.

The research results show that the current situation of Bai Traditional Residential Buildings, residents' living habits and behavioural patterns, Modern Lifestyle and spontaneous construction rules interact with each other and together constitute a complex system of Bai Traditional Residential Buildings modernisation. It is found that

the self-organised behaviours of the residents play a key role in the renovation and new construction of Dali's Traditional Bai Residential Buildings. These behaviours not only demonstrate the residents' adaptability to modern lifestyles and diversified needs, but also reflect their deep emotions and sense of protection of traditional residential culture. However, the study also reveals a series of problems encountered in the process of renovation and new construction, such as the lack of building materials and the inconsistency of design standards, which urgently require extensive attention and effective responses from all sectors of society.

Based on the results of the study, the thesis puts forward targeted recommendations and measures. Firstly, a strategy of classification protection and development is proposed. In addition to the strict protection of large-scale compounds with cultural heritage value, to ensure the complete inheritance of their historical features and cultural connotations; for the residential houses closely related to the daily life of the residents, it is suggested to carry out moderate modernisation based on the maintenance of the traditional features to meet the needs of modern life. In the process of residential renovation, attention should be paid to the rationality of functional zoning and the modernisation of equipment and facilities, and the optimisation of spatial layout in order to enhance the practicality and comfort of the residential buildings; at the same time, the introduction of modern kitchens, bathrooms and other facilities is recommended in order to improve the living conditions of the residents. In view of the shortage of building materials and non-standardised design, it is suggested that the government and relevant institutions should increase their support, provide high-quality building materials and design guidance, and promote the standardisation and standardisation of the renovation and new construction of Bai residential houses through policy guidance and technical support. In addition, the main position and wishes of the residents should be fully respected to ensure that the renovation programme meets the actual needs and expectations of the residents; at the same time, by strengthening the education of the residents on cultural values, it will stimulate their enthusiasm and creativity to participate in the protection and renovation of the dwellings.

Keywords: Modern Lifestyle, Bai Traditional Residential Buildings, Adaptive Modification, Spontaneous Construction

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CHAPTER 1
INTRODUCTION

1.1 BACKGROUND AND PROBLEM STATEMENT

1.1.1 Formulation of the problem

In the context of today's global urbanization, people's production methods, lifestyles, technological levels, and ideological concepts have changed dramatically, and the audit of the renewal of dwellings in traditional Chinese villages is an important issue that we need to face, and the response to this issue has a clear and realistic significance (Li, X., 2015). Users of traditional dwellings are also builders, fully expressing the results of construction in the context of complete spontaneity, self-need, and autonomy, and are able to demonstrate the most relevant construction results to the needs of life (Tan, R., Zou, Z. & Dong, J., 2023). Traditional dwellings are the spaces that have the richest and strongest contact with traditional Chinese people, and at the same time clearly show us the development of the whole society.

There is a clear statement in the Beijing Charter: "Metabolism is the objective law of the development of the human environment, and building units and their environments undergo a process of planning, design, construction, maintenance, protection, remediation and renewal." The industrial revolution has brought radical changes to the whole society, and the traditional houses are incompatible with the living mode, living standard and living needs of the villagers nowadays, and the

renewal design of the traditional village houses can be said to be a general trend (Chen, S., 2020). Faced with this situation, villagers began to renew traditional dwellings as well as rebuild them off-site. Due to the lack of professional guidance, the villagers' own design often lacks professionalism and reasonableness, resulting in the renewed traditional houses not only failing to meet the villagers' needs, but also losing the charm of the traditional houses themselves (Tang, S. & Tan, G., 2021). The traditional dwellings of the Bai ethnic group in Dali, Yunnan are an important part of Chinese ethnic architecture and have unique historical, cultural and architectural values. As part of the cultural heritage, the culture of the traditional villages, which

has been accumulated for thousands of years, will be greatly affected if these conditions are not guided.

1.1.2 Support from national policies

From the proposal of the task of building a new socialist countryside in October 2005 (Qin, Y., 2018) to the formal proposal of the rural revitalization strategy by General Secretary Xi Jinping in the report of the 19th CPC National Congress on October 18, 2017, it can be seen that the construction of the countryside has been increasingly valued. In particular, the report of the 19th National Congress proposes that the issues of agriculture, rural areas and farmers are fundamental issues related to the national economy and people's livelihood, and that it is necessary to always take the solution of the "Three Rural Issues" as the top priority and implement the strategy of rural revitalization. The countryside is a regional complex with natural, social and economic characteristics, with multiple functions of production, life, ecology and culture, and the contradiction between the growing needs of our people for a better life and the unbalanced and insufficient development is most prominent in the countryside (Wang, L., 2021). How to build the countryside, how to try to meet the growing needs of the people for a better life, is the focus of the research of the majority of scholars. The Fifth Plenary Session of the Sixteenth Central Committee pointed out that the focus of the construction of the countryside should be on "production development", "affluent life", "civilized countryside," "village neatness and cleanliness", "democratic management" (Liu, J., 2018); in the No. 1 document of the Central Government in 2013, the goal of building a "beautiful countryside" was put forward for the first time, and the construction of a "beautiful countryside" requires further strengthening of rural ecology, and the construction of a "beautiful countryside" requires further strengthening of rural ecology. The construction of "beautiful countryside" requires further strengthening of rural ecological construction, environmental protection and comprehensive remediation work; the Ministry of Agriculture of the State Department of Science and Education for the construction of the countryside, but also released China's beautiful countryside construction of the top ten models; nineteen report on the "strategy of rural revitalization" and put forward the "industrial revitalization ", "ecological revitalization", "cultural revitalization" and people's needs. Therefore, the

core of today's rural construction - traditional rural residential construction needs to focus on the four aspects of residents' needs, industrial development, ecological protection, and cultural inheritance and development. This study will start with the living pattern, focus on the needs of the residents, focus on the adaptability of traditional houses, and seek a path of inheritance and development of houses to promote the revitalization of the countryside, and to promote the development goals of "prosperous industry, ecological livability, civilized countryside, effective governance, and affluent life".

1.1.3 Project research base

As a key member, I participated in the Youth Project of Humanities and Social Science Fund for Arts of the Ministry of Education of China, "Research on Spontaneous Construction and Design Guidance and Control of Contemporary Folk Houses in Yunnan under the Perspective of Self-Organization Theory", which was set up in 2021, in which my team and I systematically investigated the spontaneous construction behaviors of contemporary dwellings in Yunnan from the perspective of the Self-Organization Theory. Through extensive field research, we obtained rich primary resources and sufficient research data covering the spontaneous construction behaviors and strategies of residents in different regions and cultural contexts. These data not only support our theoretical analysis, but also provide a valuable basis for us to gain a deeper understanding of the integration of traditional dwellings and modern lifestyles in Yunnan.

In the process, we have accumulated extensive research data covering the construction process, adaptation needs and cultural background of different types of Yunnan dwellings. These first-hand data have laid a solid foundation for this study on the adaptability of Bai traditional folk dwellings. Based on these rich resources and data, this project will further utilize these research results in the adaptive study of Bai traditional houses, especially in exploring how to preserve the cultural value of traditional buildings while meeting the needs of modern life.

Therefore, thanks to the success of the previous project, we not only have a more comprehensive theoretical foundation, but also accumulated a large amount of

experience in field research, all of which provide sufficient support for this topic, making it possible to conduct the research on a higher starting point, thus promoting the research on the adaptive transformation of the traditional dwellings of the Bai ethnic group in the modern mode of life to achieve more far-reaching results.

1.2 OBJECTIVES AND SUBJECTS OF THE RESEARCH

1.2.1 Research objectives

The core objective of this study is to reveal the transformation needs of the traditional dwellings of the Bai ethnic group in Dali, Yunnan Province, in the process of modernization and their internal laws.

1. Analysis of the current situation of traditional dwellings: to learn about the preservation, use, architectural form and spatial layout of the traditional dwellings of the Bai people in Dali.

2. Analysis of the relationship between the current state of the traditional dwellings of the Bai people and the living habits and behavioral patterns of the inhabitants: study of how the state of preservation of the traditional dwellings affects the living habits and behavioral patterns of the inhabitants, and, in turn, how the living habits and behavioral patterns of the inhabitants affect the preservation and renovation of the traditional dwellings.

3. Exploring the demands of modern living patterns on the renovation of traditional Bai dwellings: analyzing the demands for living space in modern living patterns, including functional zoning, equipment and facilities, and environmental comfort, and understanding how these demands interact with the living habits and behavioral patterns of the residents.

4. Constructing a theoretical framework for the transformation of traditional Bai dwellings: based on the theory of self-organization, to construct a theoretical framework that explains the intrinsic laws of the evolution of traditional Bai dwellings and the characteristics of spontaneous construction, so as to provide a scientific basis for understanding and solving the problem of modernizing and transforming Bai dwellings.

1.2.2 Subject of the research

The research object is the totality to be explored and analyzed in the study, the overall group or phenomenon to which the research question is directed. In this study, the objects of research are the current residents of the traditional dwellings of the Bai ethnic group in Dali, Yunnan Province, as well as these dwellings themselves. Specifically, it includes the following aspects:

1. Dali Bai traditional houses: The traditional houses of the Bai people in Dali, Yunnan Province are an important part of China's ethnic architecture, with unique historical, cultural and architectural values, and are the main focus of this study.

The Bai people mainly live in the Dali Bai Autonomous Prefecture in Yunnan Province, which has a beautiful landscape and pleasant climate, and is a national nature reserve and a tourist city. In this beautiful environment, the Bai people have created a unique ethnic culture. Bai folk houses are composed of "workshops", different workshops surrounded by courtyards, which are interconnected to form villages. The dwellings play an important role in passing on the culture, representing use, skill and spirit. Bai folk dwellings not only satisfy the needs of daily life, but also demonstrate construction, decoration, and handicraft skills, which is a tangible manifestation of intangible cultural heritage and an important medium for passing down Bai spiritual culture (Figure 1.1). Therefore, traditional Bai dwellings convey both material and spiritual values, and their cultural value is incalculable, and destruction will be impossible to restore.

Figure 1.1 Residential buildings of the Bai nationality in Dali

2. Current inhabitants: the various types of people living in these traditional dwellings. Their living habits, behavioral patterns and cultural beliefs directly influence and reflect the use and transformation of the dwellings.

1.2.3 Relationship between the study population and the research sample

The research sample is a portion of the research population selected for the actual conduct of the study's analysis. The research sample should be representative so that the results can be generalized to the entire research population. In this study, the research sample is a portion of individuals selected from the residents of Dali Xizhou Town and Dali Fengyangyi Village. These two representative places were chosen mainly because of their relatively well-preserved traditional residential architecture, as well as their unique regional culture and residents' lifestyles. These individuals represent different types of dwellings and groups of residents with different characteristics.

In this study, the research object covers the broad group of Dali Bai traditional houses and their current residents, while the research sample is a representative part of individuals selected from this group according to characteristics such as gender, age, education level and occupation type. Through in-depth analysis of the research sample, the study was able to reveal the core factors and laws affecting the renewal and renovation of Bai traditional houses, and extend these findings to the entire research population, so as to put forward scientific and effective renovation proposals.

1.3 RESEARCH QUESTIONS

1. What is the current status of the traditional dwellings of the Bai people? What are the problems in terms of preservation,functional zoning, etc.?

2. How do the habits and behavioral patterns of the current inhabitants affect the use and renovation of old dwellings?

3. What are the new demands placed on living space by modern living patterns?

4. How do the demands of modern life drive the traditional Bai residents to embody the law of spontaneous construction in the process of remodeling and new construction?

1.4 RESEARCH SCOPE

The scope of this study focuses on the traditional dwellings of the Bai ethnic group in the Dali region of Yunnan Province, aiming to explore the adaptive transformation of these dwellings under the modern mode of living. The study covers the architectural form, spatial layout, functional zoning of Bai traditional dwellings, and the conflict and integration with modern lifestyles.

1.4.1 Regional scope

This study takes the Dali Bai Autonomous Prefecture in Yunnan as the main study area, especially focusing on Xizhou Town and Fengyangyi Village in Dali, Yunnan, which are two areas with typical Bai traditional residential complexes. The study area covered about 30 square kilometers of villages and towns, and more than 50 typical Bai traditional houses were visited and researched, with a focus on a sample of 10 Bai houses, to examine their architectural characteristics and modernization in different environments. The size of the residences ranged from 100 to 200 square meters, and the architectural forms of the residences mainly included the classic layouts of "three chambers and screen wall" and "four pavilions and five open yards".

1.4.2 Time frame

This study focuses on the evolution and adaptation of traditional Bai dwellings during the modernization process over the past decades, especially in the past two decades, with attention to the challenges and opportunities that have arisen in recent years as a result of the development of tourism and urbanization.

1.4.3 Main research elements

1. Analyzing the historical and cultural background of the traditional dwellings of the Bai people, and exploring the cultural value and historical origin of the traditional dwellings of the Bai people.

2. Analysis of the conflict and integration between modern living patterns and

traditional dwellings. Through field research and interviews, we examine the actual situation of modern families in terms of housing needs, living habits, space use, etc., and analyze how these needs affect the transformation of traditional residential buildings. At the same time, it explores the conflict between modern living mode and traditional architecture in terms of function, spatial layout, comfort, etc., and proposes the possibility of integration and remodeling strategies.

3. Research on the adaptive transformation of traditional Bai dwellings. Detailed study of examples of adaptation of Bai traditional folk dwellings in Dali Xizhou Town and Fengyangyi, analyzing the successful cases' adaptation strategies such as functional zoning, spatial optimization, and updating of facilities. At the same time, the shortcomings of the failed cases are discussed, and the common problems and solutions of Bai traditional houses in adaptive transformation are summarized.

4. To construct a systematic framework for modernizing and transforming traditional Bai dwellings, and to provide guidance for the protection and adaptive transformation of Bai dwellings in the future.

1.4.4 Theoretical framework

The study will combine multidisciplinary theories, such as self-organization theory, architectural adaptability theory, and Maslow's demand theory, to explore in depth how the traditional dwellings of the Bai ethnic group can achieve spatial and functional optimization under the modern mode of living. Self-organization theory will provide the study with an explanation of residents' spontaneous renovation behaviors, architectural adaptability theory guides how to optimize functions while maintaining cultural values, and Maslow's needs theory will help analyze the hierarchy of residents' needs and clarify how different levels of needs drive the direction of renovation of residential buildings. These theoretical frameworks will not only help to understand the transformation process of the buildings themselves, but will also provide theoretical support for further policy formulation and architectural conservation.

1.4.5 Scope of exclusion

This study will not deal with the in-depth analysis of traditional Bai dwellings in terms of building physics and engineering techniques.

1. STRUCTURAL MECHANICS AND ENGINEERING MECHANICS ANALYSIS.

This study does not involve a detailed analysis of the structural mechanical properties (e.g., seismic performance and loading capacity) of the Bai traditional houses. Aspects of building mechanical structure, component stress, and seismic resistance belong to the specialized research area of engineering, and this study will focus on the aspects of building layout, space utilization and adaptive modification without involving the consideration of its mechanical parameters.

2. CONSTRUCTION TECHNOLOGY AND MATERIALS SCIENCE.

This study does not involve an in-depth exploration of the properties of the building materials (e.g., material strength, durability, thermal properties) or construction processes (e.g., traditional construction techniques, material selection, and material durability) of the Bai residential buildings. Research needs for the science of building materials and improvement of construction processes are applicable to the scope of research in materials science or engineering, and are beyond the scope of this study.

3. ENVIRONMENTAL PHYSICS AND CLIMATE ADAPTATION ANALYSIS.

This study does not quantify microclimatic adaptations or environmental physical factors (e.g., thermal comfort, ventilation effects, lighting design, etc.) of residential dwellings. Although the impact of modern living patterns on residential comfort will be discussed, detailed environmental physical and climatological assessments will not be addressed.

4. ECONOMIC BENEFITS AND COST-BENEFIT ANALYSIS.

This study does not provide an in-depth discussion of the economic costs, benefit analysis, return on investment, or other economic perspectives of residential remodeling. Although it will briefly mention the impact of economic factors on the renovation of Bai residential houses, it will not involve costing, benefit forecasting or the construction of economic models.

5. AN IN-DEPTH ANALYSIS OF ARCHITECTURAL AESTHETICS AND DECORATIVE ARTS.

Instead of conducting a detailed dissection of the aesthetic aspects of the decorative arts, carvings, and paintings of Bai dwellings, this study focuses on the architectural spatial layout and functional, non-aesthetic, and decorative design features.

6. DETAILED TECHNICAL TRANSMISSION OF TRADITIONAL ARTISANAL SKILLS.

This study does not analyze in depth the technical inheritance and specific processes of traditional artisan skills in residential restoration. Although the influence of traditional construction techniques will be mentioned, it does not involve a specific study of the details of their craftsmanship or the transmission of their techniques.

1.5 SIGNIFICANCE OF THE STUDY

1.5.1 Theoretical implications

(1) This study enriches the theoretical research on the protection and renovation of traditional dwellings by exploring the impact of modern living habits and behaviors on the renovation of traditional dwellings, providing new perspectives and methods for academics. At the same time, the results of the study help to construct a theoretical framework for the protection and modernization of traditional houses and promote cross research in related disciplines.

(2) provides empirical evidence for the application of self-organization theory in architecture and cultural heritage preservation, and expands the scope of application of self-organization theory.

1.5.2 Practical implications

(1) Provides a scientific basis and specific recommendations for the renovation and new construction of Bai traditional dwellings, which helps to improve the quality of dwelling and the efficiency of their use.

(2) Provide scientific basis and guiding suggestions for local governments and related organizations in the protection and renovation of traditional houses. It is an important reference value for various policy-oriented projects such as "traditional

village protection and development planning", "beautiful countryside construction planning", "urban shantytown renovation and development planning", "urban village renovation and construction planning", and so on. "Urban village renovation and construction planning" and other projects, has an important reference value. By summarizing successful renovation cases and experiences and proposing practical renovation strategies, we help residents to realize modern life while preserving and inheriting local cultural characteristics.

1.6 DEFINITION OF TERMSOPERATION DEFINITION

1.6.1 Traditional dwellings

"Tradition" refers to the sum of essential patterns, models and norms that have been handed down from generation to generation (Wang, X., 2009). Tradition is a dynamic process, not condensed or static in a certain stage of history, will change accordingly with the transformation of the needs of the object, but the core culture of the tradition in the "essence" and "soul" will not change. "Tradition has different forms of existence, including psychology, beliefs, morality, aesthetics, ways of thinking, customs, rituals and behaviors (Wang, X., 2009).

The term "residential" has a clear definition in the "Ancient Architecture of China", which refers to traditional residential buildings other than palaces and government offices. And "traditional residential" is relative to the "modern residential" concept. At present, the more authoritative definition is "traditional residential is the people of all ethnic groups in our country in the process of long-term social and historical development and was created and the complete inheritance of the continuation of the working people's way of living and the sum of residential architecture."

As the name suggests, "residential" is the place where people live. It includes dwellings and the living environment that extends from them. Li Dongzeng in his article "Space - Institution - Culture and Historical Narrative - Research on Traditional Settlements and Minju Architecture under the New Humanistic Vision" once explained that if the relationship with people can be neglected in the study of traditional Chinese

architecture, perhaps mausoleums, altars, temples, and other types of architecture can still be done, but for the Minju, which is the place that is indispensable to the daily life of human beings, it is a type of architecture that should not be neglected and is not allowed to be neglected. It is a type of building that should not be neglected and should not be allowed to be neglected. The study of residential buildings can not only study "residence" and ignore "people", ignoring is incomplete. Moreover, the term "residential" in this paper specifically refers to residential buildings that belong to collective land in terms of the nature of the land, and belong to residents' self-built houses in terms of the nature of the construction. Residential housing that is urban in nature and built in strict accordance with the relevant building regulations and under a unified planning permit is not included in this paper.

1.6.2 Patterns of life

Life pattern is a sociological term with a wide range of connotations and extensions, the formation of which has gone through a long process of historical evolution and accumulation. Simply put, life pattern is the stable situation and typical characteristics of life activities guided by people's values under certain social conditions and influences, in order to seek their own survival and development needs. Life pattern is also known as lifestyle, including people's clothing, food, housing, transportation, labor and work, social interaction, treating people and other material and spiritual life, which can be understood as the life pattern of various ethnic groups, classes and life groups in a certain historical period and social conditions (Shen, Y., 2014).

From the above definition, we can summarize that the mode of living is not a quantitative but a variable, which changes with the development of the economy, culture, and needs, so we are not able to maintain the mode of living under a social condition or a historical period, and the static continuation of the mode of living actually hinders people's right to pursue a better life and hinders the pace of social development.

1.6.3 Spontaneous construction

In order to improve the environment for their own survival, the family as a decision-making unit, not controlled by specific instructions from outside, autonomous decision-making behavior or results of the site, form, and investment of the house, is a summary of the self-organization characteristics in the behavior of the traditional homes, urban and rural residential self-builds, urban illegal construction, additions, and alterations, and the erection of business facilities on the street. As a collection of a large number of individual behaviors, spontaneous construction fully responds to the inherent law of spontaneous generation of architectural territoriality (Tan, R., 2022).

1.6.4 Adaptive Reuse

"Adaptation" was originally a specialized term in the field of ecology, referring to the ability of organisms, genetically inherited through generations, to continuously regulate their ability to adapt to changing conditions.
itself to adapt to and perpetuate continuously changing environmental conditions. The renowned scholar McHarg, in his book Designing with Nature
The concept of "adaptation" has been discussed in McHarg, who believes that "the movement of organisms and their forms towards adaptation to the environment is creation, and adaptation can be defined as creation, and adaptation is the enhancement of life" (McHarg, I., 1992). In this paper, "adaptation" refers to the process of harmonizing traditional residential architecture with the current needs and environment through human modification and design.

Adaptive Reuse" is the process of extending the life cycle of a building by periodizing its life and proposing different ways of reusing it, which means adapting it to new environments while preserving its characteristics, with the aim of extending the life cycle of the building to respond to the social, cultural, economic, technological and other needs that it carries (Kostof, S., 2005). The purpose is to extend the life cycle of the building in order to cope with the social, cultural, economic, technological and other needs that the building carries (Kostof, S., 2005). In this paper, the adaptive transformation of Dali Bai traditional residential buildings is a process of designing and adapting the buildings to the needs of the users and the future development of the countryside

CHAPTER 2
LITERATURE REVIEW

2.1 STUDY ON RESIDENTIAL HOUSES

2.1.1 Current status of research on China's folk dwellings

The study of Chinese architectural historiography began at the end of the 19th century, initially focusing on the Song Dynasty's "Building Methods" and the Qing Dynasty Ministry of Industry's "Engineering Rules" and other canonical books, as well as ancient palaces, temples and pagodas and other architectural surveying and mapping studies. During the war period in the 1930s, Liang Sicheng, Liu Dunzhen, Liu Zhiping and other scholars began to pay attention to the residential architecture of the southwest, opening up a new vision of the study of China's residential buildings. Their research results, such as Liu Dunzhen's "Introduction to Chinese Residence" and Liu Zhiping's "A Brief History of Chinese Residential Architecture" represent the academic achievements of the period. This marks the beginning of the realization that the rural dwellings other than ancient buildings also have important research value.

After the founding of the People's Republic of China, the study of China's folk dwellings entered a phase of generalization. From the 1960s to the 1980s, researchers categorized folk dwellings by region, producing a number of monographs, such as Yunnan Folk Dwellings, Zhejiang Folk Dwellings, Xinjiang Folk Dwellings, Fujian Folk Dwellings, and Xiangxi Folk Dwellings. The research in this period has an

important value of first-hand information for the nationwide residential architecture. Since then, more and more architectural scholars have begun to pay attention to the study of Chinese folk dwellings.

From the mid-to-late 1980s to the present, the study of folk dwellings has flourished in various universities. Chen Zhihua, Lou Qingxi, Li Qiuxiang and other research teams from Tsinghua University have conducted a lot of investigation and research on vernacular architecture, analyzing vernacular settlements and residential architecture from the perspective of regional history and culture, social background

and living customs. Professor Lu Yuanding and his research team from South China University of Technology have taken the folk system as the research object and analyzed the folk houses and modern village residence patterns of the five major folk systems (Xianggan, Yuehai, Minhai, Guangfu and Hakka) in South China. Prof. Ruan Yisan and his research team from Tongji University have carried out extensive research on the conservation planning of historical and cultural villages and towns across the country, and Prof. Changqing and his research team have been conducting research on terroir architecture in Jiangsu and Zhejiang regions. Scholars from Southeast University have achieved rich results in the study of residential houses represented by Huizhou houses. The research team led by teachers from Kunming University of Science and Technology, including Jiang Gao-fai, Zhu Liangwen, Wang Dong and Yang Dayu, has conducted extensive and in-depth research on the folk dwellings of ethnic minorities in Yunnan. Scholars from all over the country have also achieved considerable results in the study of vernacular settlements and residential architecture, including Central China, Northwest China, Southwest China, Taiwan and other regions.

To sum up, the research on Chinese traditional houses has made great progress so far, and many scholars in the academic circle have made a generalization and framework research on the houses in different parts of the country. Domestic scholars have grasped the basic distribution and characteristics of traditional Chinese houses, and the research on traditional Chinese houses has been carried out from the perspectives of architectural form, functional layout, and cultural value, etc. The research on traditional Chinese houses in different regions of China has made great progress so far. The research on traditional houses in different regions of China has achieved rich results, including courtyard houses in the north, Jiangnan water town architecture in the south, and Tulou buildings in Fujian. These studies have provided important references for an in-depth understanding of traditional Chinese dwellings, and at the same time revealed the challenges of transforming and preserving traditional dwellings in the process of modernization.

2.1.2 Current status of research on Bai folk dwellings

Yunnan residential research began in the 1930s Liang Sicheng, Liu Dunzhen and other scholars. The systematic categorization of Yunnan minority architecture started in the 1960s, organized by the Yunnan Provincial Department of Architecture and Engineering, "Yunnan Folk Habitat Preparation Group". After a long period of research and accumulation, two monographs, Yunnan Folk Houses and Yunnan Folk Houses Continued, were published in the 1990s, which covered the architectural features and cultural background of the houses of 16 major ethnic minorities in Yunnan and provided a lot of invaluable first-hand information. Mr. Jiang Gaofei's "Yunnan Ethnic Housing Culture", published in 1995, is a landmark study of Yunnan's residential architecture and lays down a general theoretical framework for the study of Yunnan's ethnic minority dwellings. He developed the study of housing culture in three aspects: human dwelling and construction behaviors, related environmental factors, and intermediate variables between the two, such as dwelling needs and architectural consciousness. On this basis, the book first outlines the development of Yunnan architecture and the mechanisms that promote the historical development of architectural culture, and then categorizes Yunnan's traditional dwellings into five major genealogies for detailed comparative analysis and research. In addition, there are other related studies on vernacular settlements and dwellings, such as Jiang Gaoxuan's Lijiang - Beautiful Naxi Homeland, Historical Memory of Jianshui Ancient City and Heshun Township, Zhu Liangwen's Lijiang Naxi Folk Habitat, Xu Sishu's and Zhou Wenhua's Habitat in Towns - Traditional Experiences of Habitat in Yunnan Townships and Inherited Development Research on Habitat in Towns-Traditional Experience and Inheritance Development of Habitat in Yunnan Towns" by Xu Sishu and Zhou Wenhua, "Study on Yunnan Minority Houses-Forms and Cultures" by Yang Dayu, "Ecological Perspectives-Settlements and Architecture of Southwest High-Altitude Mountainous Areas" by Mao Gang, "Research on Ethnic Architecture in the Southwest of China" by Si Xinzhi, "Exploration of the Culture of the Yi Settlements" by Guo Dongfeng and so on.

The position of the Bai people in Yunnan history and their contribution to Yunnan culture have made the history and culture of the Bai people an indispensable part of the study of Yunnan ethnic history and culture, as well as an important part of

the study of ethnic groups in southwest China. Studies on Dali Bai dwellings include such treatises as Yunnan Dali Bai Architecture, Xizhou Bai Dwelling Complexes, and Zhoucheng Culture - A Field Survey of Famous Chinese Bai Villages. These studies cover the history, culture, types, and styles of Bai settlements and residential architecture, as well as related architectural techniques, decorations and furnishings, and provide many examples of architectural mapping and furnishing drawings. In recent years, there are also many doctoral and postgraduate dissertations on Dali Bai dwellings and settlements, but basically they are researched in the direction of construction techniques, architectural features, as well as updating and preservation. So this paper will be based on the theory of rooting and research on how the Bai traditional houses adapt to the modern mode of life.

2.2 THE HISTORY AND CULTURE OF THE TRADITIONAL HOUSES OF THE BAI PEOPLE

2.2.1 Historical and cultural origins

The traditional houses of the Bai people are a unique part of the architecture of China's ethnic minorities. Its forms are diverse and reflect the understanding and adaptation of the Bai people to the natural environment and social life, with great national characteristics and cultural charm. In the Ming Dynasty, Li Yuanyang's "Yunnan Tongzhi" said, "The dwellings are all four-hex tiled houses". It is clear that in the Ming Dynasty, the four-hex house form of Bai residential architecture had already taken shape (Xue, Z., 2005). In the historical period of Nanzhao and Dali Kingdom, the Bai people absorbed the strengths of the northern courtyard and southern terrace buildings in Han-style architecture, and changed and updated them according to the needs of the social life of the Bai people in the environment, creating a new style of local courtyard architecture with distinctive national style and characteristics, which is represented by the forms of "three chambers and screen wall" and "four pavilions and five open yards". The representative forms are "three chambers and screen wall" and "four pavilions and five open yards" (Yang, D. & Zhu, L., 2009). After thousands of years of development, the Bai residential architecture in the Dali area has formed a mature

and perfect system (in terms of spatial organization, plastic arts, and construction) (Cai,X., 2001). Bai folk dwellings not only fulfill the functional needs of families, but also carry the cultural symbols and historical memories of the Bai people (Bin,H., 2006).

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The architectural form and development of Bai folk dwellings has a profound history, with its roots dating back to the Tang and Song dynasties. In western Yunnan, with the economic prosperity and social stability, the Bai gradually formed a relatively independent social system, and their residential forms were gradually stereotyped (He, Y., 2020). In the Tang Dynasty, Bai architectural culture was significantly influenced by the Han culture in the Central Plains, and gradually formed an architectural layout centered on courtyards. By the Ming and Qing Dynasties, with the further development of Bai socio-economy, Bai dwellings were more detailed and rich in function and form. Many affluent families began to build luxuriously decorated "three chambers and screen wall" or "four pavilions and five open yards" type of dwellings, as a way to show the family's economic strength and social status (Zhang, L., 2019). In the Ming Dynasty, Li Yuanyang's "Yunnan Tongzhi" said, "The dwellings are all four-hex tiled houses". It is clear that in the Ming Dynasty, the quadrangle form of Bai residential architecture had already taken shape (Xue,Z., 2005). In the historical period of Nanzhao and Dali Kingdom, the Bai people absorbed the strengths of the northern courtyard and southern terrace buildings in Han-style architecture, and changed and updated them according to the needs of the social life of the Bai people in their environment, creating a new style of local courtyard architecture with distinctive national style and characteristics, which is represented by the forms of "three chambers and screen wall" and "four pavilions and five open yards". The representative forms are "three chambers and screen wall" and "four pavilions and five open yards" (Yang, D. & Zhu, L., 2009).

Archaeological data show that as early as 1940, domestic archaeologists and scholars discovered some 38 Bai sites in the Dali Cang'er area. It is presumed that the ancestors of the Bai people lived in mounds on the hillside terraces at that time, and this form of semi-cave dwelling life arose as a result of the terrain blockage, and is the

earliest way of building Bai dwellings found so far. With the influence of topography and block movement, the ocean area expanded and people's living range gradually shifted from the mountainside to the foothill area. According to the Records of the Grand Historian, at that time, people used wooden pillars inserted into the soil and connected by beams to form a two-story frame with a wooden sheet as a roof, with people living in the upper layer and raising animals in the lower layer, which marked the emergence of the dry-fence type of architecture (Li,Z., 1998).

After thousands of years of social development, during the Nanzhao period of the Tang Dynasty, the Bai people began to utilize natural building materials such as pebbles to construct houses, "building stones into walls as high as several feet". Nowadays, the pebble material commonly used in the construction of houses in Dali area is the inheritance and protection of the construction method of Nanzhao period.

During the Ming Dynasty, traditional Bai dwellings were mainly built in the form of one square and three openings, constructed with strips of stone material from Cangshan and roofed with tiles. In the Qing Dynasty, the Bai traditional houses followed the tradition of the Ming Dynasty, but improved on it by raising the height of the building's floors and opening the windows in a single line on the rammed earth walls, thus improving the shortcomings of the houses in the Ming Dynasty, which had insufficient lighting. At the same time, the dwellings of the Qing Dynasty also had higher requirements in appearance, adding decorative arts such as carvings and colorful paintings, which enhanced the beauty and artistry of the dwellings.

During the Republic of China period, with social progress and the disappearance of status restrictions, economic strength became a key factor in determining the style of house construction. Under such a background of the times, the traditional Bai folk houses were developed rapidly. Coupled with the intermingling of foreign cultures, the Bai folk houses gradually formed a unique form of traditional houses in various styles, such as one workshop and one corridor, three squares and four squares.

After thousands of years of development, Bai residential architecture has formed a mature and perfect system (in terms of spatial organization, modeling art, construction, etc.) (Cai,X., 2001). Under the mutual influence and penetration of multi-ethnic cultures, this unique form of residential architecture belonging to the Bai people in Dali was gradually formed, which profoundly embodies the open and tolerant

architectural creation concept of the Bai people. Based on the deep roots of regional culture, the Bai people have actively absorbed the essence of foreign cultures, discarded their shortcomings, and integrated the beneficial elements into their own architectural practice, thus continuously enriching and developing the building ideas of Bai architecture. Bai folk houses not only fulfill the functional needs of families, but also carry the cultural symbols and historical memories of the Bai people (Bin, H., 2006). For the study of adaptive modification of Bai traditional houses, it is not only limited to the exploration and study of the physical space of the building, but also the continuation and development of the wisdom and spiritual pursuit of the Bai people.

2.2.2 Natural Environmental Conditions of the Bai People in Yunnan Province

Architecture is an important creation of human beings and a form of material basis for their survival, which exists in a certain region and in the natural and humanistic environment closely related to the people in that region. Therefore, the Bai traditional dwelling form and its profound national cultural connotation can be regarded as a material cultural product born from the joint action of the natural geographic environment and social and humanistic environment in Yunnan.

1. GEOGRAPHY

Dali is located in the central western region of Yunnan Province, with Chuxiong in the east, Baoshan in the west, Simao in the south, and Lijiang in the north; the distance from east to west is more than 320 kilometers, and the distance from north to south is more than 270 kilometers, with an overall area of about 29,500 square kilometers. The terrain is high in the northwest and low in the southeast, and in the lakeshore area, there is a "dam" landform formed because of seawater movement. The Cangshan Mountains, which are located in the central part of Dali, divide the prefecture in two: the western part has high mountains and deep valleys with magnificent scenery, while the eastern part is flat and open, with rich produce and excellent living conditions.

2. CLIMATIC ENVIRONMENT

The entire region of Yunnan Province is basically a low-latitude plateau with long sunshine. In winter, it is sunny and rainy, with plenty of daylight and high temperature; in summer, there are many cloudy and rainy days, with little sunshine and lower temperature. Dali region has a variety of climate types, including the dam area belongs to the southwest monsoon climate, four seasons like spring, the foothills of the region for the three-dimensional climate, subtropical southwest monsoon climate, vertical climate change is obvious. The average annual temperature is 12-19 degrees, the highest temperature has 24 degrees, the lowest temperature is only 4, 5 degrees.

3. THE HUMAN AND SOCIAL ENVIRONMENT OF THE BAI PEOPLE IN YUNNAN PROVINCE

Yunnan has been a region of multi-ethnic coexistence since ancient times, a place where various cultures converge, and one of the birthplaces of the Bai culture. Surviving around the Erhai Sea, the Bai ancestors formed a multi-ethnic group, the "Erbin People", by assimilating or integrating with other ethnic groups in the vicinity. During the Ming Dynasty, a large number of Han Chinese immigrants entered Yunnan, and most of the Bai intermarried with the Han Chinese and became Han Chinese. Only the Bai, who make up the majority of the population in the Dali area, were not Sinicized, and still maintain the Bai language and customs. Historically, the Bai people continuously absorbed and integrated Han culture, and then conveyed it to the people of other nationalities within Yunnan, playing an irreplaceable and important role in the formation of Yunnan's rich multi-ethnic culture (Wei, J., 2022).

2.2.3 Building space characteristics

Dali's favourable natural geography and climate as well as the Bai Traditional Residential Buildings have enabled the local Bai residents to create a form of residence that is different from the architectural styles of other ethnic areas. In Dali, Bai Traditional Residential Buildings are mostly two-storey structures, with closed architectural appearance and symmetrical layout of internal space, and the most common layout forms are ‘two chambers and two courtyards’, ‘three chambers and screen wall’, ‘four heats’, ‘five patios’, ‘six patios’, and ‘six houses’. The most

common layout forms are ‘two houses and one ear’, ‘three chambers and screen wall’, ‘four pavilions and five open yards’ and ‘six combinations in spring’. The variations in the spatial layout of Bai dwellings can meet the needs of different families and functions, reflecting the wisdom of the Bai people, and has a very high research value.

‘Square’, also called room and square, is the basic unit of Bai Traditional Residential Buildings. The basic minimum pattern of a square is the form of two floors above and below with three openings. In the middle of the ground floor is the main room, or living room, which is the core space of the dwelling and is used for family gatherings and reception of guests. The rooms to the left and right are the bedrooms, which ensure the privacy of living. The three open rooms on the first floor are usually directly open to each other, while some are partitioned off to serve as bedrooms, with the remaining two pieces serving as storage space. Kitchens and storerooms are located in the annexes of the houses, forming an organic whole with the main building. In this chapter, the number of workshops is used as the basis for classification, and the spatial layout of Bai Traditional Residential Buildings is systematically analysed and researched.

In the past, the second floor of the White House was basically uninhabited. The three rooms on the second floor of the main house were not partitioned to form a large space, in which the ancestor worship shrine was placed in the center, and this was the space belonging to the gods. The second floor of the compartment is used to store grain and agricultural tools, which is the storage space. In the current Bai new folk houses, the second floor bright room still places the shrine and ancestral tablets for worship, and the rest of the rooms are separated into bedrooms and studies, with each room separated by door and window partitions, and the later generations basically live on the second floor. (Figure 2.1) In many new houses, there are no real compartments because of the restriction on the land use, and they are only one floor high as auxiliary buildings, which are usually used as kitchens and bathrooms.

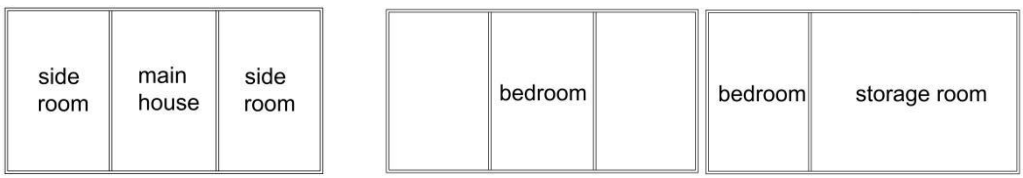


Figure 2.1 Spatial layout of ‘Square’,photo credit: author's own drawing

1. TWO CHAMBERS AND TWO COURTYARDS

‘Two chambers and two courtyards’ layout, also known as two to two chambers, two chambers and two courtyards of the houses perpendicular to each other, two chambers staggered with a small space of the ear room, generally the main room in the east, ear room in the south. In the main room opposite a tile roof decorated with flying eaves of the powder wall, is unique to the white folk dwellings, ‘wall’, house building and wall surrounded by the courtyard space is ‘courtyard’.

2.THREE CHAMBERS AND SCREEN WALL

‘Three chambers and screen wall’ literally means a traditional residence surrounded by three chambers and screen wall. The three two-storey houses are connected together, with one house in the middle as the main house, one house on the left and one on the right as the side houses, and the opposite side of the main house is the wall, and the middle area formed by the houses and the wall is the courtyard. In terms of architectural appearance, the main house is a little higher than the two side rooms, and two small courtyards are formed at the junction of the corners of the left and right squares, and the spatial layout encircles a large main courtyard and two small courtyards, which is why it is also known as the ‘Triple Courtyard’. ‘Three chambers and screen wall’ compared to “two chambers and two courtyards” layout, in the space is more conducive to the east space has more light, so that people have a bright atmospheric feeling, coupled with a magnificent decoration of the light reflection of the wall, the courtyard is full of light, so it is the most favourite form of traditional houses of the Bai people. Therefore, it is the most favourite form of Bai Traditional Residential Buildings, and also the layout form with the largest number of Bai residential buildings in Dali Xizhou area.

3. FOUR PAVILIONS AND FIVE OPEN YARDS

‘Four pavilions and five open yards’ than the “three chambers and screen wall” more than a Square, enclosed into a larger scale of the Bai Traditional Residential Buildings, the same is also a common layout of the plane of the Bai Traditional Residential Buildings form. By the four ‘square’ houses surrounded by the layout of the form, in addition to the absence of a wall, more with the ‘three chambers and screen wall’ the same. Although the Bai ‘courtyard’ and Beijing's traditional old courtyard are similar in name, there are differences in form: in addition to a large

square courtyard in the centre of the courtyard, the corners of the four houses, where the workshops meet, also have a small courtyard, which is also known as a ‘courtyard’. There is also a small courtyard, also known as the ‘leaky corner’ courtyard, the entire layout of a total of five courtyards and five open courtyards, so it is called ‘Four pavilions and five open yards’.

Table 2.1 Spatial layout form of Bai traditional residence

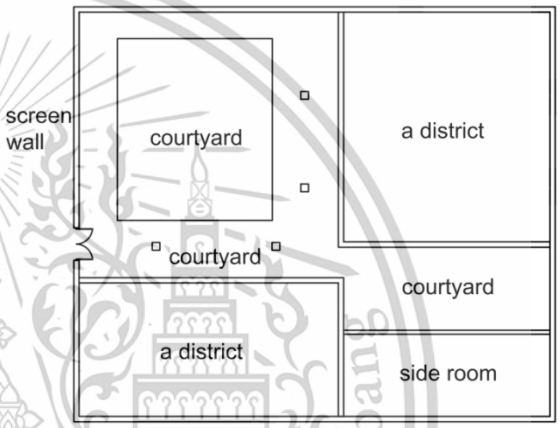
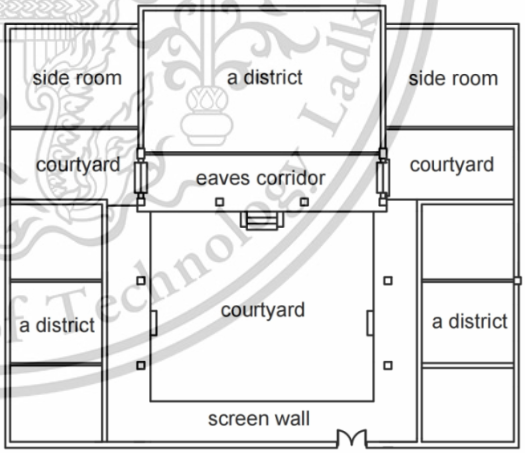
Forms of spatial layout of traditional Bai dwellings		
Typology	Hallmark	A plane figure
Two chambers and two courtyards	The main room is on the east side, and the ear room is on the south side.	
Three Chambers and Screen Wall	The spatial layout forms three courtyards, one large and two small, which is why it is also known as the "Triple Courtyard".	

Table 2.1 (Continued)

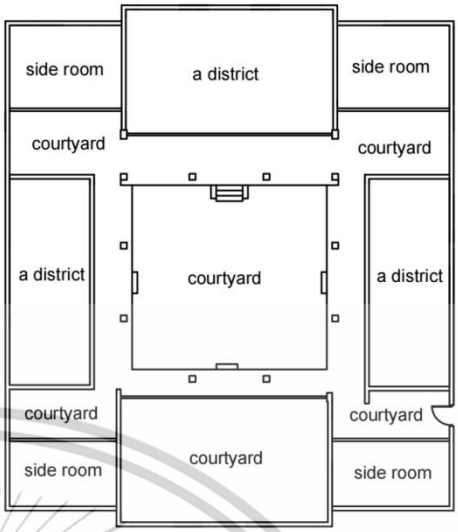
Four Pavilions and Five Open Yards	Consisting of four squares and five courtyards	

Table source: Author's own drawing

4. SIX COMBINATIONS IN SPRING

'Six combinations in spring' is also called "deer and crane together in spring", because the animal decorations of "golden deer" and "white crane" are most commonly used in Bai folk houses. Theme in the Bai residential use of the most, the most common, the Bai people to do 'deer and crane with spring', the harmonic 'six combinations in spring', but also has the meaning of good luck and blessings.

2.3 CONFLICT AND INTEGRATION OF MODERN LIVING PATTERNS AND TRADITIONAL HOUSES

2.3.1 Influences on life patterns

The emergence and evolution of living patterns are ultimately based on the needs of villagers in various aspects of their daily lives. The needs for various aspects of life at different stages affect a series of factors, such as the villagers' mode of production, the demographic structure of their families, the forms of internal and external interaction, and their economic attitudes, thus forming different patterns of life.

In the West, there is a long history of research on the theory of human needs, of which the outstanding representative psychologist Maslow constructed a hierarchy of needs theory according to the degree of urgency and the interaction of various

factors (Maslow, A.H., 1943/1954). This theory constructs a hierarchical and bottom-up pyramid model based on the basic needs that people are born with, in which the needs are interrelated and prioritized from lower to higher levels. (Figure 2.2)

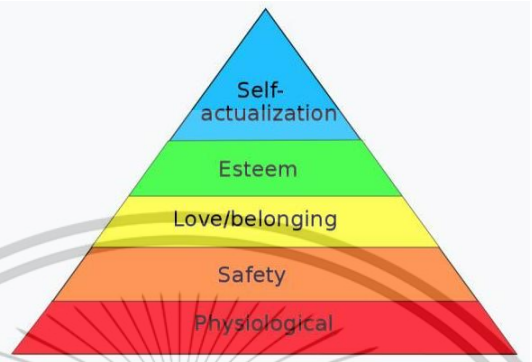


Figure 2.2 Maslow's Hierarchy of Needs Model, Image Source.

According to this theory, human beings will pursue security needs only after satisfying the most basic survival needs, and only after the security needs are satisfied will they have enough energy and space to pursue the social level needs. When the needs level reaches the first four levels, people will pursue various aspects of self-worth realization (Maslow, A.H., 1943/1954).

The three principles of architecture proposed by Vitruvius in the Ten Books of Architecture, namely, "solidity, practicality, and beauty," are also a reflection of this level of demand. The basic need for human beings to live in a productive life is "to have something to live in", which provides the most basic material conditions for the occurrence of productive life, so residential buildings should first satisfy the minimum needs of "having" and "firmness". This is the minimum need. On this basis, people will decorate their residence according to the aesthetic and cultural consciousness to achieve the demand of "beauty". The "practical and beautiful" reflects that the architectural space needs to meet the basic needs of human life style and mode of living, and due to the law of development of things, the mode of living of human beings is constantly changing, which will be directly reflected in the architectural space and architectural style, so the development and evolution of the traditional houses can not be separated from the study of the change of life style of research (Guo,B.J., 2017). In the process of adaptive transformation of traditional residential houses, we

should not only pay attention to the building itself, but also pay attention to the needs of users.

In the study of the impact of modern living patterns on traditional houses based on modern living patterns, the elements of residents' needs should be considered first, which can be summarized as physiological and psychological needs.

Table 2.2 Physical and psychological needs of the population

	Physiological needs	Psychological needs
Realize	The scale of the building in accordance with economic conditions; functional space to meet the needs of production and life; rational layout of functional space; safety and comfort of the building body and infrastructure;	The space is private and open; Cultural and aesthetic embodiment of individuals and groups.
Table source: Author's own drawing		

As can be seen from the above table, the needs of the residents are expressed in the residential architecture, which can be reflected in the scale of the building, spatial function, spatial layout, infrastructure, privacy and openness of the space, and aesthetic concepts.

When exploring the adaptive remodeling of traditional houses, we cannot look at the building itself in isolation, but should comprehensively consider the many factors that affect the needs of the residents. In order to more accurately grasp residents' needs, it is particularly important to conduct resident interviews. In the interview process, it is necessary to understand the specific expectations of the residents in terms of building scale, spatial function, spatial layout, infrastructure, privacy and openness of space, and aesthetic concepts based on the elements of their needs, including physiological and psychological needs. These needs will have a direct impact on the adaptive transformation of traditional dwellings.

2.3.2 Modern Living Models Affecting the Transformation of Traditional Houses

As an important cultural heritage of the Dali region, Bai traditional houses have

rich cultural connotations and unique architectural styles. However, with the rise of modern life style, the Bai traditional houses are facing challenges in function, structure and environment, and their adaptive transformation has become an urgent problem to be solved. At present, many scholars have conducted in-depth studies on the adaptive transformation of Bai traditional houses and put forward a series of feasible ideas and measures.

In terms of architectural style, the traditional dwellings of the Bai people are represented by the "three chambers and screen wall" and the "four pavilions and five open yards", which have strong regional characteristics and cultural connotations. However, there is a certain conflict between the earth and wood structure of these traditional houses and the demands of modern life style. For example, sanitary systems are difficult to be installed in old-fashioned houses with earth and wood structures, tiled roofs are not suitable for the placement of solar energy equipment, and problems such as insufficient lighting also affect the residents' living experience . These problems make the Bai traditional houses face functional discomfort in modern life.

Scholars generally agree that the adaptive renovation of traditional Bai dwellings must combine the needs of modern life and maintain the traditional style while enhancing its functionality and livability. In his master's thesis, Wu Zhengwen (2022) pointed out that the updating of traditional dwellings should take full account of the needs of modern life, and achieve a harmonious symbiosis between tradition and modernity by means of functional optimization, spatial reorganization, and technological innovation (Wu,Z.W., 2022). Similarly, Jin,N.L. and Chen,X.R. (2021) explored the design of suitable renovation of farm houses under the modern living mode by taking Zhaowan Village in Lu'an City as an example and proposed that through reasonable spatial layout and functional optimization, the traditional dwellings would be made more adapted to modern life (Jin,N.L. & Chen,X.R., 2021).

In addition, the study by Xu, F. (2020) emphasized the integration of traditional residential renovation design with modern living patterns, arguing that such integration needs to focus on the enhancement of functionality and practicality while preserving traditional features (Xu,F., 2020). Ji R. (2020), on the other hand, conducted a study on the optimization of the Dikeng kiln village environment based on the modern living

mode, and put forward a similar point of view, i.e., the introduction of modern technologies and materials to improve the comfort and livability of the dwellings while preserving the traditional features (Ji,R., 2020).

Scholars have also carried out in-depth exploration in terms of specific transformation strategies. Chen Sha (2020) conducted a study on the renewal design of residential spaces in traditional villages in Guangzhou based on modern living patterns, proposing to enhance the practicality and aesthetics of the residences by means of optimizing the spatial layout and introducing modern facilities (Chen,S., 2020). Tang Yujie (2019), similar to the study on the renovation of traditional courtyards in Beijing, pointed out that on the basis of retaining the traditional pattern, functional areas such as bedrooms, kitchens, halls, and bathrooms should be reasonably segregated, and the performance of warmth preservation, sound insulation, and fire prevention should be upgraded (Tang,Y.J., 2019).

In his article "Research on the Integration of Traditional Residence Renovation Design and Modern Living Patterns", scholar Wu Dexing conducted an in-depth discussion on the modernization of traditional residences. The study shows that there are big differences between traditional dwellings and modern living mode in terms of use function, especially the wooden structure, although it has universal applicability in traditional society, faces problems such as functional space replacement and comfort enhancement in modern society. In order to adapt to the modern living needs, it is necessary to renovate the design of traditional houses, and to solve the contradiction between tradition and modernity in the flow line by the coexistence of two "centers" constituting the flow line of living behavior. At the same time, reducing the size of internal space in a certain location can increase the overall comfort of the house. This research result provides a useful reference for the adaptive research of Bai traditional houses (Wu, D.X., 2019).

In the adaptability study of traditional Bai dwellings, we need to pay attention to the changes in their functional needs in the modern mode of living. For example, the kitchen, bedroom, storage and other spaces in traditional dwellings may need to be re-planned and adjusted in modern life. Kitchens may need to be equipped with modern cooking facilities and ventilation; bedrooms may need to be upgraded for sound insulation and comfort; and storage spaces need to be utilized more rationally

and efficiently. In addition, modern life brings new demands for spaces such as living rooms, studies and bathrooms, which may not have existed or were inadequate in traditional dwellings.

At the same time, the adaptability study of Bai traditional folk dwellings also needs to consider the inheritance and protection of their cultural values. In the process of adaptation design, the historical and cultural background of Bai traditional houses should be respected, and their unique architectural style and regional characteristics should be preserved. Through modern design techniques and technical means, the traditional elements are combined with the needs of modern life to realize the sustainable development of the Bai traditional houses in the modern life mode.

Scholars have proposed adaptation strategies and design ideas from many angles, but they still need to be improved and optimized in practice. The adaptive remodeling of traditional Bai dwellings also faces some practical problems. On the one hand, there is a lack of scientific guidance for the construction of new dwellings, which mainly relies on the experience handed down from folklore, resulting in certain functional deficiencies of the new dwellings. On the other hand, some residents have insufficient understanding of the value and significance of the renovation of traditional dwellings and lack the initiative to participate in the renovation. Therefore, the government and related organizations should strengthen the publicity and guidance to the residents to raise their awareness of the cultural value of traditional dwellings. Through reasonable renovation design, we can not only preserve the cultural characteristics of traditional Bai dwellings, but also enhance their functionality and livability, realizing the harmonious coexistence of tradition and modern life.

Scholars have also emphasized the importance of balancing tradition and modernity in their studies. Wang, Y.J. et al. (2015) explored the model of new rural village construction with the participation of architects, and argued that the renovation of traditional dwellings requires the introduction of modern design concepts and technological means on the basis of maintaining traditional features (Wang, Y.J., Wang, L.N., Ni, Z.Y., Jin, Y. C. & Wu, Q., 2015). This viewpoint coincides with the adaptive transformation of Bai traditional dwellings, i.e., maintaining the traditional style while realizing the integration with modern life through reasonable transformation design.

In conclusion, the adaptive remodeling of Bai traditional dwellings is a complex

and important topic that requires the joint efforts of the government, scholars and residents. Through in-depth research and continuous exploration, we can find a renovation program that retains traditional features while adapting to modern life, providing strong support for the sustainable development of Bai traditional houses.

2.4 ADAPTATION OF TRADITIONAL DWELLINGS

2.4.1 Study on the rehabilitation of traditional dwellings

In the 21st century, in terms of the conservation and renewed utilization of old buildings, the Western countries have more abundant practices of transforming old cities. Architecture Reborn provides a comprehensive description of the renewal and utilization strategies of traditional architecture. Combined with the urbanization process of heritage protection, it is proposed that in the context of the transformation of old cities, advanced technology should be used to reuse traditional buildings (Powell, K., 1999), and in the book Architecture Reborn - Alteration and Reconstruction of Old Buildings, Kenneth Powell's monolithic transformation of architectural functions is not desirable, and needs to be combined with the improvement of the user's experience and quality, emphasizing the importance of the architectural experience and quality. feeling and quality, emphasizing the design theory of building-user compatibility (Powell, K., 2001). In Building Technology, scholars Thomas Herzog and Ingeborg Flagg emphasize that the renovation of buildings needs to be combined with the cultural attributes of existing buildings and the needs of modern life, so that the renovated buildings can adapt to the current modern life. Urban Spaces" and "The Death and Life of America's Great Cities" supplemented the theory of old building renovation from different perspectives and promoted the development of the theory of old building renovation and reuse.

In Chinese academic research on the renewal and preservation of vernacular residential buildings, according to the different modes of reconstruction of traditional residential buildings, there are micro-renewal of traditional residential buildings based on the level of architectural style, texture, and folklore (Wang, W. & Zong,X. M., 2022); for the level of architectural space, courtyard space, camping technology, and

decorative color (Wei,X.R., 2021); The revitalization and rejuvenation of traditional dwellings in terms of the overall space of the countryside and its architecture (Cao,Q.R., 2022), IPization (Li,W.Z. & Lin,K.T., 2021); some scholars combined with industry (Jiang,B., 2022), with the purpose of continuing the traditional landscape (Zhou, J.J. & Liu,Q.P. 2019), and to explore and establish relevant conservation and utilization modes according to government policies (Sun,Y. & Chen,C.L., 2021) for the protection and utilization of traditional dwellings. In addition, there are scholars who have renewed and reconstructed rural dwellings from different perspectives. Guo Xiaowei has proposed a strategy for the development of traditional dwellings from the perspective of sustainable development, which is based on the concepts of "human-centeredness, improving economic income, and ageing of the countryside" (Guo,X.W., Zhao,Z.H. & Xue,Y.J., 2022), and the development of traditional houses from the perspective of ethnic culture (Sun,Y. & Chen,C.L., 2021). 2022), and providing directions for the construction of traditional residential buildings in regional villages with the insertion point of national culture (Xiong,X.Y., 2021). According to the user's behavioral pattern, there is also the renewal and protection of traditional houses according to the aging (Zhang,W.S., Wen,X.R. & Lu,S.S., 2021) and the modern life pattern needs (Kang,J., 2021).

Scholars in China have made initial achievements in the research on the transformation of traditional residential buildings at different levels, but there are still serious problems. In particular, there are a number of traditional residential buildings with historical value in the countryside that need to be appraised, renewed and reused. However, many of them are left unused or even destroyed before they can be appraised. Some of the traditional residential buildings are not properly guided and analyzed for renovation, or they are left unused and dilapidated. This is a great waste of land and cultural resources.

Compared with China, the transformation of vernacular architecture in western countries has an earlier and more mature history, and the development of traditional rural dwellings is in line with the pace of urban and rural development.

Therefore, China's traditional residential renovation should seize the opportunity of rural revitalisation to further develop a high-quality rural traditional residential renovation construction system.

2.4.2 Studies related to building adaptation

At the beginning of the 20th century, due to the influence of industrialization development leading to the deformed expansion of urban development, urban disease is becoming more and more obvious, architectural scholars gradually raise the concern for the environment, thus stimulating scholars to think about the adaptive level. Ebenezer Howard first put forward the "idyllic city of tomorrow", which permeated the development path seeking for adaptive urban design through the organic urban design proposition of moderately controlling the distribution of urban functions, the scale of urban development, and the garden-style landscape design (Howard,E., 2009). Eliel Saarinen put forward the theory of Organic Decentralization more specifically and explicitly in his book The City: Its Growth, Its Decay, Its Future (The City: Its Growth, Its Decay, Its Future). In his book The City: Its Growth, Its Decay, Its Future (1942), Saarinen argued that the city is maintained by a strict internal order like a living organism, and that the urban layout is adapted to the functional needs of the organism to form a systematic organism, and that the pulse of the city is not detached from nature at the same time (Saarinen, E., 1943).

The clear emergence of the concept of adaptability in the field of architecture comes from the introduction of ecology. In the 1960s, American architect Paolo Soleri proposed the concept of "ecological architecture" (Arcology); Ian McHarg (1962) proposed the concept of "ecological architecture" (Arcology); and Ian McHarg (1962) proposed the concept of "ecological architecture" (Arcology).
Lennox MchHarg extended the theory of adaptation to the level of design, and his book Designing with Nature used extensive empirical evidence to demonstrate the process of human development and the adaptation of the natural environment, and proposed design guidelines based on the criterion of adaptation (McHarg, I., 1992).

These studies and practices focus on the symbiosis between architecture and its environment. American architect Frank Lloyd Wright advocates the theory of "organic architecture" and the design principle of integrating architecture and environment; Indian architect Charles Correa advocates the design guideline of "form follows climate" for climate-adapted architectural forms. Charles Correa, an Indian architect, advocated "form follows climate" as a design guideline for climate-adaptive

architectural forms.

In the field of Chinese architecture, through the in-depth study of residential houses in different regions, the view that architecture and its environmental impact are inseparable was developed. 80's and early 90's, Wu Liangyong and other scholars put forward the "Habitat Science", the environmental elements, including the natural and social environment as a part of the discipline into the architectural field of vision, which is the result of the mutual adaptation of the two. Since the 90's, the concept of sustainable development began to prevail in the field of architecture, the building to adapt to the requirements of the environment where it began to be more widely mentioned, and the energy crisis makes a variety of new energy operations, energy-saving buildings in the design of the building has become a precursor to the Xi'an University of Architecture and Technology, academician Liu Jiaping, South China University of Technology, Sun Yimin, Southeast University and other famous scholars in the field of building and climate, such as Wang Jianguo. Famous scholars in the field of architecture such as Liu Jiaping of Xi'an University of Architecture and Technology, Sun Yimin of South China University of Technology, Wang Jianguo of Southeast University and so on have great achievements in the strategy of eco-environmental adaptive technology of building and climate.

However, at present, there are limited systematic theories on "architectural adaptability" as the main line of research, and the research on architectural adaptability mainly centers on different perspectives, architectural elements, architectural forms, natural environments, and adaptability evaluation indexes. At the perspective level, Chen Peng proposed adaptive transformation strategies for historical buildings through the interpretation of the "three natures" theory (Chen, P., 2019); Sun Leilei et al. analyzed and interpreted the adaptive transformation design strategies for the Dutch stock of buildings from a typological perspective (Sun,L.L., Jing,L.P.& amp; Zhu,F.J., 2021); while Liu, Hanlu researched through the modular design methodology of hospitals and proposed adaptive design strategies for hospital buildings. In terms of architectural elements, building space adaptive transformation classification study according to different architectural attributes, Li Na to adaptive concept and the analysis and interpretation of vernacular architecture to reshape the architectural heritage space (Li,N. & Zhang,C.F., 2019), Rui Rui Gou from the office space adaptive as

an entry point, from the five aspects of spatial function, layout, structure, flow, and the environment of the old Gou, S.J. et al. found the problems and analyzed them according to the current situation of Tianjin rural residential research, and put forward the relevant transformation strategies for Tianjin rural residential space by applying the adaptability theory from the four aspects of spatial reasonableness, optimization of residential house type, residential safety and continuity of cultural lineage (Gou, S.J., Li, F., Zhang, Y. & Wang, C.F., 2019); Gou, Ruirui took the adaptability of office space as an entry point, and studied the spatial adaptability of the old rural residential space from the five aspects of spatial function, layout, structure, flow line and environment (Ji, R.R., 2021). Zhang,Y. & Wang,H.Y., 2023); Yao Shuhui analyzes the relationship between space and function of hotel buildings and office buildings, and adapts hotel buildings by introducing adaptive system ideas (Yao, S.H., 2018); Wang Zhiyuan starts from the adaptive adaptive reuse of existing building structures, and carries out structural restoration and reinforcement (Wang, Z.Y., 2013), and Liao Lei dissects the old buildings in the form of adaptive system theory, and proposes relevant architectural adaptive transformation strategies from the basic three elements of architecture, namely, use, sturdiness, and aesthetics (Liao, L., 2017). The analysis of building elements and their social, economic and cultural environments in different periods puts forward corresponding adaptive transformation strategies. Li Jiaxiang puts forward corresponding adaptive transformation strategies by analyzing the relationship between the traditional brick and wood buildings in Gu'nanjie and the demand for modern living (Li,J.X., 2017); Shan Wen puts forward relevant adaptive building transformation strategies by analyzing the dialectical relationship between historical veins and the modern architectural trend (Shan ,W., 2017). The extreme and special natural terrain and hydrological climate of some regions has relevant requirements for architectural design, Liang R. et al. proposed architectural design strategies adapted to the plateau climate from the perspective of site selection, architectural form, building materials, and living space versatility (Liang, R., Liu, J.P., Chen, J., Zhang, Q. & Wang, G.L., 2016); Zhang,F. proposed climate-adapted architectural design strategies for hot summer and cold winter regions by using adaptive techniques to establish components such as envelope, window openings, solar energy systems, and geothermal energy systems, air supply systems, etc.; Wen,Y. et al. used the Complex Adaptive System

(CAS) model to analyze the complexity system of mountain architectural design, and proposed design theoretical guidance in concept, layout, organization, and morphology (Wen,Y., Ji,H.Z. & Chen, G., 2022). Finally, Liang Xiaobo proposed the elements related to the evaluation of building adaptability by analyzing the constraints of old building reuse and adaptive reuse theory (Liang,X.B., 2010).

In general, adaptability research in the field of architecture has some results in the construction of macro-comprehensive level theory, the core idea of building adaptability from the elements of the building, the natural environment, building energy efficiency and different perspectives have been built. However, most of the current research is only limited to the physical level of the natural environment and building peripheral supporting performance adaptation and regulation, while building adaptability is not limited to the physical level, but also need to incorporate the needs of the user into the adaptability of the building system. On the other hand, under the guidance of rural revitalisation, the research system of building adaptability needs to be further improved, combined with the unique regional characteristics of the countryside and in line with the direction of future development of the countryside.

2.4.3 Current Situation and Challenges of Adaptive Retrofitting of Bai Traditional Houses

The traditional dwellings of the Bai people face many challenges in the process of adapting to the modern mode of life. On the one hand, how to enhance the comfort and functionality of the dwellings while maintaining the traditional architectural style is a key issue. Traditional Bai residential houses often have a gap with the demands of modern life in terms of spatial layout, material utilization and construction technology. For example, traditional ventilation, lighting and heat preservation may not meet the needs of modern life, while traditional building materials and technologies may also have difficulty in meeting the safety, durability and environmental protection requirements of modern buildings.

On the other hand, how to avoid destroying the traditional culture in the process of remodeling and maintain the uniqueness of Bai residential houses is also an urgent problem to be solved. Bai traditional houses are not only architectural heritage, but

also an important carrier of Bai culture. In the process of transformation, how to balance the relationship between tradition and modernity, protection and utilization is an issue that needs to be explored in depth.

1. RESEARCH PROGRESS ON ADAPTIVE RETROFITTING OF BAI TRADITIONAL HOUSES

In recent years, research on the adaptive transformation of traditional Bai dwellings has achieved certain results. Scholars have conducted in-depth studies on the adaptive transformation of traditional dwellings from various angles, providing useful reference for the modernization of Bai traditional dwellings.

In terms of spatial layout and functional optimization, scholars generally believe that optimizing spatial layout and enhancing architectural functions are the keys to adaptive transformation of Bai traditional folk dwellings. For example, Zhang Linghan pointed out in his study on the adaptive transformation of Yongshun Tujia traditional dwellings that the modernization and sustainable development of traditional dwellings can be achieved by optimizing the spatial layout and introducing modern facilities (Zhang,L.H., 2024). This viewpoint is also applicable to the adaptation of Bai traditional dwellings.

Scholars have also actively explored the innovation of materials and technologies. For example, Li Yufeng et al. put forward the idea of introducing modern building materials and technologies while maintaining the traditional architectural style when studying the adaptability and sustainable development of Dong village architecture (Li,Y., Lin,G. & Sun,Y., 2023). This viewpoint is equally important for the remodeling of Bai traditional dwellings. By introducing modern building materials and technologies, the comfort and safety of the dwellings can be enhanced while maintaining their traditional characteristics.

In terms of cultural inheritance and protection, scholars have emphasized the importance of maintaining the uniqueness of Bai folk dwellings. For example, Qiu Jiajie, when studying the adaptive transformation of unused traditional dwellings in rural villages in northeast Qianjiang, put forward the viewpoint of enhancing the practicality and aesthetics of dwellings through innovative design techniques in the context of rural revitalization (Qiu,J., 2023). This viewpoint emphasizes the important role of traditional dwellings in rural revitalization, and also provides useful insights into the

adaptation of Bai traditional dwellings.

Scholars have also carried out in-depth studies on sustainable utilization and economic benefits. For example, Chen Hongxuan et al. proposed a strategy based on the concept of rural regeneration when studying the adaptive renewal strategy of rural buildings, aiming to realize the sustainable utilization of residential houses and the sustainable development of the countryside (Chen,H., Li,J. & He,S., 2022). This viewpoint is equally important for the transformation of Bai traditional houses. Through reasonable planning and design, the sustainable utilization of residential houses can be realized, while driving the development of rural economy.

In terms of historical building reuse, Luo, M. and Li, T.'s research provides useful reference. Through example analysis, they explored the B&B design strategy for adaptive reuse of historical buildings, which provides new ideas for the transformation of traditional Bai residential houses (Luo, M. & Li,T., 2022). By transforming traditional dwellings into tourism facilities such as B&Bs, not only can the utilization rate of dwellings be improved, but also the development of rural tourism can be promoted.

2. PROBLEMS AND FUTURE RESEARCH DIRECTIONS

Although research on the adaptive remodeling of traditional Bai dwellings has achieved certain results, there are still many problems and challenges. For example, how to maintain a balance between traditional features and modern needs in the process of adaptation; how to introduce modern building materials and technologies without destroying the traditional features; and how to achieve a balance between sustainable use of dwellings and economic benefits.

Future research should explore these issues in greater depth and propose more comprehensive and effective solutions. Specifically, in-depth studies can be conducted in the following areas:

Interdisciplinary cooperation: Strengthen the cross-cooperation among the disciplines of architecture, culture and sociology, and explore the adaptive transformation of the traditional dwellings of the Bai people from multiple perspectives.

Empirical research: through field research and case studies, we have gained a deeper understanding of the current situation and needs of the traditional dwellings of the Bai ethnic group, which provides a strong basis for the renovation design.

Technological innovation: actively exploring new building materials and technologies to enhance the comfort and safety of residential houses while maintaining their traditional characteristics.

Cultural inheritance: focus on cultural inheritance and protection in the process of remodeling, reflecting the unique charm of Bai culture through design techniques and decorative elements.

Sustainable use: Focusing on the balance between sustainable use and economic benefits of dwellings, the long-term benefits of dwellings are realized through rational planning and design.

To summarize, the research on the adaptability of Bai traditional houses based on the modern life mode is a complex and important topic. Traditional houses and modern buildings are two individuals, organically combined in the environment, interdependent and integrated, looking for commonality in individuality, and the adaptive transformation of traditional houses to modern life organically combines the old and the new, finally forming a valuable whole. In a sense, adaptive transformation is the necessary way to protect and inherit ancient houses. Through interdisciplinary cooperation and in-depth research, we can provide more comprehensive and effective solutions for the adaptive transformation of traditional Bai dwellings and contribute to the inheritance and development of Bai culture.

2.5 SELF-ORGANIZATION THEORY AND THE SPONTANEOUS CONSTRUCTION OF WHITE FOLK HOUSES

Self-organization theory originated in physics and has since been widely applied to the fields of social sciences and architecture. In the adaptive modification of traditional dwellings, self-organization theory provides a new perspective to help understand the spatial and functional optimization of dwellings achieved through spontaneous construction during long-term development.

2.5.1 Current status of self-organization theory research in architecture

Self-organization theory is a collection of doctrines that study the phenomena and laws of self-organization, which is a group of theories. Self-organization theory is the study of "self-organization phenomena" in complex systems, which was first proposed by Ilya Prigogine, founder of Dissipative Structure, and Hermann Haken, founder of Syneraetics. It was first proposed by Ilya Prigogine, the founder of Dissipative Structure, and Hermann Haken, the founder of Syneraetics. Wu Tong defines "self-organization phenomenon" as "self-organization, self-creation, and self-evolution without specific instructions from the outside world, and the ability to autonomously move from disorder to order, forming a structured system." (Wu, T.) (Wu,T., 2001) According to Paul Cilliers, "Self-organization is the ability of complex systems to develop or change their internal structure spontaneously and adaptively to better cope with or deal with their environment." (Silliers, P., 2006)

Since the theory related to self-organization was proposed in the 1970s, it has been widely used in the research of basic science and life science, and has also been introduced into the research of architecture, planning and other fields. The principle of self-organization was firstly introduced into the study of urban space in the 1970s, and research scholars such as P.M. Allen, M. Batty and D.S. Dendrinos have explored and studied the urban space with the guidance of dissipative structure theory, fractal theory and chaos in the framework of the self-organization theory, and put forward the concepts of Dissipative Cities, Synergistic Cities, and Dissipative Cities, and Chaotic Cities. Dissipative Cities, Synergetic Cities, Chaotic Cities and Fractal Cities (Chen, Y., 2003). However, the self-organization theory has been less applied in related studies such as rural dwellings.

Domestic research using self-organization-related theories to intervene in the fields of planning and architecture has not been long. Only a few scholars in architecture and planning have introduced the principle of self-organization since the early 21st century to study complex urban architecture and village space. For example, Chen Yanguang and Qi Weiqi discussed urban planning and design methods in depth with the self-organization theory (Qi,W., 2006), and Hou Zhenghua and Lu Jiansong used the theory of self-organization to study the mechanism of generating urban and rural territoriality and architectural form respectively (Hou,Z., 2003), of which Lu Jiansong pioneered the use of the theory of self-organization in the micro-levels of

residential units and streets, and studied the complexity of urban architecture and village space. Among them, Lu Jiansong pioneered the use of self-organization theory to intervene in the micro-level of residential units, streets, etc., and discussed in detail the structural relationship between irrational and contingent factors such as specific spontaneous behaviors and the mechanism of territoriality generation (Lu,J., 2009).

Since 2010, some scholars have begun to apply self-organization-related theories to study complex phenomena such as the generative logic of village spaces and urban communities as well as the mechanism of territoriality generation. They have combined the theories of sociology, anthropology, communication and other disciplines to study spontaneous activities in depth. The number of such related studies has also gradually increased. For example, T. Schneider, J. Till, and N. Awan, combining the fields of political science and economics, have explored spontaneous construction behavior in detail by analyzing the phenomenon of sociality and construction activities (Arang,N., Schneider,T. & Til,J., 2016), and there are also a number of domestic related studies.

However, as of now, both domestically and abroad, the interdisciplinary and comprehensive research results on self-organization and architecture are mainly focused on the explanation and analysis of related phenomena, while the research and discussion on the adaptive design of residential houses are very limited.

Table 2.3 Doctoral dissertations related to the intervention of self-organization theory in architecture research, data from China Knowledge Network

Name	Thesis title	School
Qi Weiqi	The fit between urban design and self-organization	Tongji University
Hou Zhenghua	Crisis of Urban Character and Self-Organizing Mechanisms of Urban Architectural Landscapes	Tsinghua University
Hu Jiansong	The Regionality of Architecture from the Perspective of Spontaneous Construction	Tsinghua University
Jiang Min	A Study on the Guidance and Control of Contemporary Village Public Space from the Perspective of Self organization Theory	Hunan University
Guo Rui	Research on Contemporary Renewal Models of Traditional Villages Based on Self-Organization Theory	Huazhong University of Science and Technology
Teng Junhong	Wholeness and Adaptation What Complexity Science Tells Us About Architecture	Tianjin University
Cai Hua	Research on the Evolutionary Development of Urban Systems in Heilongjiang Province Based on Self-Organization Theory	Harbin Engineering University

Table source: Author's own drawing based on information

2.5.2 Spontaneous construction behavior

Traditional houses, contemporary self-builds, and unauthorized communities all consist of a large number of independent construction acts (Lu, J., Jiang, M. & He, W., 2021). These types of construction can be categorized as Spontaneous Building. This concept was first proposed by Bernard Rudofsky (Rudofsky, B., 2011), and has subsequently attracted widespread attention worldwide. In recent years, with the promotion of the rural revitalization strategy, there has been a gradual increase in the discussion of contemporary rural self-built houses in the domestic academic community. According to Lü Pinjing, the appearance of these newly built houses reflects "a rough aesthetic" and they "destroy the original simplicity and harmony of the village" (Lü, P. & Dai, L., 2020). According to Wu Zhihong, due to the lack of macro-control and guidance, spontaneous residential construction in the countryside "mostly focuses on short-term benefits and blindly imitates the architectural patterns of towns and cities, resulting in a large number of disorderly, chaotic and low-quality residential forms" (Wu,Z., Wu,Y. & Shi,W., 2017). According to Zhu Liangwen, although the livability of new dwellings in the countryside has been improved compared to that of ordinary traditional dwellings, they "lack the concept of planning, the awareness of quality, the ability of aesthetics, and professional design", which is related to the "non-uniform construction mode" (Zhu, L. & Cheng, H., 2022). According to Qiu Xiaopeng, the current problems of rural self-built houses mainly include "a single living pattern, blurred functional zoning, and arbitrary spatial additions", which is attributed to "the lack of professional knowledge and theoretical guidance for builders" (Yue,X. & Wang,F., 2017). ..., 2017). According to Che Zhenyu, although contemporary residential houses use new building materials, they are unable to fully recognize and apply their characteristics and functions, and their design methods are simple and random, thus manifesting themselves as "modern rural generic residential forms without regional characteristics" (Che,Z., Qian,Y. & Jiang,P.,. 2021).

The above scholars hold different degrees of critical attitudes towards the emergence of contemporary rural self-built dwellings, either by taking the construction mode and presentation of traditional dwellings as a reference, or by taking the design norms of urban architecture as a guideline. At the same time, another voice focuses

on the phenomenon itself, trying to explain the reasons for the emergence of contemporary rural self-built dwellings and the law of development from a specific perspective. According to Duan Wei, vernacular dwellings are characterized as life-like organisms that are "subject to a series of regional environmental influences," so that universal architectural archetypes are produced in a specific region. Such archetypes can be compared to genes, which are widespread in both spontaneously built traditional dwellings and contemporary vernacular dwellings, and have the capacity for expansion and transmission (Duan, W. & Li, X., 2020). With the help of "landscape gene theory", Li Sifen utilizes four methods, including "element extraction, pattern extraction, structure extraction, and meaning extraction", to record "the architectural gene characteristics of modern houses at different stages of development", and then compares them with each other. The four methods of "element extraction, pattern extraction, structure extraction and meaning extraction" are used to record the "genetic characteristics of modern residential architecture at different stages of development" and to reveal their evolutionary laws through comparison (Li, S., Kuang, Y., Qin, Y. & Li, J., 2021). According to Cheng Hui, contemporary rural dwellings are not homogeneous, but have formed a rich variety of architectural forms under the joint action of "regional commonality constraints and pluralistic individuality openness" (Cheng,H., Zhang,Z. & Li,X., 2021). Ding J. uses "spatial syntax" as a theoretical tool to study the "relationship between material form and cultural logic" of the newly-built houses in the countryside, and further reveals "the sustainability of local culture" by comparing it with traditional houses. Through comparison with traditional houses, it further reveals "the sustainability of local culture in the spatial structure of newly-built houses" (Ding, J. & Shen, X., 2022). Xiao Bing argues that contemporary rural housing is built on "industrialized technology systems", but by upgrading "the materiality, workmanship, structure and organizational characteristics of the new industrialized technology systems", and "placing the construction activities in specific environments and places", the construction activities are "placed in the concrete environment and places". However, by upgrading "the materiality, workmanship, structure and organizational features of the new industrialized technological system" and placing construction activities "in concrete environments and places", the humanistic spirit of traditional construction can be reshaped (Xiao, B., Ji, G., Hong, X. & Ma, Q., 2022).

"According to C.A. Doxiadis, the founder of the Science of Human Settlement, "human settlement is a synergistic phenomenon in which a number of complex individuals are brought together as a whole through dynamic development" (Wu, L., 2001). " (Wu, L., 2001), and residential houses are the products of the phenomenon of human settlement in different periods. Therefore, the so-called holistic research is actually to regard spontaneous construction as a whole complex system, and this is where the strength of self-organization theory lies. Lu Jiansong believes that from the perspective of the study of "spontaneous construction", he thinks that "spontaneity is the fundamental driving force for the formation of regional commonality, and it is the key to exploring the mechanism of generating architectural regionality." (Lu, J., 2009)

In the adaptive modification of traditional dwellings, self-organization theory provides us with a new perspective to help understand the spatial and functional optimization of dwellings achieved through spontaneous construction during long-term development. Self-organization theory suggests that in the absence of external instructions, individuals within a system can gradually form an orderly structure through self-regulation and feedback. This theory aptly explains the phenomenon of spontaneous construction of Bai dwellings, that is, villagers constantly adjust and expand their dwellings according to the actual needs of life, making them more functional and adaptable. In some Bai villages, residents spontaneously transform the space originally used for livestock enclosure into a bathroom or kitchen, thus meeting the needs of modern life. Therefore, this paper will take the traditional residential houses in Dali, Yunnan Province as a sample to explore their spontaneous construction to meet the demands of modern life.

2.6 SUMMARY

As an important cultural heritage of Dali region, Bai traditional houses have rich cultural connotation and unique architectural style. Their architectural forms not only reflect the building wisdom of the Bai people, but also carry a deep cultural heritage. With the rise of modern life style, the Bai traditional houses are facing challenges in function, structure and environment. Problems such as these also affect the residents' living experience. Scholars generally agree that the adaptive transformation of traditional Bai dwellings must be combined with the demands of modern life,

maintaining the traditional style while enhancing its functionality and livability, so as to realize the sustainable development of the traditional Bai dwellings under the modern mode of life.

Although certain research results have been achieved, the adaptive remodeling of traditional Bai dwellings still faces many problems and challenges. Future research should explore in greater depth how to maintain a balance between traditional characteristics and modern needs in the process of adaptation.

This literature review reveals the adaptive challenges and transformation strategies of Bai traditional dwellings in the modern mode of life, emphasizes the importance of cultural inheritance and protection, and points out the direction of future research. It enriches the research perspectives of Bai traditional folk dwellings, promotes the innovation of adaptive transformation strategies, and emphasizes the importance of cultural inheritance and protection.

CHAPTER 3

RESEARCH METHODOLOGY

Methodology is a system of principles, methods and norms used in research or problem solving. It emphasizes a systematic and scientific approach to the research process and provides a framework to guide the researcher in effective research design, data collection, analysis and interpretation. Methodology is critical to the quality and reliability of the research, which ensures high internal and external validity of the research and makes the findings persuasive and generalizable. In research methodology, quantitative analysis and qualitative analysis are two common research methods. Each of these two methods has its own advantages and scope of application in research.

Quantitative analysis is a research method based on quantitative data and statistical analysis. It draws conclusions by collecting, organizing and analyzing numerical data and conducting quantitative research using statistical methods. Quantitative research usually employs questionnaires, experimental design, and statistical analysis to clarify the relationships, differences, and trends between the target variables being measured, as well as to test hypotheses. Quantitative analysis is suitable for validation studies, obtaining large-scale data, revealing causal relationships between variables, and making predictions.

Qualitative analysis is a research method based on qualitative data and descriptive information. It focuses on understanding and explaining the characteristics,

causes and meanings of phenomena, events or social behaviors. Qualitative research usually uses interviews, observations, text analysis and other methods to collect data and to reveal the essence of the problem by generalizing and summarizing the data and extracting themes, patterns and concepts. Qualitative analysis is suitable for exploratory research, understanding subjective experience, explaining complex phenomena and generating new theories. It is particularly advantageous in providing in-depth understanding of complex social phenomena.

Whereas the renovation and use of traditional Dali Bai dwellings involves architectural, cultural, social and other factors, qualitative analysis is able to dig deeper into the motives and logic behind these complex factors. Qualitative research focuses

on the in-depth description of the details and background of the phenomenon, which can provide rich contextual information. In the study of Dali Bai traditional houses, the qualitative analysis method can record the living habits, cultural background and architectural features of the residents in detail, providing rich data support for the study. Qualitative analysis methods are flexible and able to cope with complex and dynamic issues. In the research process, new problems and phenomena other than the preset problems may be encountered, and the qualitative analysis method can flexibly adjust the direction and content of the research and capture new information in a timely manner. Therefore, the research method of qualitative analysis will be used in this study. In-depth interviews and field surveys are the main methods of qualitative analysis, which can provide an in-depth understanding of the real thoughts and behaviors of the research subjects. In this study, through in-depth interviews and field observations of residents, rich first-hand information is obtained, which provides a solid foundation for qualitative analysis.

Rooted theory is an important qualitative research method that can reveal underlying social laws and mechanisms by discovering and constructing theories in data. Rooted theory is an integrated, multifaceted, and organic approach to research ideas and methods. For example, learning to enter the scene, cultural etiquette and morality from the perspective of fieldwork, and using analytical thinking about texts to dig into the deeper meanings of the texts; and it is this more open and inclusive quality that enables the theory of rootedness to go deeper and deeper. Zagan's theory emphasizes "constructive theory", but in qualitative research, it pays more attention to "description" than "generation", and therefore conducts more exploratory research; while "Zagan's" theory emphasizes "constructive theory", but in qualitative research, it pays more attention to "description" than "generation", and therefore conducts more exploratory research. Rootedness" theory, on the other hand, takes "constructing theories" as its first priority: researchers can make general interpretations of social phenomena and problems through systematic analyses of material materials, explore the connection of things, and predict laws and trends, thus making up for the shortcomings of traditional organic research in theory construction (J. K. K., "The Rootedness of Organic Research", p. 4). The shortcomings of traditional organic research in the construction of theories (Jia, Z., 2015).

The study of Dali Bai traditional houses needs to distill the theory from the actual life experience of the residents, the existing research on the life pattern of the residents of the Bai traditional houses is relatively small, and the related research does not have scales and theoretical results that can be directly referred to, and the rooting research is suitable with the construction of the theory in the case that the research topic is still immature (Zhang,B. & Zhang,Q., 2018), therefore Zagan theory, which is the main stream qualitative research method, is selected for the study, and is summarized and developed into a theory based on the collection of information and data. After three-level coding, the model of influencing factors for the transformation of Bai traditional houses was derived.

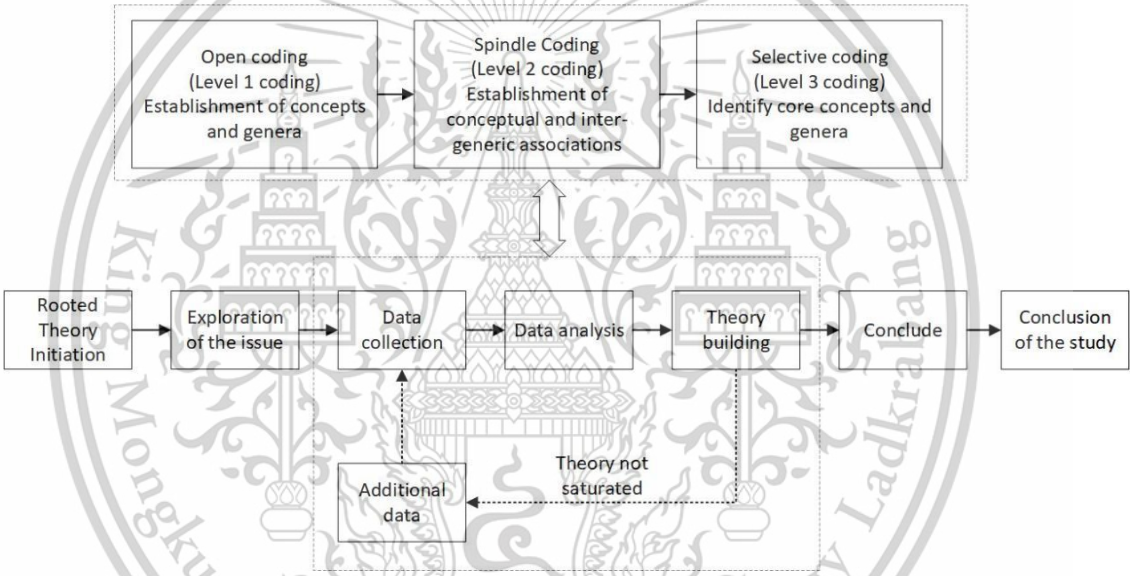


Figure 3.1 Rooting Theory Research Process

Collated from Anselm Strauss & Barney Glaser (1967)

3.1 RESEARCH PROCESS

Through a series of systematic steps, from research design, data collection, data analysis to result validation and thesis writing, this study comprehensively explores the current situation and renovation of Bai traditional dwellings in Dali Xizhou Town and Fengyangyi Village, as well as the impacts of modern lifestyles on these dwellings.

3.1.1 Research design

1. DEFINING THE OBJECTIVES OF THE STUDY

The main objective of this study is to explore the current situation and renovation of traditional Bai dwellings in Xizhou Town and Fengyangyi Village in Dali, as well as the impact of modern lifestyles on these dwellings. Specifically, the study aims to reveal the impact of modern lifestyles on traditional dwellings in terms of spatial use, functional needs and renewal of building materials.

2. RESEARCH PROBLEM

Define the research questions, including the architectural features, functional layout, and cultural connotations of traditional dwellings, as well as the impact of modern living patterns on the transformation of dwellings.

3. CHOICE OF RESEARCH METHODOLOGY

A qualitative research methodology was used, consisting mainly of rooted theory and fieldwork, to obtain in-depth and rich information.

Rooted theory allows researchers to discover and construct theories within data (Glaser & Strauss, 1967). Fieldwork, on the other hand, facilitates direct observation and documentation of phenomena in real environments. Research ethics should be emphasized in the methodology to ensure the legitimacy and morality of the research. It is also important to consider the feasibility of the research, including the constraints of time, resources, skills and the research environment.

4. SELECTION OF STUDY POPULATION AND SAMPLE

In this study, after clarifying that the research object is the Dali Bai traditional residential houses that are being used, the residential houses are selected for the study area in Dali Xizhou Town and Fengyangyi Village, where observation visits are made to the residential houses in the area and in-depth interviews are conducted with the local residents around the research questions.

Through on-site research, it was determined that the dwellings to be studied were being used and had been refurbished and remodeled, and the gender ratio, age distribution, occupational background, and literacy level of the interviewees were determined to ensure that the sample consisted of 50% males and 50% females, and that residents of different age groups and occupational backgrounds were represented.

At the same time, in order to ensure the diversity and representativeness of the sample, residents living in owner-occupied dwellings, commercial and residential dwellings, and purely commercial dwellings were selected. This gives a more comprehensive picture of the various types of use of traditional Bai residential houses nowadays, and thus determines the demand for residential remodeling.

3.1.2 Data collection

1. FIELD SITE RESEARCH

Research preparation: This includes making a detailed research plan and preparing the necessary tools such as cameras, video equipment, recording equipment, etc.

On-site research: Field research was conducted in Dali Xizhou Town and Fengyangyi Village, where photos, videos, observations and records were taken of typical Bai dwellings.

2. FIELDWORK

Visits to villages are conducted, and scholars visit and observe villages for 15-20 days each year for three consecutive years to ensure that the situation in each region is grasped. Moreover, through the observation visits, the residents of typical residential houses in the region were sampled for household surveys, and through detailed surveys conducted in each resident's home, they were able to learn about their use of residential houses, their needs for remodeling, and their living habits, among other things.

1. RESIDENT INTERVIEWS

Sample selection: residents who have been living in typical Bai traditional houses for a long time were selected as interview subjects to ensure the diversity and representativeness of the sample.

Interview content: Design the interview outline and conduct in-depth interviews around the use of residential houses, remodeling needs, living habits and other issues.

Recording and documentation: Residents' responses were recorded during the interviews and detailed notes were taken to ensure the accuracy and completeness of the interviews.

3.1.3 Data organization and analysis

1. IMAGING

Photographs and video recordings were taken of each residence, detailed records were made of the use of the residence and its renovation, and the photographic information was categorized and organized.

2. AUDIO TO TEXT

Translate all audio recordings of interviews verbatim into textual material to ensure a complete record of the interviews. Organize and classify the transcribed textual material.

3. QUALITATIVE ANALYSIS

Qualitative analysis, a bottom-up approach to building substantive theories, is used to conceptualize the phenomena found by breaking down and analyzing the information collected, and then reabstracting and elevating the concepts to theoretical categories in an appropriate way (Chen, X., 1999). This study is divided into three steps to analyze the content of the interviews:

(1) Coding and categorization: an open-ended coding of the interview text was used to extract concepts and themes relevant to the research questions using a rooted theory approach.Strauss & Corbin's (1990) rooted theory coding approach was used to guide this process.

(2) Thematic analysis: the coded data were subjected to thematic analysis, as indicated in section IV of this chapter.

(3) Theoretical construction: Based on the results of the qualitative analysis, construct a theoretical model on the self-organizing behavior of the residents in the process of renovation and new construction of Bai dwellings, and reveal the mechanism of the influence of modern lifestyle on the renovation of traditional dwellings.

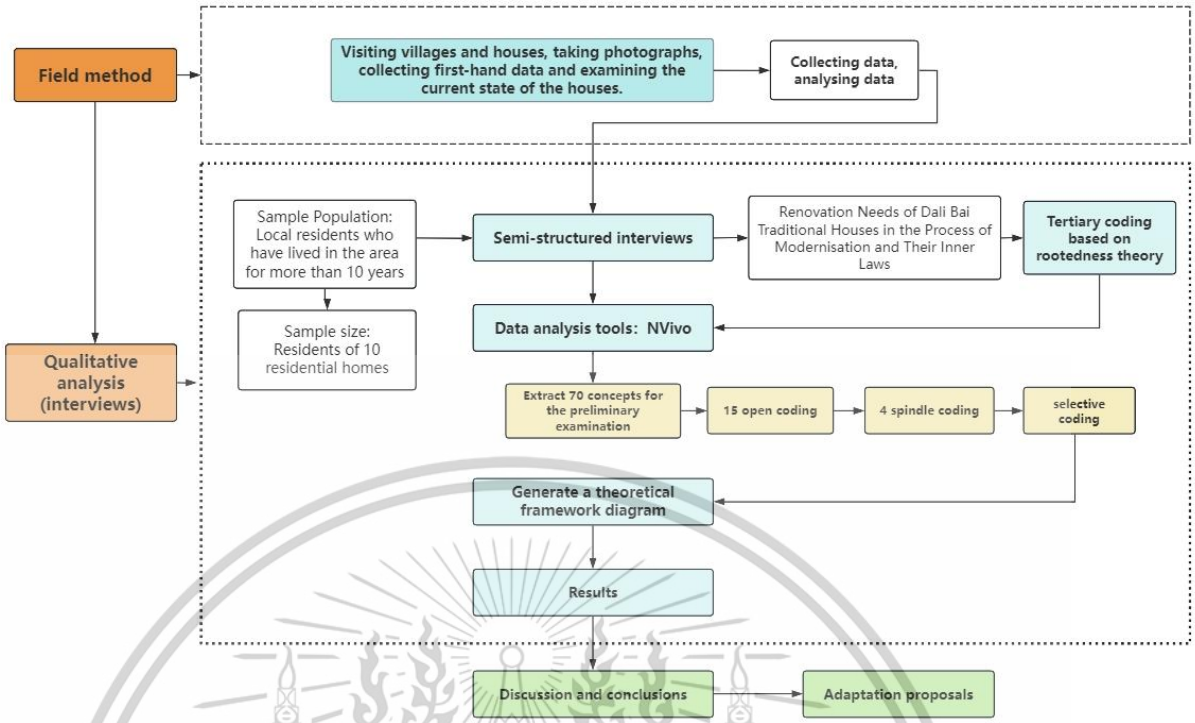


Figure 3.2 Process diagram for data collection and data analysis, image source: author's own drawing

3.1.4 Thesis writing

1. STRUCTURE OF THE PAPER

Determine the structure of the paper, including an introduction, literature review, research methodology, data analysis, discussion and conclusion sections.

2. WRITING OF THE FIRST DRAFT

Write the first draft of the paper based on the research process and the results of data analysis. Ensure that the sections are logically clear and strongly argued.

3.REVISION AND FINALIZATION

Revise and optimize the first draft to ensure the accuracy and completeness of the content of the paper. Finalize the draft.

3.1.5 Research reflection and summarization

1. RESEARCH REFLECTIONS

Reflect on the shortcomings and challenges of the research process and

summarize lessons learned to inform future research. Discuss the ethical issues encountered during the research process and explain how they were resolved.

2.SUMMARIZE

Summarize the main findings of this study, point out the limitations of the study and directions for future research.

To sum up, this study systematically reveals the transformation of traditional Dali Bai dwellings under the influence of modern lifestyles and the self-organized behaviors of the residents from the research design, data collection, data analysis, and thesis writing. These findings not only provide theoretical support for the protection and renovation of traditional dwellings, but also provide practical references for the integration of modern lifestyles and traditional culture.

3.2 RESEARCH TOOL

This study used a variety of data collection tools to ensure a comprehensive understanding of the process of remodeling and new construction of traditional Bai dwellings in the town of Xizhou, Dali and the village of Fengyangyi, Dali. The following is a detailed description of the specific research tools and how they were used:

3.2.1 Interviews

The interview method is a face-to-face interaction and dialog with the research subject in order to obtain information about the other person's opinions, experiences, perspectives, and feelings. Interviews are usually conducted between the researcher and the interviewee in an open-ended or structured question-and-answer format. Ethical requirements need to be taken into account during interviews to protect the privacy and rights of the interviewees. The researcher also needs to control his or her subjective bias and pay attention to the setting of the interview environment to ensure that authentic, reliable and valid information can be obtained.

The two main types of interviews are structured and semi-structured. Structured interviews are interviews conducted within a pre-designed sequence of questions and question framework. The researcher guides the conversation through pre-determined

questions to ensure that key elements of the research area are covered. This form of interview facilitates comparison and analysis, and its design may include closed-ended multiple-choice questions, open-ended descriptive questions, and so on. Semi-structured interviews are more flexible than structured interviews. The researcher will provide some basic questions and topics, but allow the interviewees to free-ride, answer questions and share their experiences and opinions. This interview format allows for follow-up questions, deeper digging and exploration based on the respondents' answers.

1. SEMI-STRUCTURED INTERVIEWS

Semi-structured interviews were chosen as the primary data collection tool for this study based on their flexibility, adaptability, depth, and trust-building characteristics. This method can effectively capture the complexity and diversity of residents' self-organizing behaviors in the process of renovation and new construction of traditional Dali Bai dwellings, providing rich and in-depth information to support the study.

(1) Flexibility and depth

Semi-structured interviews combine the strengths of structured and unstructured interviews by having a certain amount of structure while allowing the respondents to express themselves freely. This flexibility allows the researcher to adjust the questioning according to the progress of the interview and delve into the real feelings and opinions of the interviewees (Bryman, 2016). For the study of traditional Dali Bai dwellings, semi-structured interviews can ensure that the research questions are answered while at the same time capturing the residents' deeper understanding of dwelling renovation and self-organizing behaviors.

(2) Accommodating respondents from different backgrounds

Respondents in this study included three types of residents: owner-occupied residential, residential converted to commercial and residential, and commercial. Semi-structured interviews can be adapted to the specifics of the interviewees by asking questions appropriate to their backgrounds and experiences. This approach ensures that rich and diverse information is obtained from different types of interviewees, reflecting the diverse self-organizing behaviors in the process of White residential conversion.

(3) Promoting trust and interaction

Semi-structured interviews are more flexible in format and allow for trusting relationships to be built through communication and interaction during the interview. This approach helps to break down the psychological defenses of the interviewees, making them more willing to share authentic experiences and perceptions (Kvale & Brinkmann, 2009). Building trusting relationships is especially important for studies involving residents' personal lives and community activities.

(4) Capturing complex phenomena

The complexity and diversity of residents' self-organizing behaviors during the renovation and new construction of traditional Dali Bai dwellings. Semi-structured interviews are able to capture these complex phenomena flexibly, allowing the researcher to explore in depth based on interviewees' responses, revealing the motives and mechanisms hidden behind appearances. This in-depth exploration helps to understand how residents engage in self-organizing behaviors during the remodeling and new construction process.

(5) Promoting data richness and completeness

Through semi-structured interviews, the researcher is not only able to obtain answers to pre-set questions, but also capture other relevant information that the respondent has expressed freely. This information may include elements that the respondent had not thought of or had not been directly asked about, thus adding to the richness and completeness of the data (DiCicco-Bloom & Crabtree, 2006).

2. SETTING UP THE INTERVIEW OUTLINE

This study developed a semi-structured interview outline based on the research questions. The outline covered a number of dimensions such as basic information about the residents, building size, spatial function, spatial layout, basic settings, aesthetic concepts, remodeling needs, and lifestyles.

Interviews were conducted in a face-to-face format, with each interview lasting 60-90 minutes for the residents in the sample, to ensure the accuracy and depth of the information and to ensure that detailed first-hand information was obtained. All interviews were audio-recorded and detailed notes were taken, and photographs and audio-records were taken of the interviewees. After the interviews, the audio recordings were transcribed into transcripts and initially organized and categorized for subsequent

analysis.

3.2.2 Observation

The scholars conducted lengthy on-site observations in Dali Xizhou Town and Dali Fengyangyi Village. Observations included the architectural structure, internal layout, use of the dwellings, and the daily life behaviors of the residents.

Observed phenomena are recorded in detail through notes and photographs and analyzed instantly in the field to capture important details and dynamic changes.

3.2.3 Photography and video recording

In order to visualize the current situation and the transformation process of traditional houses, the research team used cameras and video cameras for systematic photography and video recording.

During the course of the field research, the scholars took a large number of pictures and video footage, which served to supplement and validate the information in the later analysis.

3.2.4 Recording equipment

When conducting semi-structured interviews, the research team used audio recording equipment to record the interviews. Audio recording ensures the completeness and accuracy of the interview information and provides a reliable basis for subsequent text transcription and analysis.

A detailed qualitative analysis was conducted after the subsequent translation of the audio-recorded interviews into textual material in order to summarize the key themes and theoretical models.

3.2.5 Data analysis software

In this study, the qualitative analysis software NVivo was used to analyze the

data and assist in processing the large amount of text data. It enabled a large number of interview texts to be systematically managed and analyzed, improving the efficiency and accuracy of data processing.

Software was used to code interview texts, summarize themes, and perform pattern recognition and relationship analysis to ensure systematic and scientific data analysis. The coding framework and theory building tools ensured systematic and scientific data analysis and supported the progressive deepening of rooted theory and the construction of theoretical models.

3.3 SAMPLE SAMPLING OR CASE STUDIES

3.3.1 Basis for sample selection

Dali Bai traditional houses are preserved in different states, now retained to be able to use and inhabited houses, are relying on the owners to constantly renovate and repair, those who have not repaired the houses have long been dangerous or damaged or even collapsed.

1. OVERVIEW OF THE STUDY AREA

Dali Xizhou town and Fengyangyi village, as a Bai settlement, the residents are very familiar with the use of traditional dwellings, which provides a real life scene and experience base for the study.

Dali Xizhou Town is one of the representative areas with well-preserved traditional Bai culture and architectural features. The traditional Bai dwellings here are famous for their unique architectural features and deep cultural connotations (Figure 3.2). Most of the Bai dwellings in Xizhou Town were built in the Ming and Qing Dynasties, and after hundreds of years of erosion and human activities, the existing dwellings are well preserved as a whole, but they also face some challenges. Many of the old houses have been renovated and repaired to varying degrees, but there are still some buildings that have structural safety hazards due to age and disrepair. Since most of the traditional dwellings are still structurally sound, with most of the walls made of earth and wood and the roofs covered with gray tiles, they have high historical and ornamental value. The traditional Bai dwellings are mostly laid out in the form of

"three chambers and screen wall" or "four pavilions and five open yards", and the interior of the buildings is divided into functional areas such as halls, bedrooms, kitchens, storage rooms, etc. Despite modernization, many of the dwellings are still in good condition and are not safe and secure. Despite modernization, many houses still retain this traditional functional layout, and some families have added modern facilities, such as bathrooms and kitchens, during the renovation process, but the overall layout still reflects the traditional features of Bai houses. At present, many Bai dwellings are still used as the main residence of the residents, with a high rate of owner-occupancy. At the same time, some of the dwellings have been transformed into a form of commercial and residential use for commercial purposes such as lodging, catering, and cultural displays, in order to attract tourists and promote local economic development. Interviews in Xizhou Town were mainly dominated by owner-occupied houses.

The ancient village of Fengyangyi was originally a hollow village with more than sixty unused old courtyards for villagers' ancestral houses (Figure 3.3). In order to develop the agriculture, culture and tourism industry and promote villagers' entrepreneurship and income, Fengyangyi actively revitalizes idle assets and scientifically activates the use of old compounds. Villagers are encouraged to invest in the village collective with resources such as old courtyards, collective land, and unused house bases, and the village collective develops the agro-literacy and tourism industry by striving for government projects or introducing enterprises. The village preserves a 1.9-kilometer section of the Yunnan-Tibet Tea Horse Road, and was selected as one of the second batch of Chinese traditional villages in 2013. 2021, Fengyangyi was listed as one of the three key demonstration villages in the National Rural Revitalization Demonstration Park on the west side of the Erhai Sea in Dali. Nowadays, Fengyangyi retains the traditional courtyard pattern of the Bai ethnic group, but also introduces the new tourism business of literature and art. Through observation visits, it is found that the whole village has poor overall lighting, narrow roads, many tourists on holidays, and the tour time is mostly concentrated in the daytime, which can't keep tourists at night. The village as a whole old building preservation status is not as good as Xizhou Town, local villagers have the will to rebuild new houses, the village's new homes in the village's periphery, the core area preserved the old building,

the old building is basically in the commercial sector. Interviews in the village were mainly commercial and residential.

Figure 3.3 Xizhou research area, image source: author's own drawing

Figure 3.4 Feng Yang Eup research area, image source: author's own drawing

2.ELEMENTS TO CONSIDER IN THE SELECTION OF A RESIDENTIAL HOME

For the selection of the sampled dwellings, firstly, the current state of preservation should be taken into account, selecting dwellings that are well preserved and need only partial renovation, those that are in average state of preservation and need more renovation, and those that are in poor state of preservation and need complete renovation. Secondly, the type of dwellings should be taken into consideration, and three types of dwellings, namely owner-occupied, commercial and residential, and commercial, are included in the selected sample, so as to have a more

comprehensive understanding of the utilization and renovation of different dwellings.

The core area in Xizhou Town is chosen because it is centered around the Yan Family Residence, and the old houses around it are in a good state of preservation, and most of them are residents' houses for self-occupation. In this area, both well-preserved and generally well-preserved dwellings can be selected.

In Fengyang Eup Village, the area on the route of the old tea-horse road was selected. This area has a concentration of old dwellings and is a key area for tourism development, containing both commercial and residential dwellings, some in good state of preservation as well as those in poor state of preservation, such as those where some of the buildings are in a collapsed condition.

3.CONSIDERATIONS FOR RESIDENT CHOICE

The first consideration is the willingness of the residents to be interviewed, and, since local residents generally speak the local language of the Bai people, it is also necessary to find residents who can communicate in Mandarin. At the same time, it is also important to ensure the diversity of the residents to be interviewed, choosing residents of different age groups, genders, and occupational backgrounds.

Secondly, it is necessary to find residents who have lived in the Bai residential buildings for a long period of time, so as to ensure that the residents have remodeling behaviors occurring during the living process.In order to obtain comprehensive and reliable data on traditional residential buildings, it is Long-term residents, those who have lived in the traditional houses for over 10 years, provide valuable insights into the usage, maintenance, and renovation behavior. Long-term residents, those who have lived in the traditional houses for over 10 years, provide valuable insights into the usage, maintenance, and renovation behaviors required for adapting these structures to modern needs.(Li, Wang, & Xu, 2020) Residents who have lived in their homes for an extended period, typically more than a decade, are more likely to have made various modifications and can provide detailed accounts of the interaction between traditional structures and modern needs. accounts of the interaction between traditional structures and modern living requirements.(Zhang,B. & Zhang, Q., 2018).

Combining the above reasons, specific criteria for selecting the sample were determined, such as the state of preservation of the dwellings (well-preserved, partially

remodeled, and completely remodeled), the type of dwellings (owner-occupied, commercial/residential, and commercial), and the living habits and behavioral patterns of the residents. Ten residential houses were selected as a sample to ensure that each house was representative to some extent of the different situations in the study area. In-depth interviews were conducted with the selected sample to collect detailed information to ensure that each sample provided valuable information.

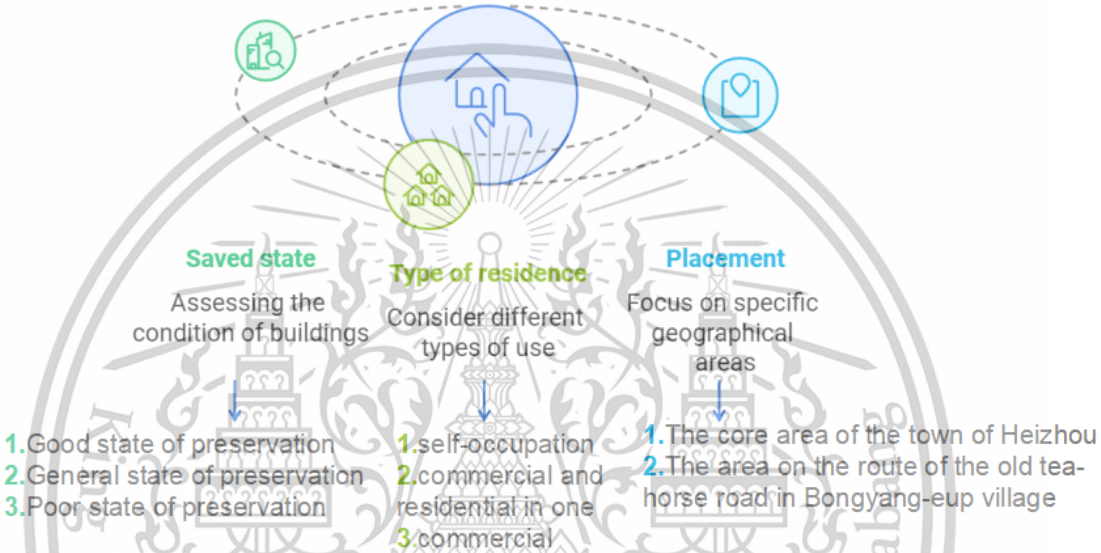


Figure 3.5 Considerations for residential sampling,author's own drawing

3.3.2 Sample profile

In this study, scholars used semi-structured in-depth interviews to collect textual data for further coding category identification, and a total of 10 samples were collected. Interviews for this study centered on residents of Dali Xizhou Town and Fengyangyi Village, who had lived in the area for a period of time roughly coinciding with their age and were familiar with the use of traditional dwellings. The gender distribution in the sample was balanced, with 50% male and 50% female. In terms of age group distribution, the largest number of people were aged 40-60 years old, accounting for 50%, followed by residents aged 30-40 years old, accounting for 30%; residents aged 20-30 years old accounted for 10%, while those aged 60 years old and above accounted for 10%. In terms of literacy level, 60% of the residents had less than a bachelor's degree and 40% had more than a bachelor's degree. In addition, the

distribution of individual occupations in the sample varied, with 60% of business people, 30% of laborers, 10% of unit retirees, and 0% of farmers.

Table 3.1 Statistics on the sample of semi-structured in-depth interviews

Variant	Norm	Sample size	Proportions
Distinguishing between the sexes	Male	5	50%
	Women	5	50%
(a person's) Age	20-30	1	10%
	30-40	3	30%
	40-60	5	50%
	60 or more	1	10%
Education attainment	Undergraduate or below	6	60%
	Undergraduate (adjective)	4	40%
	Bachelor's degree	0	0%
	Master's degree or higher	0	0%
Careers	Farming	0	0%
	Work	3	30%
	Self-employed	6	60%
	Unit retirement	1	10%

Table source: Author's own drawing

The sample in this study was diverse and representative:

Balanced and representative in terms of gender and age: The sample has an equal proportion of men and women, and the age span covers a wide range of stages from 20 years old to over 60 years old. This balanced gender and age structure helps to gain a comprehensive understanding of the different needs and perceptions of different age groups and genders on the remodeling of traditional dwellings, and ensures that the results of the study are broad and representative. The middle-aged group of 40-60 years old was chosen as the sample, which has rich life experience as well as a strong sense of family responsibility and social participation; the 30-40 year olds, as the mainstay of their families and careers, have a high demand for the living environment; the 20-30 year olds represent the new generation's lifestyles and housing needs. the 60+ year olds provide the traditional lifestyle's direct experience and cultural memory.

Diversity of literacy levels: 60% of the residents in the sample have a bachelor's degree or lower literacy level, and 40% have a bachelor's degree or higher. This distribution of literacy levels reflects the differences in how local residents receive

information and express their needs, providing a diverse perspective for the study. Highly educated residents may have more concerns about modernization and environmental protection and energy saving, while low-educated residents may be more concerned about the convenience and cost of actual living. The flat differences in cultural water can help us understand the differences in the perceptions of residents with different educational backgrounds in residential renovation, especially the trade-off between modernization and traditional preservation.

Diversification of occupational backgrounds: 60% of the residents in the sample are businessmen, 30% are laborers, 10% are retirees, while agricultural workers are not present in the sample at all. This difference in occupational structure reveals the characteristics of the local socio-economy and the differences in the lifestyles of the residents. Businessmen and workers may have more modern needs in terms of living conditions and renovation needs, while retirees' concerns may be more focused on living comfort and historical and cultural heritage. The economic activities of business people and the actual living needs of laborers reflect the impact of economic development on the living environment; the living needs of retirees are more focused on comfort and tranquility. These differences in occupational backgrounds provide valuable perspectives for an in-depth discussion of how modern people's habits and behaviors affect the renovation of traditional dwellings.

In summary, through such diverse sample selection, we are able to gain a comprehensive understanding of how modern living habits and behaviors affect the renovation of old homes. Residents of different genders, ages, cultural levels and occupational backgrounds have different needs and expectations for their living environments, which will become important factors to be considered in the process of remodeling old residential buildings. The diversity of the samples ensures that the results of the study are broad and representative, providing a solid foundation for the development of a more scientific and rational residential renovation program.

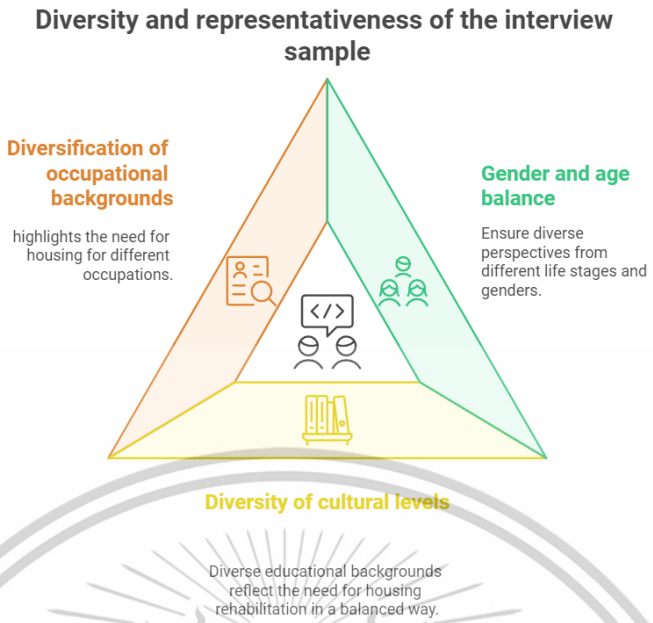


Figure 3.6 The interview sample was diverse and representative,author's own drawing

3.4 DATA ANALYSIS

Data analysis refers to the use of appropriate statistical analysis methods to analyze a large amount of collected data, summarize and understand them and digest them in order to maximize the development of the data's function and its usefulness. Data analysis is the process of studying and summarizing data in detail in order to extract useful information and form conclusions (Tao,W., 2017). The main activities of the data analysis process consist of identifying information needs , collecting data, analyzing data, and evaluating and improving the effectiveness of data analysis (Zhao, K. & Li,W., 2016).

This study adopts Grounded Theory (GT) as the main data analysis method, and systematically codes and classifies the data through qualitative analysis software (e.g., NVivo) to gradually refine the theoretical model of residents' self-organizing behavior. This approach emphasizes the abstraction of concepts from actual information and the construction of a theoretical framework through the relationships between concepts, rather than relying on a priori assumptions or preconceived theories. The core of the rooted theory lies in the open coding, spindle coding and selective coding of information to gradually deepen the understanding of the phenomenon under study.

3.4.1 Data analysis process

1. INITIAL CODING

In the initial coding stage, the researcher transcribed all the audio-recorded interviews into textual materials and imported them into the qualitative analysis software. The text was then read line by line to extract meaningful concepts and keywords from it. The purpose of initial coding was to try to be able to discover as much important information in the data as possible without blindly interpreting or categorizing this information prematurely. For example, with regard to how residents' living patterns affect the retrofitting of traditional homes, initial coding might include "current state of the home," "environmental comfort," "economics and costs," and "behavioral patterns, "Behavioral patterns", "spatial layout", "facilities and equipment", and so on.

The initial coding process emphasizes openness and flexibility, with no preconceived theoretical framework, and is based solely on the data itself (Glaser & Strauss, 1967). At the stage of initial coding, it is important to ensure that no information can be omitted or it will result in capturing data that is not all accurate and losing the potential meaning in the data.

2. SPINDLE CODING

Spindle coding is the second level of coding in root system theory, the goal of which is to elucidate the meaning of various categories, and the conceptual categorization of categories in the open coding is unclear, according to the spindle coding in-depth excavation and construction of the logical relationship between the categories, which will be classified into major categories, the specific process is to merge similar or dissimilar types, so as to get a deeper categorization of the representation. In the stage of spindle coding, the researcher further analyzes and integrates the initial codes to categorize similar concepts and keywords into higher-level themes. This process involves iteratively comparing different codes and recognizing common patterns and relationships (Strauss & Corbin, 1998).

For example, in the coding of the main axis of this study, the initial coding of "how the living patterns of the residents affect the transformation of traditional houses" needs to be further integrated into sub-themes such as "the current situation of

traditional houses", "the living habits and behavior patterns of the current residents", "the demand for living space in modern living patterns", and "the pattern of spontaneous construction". The initial coding of "how residents' living patterns affect the renovation of traditional houses" needs to be further integrated into the sub-themes of "the current state of traditional houses", "the living habits and behavioral patterns of the current residents", "the demand for living space in modern living patterns", and "the pattern of spontaneous construction".

Through spindle coding, it was eventually possible to integrate the scattered concepts of the initial coding phase into a more systematic theoretical framework. Completion of this phase requires a deep interpretation of the data to recognize the logical relationships between the various phenomena in the data.

3. SELECTIVE CODING

Selective coding is the further integration and refinement of the themes identified in the first two stages to construct a coherent theoretical framework. In this stage, the researcher selects the most central themes, analyzes them in detail, and clarifies the relationships between them (Charmaz, 2006). This is the triple code of 'rooted' theory, where the core categories that dominate all categories are uncovered from the main categories and related to other categories to form a new theoretical structure. The purpose of selective coding is to clarify the interrelationships among the main categories, to explore the typical relationship structure of the main categories directly, and to establish the path of action in the repeated generalization and analysis of the main categories. For example, it may be possible to discover in this study how the habits and behaviors of modern people further promote the spontaneous construction and renovation of old dwellings through their influence on the demand for living space.

4. THEORETICAL CONSTRUCTION

In the theory building stage, the core themes and relationships generated in the selective coding stage had to be integrated into a complete theoretical model. This model aims to explain the impact of modern living patterns on the spontaneous transformation of traditional Dali Bai dwellings. The theory building process involves constant comparison and revision to ensure the model's logic and explanatory power (Glaser & Strauss, 1967). The theory building stage is the ultimate goal of rooting the

theory and transforming the data into a coherent theoretical framework through systematic coding and analysis. This phase of the process requires in-depth theoretical analysis and interpretation in conjunction with the research questions and actual data. The systematic theoretical model developed ultimately visualizes the research findings, which can provide a scientific basis for understanding and solving the problem of retrofitting old homes.

3.4.2 Data analysis techniques

1. QUALITATIVE ANALYSIS SOFTWARE

This study used qualitative analysis software (e.g., NVivo) for data management and analysis.NVivo software provides powerful coding, querying, and visualization functions that can effectively support the processing of large-scale qualitative data.

Coding Function: The NVivo software allowed the researcher to code the text line by line and group similar codes into nodes (Node). This feature helps to systematically organize and manage large amounts of interview data.

Query function: Through the query function, the researcher can retrieve and compare the relationship between different nodes and identify patterns and trends in the data. For example, the researcher can query all codes related to "motivation to remodel" and analyze the views of different respondents on this topic.

Visualization features: NVivo software provides a variety of visualization tools such as coding matrices, thematic maps, and relationship maps to help researchers visualize patterns and relationships in the data. These visualization tools help to gain a deeper understanding of complex qualitative data.

2. CODING FRAMEWORK

A coding framework is an important tool to guide data analysis. The researcher designed a multilevel coding framework that includes initial coding, cluster coding, and selective coding based on rooted theory and research questions. This framework ensured a systematic and scientific approach to data analysis.

Initial Coding Framework The initial coding framework includes a wide range of concepts and keywords designed to maximize the information captured in the data, the cluster coding framework categorizes the initial codes into higher-level themes,

and the selective coding framework further refines and integrates the cluster codes to construct core themes and relationships to form the final theoretical model.

In summary, this study systematically analyzed the data on residents' self-organizing behaviors in the process of renovation and new construction of traditional Dali Bai dwellings through a rooted theory approach, combined with qualitative analysis software and a coding framework. Through the four stages of initial coding, cluster coding, selective coding, and theory construction, the researcher gradually refined the core themes and relationships and constructed a theoretical model to explain residents' self-organizing behaviors. This process ensured the systematic, scientific and logical nature of the data analysis, and provided important theoretical support for understanding the current situation and renovation of traditional Dali Bai dwellings.

CHAPTER 4

DATA ANALYSIS

In this section, the current situation of traditional residences in Dali Xizhou Town and Fengyangyi Village will be analysed in detail by combining interview texts and current photographs, and the main problems and needs will be extracted from the coding results in order to better understand the impacts of modern living habits and behaviours on the transformation of traditional residences. Bai folk dwellings are composed of 'workshops', with different workshops enclosing courtyards, and the courtyards are interconnected to form villages. Bai folk houses not only meet the needs of daily life, but also demonstrate architectural skills and handicrafts, which is an important manifestation of intangible cultural heritage and has high cultural value.

Through visits, it was found that nowadays, different families may be living in each 'workshop' of a Bai house, and a house consists of many families (Figure 4.1). The reason for this is the government's policy of adjusting and redistributing land ownership and use rights during the land reform period. For a traditional architectural form such as the Bai hutong, the land reform allocated it to multiple families, which led to the division of the originally unified living space. Multiple families sharing a compound may need to share common facilities such as kitchens, toilets, and wells. Land reform has led to an increase in the number of families living in the same compound, thus increasing the density of living. This may have implications for quality of life, sanitation and privacy.

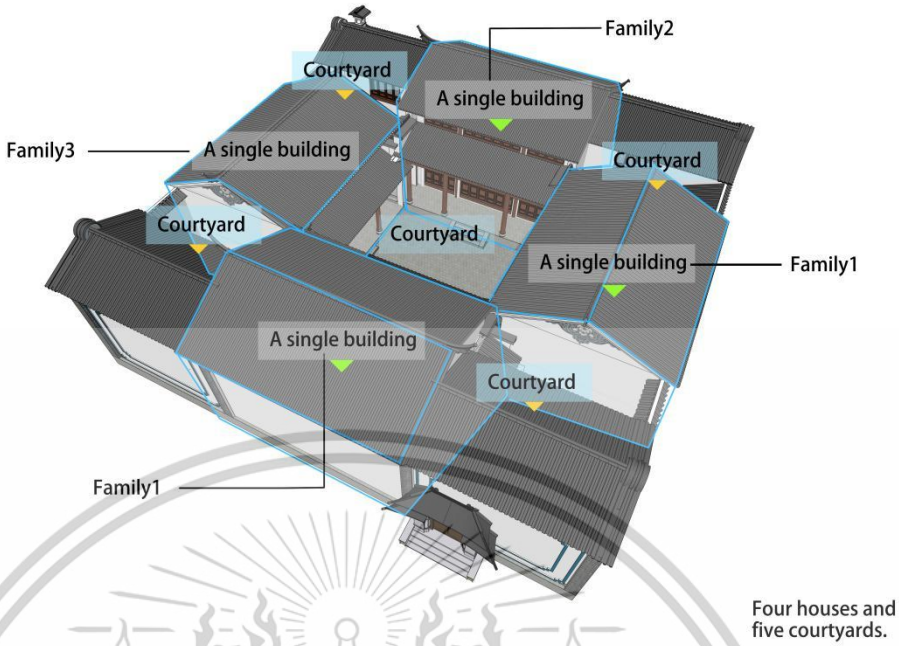


Figure 4.1 Density of living in the white colony, photo credit: author's own drawing

4.1 COLLECTION OF RESEARCH DATA

This study collects the living experiences and renovation needs of the current residents of 10 traditional Bai dwellings in Dali Xizhou Town and Dali Fengyangyi Village through semi-structured interviews and field observations, focusing on the question "How do the living habits and behaviors of modern people affect the renovation of old dwellings? From 2021 to 2024, the researchers conducted five in-depth surveys in Dali Xizhou Town and Dali Fengyangyi Village, recording the current situation of the local houses and conducting in-depth interviews with the residents. Interviews were conducted with long-term local residents, and each interview lasted 60-90 minutes, with photographs and audio recordings taken during the research. Subsequently, the audio recordings of the interviews were transformed into written materials, and a total of more than 15,000 words of Chinese text were compiled.

Bai residential mainly consists of a single building and courtyard space, there are several basic forms: ‘one chambers and two ears’, ‘two chambers and two ears’, ‘three chambers and screen wall’, ‘four pavilions and five open yards’, “six combinations in spring” and so on. The main house and the two bedrooms are arranged in different locations. On the left and right sides of the main house, there are

smaller ear rooms, the number of which depends on the plot and the depth of the side houses, and is usually one to three. The ear rooms are flush with the back wall of the main house, and their width, depth, opening and height are smaller than those of the main house, and they are used for subsidiary functions.

The 'three chambers and screen wall' is the classic work of the whole Bai residential complex. The whole layout consists of three squares with two-storey buildings, a large and two small three courtyards, a wall and a garden.

The difference between 'four pavilions and five open yards' and 'three chambers and screen wall' is that the main house is replaced by one of the chambers. The courtyard is formed by four main houses surrounded by a small ear room and a small patio at the junction of every two houses, four in total, also known as the leaky corner patio, plus a large patio in the middle, a total of five pavilions and five open courtyards, hence the name of the 'four pavilions and five open yards'. The four sides of the courtyard building in front of the front gable columns are placed in front of the building columns, and the building inserted and connected to it, constituting the upper and lower two heavy eaves type roof, the waist under the eaves to form a spacious corridor, the Bai people called 'eaves platform'. The 'Eaves Terrace' is the main activity space of Bai household life. Normally, it is the place for Bai people to live, relax and engage in household activities. During festivals, it is also a place for entertaining honoured guests. Through the visit, it was found that even now the Bai residents still retain this habit, and even the remodelled houses use this corridor to design a resting place. (Figure 4.2)

Figure 4.2 A spacious corridor is formed under the waist eaves, which the Bai people call the "eaves terrace"

Many of my interviews have also been done in such corridors, and I can see that White people place seats under such corridors. Daily use is high.

4.2 ANALYSIS OF THE CURRENT SITUATION OF THE STUDY POPULATION

Bai Traditional Residential Buildings, as the residence of Bai people, fulfil the material needs of people's life and production. However, with the improvement of living standards and the advancement of construction level, the original residential buildings were left unused because of various problems brought about by the contradictions of modern conflicts, and the villagers' attitudes towards the traditional residences were mostly choosing to build new houses by themselves or relocating them (Figure . 4.3). The following problems were found in the field research:

1. Serious deterioration of buildings: due to the age of the traditional residence and the relocation of the population, many buildings have not been maintained in a timely and effective manner, and have been damaged to different degrees due to wind and rain erosion and insect infestation, and some of them have become dangerous houses due to the collapse of the structure of the house.

2. Outdated spatial layout and simple facilities: Compared with modern life, the spatial layout is outdated and single-functional, and the indoor facilities of some houses are simple and lack of modern living equipments and facilities, which affects

the livability of the houses.

3. Aging materials: traditional residences are mainly made of adobe, wood, bricks and tiles, etc. These primitive natural materials are subject to certain limitations due to the influence of the environment and time. The outer walls of building adobe are easy to fall off, timber is prone to deformation, cracking, insect infestation, corrosion, mould, etc. Bricks and tiles weather over a long period of time, requiring stage-by-stage maintenance and repair. Many primitive residential buildings have problems such as ruined wooden structures and collapsed and leaking roofs.

4. Alienation of architectural styles: the number of villagers‘ self-built houses has increased since 2000, and the use of modern architectural forms and decorative materials in some of them has led to architectural styles that are very different from those of Bai Traditional Residential Buildings, and the architectural styles of Bai Traditional Residential Buildings have been alienated, thus affecting the wholeness, unity and cultural nature of the Bai Traditional Residential Buildings, and weakening the Bai Traditional Residential Buildings’ cultures and characteristics.

Figure 4.3 Traditional residence damage, collapse and new construction, photo credit: author's own photographs.

In this study, 10 dwellings were selected as a sample to ensure that each dwelling was representative to some extent of the different situations in the study area. The selected samples were analysed for their current conditions through image

recording and observation.

In order to systematically manage and cite the residential houses in different regions, a uniform numbering rule was adopted. Area code, which is used to identify the area where the dwellings are located. Serial number is a two-digit serial number starting from 01, which is used to identify different dwellings.

The specific numbers are listed below:

Xizhou (XZ): The houses in Xizhou Old Town are prefixed with "XZ" and numbered sequentially from "XZ-01".

Bongyang-eup (FYY): Residences in Bongyang-eup are prefixed with "FYY" and numbered sequentially from "FYY-01".

The following is an example record of a research subject.

- Place of interview: Mr Zhang's house （XZ-01） , Xizhou Township, Dali.
- Interview time: 5 October 2023, 14:00-16:00 am.
- Household head: Mr Zhang, 45 years old
- Recording method: Audio recording and handwritten notes.
- Environmental Description:

The residence is mainly inhabited by the head of the family and his lover, it is the main square in the ‘three chambers and screen wall’, the ear rooms on both sides have been damaged because of no one lives there, the screen wall is also damaged, the whole courtyard is not quite complete. However, the main square of Zhang's house has been renovated and repaired 4 times, the building as a whole is better preserved, and the courtyard has been cleaned up, and the ground has been poured with cement, so it is not easy for Zhang to get rid of weeds. The renovated house is mainly for the head of the family and his lover to return to his hometown to visit his family, the head of the family's 80-year-old father has moved to his new house, only 100 metres away from the old house. The head of the family works in a government department in the city and does not often come back to the old house during working hours, but only comes back to live during breaks and family visits. This house is mostly used on the ground floor with a main house and two bedrooms. The entire facade of the building was renovated, windows and doors were replaced, beams were refurbished, tiles were replaced and the interior spaces were redecorated.

Figure 4.4 The building exterior of the old house has been renovated, the wooden structure of the house remains unchanged, mainly painting the walls, replacing windows and doors, replacing tiles

The main house on the ground floor has been renovated with a wooden flat ceiling, painted walls and tiles for easier cleaning. The main house has been furnished with a TV, sofa and coffee table, which has functioned as a living room, and the decoration and layout are in line with Modern Lifestyle Mode. On the left and right sides are two bedrooms, with a lot of space, fully meet the function of use, the bedrooms are able to place wardrobes, desks, beds and so on. The bedrooms have plasterboard ceilings, white latex paint on the walls, and tiles on the floor as in the living room, which enhances the quality of the overall living environment, and the space appears open and bright, the only problem is that the ceiling of the main house on the ground floor is on the low side, and the floor height is short. The whole interior space is not to see the sense of history of traditional residence, for this 200 years old building, the renovation is very successful.

Figure 4.5 main room on the ground floor

Figure 4.6 Ground floor bedroom

The kitchen and toilet are newly built by ourselves, set in the entrance of the door in the courtyard, which has the function of use, but is far away from the living area, and the movement line is not convenient enough. There is no separation of indoor and outdoor functions, and the courtyard must carry the function of passing from the bedroom to the kitchen and bathroom in addition to leisure. In that case, you still need an umbrella to go to the kitchen and bathroom on a rainy day.

Figure 4.7 Kitchen and bathroom

The stairs between the first and first floors are very narrow, making it difficult for the elderly to move around. The first floor retains the original ancestor rows for worship, and the whole family comes to worship their ancestors on New Year's festivals, and the first floor is mainly used for ancestor worship at present. One wall was removed from the first floor to make the space open and bright, and only one

unused bedroom was kept, with a shrine and a desk placed in the open space, which functioned as a shrine and a study. On the first floor, wooden cabinets were made under the windows to increase the storage capacity. The building structure is a big building with deep eaves, so there is a lot of storage space.

Figure 4.8 The very narrow and steep staircases on the first and first floors of the Link, the photo angle was taken from the first floor down.

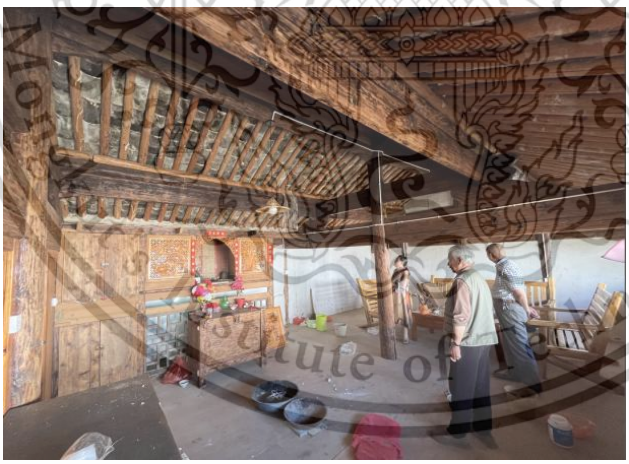


Figure 0.9 On the second floor, one wall was removed to make the space open and bright, and only one room was kept, which is now a storage room. In the picture, there is a shrine on the left and a desk on the right, where the old man of the family used to write with a brush. The beams and pillars of the house have been polished and are not so old.

Figure 4.10 The bedroom on the first floor, positioned to the left of the shrine, is separated by wooden panels and is poorly soundproofed.

Figure 4.11 Storage cabinets on the second floor, under the windows, are made into wooden storage cabinets.

Interview content:

1. Does the scale of the building meet the current living or production needs?

A: 'The original kitchen and bathroom were separate and inconvenient to use. The kitchen before our renovation was very small and the bathroom was outside the courtyard. Now the new bathroom is wet and dry, and is large enough for a washing machine. And the kitchen and bathroom are next to each other, which basically meets the needs of life. However, it is far away from the bedroom, so every time I go to the bathroom, I have to cross the courtyard, which is not very convenient. It is even more inconvenient to go to the toilet when it rains.'

2、 What are the shortcomings in the functionality of the space? What space

can be added? Does the area meet the use?

A: 'The space of the building is divided into bedroom, living room, kitchen, bathroom, shrine, storage room and courtyard. The area is all sufficient and the courtyard is large. The ground floor of our house is the main house and two bedrooms, which are mainly occupied by our children. The first floor is for the elderly. We removed a wall on the first floor ourselves, and the space seems larger, creating an open study. There is a shrine on the first floor and a storage function. In Bai Residential Buildings, whether it's a new residence or an old traditional residence, we keep shrines in each family.'

3. Is there anything unreasonable in the spatial layout? (Unreasonable layout may lead to unreasonable living activity lines, which can be considered from the perspective of living behaviour)

A: 'The layout of the old house is unreasonable. The kitchen and bathroom of the old house are outdoors, in the courtyard, far away from the living area, and inconvenient in terms of using the moving line. The staircases in old houses are steep and narrow, with limited space in the stairwell. Nowadays, new houses have integrated the kitchen and bathroom into the interior, realising the separation of the functions of indoor space and outdoor space. The outdoor courtyard is planted with flowers and plants to satisfy leisure, and such functional division is more in line with modern living habits, and the indoor space is more functional and tidy and hygienic.'

4. What are the infrastructures that need to be improved? Is it safe and comfortable? What are the problems with water, electricity and heating? For example, is the hot water solar, electric or gas? What do you use for cooking? (induction cooker, gas cooker, traditional cooker)

A: 'Cooking used to be done with a cooker that burned wood. Now it has been changed to induction cooker or liquefied petroleum gas. Nowadays, water and electricity are all connected, and although the old house does not have heating facilities, it is warm in winter and cool in summer. Water heaters have also been installed, making it easy to take a bath. The basic facilities have been improved.'

5. Private and open spaces

What do you think are private spaces and what are open spaces? What kind of activities take place in these spaces?What are your thoughts on the privacy and

openness of spaces in traditional residences?

A: 'Generally bedrooms and bathrooms should belong to private spaces, and living rooms and courtyards belong to open spaces, but bathrooms in old houses are usually in courtyards, and if bathrooms can be next to bedrooms, they will be more private and easier to use.'

6. Aesthetic concepts (stemming from villagers' aspirations for better quality of life, but also reflecting regional or foreign cultures)

What do you think are the most important Bai features in building houses? Are these architectural features mainly considered for use function or for aesthetics? Do you prefer traditional residence forms or modern building forms?

A: 'Families with financial means consider both functionality and aesthetics, while those without financial means consider adding some decorations to enhance the aesthetics and reflect the ethnic characteristics under the condition that the use function is perfect. Before the Republic of China did not pay attention to the form of housing, the late Republic of China 1930-1940, the form of traditional residence, and the people who pay attention to the large frontage, large courtyard. Now remodelling words also need to consider the budget, 100,000 can be aimed at the door decoration, facade beautiful atmosphere, 150,000 can be considered as a wall also need to pay attention to. White folk dwellings have 'out of the building', is a large out of the building or small out of the building depends on the owner's preferences.'

'For now the new modern buildings are more reasonable and suitable for living.'

7. Do you think there needs to be uniformity in the style of buildings in the village? Or are they built according to each family's wishes?

A: 'The style needs to be unified. Although people are remodelling according to their own wishes, without professional guidance, it can lead to many problems after remodelling. For example, the drainage system of bathrooms is often clogged, cracks in walls need frequent repairs, and roofs are prone to leakage. There is also the fact that it is easy to cause the style of the buildings to become inconsistent, and the village just doesn't look good.'

8. Are villagers concerned about or aware of building appearance? Will the Government control the appearance of the village?

A: 'The government will intervene in architectural style and village appearance. For example, buildings cannot exceed two storeys and must have sloping roofs. Traditional forms and decorations have to be preserved.'

9、 What suggestions or ideas do you have for the renovation and design of traditional residences in the countryside under the Modern Lifestyle Mode? How do you think about the retention or removal of traditional old buildings? Should they be remodelled or demolished and rebuilt? What are your views on the comfort of the old traditional buildings, and the comfort of the new contemporary self-built residences?

A: 'In fact, most of the villagers will want to demolish the old houses to build new ones, because the newly built houses are better to live in, and even the remodelled old houses are not as good to live in as the new ones, and the wooden structures will still rattle, and the cost of maintenance is also high.'

Interview Findings:

Mr Zhang believes that the traditional layout, although culturally valuable, is not practical. He hoped that the house could be made more comfortable through remodelling. He also pointed out that due to the lack of professional design guidance, a lot of difficulties were encountered during the remodelling process. He said that he valued the preservation of traditional culture, such as the preservation of the ancestral hall and the traditional architectural style. Mr Zhang's house exemplifies the conflict between tradition and modern needs. His remodelling efforts demonstrate the spontaneous building behaviour of residents driven by functional needs. His emphasis on cultural preservation and pursuit of quality of life reveals the common need of Bai residents for a balance between culture and modernisation. Interviews revealed that residents showed a high degree of flexibility in spontaneous remodelling, but the lack of planning resulted in poor quality remodelling for long-term use.

4.2.1 Analysis of the Current Situation of Residences in Xizhou Township

1. RESIDENCE XZ-01

(1) Residence

Table 4.1 Occupancy statistics for XZ-01

Head of Household Information	Mr Zhang, 45 years old, male
Careers	government employee
Occupants and users	Head of household and his lover
Frequency of use	Lived here since childhood, went to work in the city center for the municipal government, and now lives here mainly during breaks and visits to family.

(2) Architectural overview

Table 4.2 XZ-01 Building Summary Statistics

Building type	The main square in the Three Chambers and Screen Wall
Damage	Damage to the two side chambers and the wall, the whole compound is incomplete
Maintenance	The main square has been renovated and repaired 4 times, the building is well preserved as a whole, the floor of the courtyard has been poured with cement to prevent weeds from growing, and the tiles have been replaced with cement tiles

(3) Floor plan

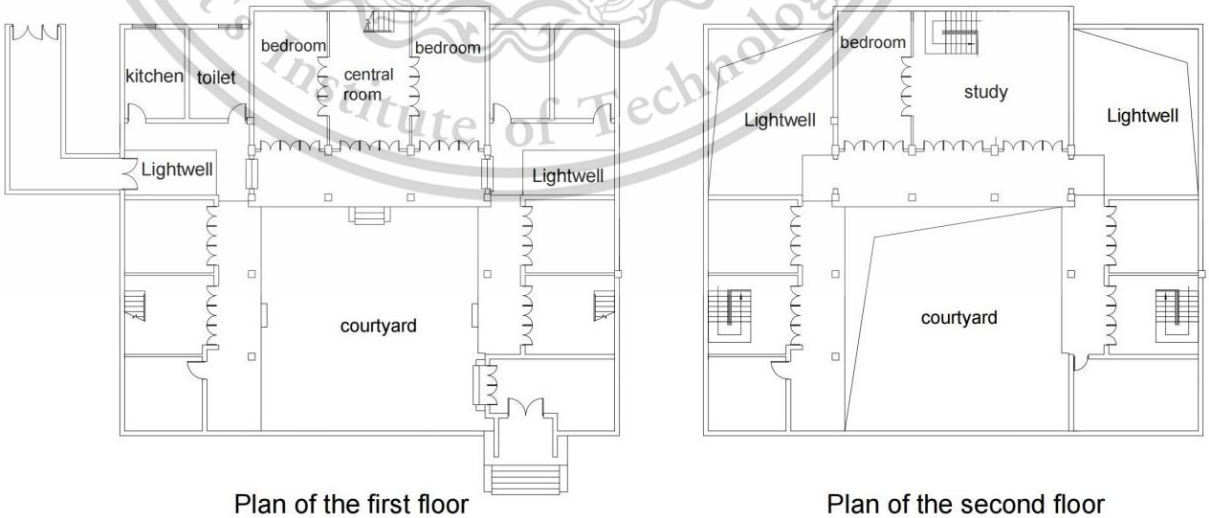


Figure 4.12 Plan of XZ-01, source: author's own drawing

(4) Spatial analysis map

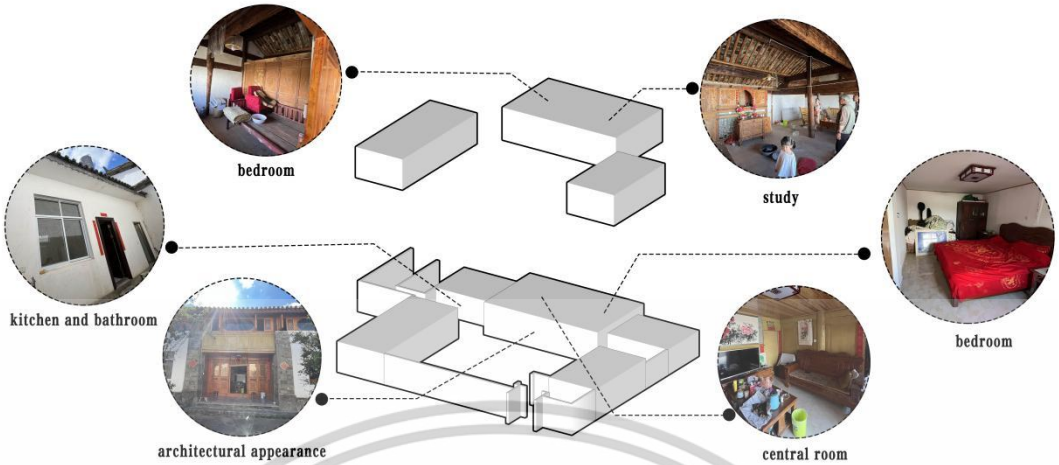


Figure 4.13 Spatial analysis of XZ-01, source: author's own drawing

(5) Status of residential buildings

Table 4.3 XZ-01 Building Summary Statistics

functional zone	Description of the current situation	Map of the current status of each space
Building exterior	Wooden structure of the house remains unchanged, painting of walls, replacement of windows, doors and tiles	
First floor parlor	Hanging wooden flat roof, painted walls, tiled floor. The hall is used as a living room with a TV, sofa and coffee table, which is in line with modern living patterns.	

Table 4.3 (Continued)

First floor bedroom	Two bedrooms with plenty of space for closets, desks and beds. Plasterboard ceiling, white emulsion paint on the walls and tiled floor. The overall living environment is enhanced and the space is bright. The only problem is that the ceiling of the hall is low and the floor height is short	
Kitchen and bathroom	Newly built at the entrance of the compound, fully functional, wet and dry bathrooms are separated, but the line of movement is inconvenient, especially in rainy days, you need to use umbrellas to get there	
Staircases	Narrow and steep, mobility problems for the elderly	

Table 4.3 (Continued)

Second floor	The second floor is the main ritual function, retaining the ancestor rows, which are used by the whole family to pay tribute to their ancestors during festivals. After removing one wall, the space is opened up and an unused bedroom is kept. In the open space, a shrine and a desk are placed, which can be used for both worship and study.	
Second floor bedroom	Bedrooms on the second floor: only one bedroom is retained and is poorly soundproofed	 
Hoard	Wooden storage cabinets underneath the cornice for added storage	

Images are from the author's own photographs

(6) Remodeling needs

Mobility Optimization: In order to improve living convenience, it is recommended that the kitchen and bathroom be converted to indoor facilities to avoid inconvenience during inclement weather;

Living environment for the elderly: To accommodate the mobility of the elderly, consideration can be given to installing an elevator or changing the living area for the elderly to the first floor;

Soundproofing Retrofit: The second floor bedrooms are poorly soundproofed and soundproofing retrofit is recommended to improve living comfort;

Sense of history preservation: While modernizing, the historical elements of some traditional houses are appropriately preserved to give them historical and cultural value.

1. RESIDENCE XZ-02

(1) Residence

Table 4.4 XZ-02 Occupancy Statistics

Head of Household Information	Mr Zhang, 51 years old, male
Careers	Catering industry, own small restaurant
Occupants and users	Head of household and his/her loved ones and children
Frequency of use	Owned for 31 years, used daily, long term residence

(2) Architectural overview

Table 4.5 XZ-02 Building Summary Statistics

Building type	Three Chambers and Screen Wall, a street name in Suzhou, Jiangsu province
Damage	The overall integrity of the compound and the unity of the architectural style
Maintenance	The building as a whole is well-preserved, the courtyard floor is well-preserved with green stone slabs, and the residence has been repaired many times, and the tiles have been replaced with cement tiles.

(3) Floor plan

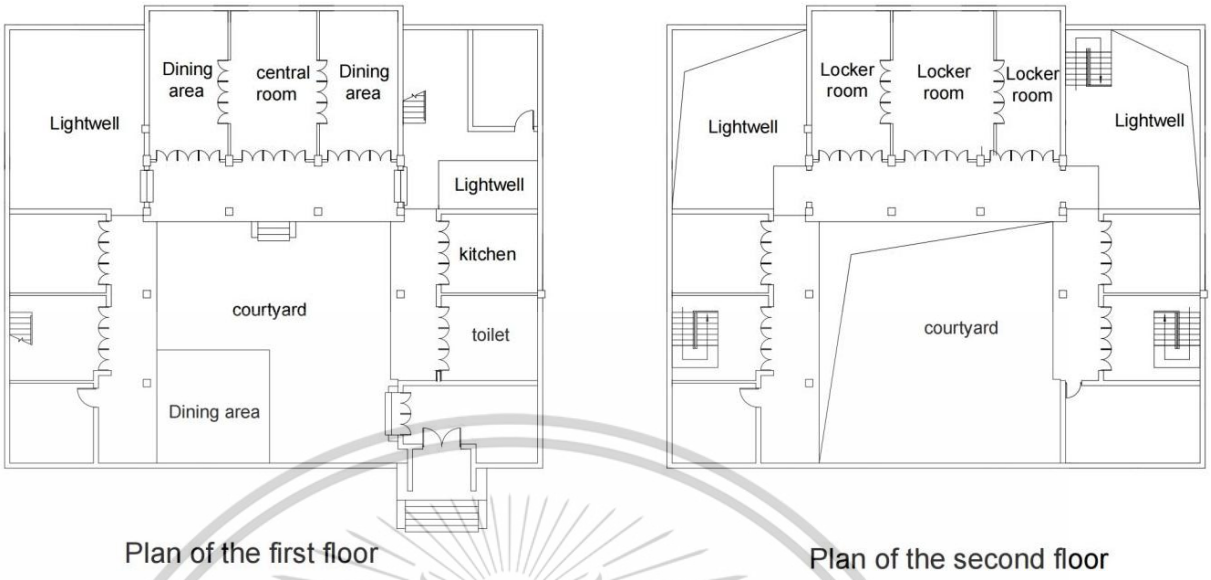


Figure 4.14 Plan of XZ-02, source: author's own drawing

(4) Spatial analysis map

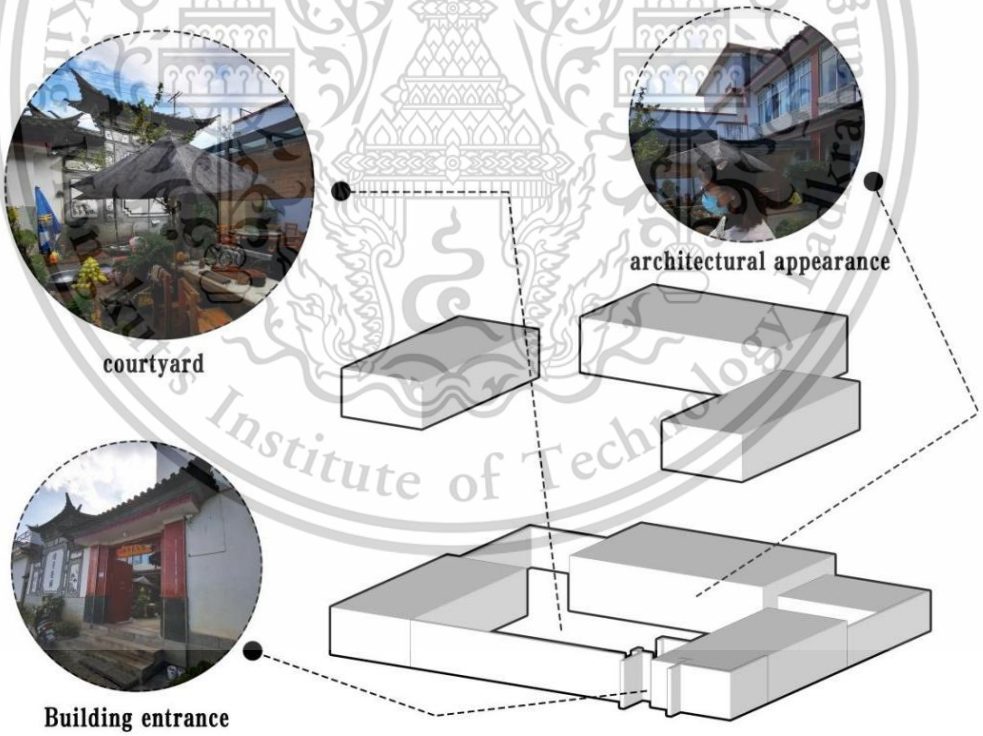


Figure 4.15 Spatial analysis of XZ-02, source: author's own drawing

(5) Status of residential buildings

Table 4.6 Status of residential dwellings in XZ-02

Functional zone	Description of the current situation	Status chart
Courtyard	The courtyard is designed as a dining area in the style of the Bai people.	
First floor parlor	The parsonage now houses ancestral tablets and piles of disposable dishes, forcing it to become a storage room.	
Staircases	An exterior staircase was added to the patio; the original staircase was too narrow and steep, and the new staircase has a gentler slope and is easier to use, but has a larger footprint, so the addition was built on the exterior of the building.	
Restrooms	Restrooms are built in the courtyard, with an addition at the patio, and the restrooms are separated from wet and dry toilets. Abolish the dry latrine and pigsty at the patio.	
Kitchen	The existing kitchen is small and heavy with grease and smoke, which affects health. Uncle Cheung wishes to remodel his house, live by himself and do some simple takeaways, so he needs a large kitchen and a large storage room.	
Staircases	Second floor stairs: narrow and steep, mobility problems for the elderly	

Table 4.6 (Continued)

Second floor	The second floor is mainly used for miscellaneous storage.	

Images are from the author's own photographs

(6) Remodeling needs

Kitchen: a larger, more efficient kitchen with proper ventilation is needed to minimize the health effects of fumes.

Storeroom: A spacious and clean storage room is needed to support the take-out business.

Bathroom: The bathrooms have been improved and built into the courtyard, separating wet and dry for easier use.

Stairs: new exterior stairs are easier to use, but take up more space and require exterior adjustments.

Dining area: although a large dining area is not required, the courtyard dining area retains the traditional beauty of the Bai ethnic group and needs to be retained or improved.

2. RESIDENCE XZ-03

(1) Residence

Table 4.7 XZ-03 Occupancy Statistics

Head of Household Information	Mrs Zhang, 78 years old, female
Careers	Unit retirement
Occupants and users	Head of household and his lover
Frequency of use	In the residence to live more than 40 years, in recent years relocated to the city son's home, the old residence usually ancestor worship will come back to live.

(2) Architectural overview

Table 4.8 XZ-03 Building Summary Statistics

Building type	Four pavilions and five open yards
Damage	Overall integrity of the compound, the interior spaces have not been completely restored and remodeled
Maintenance	Elderly have fewer usage needs and fewer remodeling components, mainly kitchen and living room remodeling

(3) Floor plan

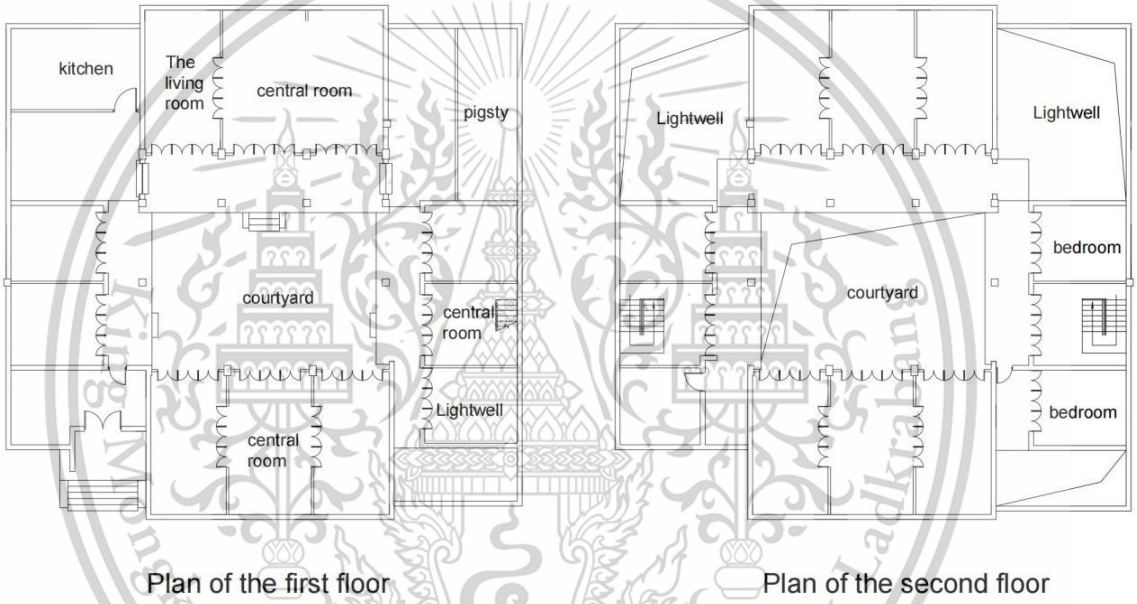


Figure 4.16 Plan of XZ-03, source: author's own drawing

(4) Spatial analysis map

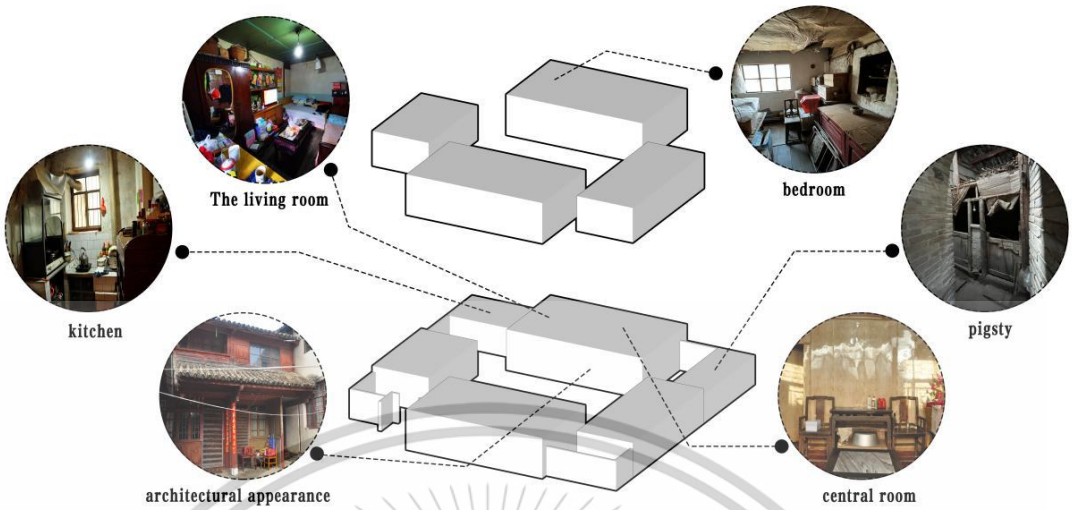


Figure 4.17 Spatial analysis of XZ-03, source: author's own drawing

(5) Spatial functions

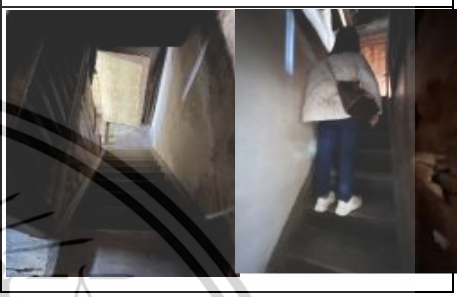
Table 4.9 Status of Residences in XZ-03

Functional zone	Description of the current situation	Status chart
Building Exterior	The exterior of the building has not been overly repaired other than repairing leaking shingles.	
Pigsty	The pigsties have been abandoned, not converted into other usable space, and are now derelict.	
First floor parlor	The first-floor parlor is used only for guests, not for living, and is dim and small, making it uncomfortable.	

Table 4.9 (Continued)

First floor living room	The first floor living roomBuilding Exterior, which is the main living space, was remodeled to have a bed, sofa, and TV to equal a living space. The walls were repainted with latex paint and the ceiling was hung, but the interior lighting was dim.	
Kitchen	A kitchen has been added at the patio, which is spacious but uncluttered, with amenities including an induction cooktop and LPG stove. The walls and cooktop are tiled for easy cleaning.	 
Courtyard	The courtyard is in a complete state of preservation, with clean slate, but is small and not functional.	
Shrine	The shrine is on the second floor, where you usually come back to worship your ancestors. The second floor is not used for living, but only for ancestral rows.	

Table 4.9 (Continued)

Second floor bedroom	The second-floor bedroom, which had been deserted as a utility room, was re-cemented with a flat roof and glued with bamboo mats and paper, but the roof is now yellowed and peeling.	
Staircases	The stairs from the first floor to the second floor are narrow and steep, with narrow treads, making it inconvenient for the elderly to use them.	

Images are from the author's own photographs

(6) Remodeling needs

Kitchen: Needs a tidier kitchen with additional modern cooking facilities.

Bathroom: Additional toilets and showers are needed in the home to enhance the ease of living.

Parsonage: The parsonage needs improved lighting and comfort to make it more suitable for daily living.

Living Room: Improve the quality of life by improving the lighting in the living room.

Staircases: Staircases have been redesigned to make it safer and easier for the elderly to go up and down the stairs.

4.RESIDENCE XZ-04

(1) Residence

Table 4.10 XZ-04 Occupancy Statistics

Head of Household Information	Mrs Li, 54 years old, female
Careers	Retired and rehired to work in the logistics department of a college, primarily in the university's cafeteria
Occupants and users	Head of household and his/her loved ones and children
Frequency of use	Residing in the home for more than 30 years, permanent residence

(2) Architectural overview

Table 4.11 XZ-04 Building Summary Statistics

Building type	East and West of the Three Chambers and Screen Wall
Damage	The residence is in good condition, the exterior of the building is in good condition, the courtyard is clean and tidy, and the courtyard is slightly cluttered with clotheslines and clothing.
Maintenance	The roof was replaced with concrete tiles and the interior redecorated. 13 years ago the patio was closed off at the patio and two new floors of usable space were created, including a bathroom, kitchen, staircase, and shrine.

(3) Floor plan

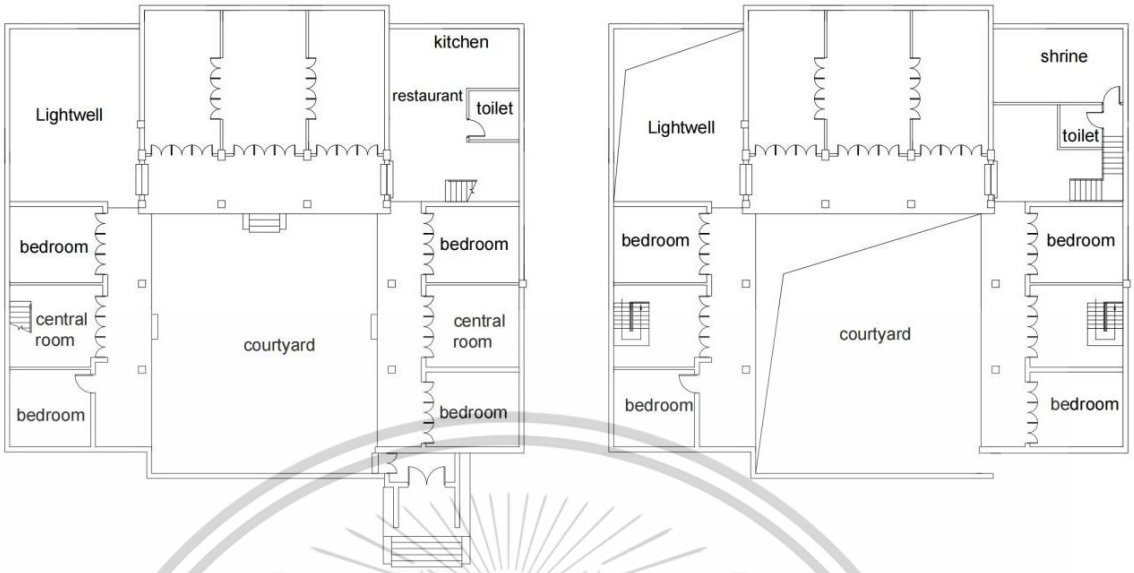


Figure 4.18 Plan of XZ-04, source: author's own drawing

(4) Spatial analysis map

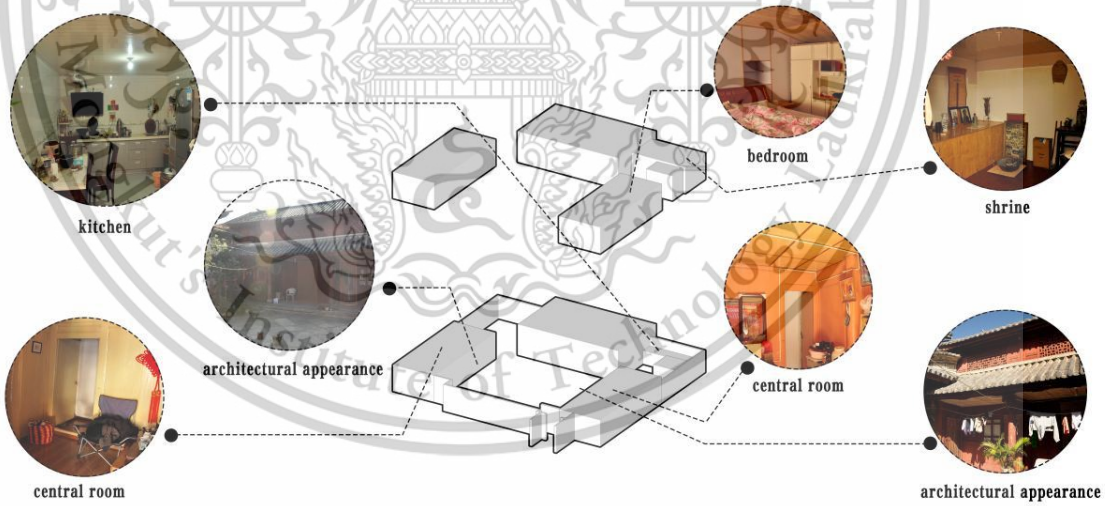


Figure 4.19 Spatial analysis of XZ-04, source: author's own drawing

(5) Status of residential buildings

Table 4.12 Status of Residences in XZ-03

Functional zone	Description of the current situation	Status chart
Architectural style	Roof tiles have been replaced with concrete tiles. Interior walls were painted, wood floors were re-tiled, and ceilings were re-roofed. The courtyard is tidy and the building looks good. Drying of clothes in the courtyard is somewhat disorganized.	
The main hall on the first floor of the east side	The first-floor hall became a pass-through space that also functioned as a storage room, and the hall mainly housed ancestral tablets and miscellaneous items.	

Table 4.12 (Continued)

Living room on the first floor of the East Wing	The original first-floor bedroom was converted into a living room to house a sofa and TV. Becomes the main public resting space	
Bedroom on the second floor of the East Wing	The two bedrooms on the second floor where the elderly live, wood paneling for ceiling and siding, appearing to be a neat space, with recessed shelves on the walls. Use area and floor height are satisfied.	
East Place Stairwell	First floor access to second floor bedrooms is via an interior staircase at the back of the hall, which is narrower and steeper, with narrower stair treads.	

Table 4.12 (Continued)

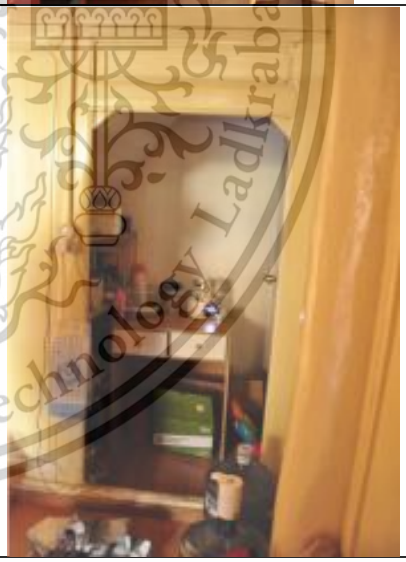
West Place Hall and Bedroom	The first floor parlor of the West Workshop houses children's toys and mainly caters to the entertainment of the youngest grandchildren. It is also the passing space from the yard to the first and second floors. The bedroom is a room for the son's family.	
West Place Storage and Pantry	Under the stairwell on the first floor of the West Workshop was transformed into a small storage room, and a small table was placed to form a simple pantry.	

Table 4.12 (Continued)

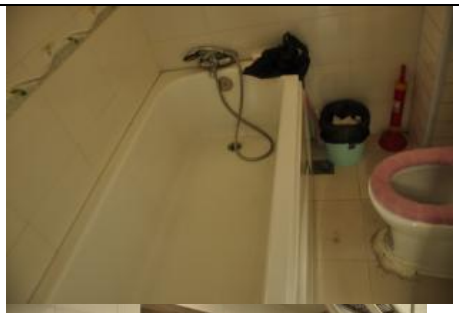
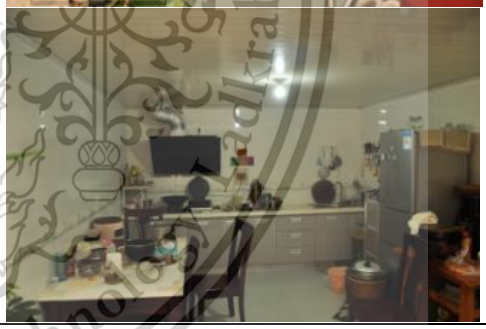
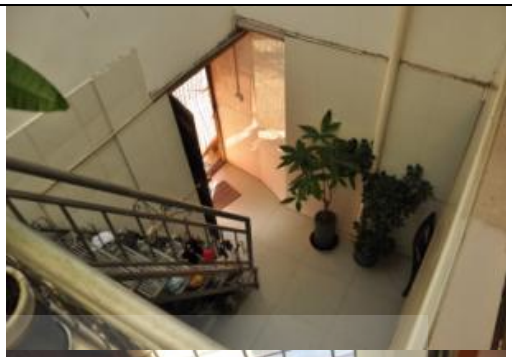
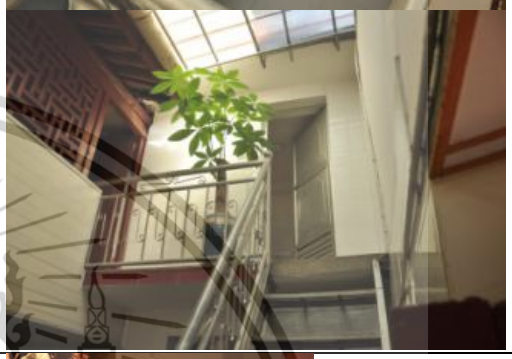
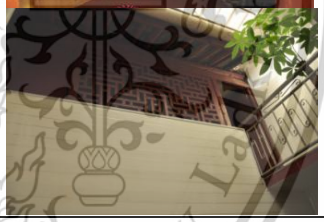
Patio area remodeling bathroom	The patio area has a new upper and lower level with a new bathroom on each level, a wet/dry bathroom on the first floor and a separate bathroom on the second floor.	 
Patio area remodeling kitchen	The first floor of the patio area was transformed into a modern kitchen, tiled and customized with modern cabinets to house the refrigerator and dining table, with the kitchen and dining area as one.	 

Table 4.12 (Continued)

Patio area remodeling stairs	The patio remodeled kitchen and bath space is easy to use in terms of movement lines, and is topped with a glass light roof, which provides good light throughout the space. There is also a new exterior steel staircase, which is very convenient in terms of mobility.	 
Patio area remodeling shrine	A small room was also built next to the bathroom on the second floor of the patio, dedicated to the Ancestors' Row	 

Images are from the author's own photographs

(6) Remodeling needs

The current state of preservation of the converted dwellings is good, and the remodeling is reasonable, so it is possible to continue to maintain the existing functional zoning, increase storage space as appropriate, and ensure a tidy living environment. Continue to optimize the configuration of kitchens and bathrooms to ensure wet and dry separation and good ventilation. Keep the interior clean and comfortable, regular maintenance and renovation to ensure long term use. Later on, we can consider optimizing the functional area for drying clothes.

5.RESIDENCE XZ-05

(1) Residence

Table 4.13 XZ-05 Occupancy Statistics

Head of Household Information	Mrs Zhao, 60 years old, female
Careers	None, recycled scrap
Occupants and users	Head of household and his 87-year-old mother
Frequency of use	Lived here since birth, long time resident

(2) Architectural overview

Table 4.14 XZ-05 Building Profile Statistics

Building type	The main square in the Three Chambers and Screen Wall
Damage	The building is structurally sound but in a slightly dilapidated state overall. The doors and windows are old and retain traditional flower windows. The wall is damaged and the gate of the courtyard is destroyed. The second floor of the residence is now a utility room, which is difficult to use due to the narrow and steep staircase.
Maintenance	Repairs have been made several times, mainly to replace the concrete tiles as they would leak if not replaced. In order to expand the area and increase the light, a bedroom on the first floor was added with glass. The kitchen was remodeled on the basis of the original pigsty, and the bedroom was simply decorated and fitted with wooden flooring.

(3) Floor plan

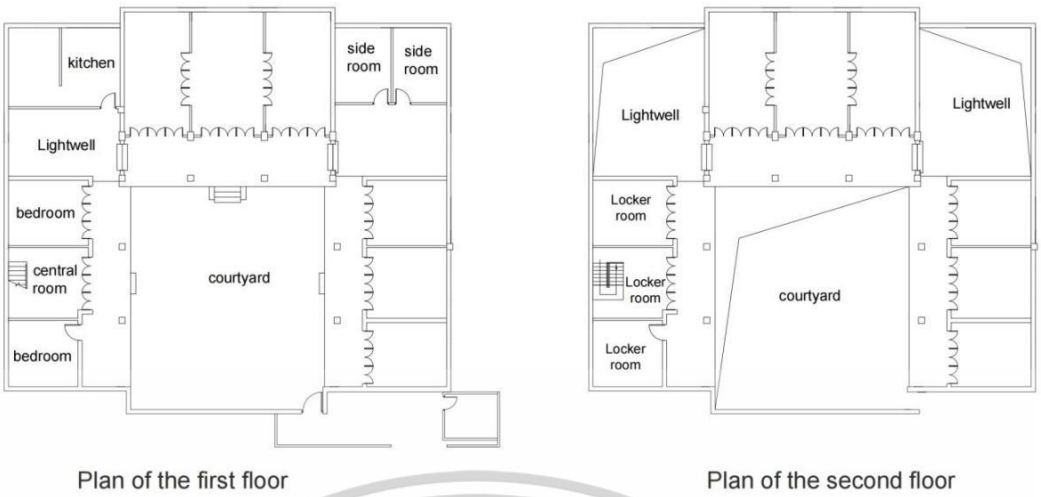


Figure 4.20 Plan of XZ-05, source: author's own drawing

(4) Spatial analysis map

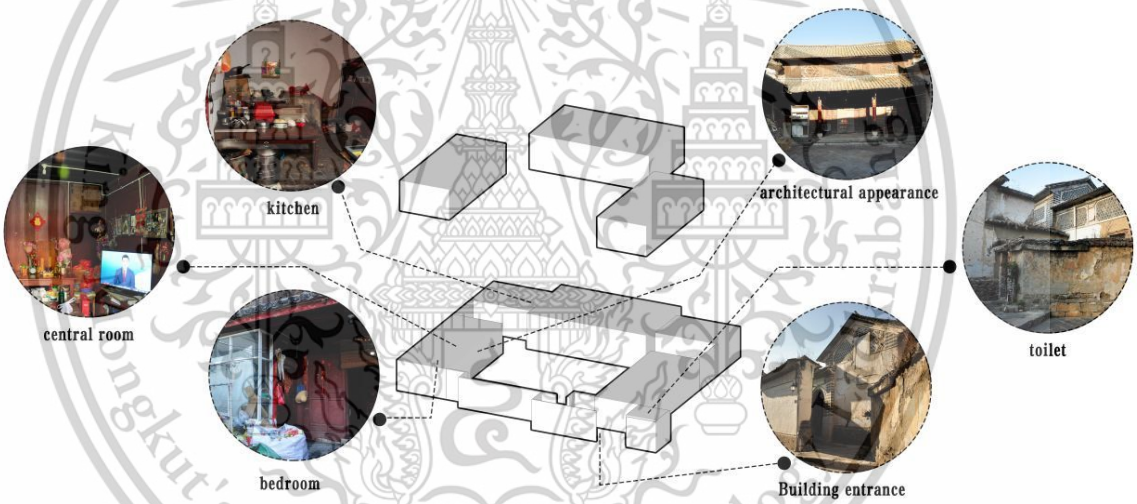


Figure 4.21 Spatial analysis of XZ-05, source: author's own drawing

(5) Status of residential buildings

Table 4.15 Status of residential dwellings in XZ-03

Functional zone	Description of the current situation	Status chart
Building Exterior	The building is structurally sound, but in a slightly dilapidated state overall. The doors and windows retain traditional flower windows. The flower carvings on the doors and windows were eradicated during the Cultural Revolution, and only a few traces remain. The stone slabs on the original floor are well preserved and have been in use.	
First floor parlor	Highly utilized, place TV, sofa, coffee table and shrine.	 
Bedrooms	The bedroom on the left side of the hall was enlarged with a glass addition to increase light.	 
Corridors	Place a small dining table for daily meals.	
Kitchen	The kitchen at the patio uses an induction cooktop, has not been customized with modern cabinets, and appears to be dirty.	 

Table 4.15 (Continued)

Restrooms	The toilet outside the courtyard next to the main door, converted from a pigsty, is narrow and simple.	
Courtyard	A large amount of scrap is piled up in the compound.	
Screen wall	The walls are poorly preserved, costly to maintain, with peeling siding and no decorative paintings.	
Wooden door	The original wooden door was sturdy and durable, but it warped badly and leaked when closed.	
Main and second doors	The main gate and the second gate have feng shui rules and are not in a straight line. The front door of the main gate has been demolished and the original appearance cannot be seen.	 

Table 4.15 (Continued)

Courtyard	The patio is basically deserted; there is a well inside, but it is largely unused, and tap water is the main source of water. The water from the well is shallow and has an earthy taste, making it unsuitable for drinking.	

Images are from the author's own photographs

(6) Remodeling needs

Kitchen: Kitchen needs to be remodeled with custom modern cabinets and tiling to improve sanitation.

Restrooms: The outside restrooms in the courtyard are cramped and simple, with inconvenient mobility. There is a need to add modern restrooms within the compound for ease of use.

Stairs: Stairs are narrow and steep and interfere with the use of the second floor. Stairs need to be remodeled or new exterior stairs need to be built to make them more spacious, safe and easy to get up and down.

Storage room: need to organize and optimize the storage room to increase the use of space.

4.2.2 Analysis of the current living conditions of the villagers in Fengyangyi

1. RESIDENCE FYY-01

(1) Residence

Table 4.16 FYY-01 Occupancy Statistics

Head of Household Information	Mrs Li, 35 years old, female
Careers	Freelance, runs his own craft studio "Elephant Handicraft Studio"
Occupants and users	Head of household and his daughter
Frequency of use	Foreigner renting the residence and has been living there for 10 years

(2) Architectural overview

Table 4.17 FYY-01 Building Summary Statistics

Building type	Two Square's Houses
Damage	The house was in poor condition before repairs, the yard was full of weeds, and this building is still expensive to remodel. One wall in the courtyard has collapsed and was remodeled by this owner. The white walls on the outside of the building have fallen away, exposing rammed earth walls.
Maintenance	Focusing on interior renovation, the living area is remodeled with a separate bathroom. A terrace is added to the second floor to fulfill the function of drying and relaxing. Landscaped rest areas are designed in the courtyard.

(3) Floor plan

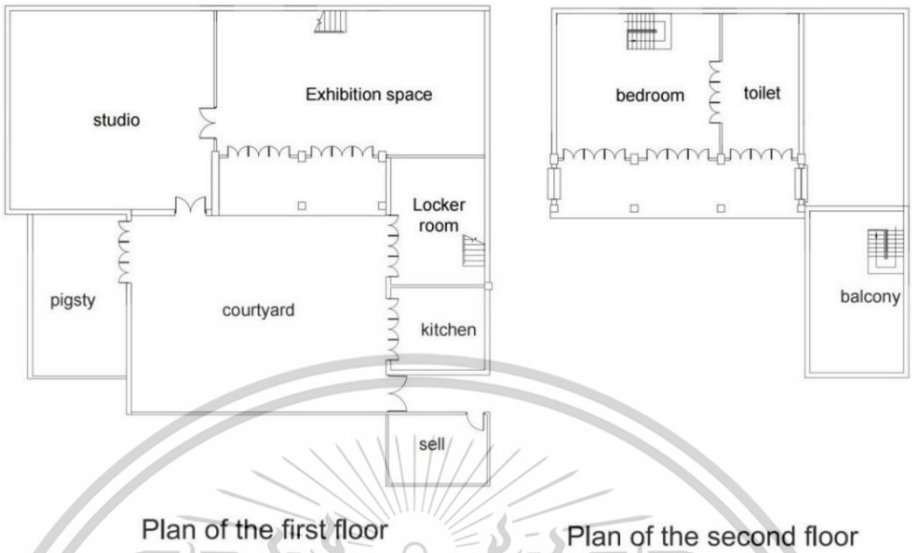


Figure 4.22 Plan of FYY-01, source: author's own drawing

(4) Spatial analysis map

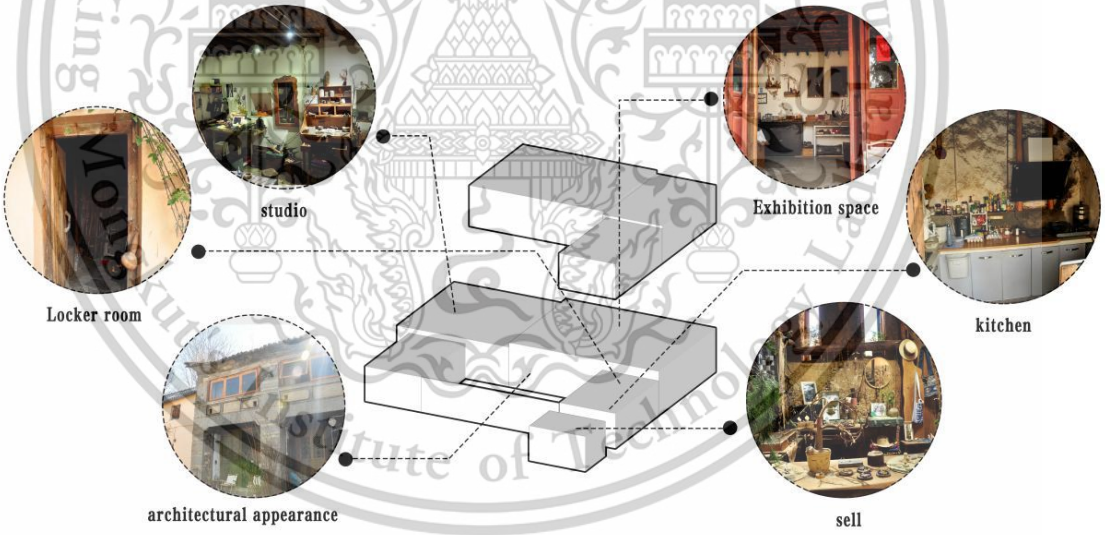


Figure 4.23 FYY-01 space analysis map, source: author's own drawing

(5) Status of residential buildings

Table 4.18 Status of residential dwellings in FYY-01

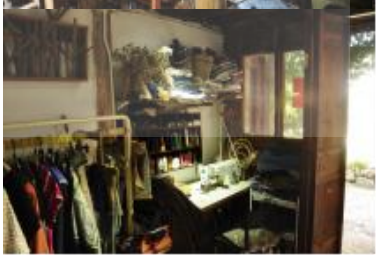
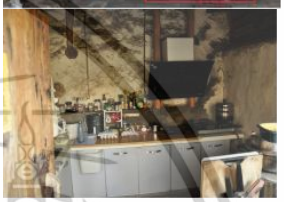
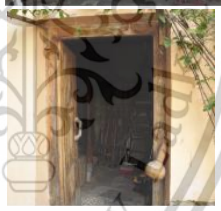
Functional zone	Description of the current situation	Status chart
Building exterior	The white walls are peeling off, exposing the rammed earth walls, which are in a poor state of preservation. The overall preservation of the dwellings in Bongyang Eup is not as good as in Hee Chau.	
Courtyard leisure space	The courtyard is clean and tidy, and the use of anticorrosive wooden boards to build leisure seating adds to the literary atmosphere.	
Ateliers	The first floor is a handicraft work area, and the second floor is a living area, with the addition of a terrace and a separate bathroom, so that the living and working areas are clearly defined.	 

Table 4.18 (Continued)

Living area	The bedroom, bathroom, and living room are all on the second floor, and the second floor bathroom is newly constructed with a wet/dry separation. Due to the privacy involved, it is not convenient to take photos for documentation.	
Display and sales area	A handmade jewelry display and sales area is located at the main entrance, making it easy to display and sell handicrafts.	 
Sunrooms and terraces	The enclosed part of the second floor forms a sunroom and the unenclosed part is a terrace for relaxation and drying clothes.	 
Display area	On the right side of the first floor is a handicraft display area, richly arranged with crafts.	

Table 4.18 (Continued)

Abandoned cowshed	The bullpen is untreated and utilizes tie-dye door curtains to conceal and decorate without detracting from the overall aesthetics.	
Kitchen	Kitchen is well equipped with custom cabinets but not tiled walls, grease is hard to deal with, uses induction and LPG gas cooktops.	 
Utility room	There is a utility room off the kitchen for large appliances.	 

Images are from the author's own photographs

(6) Remodeling needs

Improve the kitchen environment: Although basic facilities are already in place, it is difficult to deal with grease stains on the walls, so it is recommended to re-tile the walls and add a range hood to keep the kitchen clean.

Strengthening the building structure: inspect and repair old structural parts to ensure that the building is safe and sound.

Optimize energy use: introduce renewable energy sources such as solar energy, reduce electricity and gas use, and improve energy efficiency.

Improved Thermal Insulation: Improvement of the thermal insulation of roofs

and walls improves living comfort and reduces energy consumption.

Restoration of the exterior: Repair of the damaged facades and decorations while maintaining the traditional look.

2. RESIDENCE FYY-02

(1) Residence

Table 4.19 FYY-02 Occupancy Statistics

Head of Household Information	Mr Yang, 33 years old, male
Careers	Doing business, running "A Bowl of Tea Tea House". Sells Yunnan tea and Dali liquor through online and offline channels.
Occupants and users	Head of household and his mother in her 50s
Frequency of use	Living here from birth, long term

(2) Architectural overview

Table 4.20 FYY-02 Building Summary Statistics

Building type	One Square in Four pavilions and five open yards with commercial and residential facilities
Damage	One of the squares in the compound has been damaged, but the architecture of this square in the house of the head of the family is well preserved and maintained, and it has been inhabited and repaired for a long time.
Maintenance	The beams, pillars and doors were well protected, the roof was replaced with cement tiles and the interior was redecorated. The first floor was mainly remodeled, opened up into a large open room with holes in the wall to increase light and activity space.

(3) Floor plan

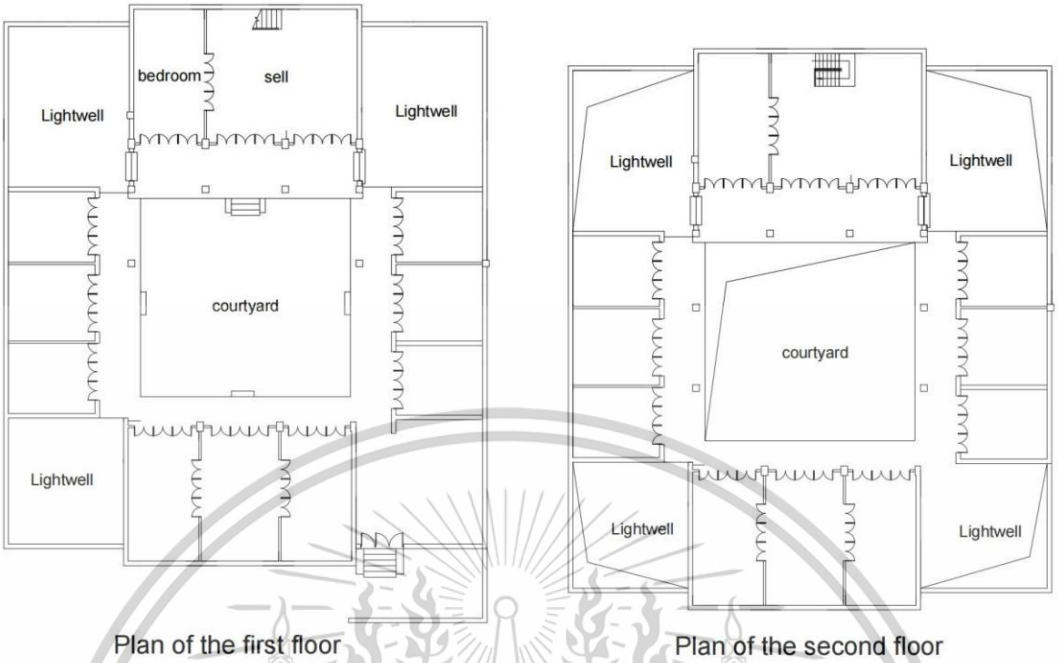


Figure 4.24 Plan of FYY-02, source: author's own drawing

(4) Spatial analysis maps

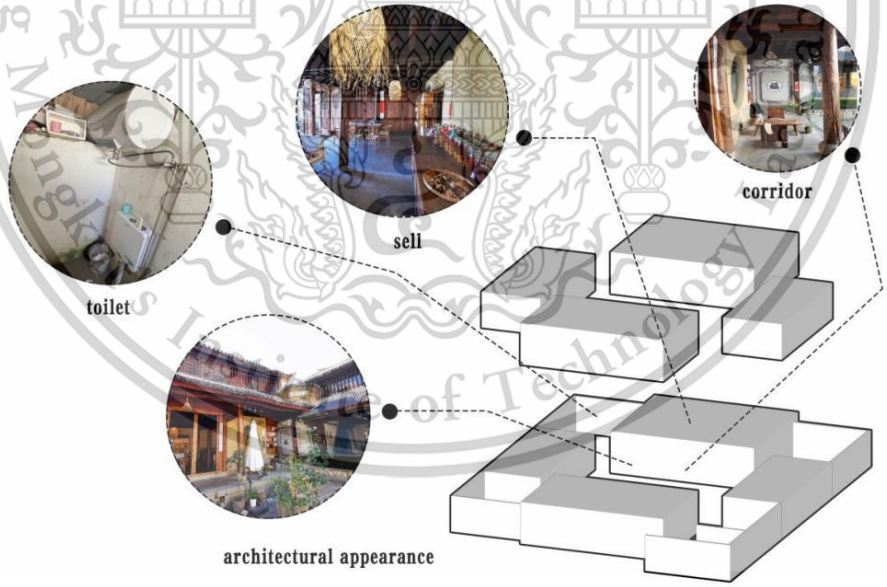


Figure 4.25 Spatial analysis of FYY-02, source: author's own drawing

(5) Status of residential buildings

Table 4.21 Status of Residences in FYY-02

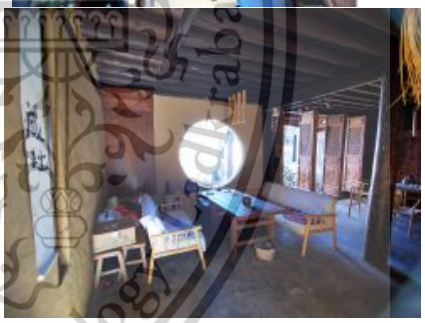
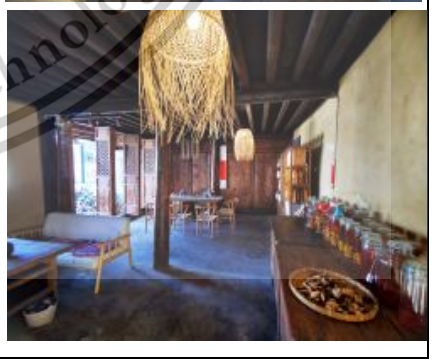
Functional zone	Description of the current situation	Status chart
Building Exterior	After many repairs, the building looks good, the wood has been refurbished and the overall look and feel is open again.	
First floor space	Tea and wine display and sale, sitting area. The current condition of the beams, pillars and doors in the interior of the first floor are well protected. The square beams on the roof are not the round shape of ordinary houses, but have been carved to form a square shape and texture. There is no separate bathroom in the commercial space on the first floor.	  

Table 4.21 (Continued)

Corridors	The corridor under the eaves retains the function of cooling and relaxation, and is designed as an outdoor sitting area where one can drink tea and read books, etc. A round window is transformed on the exterior wall of the building to increase indoor lighting, and embedded bookshelves are designed to create a sense of leisure and cultural atmosphere. The beams and roofs of the corridor are finely carved and well preserved.	 
Toilets	Set up in a patio with poor facilities, poor waterproofing, use of electric water heaters	 
Second floor living area	The second floor is a bedroom with poor soundproofing, inconvenient access to the bathroom and inconvenient use of the kitchen. Privacy is involved and it is not convenient to take photos to document.	

Images are from the author's own photographs

(6) Remodeling needs

Upgrading of toilet facilities: Installation of modern toilet facilities and waterproof and easy-to-clean wall and floor materials.

Improve soundproofing: add soundproofing materials to walls and floors and use double-glazed windows to ensure a private and quiet living environment.

Kitchen remodeling: kitchen facilities were basic and not easy to use. Upgrade kitchen equipment and re-tile to ensure cleanliness and aesthetics.

Adding indoor restrooms: There is no independent restroom in the commercial space on the first floor, which is inconvenient for customers to use. A small independent restroom is added at a reasonable location on the first floor for the convenience of customers and family members.

3.RESIDENCE FYY-03

(1) Residence

Table 4.22 FYY-03 Occupancy Statistics

Head of Household Information	Mr Yang, 29 years old, male
Careers	Designer, businessman, runs the Ridiculous Art Museum, curates and operates his own art events and performances.
Occupants and users	Mainly for hospitality
Frequency of use	The "Museum of Ridiculous Art" restaurant receives tourists every day.

(2)Architectural overview

The "Ridiculous Art Museum" and "A Bowl of Tea" belong to the same compound, but the different workshops in this compound reflect the artistic and literary atmosphere, and the space of the compound is clean and tidy, and the area of the compound is large. The owner of "Ridiculous Art Museum" is a designer, who has organized and planned many events over the years based on his sensitivity to art and design, and also operates his own catering restaurant, "Ridiculous Art Museum". It is not only an art museum, but also a place to relax, eat and drink, and feel the artistic atmosphere. The whole space is designed by the owner himself, from the façade to the interior soft furnishings of various details, all reflecting the owner's design concepts,

the whole building renovation is also advocating the old as the old, retaining the historical imprint of the traditional old building, the soft furnishings are also transformed with old objects, fully reflecting the artist's divergent thinking, the owner has collected a lot of handmade works of artists, such as dinner plates, dining tables, ceramic decorative items, etc., indoor The walls are covered with artists' paintings, so the building is not only operating a restaurant, but also an art gallery and an art activity center. Books are placed on each dining table, so you can open them when ordering or waiting for your meal, creating a library atmosphere.

The entire building remodeling was done with the philosophy of spending the least amount of money, doing the most heartfelt design, and operating in an artistic way. All the remodeling cost over 100,000 dollars, very low cost.

Table 4.23 FYY-03 Building Summary Statistics

Building type	Commercial, One Square in Four pavilions and five open yards
Damage	One of the houses in the compound has been destroyed, but the building structure of the "Museum of Ridiculousness" is well preserved and maintained.
Maintenance	"The Ridiculous Art Museum is a designer-run restaurant that functions as an art museum, displaying works of art and providing a space for relaxation. From the exterior to the interior, the building has been remodeled to preserve the history of the old building. The architecture and interior soft furnishings reflect the owner's design concepts.

(3)Floor plan

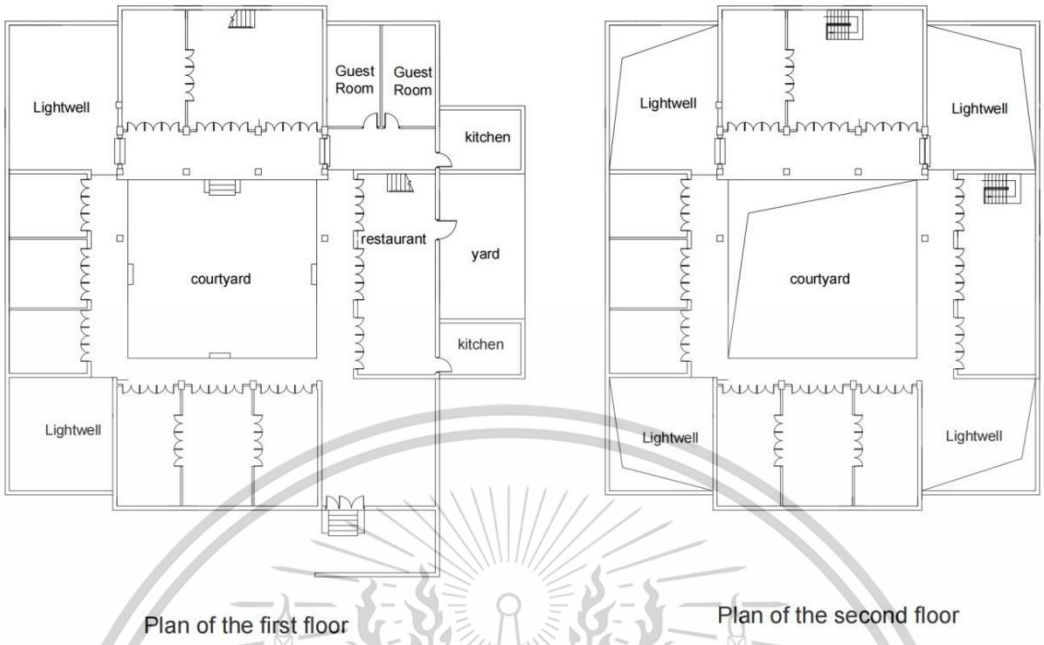


Figure 4.26 Plan of FYY-03, source: author's own drawing

(4)Spatial analysis map

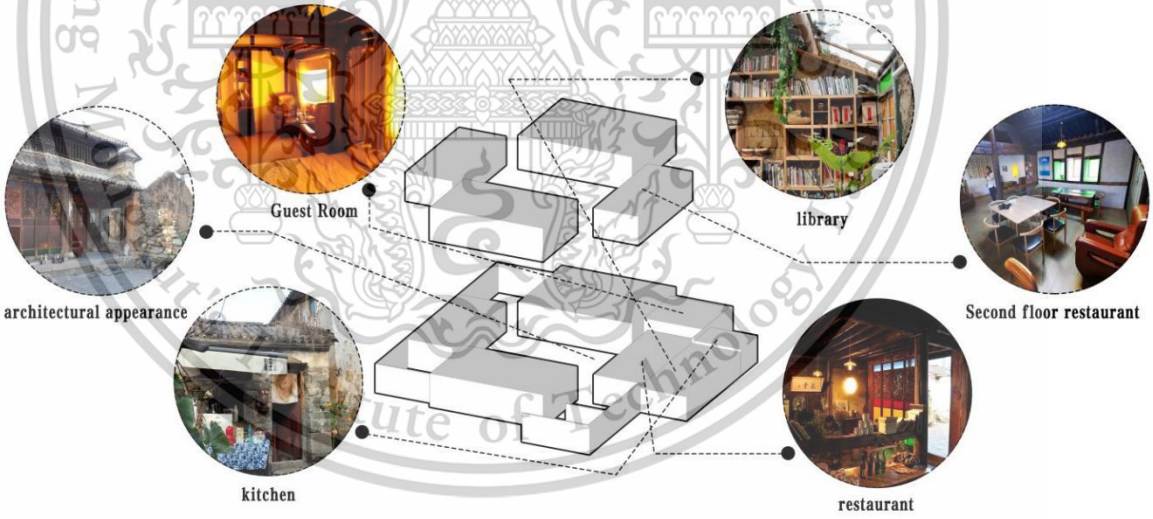


Figure 4.27 Spatial analysis of FYY-03, source: author's own drawing

(5)Status of residential buildings

Table 4.24 Status of Residences in FYY-03

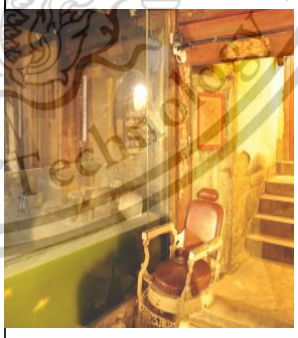
Functional zone	Description of the current situation	Status chart
Building exterior	The compound is clean and neat with a large yard. The exterior of the building has been restored to its original condition. The picture on the left shows the entrance gate with the "Ridiculous" sign on the wall, and the picture on the right shows the courtyard.	 
Ground floor entrance	On the first floor, one side of the wooden door was removed and transformed into a large fish tank, which is dynamic and adds light. There are different views from the yard to the interior, or from the interior to the yard.	 

Table 4.24 (Continued)

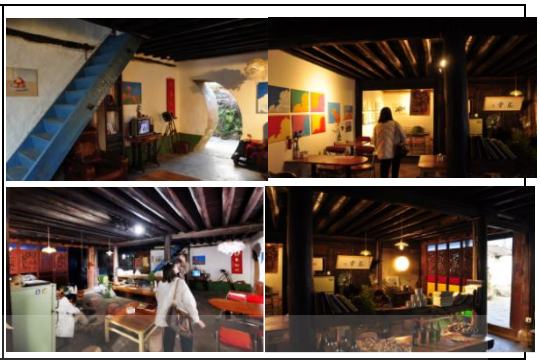
First floor dining area	The space on the first floor is opened up to create an open space for dining and displaying artwork.	
Second floor dining area	The second floor opens up a wall to create open space, adds skylights for light, and retains a room for storage.	
Second floor shrine	Because of commercial use, the function of the shrine was not retained, only the wall alcove was retained and the wall was opened up and converted into a window, which would add light to the second floor.	
Bookcases and soft furnishings	The bookcases and soft furnishings were remodeled from old wooden doors to reflect the operator's artistic background.	

Table 4.24 (Continued)

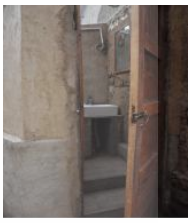
Outdoor stage	A stage is set up outside the courtyard to host events such as book clubs and stand-up comedy, with a dining and lounge area underneath.	 
public toilet	Off-campus public restrooms with simple interiors, good facilities, and artfully designed signage.	 
Outdoor library	Converted from a pigsty, the roof is transparent to increase light, and the interior is made of discarded wood for bookcases to preserve the historical imprint.	  
Kitchen	The facilities are well equipped, both aesthetically pleasing and practical.	 

Table 4.24 (Continued)

Bed and Breakfast Rooms	Two-story B&B at the patio, 2 queen rooms on the lower level and 1 suite on the upper level, with good light and nostalgic decor.	

Images are from the author's own photographs

(6) Remodeling needs

Restrooms: There is a need to improve restroom facilities to address the problems of rudimentary, not easily cleaned, and poor waterproofing, and to make them suitable for use by the elderly and mobility-impaired, and to add handrails and other barrier-free facilities.

Soundproofing of Bed and Breakfast: Improvement of soundproofing of rooms, especially on the second floor. Add soundproofing materials to improve the soundproofing performance of walls and floors. Use heavy curtains or soundproof windows.

Structural and safety: To ensure the structural safety of the house and to avoid safety hazards associated with older structures. A comprehensive structural inspection of the house needs to be carried out regularly to repair parts that may pose safety hazards. Reinforcement of beams and columns to ensure the stability of the building.

Courtyard: As a commercial space, it is necessary to add courtyard lighting to improve nighttime safety and enhance the function and attractiveness of the commercial space. Interactive facilities can also be added, such as art exhibition areas and handmade experience areas.

4.RESIDENCE FYY-04

(1) Residence

Table 4.25 FYY-04 Occupancy Statistics

Head of Household Information	Po, 33 years old, male
Careers	Illustrator, running his own illustration studio
Occupants and users	the head of the household himself
Frequency of use	Rented for 10 years

(2) Architectural overview

Table 4.26 FYY-04 Building Summary Statistics

Building type	One of the two neighborhoods, commercial and residential
Damage	The top tiles are leaking and the wooden beams are old.
Maintenance	Low-cost remodeling, removing partition walls on the first and second floors to create a large pass-through room, studio on the first floor, living quarters on the second floor, and remodeling an en-suite bathroom on the second floor to separate wet and dry areas. Remodeled utilities. Did not remodel the kitchen because it does not cook.

(3) Floor plan

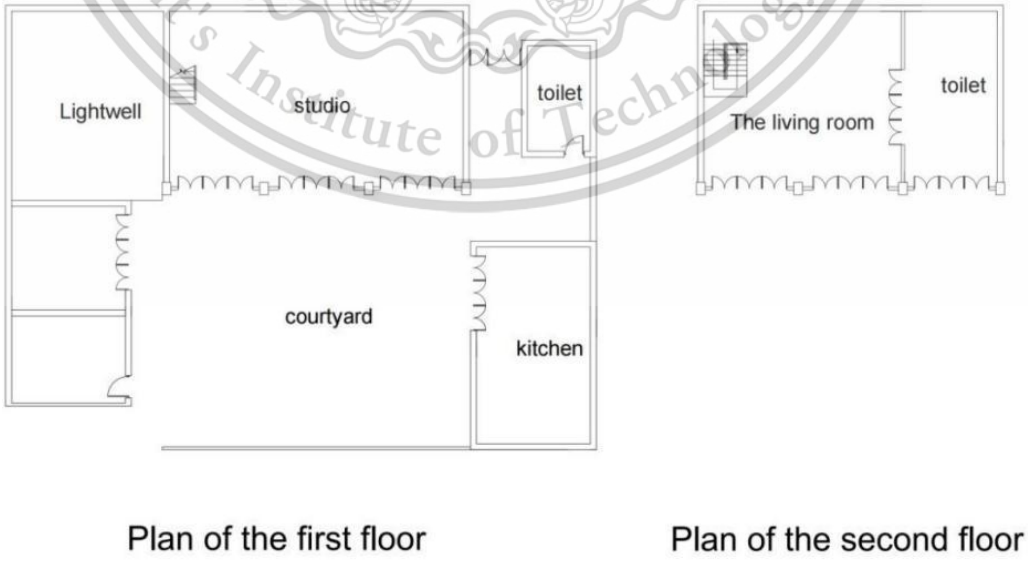


Figure 4.28 Plan of FYY-04, source: author's own drawing

(4) Spatial analysis maps

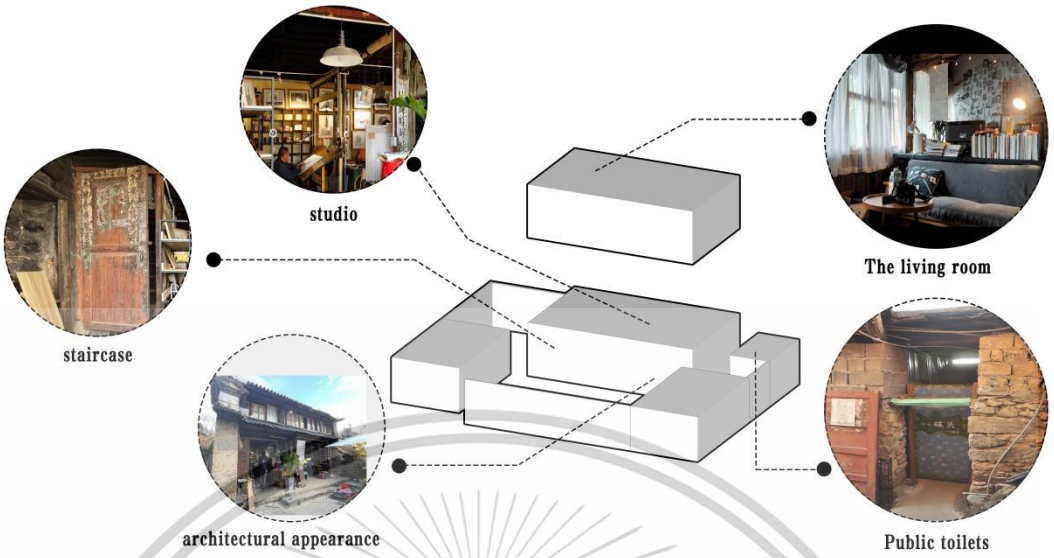


Figure 4.29 Spatial analysis of FYY-04, source: author's own drawing

(5) Status of residential buildings

Table 4.27 Status of Residences inFYY-04

Functional zone	Description of the current situation	Status chart
Building exterior	Good appearance, low cost remodel, replacement windows, top shingle no better. Yard is small.	
Workshop (1st floor)	The studio wall is opened up to create an open and spacious room. It is mainly used for creating and displaying illustrations, showing your own drawings and other artists' works on the wall. There is an experience area for visitors and children to learn about illustration. The stairwell is decorated with artistic decorations and added storage functions.	

Table 4.27 (Continued)

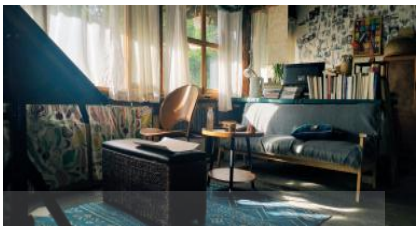
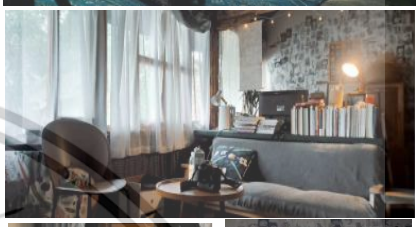
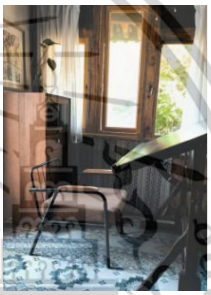
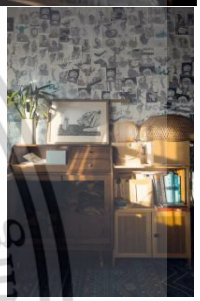
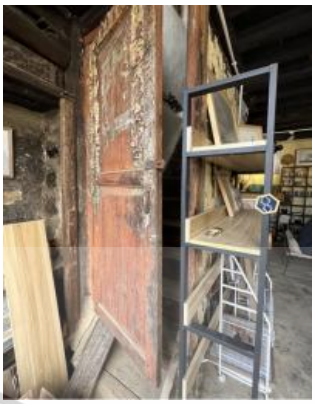
Living room (2st floor)	The living room opens up the wall to form a large through room containing the bedroom, study and bathroom. The bathroom has been modernized and is well waterproofed and drained. The floor is aged with carpet, which also serves to prevent noise, and the walls are plastered with small drawings of his own illustrations, very much in keeping with the artist's style. Layout with sofa, desk, drawing table, piano, bed, etc., to meet the needs of life and work.	   
Indoor private bathroom	The bathroom is on the second floor, separating wet and dry for ease of living. Modern facilities are complete and convenient to use. Privacy is involved, it is not convenient to take photos to record.	
Public restrooms in the compound	The courtyard was overgrown when we first moved in, but we have since taken care of it ourselves. There is a public dry toilet at the entrance of the courtyard, converted from a cow shed.	

Table 4.27 (Continued)

Staircases	Where the door opens in the photo is the staircase leading from the first floor to the second floor, and wooden cabinets have been installed at the top end of the stairwell for books and added storage.	

Images are from the author's own photographs

(6) Remodeling needs

Kitchen: For future cooking needs, simple kitchen facilities can be added. For example, set up a small kitchen in the corner of the studio on the first floor, equipped with an induction cooker, a small refrigerator and simple cabinets.

Lighting and ventilation: Due to the structure of the old house, there are problems with lighting and ventilation. Doors and windows are modified to improve light and ventilation.

Damp-proofing and wind-proofing measures: to solve the problem of returning moisture to the floor, add a damp-proof layer under the floor or lay a damp-proof carpet, and damp-proof paints can be used on the walls. Prevent cold wind from entering in winter. Strengthen the sealing of doors and windows, you can add sealing strips at the gaps of doors and windows.

Electricity safety: Older houses with wooden structures require special attention to electrical circuitry. Conduct a thorough inspection and remodeling of the circuit, and use wires and appliances that meet safety standards. Avoid using high power heating equipment.

Public latrines: Public latrines have been upgraded to improve sanitary conditions. Replace dry toilets with flush toilets, increase ventilation and drainage facilities, and maintain cleanliness.

5.RESIDENCE FYY-05

(1) Residence

Table 4.28 FYY-05 Residency Statistics

Head of Household Information	Mr Zhao, 50 years old, male
Careers	Doing business, running a bed and breakfast
Occupants and users	travelers
Frequency of use	It has been remodeled for 15 years and receives visitors daily

(2) Architectural overview

Table 0.29 FYY-05 Building Summary Statistics

Building type	Three Chambers and Screen Wall, commercial
Damage	The old Zhao family house transformed into a bed and breakfast. The housing area is large, and the B&B with Bai ethnic style was rebuilt on the basis of the old house. In the remodeling of the B&B, the main consideration is the rationality of space and the convenience of use, and in order to increase the space of the guest rooms, the area of the original compound was reduced. Each guest room in the B&B was remodeled with an independent bathroom, and the second floor was converted into a larger terrace with solar energy installed on the roof. The first floor was transformed into a modern living room and kitchen.
Maintenance	

(3) Floor plan

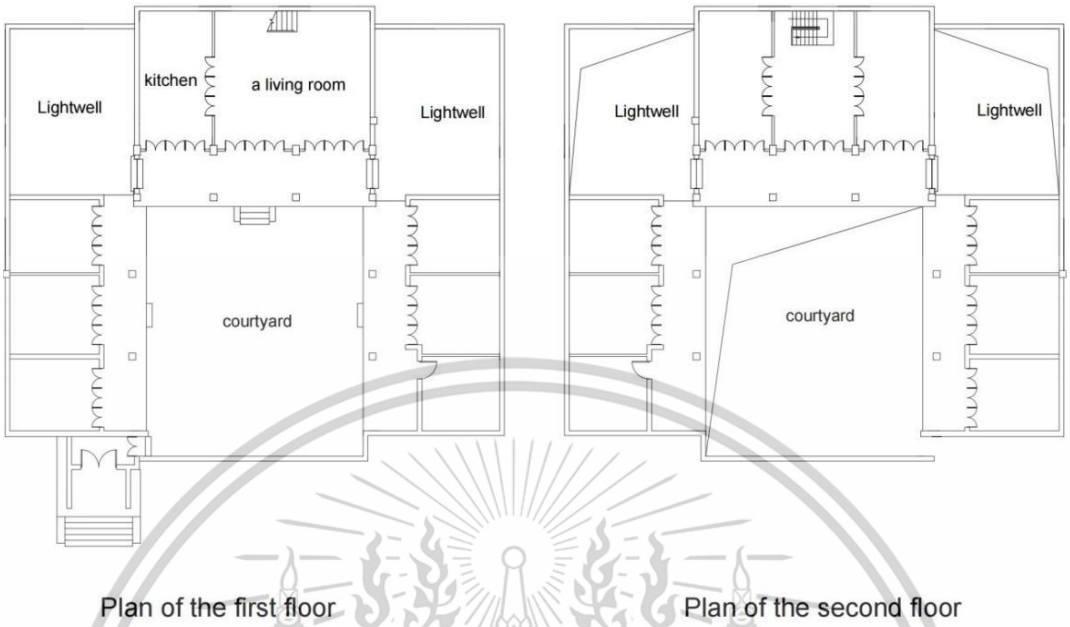


Figure 4.30 Plan of FYY-05, source: author's own drawing

(4) Spatial analysis maps

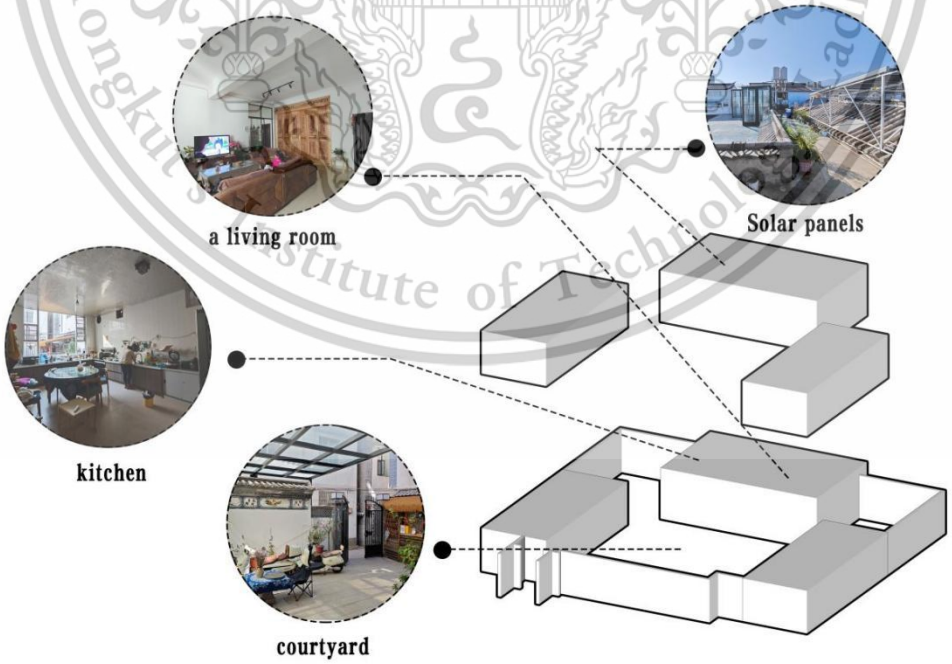


Figure 4.31 Spatial analysis of FYY-05, source: author's own drawing

(5) Status of residential buildings

Table 4.30 Status of Residences in FYY-05

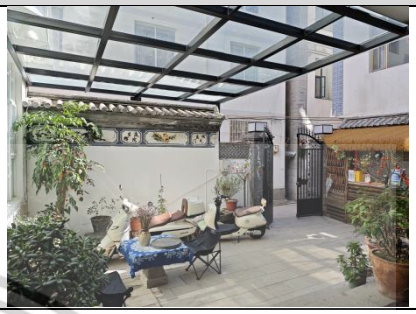
Functional zone	Description of the current situation	Status chart
Courtyard	The courtyard area was reduced by the building extension. A glass canopy was erected to provide more space for outdoor use.	
Ancient imperial celestial observation terrace	A new terrace was built on the second floor as a relaxation space to add to the resident experience.	
Solar panel	Solar panels have been installed on the roof of the building to provide hot water, adding to the ease of living.	
Fireplace	The parlor part of the first floor is transformed into a modern living room, where sofas and TVs are placed as a common space, which is highly utilized, large and functional.	

Table 4.30 (Continued)

Kitchen	A shared open plan kitchen has been converted on the first floor, which is equipped with modern amenities and is well used with a large usable area.	

Images are from the author's own photographs

(6) Remodeling needs

Energy use and environmental protection: Solar panels are currently installed, which can still improve the efficiency of energy use. Consideration is being given to the introduction of energy-saving lamps, intelligent temperature control devices and water-saving devices.

Safety Facilities: In order to enhance the sense of security for our residents. Installation of safety facilities such as smoke detectors, fire extinguishers and first aid kits. Enhancement of electrical circuit inspections to ensure the stability and safety of the electrical system.

4.2.3 Analysis of results

1. STATUS OF TRADITIONAL DWELLINGS

Preservation: The better-preserved traditional houses show a more complete architectural form and spatial layout, e.g. XZ-04, while the poorly-preserved ones suffer from structural damage and poor facilities, e.g. FYY-04.

Utilization: The utilization of dwellings varies according to the economic status and living needs of the owners. The homes that are in use have been modernized with the addition of modern amenities.

Architectural forms and structures: Most of the dwellings have retained the traditional Bai architectural forms and structures, but due to the long-term lack of maintenance, some of the structures are aging and corroding, and need to be repaired and reinforced.

Spatial Layout: The spatial layout of traditional residential houses is more reasonable, but due to the changes in the demands of modern life, some spaces are under-utilized and there is the phenomenon of idleness, such as the courtyard of XZ-05.

2. HABITS AND BEHAVIORAL PATTERNS OF THE POPULATION

The living habits and behavioral patterns of the Bai residents have a direct impact on the use of the dwellings:

Drying Habits: Residents are used to drying clothes in courtyards and roofs, which require open space and sunny areas. For example, FYY-01 has a special terrace for drying clothes, while other residences dry clothes in courtyards.

Kitchen use: The problem of grease and smoke in traditional kitchens is more common, and the introduction of modern kitchen facilities has become a demand. For example, the kitchen of XZ-02 has a serious problem of grease and smoke, and urgently needs to improve the ventilation system.

Bathroom Facilities: Modernization of bathrooms is a common demand among residents. Traditional bathroom facilities are simple and unhygienic, affecting the quality of daily life. For example, XZ-04, FYY-01 and FYY-04 have been modernized to improve the living comfort.

Cultural beliefs: The cultural beliefs of the residents, such as family harmony and respect for ancestors, are reflected in the architectural design and spatial layout. For example, local residents who remodel traditional houses will always keep the shrines, reflecting their respect for traditional culture.

3. DEMAND FOR LIVING SPACE IN MODERN LIVING PATTERNS

Functional zoning: Modern living pattern puts higher requirements on the functional zoning of living space, especially the independence and modernization of kitchen and bathroom. The modernization of XZ-04, for example, enhances the rationality of functional zoning.

Facilities: The modernization of infrastructure such as water, electricity and gas is essential, and the renovation of traditional houses must comprehensively increase these facilities.

Environmental Comfort: Lighting and ventilation are important factors affecting the comfort of living, and traditional dwellings have certain problems in this regard.

For example, XZ-05, FYY-02 and FYY-03 have insufficient light, and improvements are made to address the lighting problem.

4. LAWS OF SPONTANEOUS CONSTRUCTION

The spontaneous construction and remodeling of homes by residents reflects certain patterns, such as the economical choice of building materials and flexible design within the scope of government control. These modifications not only meet the needs of modern life, but also reflect the combination of tradition and modernity.

Choice of building materials: Residents tend to choose affordable and durable building materials for repair and remodeling, such as tiles replaced with cement tiles, but with improved durability and practicality.

Flexibility in design: Within the scope of government control, residents have made flexible designs for their homes, preserving traditional elements and introducing modern facilities. For example, the construction of FYY-05.

4.3 ANALYSIS OF CODING RESULTS FOR INTERVIEW DATA

In the study of "how modern people's living habits and behaviors affect the renovation of old houses", the Grounded theory provides a systematic approach, which systematically analyzes four aspects, namely, the current situation of traditional houses, residents' living habits, modern living needs and spontaneous construction patterns, and the relationship between them, through coding the interview data. The key factors affecting residential remodeling were gradually identified and a theoretical framework was constructed. This process not only helps researchers to understand complex social phenomena, but also provides a scientific basis for related policy making.

4.3.1 Concept Extraction

Concept extraction was the first step in the research process of Grounded theory, aiming to extract initial concepts from a large number of primary sources. By analyzing the content of the interviews, 70 initial concepts were identified. These initial concepts are direct expressions of the research subjects, reflecting the interviewees'

views on the status quo of the old folk houses, their living habits, their behavioral patterns, and the needs of modern life.

Table 4.31 Concept extraction table

Original wording of the interview	Initial concepts
There is a 1.9-kilometer section of the Yunnan-Tibet Tea Horse Road preserved in the village.	(A1) Preservation of the old tea-horse road in village
The whole village is poorly lit overall, with narrow roads and lots of tourists on holidays.	(A2) Villages poorly lighted narrow roads with many tourists
The village as a whole is in a poor state of preservation of old buildings, and the villagers are willing to build new houses.	(A3) Old building not well preserved willing to build new houses
The old residence did not have a bathroom in the courtyard, so a separate bathroom was remodeled in the second floor living area.	(A4) second floor remodeled with separate bathroom
Add a handmade jewelry display and vending area at the main entrance.	(A5) Additional display and sales area at gate
The house was in poor condition before repairs and was full of weeds in the yard.	(A6) Poor state of house before repairs and overgrown weeds
The owners say they love the quiet life away from the city now.	(A7) Likes the quiet life away from the city
Because the toilet and shower are separate, it's not easy to use and the line of motion is inconvenient.	(A8) Separate toilets and showers for inconvenient movement lines
The original hog pen in the yard was left unkempt because it was too filthy and covered directly with a gate.	(A9) Dirty pigsty covered with a door
Homeowners say restoring old homes is laborious, cumbersome and costly.	(A10) Restoration of older homes is cumbersome and costly
The owner stated that the second floor of the old house was not very livable.	(A11) Old houses are not good on the second floor
This house remodel was designed and materials bought by myself, and a master was hired to help fix it together.	(A12) Design your own remodeling and hire a master
This house is over 100 years old and the owner's family has granted new land outside the village and is building a new house now.	(A13) Old houses 100 years old New houses built outside the village
The old staircase was narrow and steep and was re-built with new stairs on the perimeter.	(A14) New staircase on perimeter
The old compound is poorly preserved, the roads are narrow and poorly lighted, and holiday visitors are unable to stay at night.	(A15) Narrow roads poorly illuminated tourists can not be retained
The original floor was lapis lazuli, and the back was paved with cement, which is better for cleaning and taking care of.	(A16) Cement on floor behind lapis lazuli slabs
Storage in the village house is with a separate storage room.	(A17) Separate storage room in village house
Many of the local villagers in the village then rented out their old houses to outsiders to run their businesses.	(A18) Old room rented and operated by outsiders
Our village government intervenes in the architectural style. Buildings can't be more than two stories and must have sloping roofs.	(A19) Government controlled landscape buildings limited to two storeys
The stairs were narrow and steep before the remodel and new stairs were built on the exterior after the remodel.	(A20) Stairs narrow steep remodeling exterior new construction
Kitchen and bathroom remodeled on patio.	(A21) Kitchen and bathroom conversion

Original wording of the interview	Initial concepts
	to patio
The old compound is in a poor state of preservation, poorly lit, and has many holiday visitors.	(A22) Poorly preserved old courtyard poorly lit with tourists
The old staircase was narrow and steep and was re-built with new stairs on the perimeter.	(A23) Old staircase narrow new staircase
Home repairs for older homes are expensive.	(A24) Repairing old houses is costly
The owner stated that the village has separate storage rooms for house storage.	(A25) Separate room for storage in village house
All the agricultural land in the village is contracted by the government to be operated by outsiders.	(A26) Agricultural land government contracted for outsider operation
The owner stated that many of the old houses are still occupied.	(A27) Many of the old houses are still occupied
Love the quiet life away from the city.	(A28) Quiet life away from the city
Even though the dwellings have been repaired and remodeled, they still do not have a platform for drying clothes and retain the traditional way of drying clothes is in the courtyard.	(A29) Inadequate drying facilities using traditional methods
The renovated residence is mainly occupied by the head of the family and his loved ones visiting their families back home.	(A30) Renovation of residential homes mainly for family visits
The entire building façade was renovated, windows and doors were replaced, beams were refinished, shingles were replaced, and interior spaces were redecorated.	(A31) Renovation of building facades and interiors
The kitchen and toilet are newly built by ourselves, set in the courtyard at the entrance of the door, which is functional but far away from the living area and not convenient enough for the movement line.	(A32) Kitchen and bath newly constructed but with inconvenient lines of movement
The second floor is mainly used for ancestor worship, and the whole family comes to worship their ancestors on New Year's holidays.	(A33) The second floor is mainly used for ancestor worship
The original kitchen and bathroom were separated and inconvenient to use. Now the new kitchen and bathroom are next to each other, which basically meets the needs of life.	(A34) New Kitchen and Bathroom to Address Lack of Access
Older homes have kitchens and bathrooms outside, away from the living area, and are inconvenient to use in terms of mobility.	(A35) Kitchen and baths are inconveniently used in the yard
The stairs in the old house were steep and narrow with limited space in the stairwell.	(A36) Older houses with steep and narrow staircases have limited space
Cooking was originally done on stoves, which burned wood, but now it has been changed to induction cookers or liquefied petroleum gas (LPG).	(A37) Kitchen equipment has been modernized
All utilities are connected, the old house is not heated, but it is warm in winter and cool in summer.	(A38) Fully plumbed and unheated
Generally bedrooms and bathrooms should be private spaces and living rooms and courtyards are open spaces.	(A39) Bedroom bathroom open to private living room courtyard
Functionality and aesthetics should be considered if you have the financial ability, and if you don't have the financial ability, you should consider adding part of the decoration to enhance the aesthetics and reflect the national characteristics under the condition that the use of the function is perfect.	(A40) Economic conditions determine function and aesthetics
The landscape needs to be unified.	(A41) The architectural style of the village needs to be harmonized

Original wording of the interview	Initial concepts
The government will intervene in the architectural style and village appearance. Buildings cannot exceed two storeys and must have sloping roofs.	(A42) Government has control over the landscape
Using brick and mortar construction is cheap and aesthetically pleasing.	(A43) Use of brick and mortar construction for new houses
The family has a newly constructed home, and the new construction was designed by the homeowner himself, led by the homeowner himself, and approved by the government before getting a construction team to build it.	(A44) New builds are homeowner-led
Alterations should also consider the budget, 100,000 can be aimed at the front door decoration, the facade is beautiful and atmospheric, 150,000 can be considered to shine the wall is also important.	(A45) Alteration budget affects quality of renovation
Nowadays, the kitchen is small and the fumes are too heavy, which has affected the health.	(A46) Heavy fumes in small kitchens affect health
The tap water was only connected in 2010, and originally only well water could be used.	(A47) Water only came on in 2010
Now the dry latrines and pigsties are not used. All the toilets are now built in the courtyard.	(A48) Dry pit abandoned restroom moved to courtyard
A sanitary home and exterior stairs were added to the patio; the original stairs were too narrow and steep, and the new stairs have a gentler slope and are easier to use.	(A49) Patio addition bathroom stairs new construction
Most of the villagers will want to demolish their old houses and build new ones because the newly built houses are better to live in.	(A50) Villagers tend to demolish old houses and build new ones
The elderly couple came to stay occasionally and used only the kitchen and a parlor room.	(A51) Older couple comes to stay occasionally
There are no toilets or showers in the home, so you cannot take a bath and it is not easy to use.	(A52) No toilet showers in the yard
Only the elderly couple came to stay occasionally and used only the kitchen and a parlor room.	(A53) Older couple only use the kitchen parsonage
The first-floor parsonage was for guests only, not living, and was dim and small, with poor comfort.	(A54) Small, dimly lit parlor with poor comfort level
Patio out with additional kitchen, which is spacious but unorganized.	(A55) Kitchen addition on patio untidy
The original occupants made a flat ceiling with white paper glued on bamboo mats for sealing and cleanliness.	(A56) Bamboo mat paper mache ceiling in order to seal cleanly
The photo wall is damaged and has not been repaired.	(A57) Damage to wall not repaired
The current condition of the home's buildings. The windows and doors have not been replaced or refurbished, retaining the traditional floral windows.	(A58) Doors and windows not replaced to maintain traditional windows and flowers
Because the toilet and shower are separate, it's not easy to use and the line of motion is inconvenient.	(A59) Separate toilets and showers are inconveniently located.
There were no custom modern cabinets and no tile, which made the kitchen look dingy.	(A60) Kitchen not tiled and dirty
The kitchen and bathroom are built into the patio.	(A61) Kitchen and bath built on patio
Our village style needs to be unified.	(A62) Village appearance needs to be unified
The village needs government approval for repairs.	(A63) Repair requires government approval
Most houses in the village cost $200,000 to renovate.	(A64) The refurbishment cost about

Original wording of the interview	Initial concepts
	$200,000
We have difficulty drinking water from the tap well.	(A65) Tap water difficult to drink
Hijau is too jammed with traffic for the holidays for locals to get in.	(A66) Traffic jam over the holidays makes it hard for locals to get in
Pleasant Island has a big parking problem to charge for.	(A67) Parking Problems High Charges
There's a well on the patio now, and it's shallow and doesn't work well.	(A68) Patio wells are shallow and difficult to use
There are many large families in Xizhou, and the current state of the preserved dwellings is relatively good.	(A69) Large families are mostly better preserved
The first floor parsonage is the most heavily utilized.	(A70) Highly utilized first floor parsonage

4.3.2 Open coding

By further organizing and categorizing the initial concepts, the open coding grouped them into 15 subcategories. The goal of this step was to refine and systematize the original concepts, making them more specific and easier to analyze. Open coding lays the groundwork for subsequent principal axial and selective coding, which is a key step in gaining a deeper understanding of the object of study.

Table 0.32 Table of open codes

Generalization	Initial concepts
(B1) Preservation	(A1) Village preservation of the old tea-horse road, (A2) Village lighting poor road narrow tourists, (A3) Old building preservation is bad willing to build new houses, (A6) Maintenance before the poor state of the house weeds, (A15) Road narrow lighting poor tourists can not stay, (A22) The old courtyard preservation of poor lighting poor tourists, (A57) Wall damage has not been repaired, (A69)Large families are well preserved.
(B2) Materials and structures	(A16) Concrete on floors after lapis lazuli, (A43) Brick and concrete construction used for new houses
(B3) Functional Partition	(A4) Second floor remodeling separate bathroom, (A21) Kitchen and bath remodeling patio, (A32) Kitchen and bath new but inconvenient circulation, (A34) New kitchen and bath to solve the problem of inconvenience, (A48) Dry pit abandoned bathroom moved to the yard, (A49) Patio covered bathroom stairs new, (A52) No bathroom shower in the yard, (A61) Kitchen and bath built on the patio
(B4) Environmental comfort	(A46) Heavy fumes in small kitchens affect health, (A54) Dark and small parlors with poor comfort, (A60) Kitchens without tiles are dirty, (A65) Tap water is hard to drink, (A67) Parking problems with high charges, (A68) Shallow patio wells are hard to use.
(B5) Building structures	(A36) Old houses with steep and narrow staircases and limited space,(A56) Bamboo mats and paper mache ceilings in order to seal them cleanly.
(B6) Building form	(A17) Separate storage room in village house, (A25) Separate room for storage in village house, (A31) Renovation of building facade and interior decoration, (A58) Windows and doors not replaced to maintain traditional window patterns
(B7) Economics and costs	(A10) Restoring old houses is troublesome and costly, (A24) Repairing old houses is

Generalization	Initial concepts
	costly,(A40) Economic conditions determine functionality and aesthetics, (A45) Alteration budget affects the quality of renovation, (A64) Renovation costs about $200,000
(B8) Space layout	(A14) New stairs outside, (A20) Stairs narrow steep remodeling outside new, (A23) Old stairs narrow new stairs, (A39) Bedroom bathroom open to private living room courtyard, (A55) Kitchen addition on patio untidy, (A59) Separate toilets and showers inconveniently moving around.
(B9) Equipment and facilities	(A37) Kitchen equipment modernized,(A38) Electricity and water available, no heating, (A47) Running water only in 2010.
(B10) Habits	(A7) Prefer quiet living away from the city, (A8) Inconvenience of separate toilets and showers, (A28) Quiet living away from the city, (A29) Inadequate drying facilities using traditional methods, (A51) Older couple comes to live occasionally, (A53) Older couple only uses the kitchen parlor
(B11) Utilization	(A5) Add display and selling area at the main gate, (A9) Pig pen is dirty and covered by the gate, (A11) Old house is not good for living on the second floor,(A13) Old house is built outside the village for a hundred years, (A18) Old house is rented to outsiders for business, (A27) Many old houses are still inhabited, (A30) Renovated houses are mainly used for living with visiting relatives, (A35) Kitchen and bathrooms are inconvenient to be used in the yard, (A70) The first floor of the parish hall is highly utilized.
(B12) Cultural beliefs	(A33) The second floor is mainly used for ancestor worship
(B13) Behavioral patterns	(A41) The need to unify the architectural style of the village,(A62) The need to unify the style of the village, (A66) Traffic jams at festivals make it difficult for locals to get in
(B14) Government control	(A19) Government control of landscape buildings limited to two floors, (A26) Agricultural land contracted by the government for outsiders' operation,(A42) Government control of landscape, (A63) Government approval required for renovation
(B15) Autonomous design and construction	(A12) Design and remodel by themselves and hire a master, (A44) New houses are led by homeowners, (A50) Villagers tend to demolish old houses and build new ones

4.3.3 Spindle type coding

On the basis of open coding, principal axis coding integrates 15 sub-categories into 4 main categories. The relationship between the main categories is more complex, covering the current status of traditional dwellings, the living habits and behavioral patterns of the current residents, the demand for living space in modern living patterns, and the law of spontaneous construction. The main-axis coding reveals the core factors affecting the renovation of old dwellings by analyzing the relationships between the categories in depth.

Table 4.33 Spindle coding table

Main category	Subcategory
(C1) Status of traditional dwellings	(B1)Conservation, (B11) Utilization, (B6) Building form, (B5) Building fabric, (B8) Spatial layout
(C2) Habits and behavioral patterns of current residents	(B10) Life Habits, (B13) Behavioral Patterns, (B12) Cultural Beliefs
(C3) Demand for living space for modern living patterns	(B3) Functional zoning, (B9) Equipment and facilities,(B4) Environmental comfort
(C4) Laws of Spontaneous Construction	(B15) Autonomous design and construction,(B7) Economics and cost, (B14) Government controls, (B2) Materials and structures

4.3.4 Selective coding

Selective coding is the final step of the Grounded theory study, which integrates the previous coding results into a coherent theoretical system by constructing a theoretical framework. Selective coding analyzes the typical relationships between the main categories and demonstrates how modern habits and behaviors further drive the spontaneous construction and renovation of old dwellings through their influence on the demand for living space. The final theoretical framework diagram visualizes the research findings and provides a scientific basis for understanding and solving the problem of old residential renovation.

Table 4.34 Selective coding table

Typical relationship structure	Typical Relationship Connotation
(C1) Status of traditional dwellings ↔ (C2) Habits and behavioral patterns of current residents	The state of preservation and architectural structure of traditional dwellings directly affects the living habits and behavioral patterns of residents, which in turn affect the maintenance and renovation of traditional dwellings. The daily life practices of the residents, such as drying, using the kitchen and the bathroom, etc., put forward a direct demand for use and motivation for remodeling the current state of the traditional houses.
(C1) Status of theTraditional Houses ⟶ (C3) Demand for Living Space in Modern Living Patterns	The current state of preservation, architectural form and spatial layout of traditional dwellings determine the specific needs for living space in modern living patterns. Well-preserved traditional houses may only need partial renovation to meet modern needs, while poorly preserved houses need more renovation or even reconstruction to meet the comfort and functional needs of modern life.

(C2) Living habits and behavioral patterns of current residents ⟶ (C3) Demand for living space in modern living patterns	The living habits and behavioral patterns of residents, such as cooking styles, family structures, and cultural beliefs, directly affect the demand for functional zoning, equipment and facilities, and environmental comfort in living spaces under modern living patterns. For example, families with many family members and elderly people may need more bathrooms and convenient kitchen facilities, while families that value cultural traditions may retain more traditional architectural elements.
(C3) Demand for living space in modern living patterns ⟶ (C4) Laws of spontaneous construction	The demand for living space in modern living patterns has led to a pattern of spontaneous construction by residents in the process of remodeling and new construction. Residents design and build their own living spaces, taking into account economic conditions, government controls and other factors, reflecting spontaneity and flexibility. For example, to the extent permitted by the government, residents prioritize affordable building materials and structures while meeting their own living needs.

4.3.5 Theoretical framework diagram

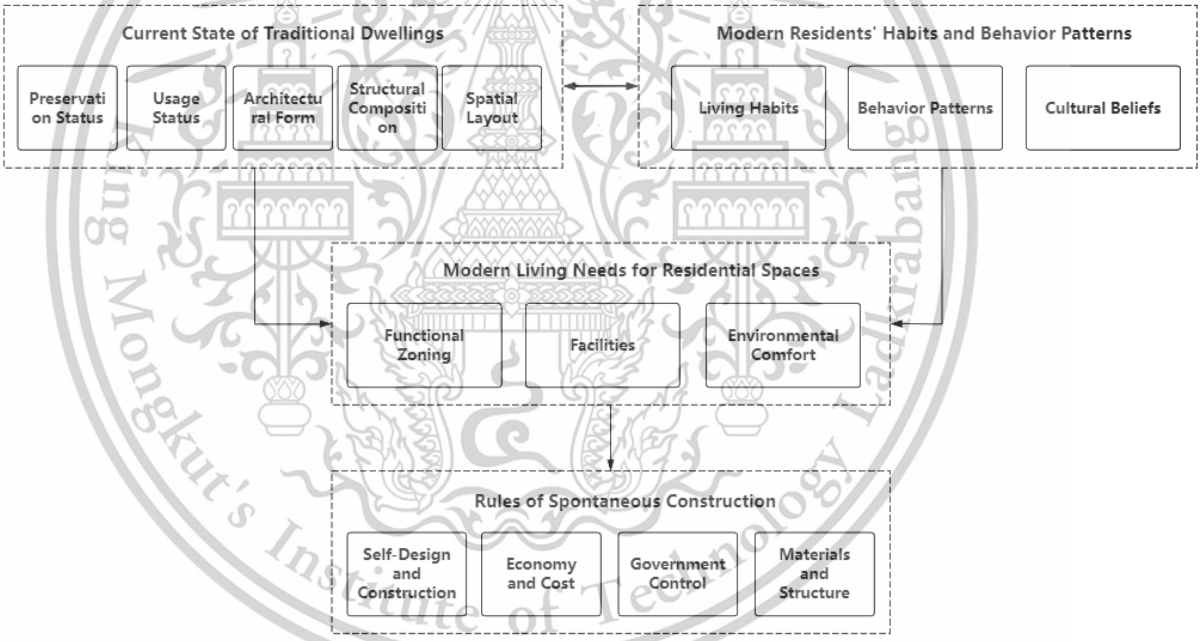


Figure 4.32 Theoretical framework diagram

The theoretical framework reveals how modern living habits and behaviours can further promote the spontaneous construction and renovation of old dwellings through their impact on the demand for living space. (Figure 4.32)

There is a direct relationship between the current state of traditional houses and the living habits and behaviours of the current residents. The state of preservation and architectural structure of traditional houses directly affect the living habits and behavioural patterns of the residents, which in turn influence the maintenance and

renovation of traditional houses.

There is a correlation between the current state of traditional houses and the demand for living space in modern living patterns. Well-preserved traditional houses may only need partial renovation to meet modern needs, while poorly-preserved houses need more renovation or even reconstruction to meet the comfort and functionality needs of modern life.

There is a direct link between the living habits and behavioural patterns of existing residents and the demand for living space in modern living patterns. The living habits and behavioural patterns of the residents, such as cooking style, family structure, cultural beliefs, etc., directly affect the demand for functional zoning, equipment and facilities, and environmental comfort in the living space under the modern living pattern.

The demand for living space in modern living patterns drives residents to embody the law of spontaneous construction in the process of remodelling and new construction. Similarly, spontaneous construction is accompanied by the residents' demand for living space.

4.3.6 Saturation test

The saturation test ensured the completeness of the data and the reliability of the analyzed results. Through semi-structured interviews and field observations, the living experiences and transformation needs of the current residents of 10 traditional Bai dwellings in Xizhou Town and Fengyangyi Village in Dali were collected. Data were coded and analyzed using NVivo software, and a theoretical framework for selective coding was constructed on the basis of open coding and spindle coding. Repeated verification of the consistency and completeness of the data confirmed that the data had reached saturation and no new concepts were generated, ensuring that each main category and sub-category accurately reflected the actual situation of the residents. The results of the study are reliable and provide a scientific basis for the modernization of Bai residential houses.

4.4 ENCODING RESULTS

In order to further analyse the coding results in depth, a more detailed description can be used to dig into the specific performance of each main category and the influencing factors behind it. The following is a more detailed analysis of the coding results:

4.4.1 Status quo of traditional dwellings

The status quo of traditional dwellings is the basis for understanding their transformation needs. Through the analysis of the interview data, we found that the preservation status, the current use status, the architectural form, the architectural structure and the spatial layout of the dwellings constitute the main aspects of their current status.

- Preservation status: There are large differences in the preservation status of Bai traditional dwellings. Residences with cultural value and historical significance have been better preserved (A1). However, most of the dwellings have structural problems due to old age, such as leaking roofs and cracked walls (A3, A57). Some wealthier households have relatively well-preserved buildings due to sufficient funds (A69), while important architectural structures, such as photo walls, tend to be more severely damaged and have not yet been repaired (A57). The overall lighting conditions of some villages are poor, especially when there are more tourists during holidays, and the infrastructure is insufficient, which affects the overall conservation and utilisation (A2, A15). This discrepancy reflects the lack of funding, policy support and community participation in the conservation of residential houses.

- Usage: The frequency and manner of use of traditional houses by residents directly affects the preservation and maintenance of the buildings. Specific functional areas of some houses, such as the ancestral worship space on the first floor, are frequently used during holidays when the whole family gathers (A33), while other areas are less frequently used due to incomplete facilities or inconvenient functions (A51). For example, the kitchens and bathrooms of many traditional houses are still located in the courtyards, and their locations and layouts similarly affect residents' daily use (A35, A32). Some houses, although renovated, still have, for example, narrow and steep

staircases (A36) due to insufficient modern facilities or inappropriate remodelling, resulting in restrictions on residents' daily lives.

- Architectural structure and materials: The architectural structure of Bai dwellings is mainly based on wood and adobe structures, and these building forms have a certain degree of territorial adaptability, especially in earthquake-prone areas with strong anti-seismic performance (A16). However, due to the increased demands of modern living, many residents have opted for modern building materials, such as brick and concrete construction or concrete floors, when renovating their homes (A43). to improve the durability of the houses (A16, A43). Some house facades, doors and windows still retain traditional features (A58).

-Spatial layout: the spatial layout of traditional houses focuses on the interaction between the courtyard and the interior of the home, but with the changes in modern lifestyles, the functionality of courtyards has declined, and the division of functional areas in many houses does not meet the needs of modern life (A39, A55). For example, private spaces such as bedrooms and bathrooms are not clearly separated from public spaces, leading to a decline in living comfort. In addition, the staircases of many traditional dwellings are not reasonably designed, with steep and narrow staircases, causing great inconvenience to residents' daily lives (A23).

4.4.2 Influence of residents' living habits and behavioural patterns

The living habits and behavioural patterns of the residents directly affect the way they use traditional dwellings and their needs for renovation.

- Living habits: the living habits of Bai residents are deeply influenced by traditional culture, especially in the division of household chores, eating habits and festivals. For example, the traditional way of drying clothes still continues, and many families lack modern drying facilities and have to rely on the space in the courtyard to dry clothes (A29). In addition, due to the inconvenient layout of kitchens and bathrooms, many families still maintain traditional living patterns, such as using makeshift stoves in the courtyard (A37), which makes modernisation of kitchens and bathrooms an urgent need.

- Cultural beliefs: Bai residents also retain cultural traditions such as ancestor

worship and family gatherings in their building use, which has a profound impact on the functional allocation of building space (A33). For example, many families would keep spaces for ancestor worship on the first floor or in the hall, and even though these spaces were not frequently used, their symbolic significance was still important (A12). Cultural beliefs not only affect the design and layout of buildings, but also constrain the introduction of some modern facilities, e.g., some families are reluctant to install modern facilities near the ancestral halls, believing that it will destroy the traditional cultural atmosphere.

- Behavioural patterns: Behavioural patterns of Bai residents include family interactions and community activities in daily life. Residents need larger public spaces for family gatherings, festivals, etc. (A53), which conflicts with the need for privacy and independent space in modern life. For example, many residents want to add separate bedrooms and bathrooms, but the spatial layout of traditional buildings cannot easily meet these needs (A51).

4.4.3 Demands of modern living patterns on Bai folk dwellings

Changes in modern living patterns have put forward new functional requirements for traditional dwellings, which are reflected in functional zoning, equipment and facilities, and environmental comfort.

- Functional partitioning: The demands of modern homes include clearer functional partitioning, such as separate bedrooms, bathrooms and kitchens. The open spatial layout of traditional dwellings is clearly unable to meet these needs (A39, A4). For example, some families concentrate their kitchens and bathrooms in the patio area during remodelling, which is convenient for daily use (A34, A48), but also brings problems such as irrational movement lines (A32).

- Equipment and Facilities: Modern life puts higher demands on equipment and facilities, especially the modernisation of kitchens and bathrooms (A37). Many traditional houses have outdated kitchen and bathroom facilities and lack modern equipment, which brings great inconvenience to residents' daily life (A35, A38). The introduction of modern facilities often conflicts with the structure and spatial layout of traditional buildings, making renovation more difficult.

- Environmental comfort: Modern families pay more attention to the comfort of the living environment, such as lighting, ventilation and temperature control (A46, A60). Many traditional dwellings have insufficient indoor light and poor ventilation due to their compact layout and few windows, resulting in reduced living comfort. These problems have prompted residents to hope to improve their living quality by adding windows and extending rooms when remodelling (A46).

4.4.4 The Law of Spontaneous Construction

Residents demonstrated autonomy and flexibility in remodelling traditional dwellings and balancing economic conditions, government controls and material choices.

- Autonomous design and construction: In many of the remodelling cases, residents demonstrated a high degree of autonomous design ability and a keen sense of spatial needs. They designed and implemented the remodelling independently according to their own economic conditions, living needs and aesthetic pursuits (A12, A44). For example, some families chose to use affordable building materials, such as brick-concrete structures, to reduce costs (A43) while preserving the traditional features of the buildings.

- Economic and cost constraints: Economic conditions are an important factor in determining the renovation of residential buildings. Many residents could only carry out small-scale renovation due to lack of funds, or choose low-cost building materials and construction methods (A10, A24, A64). For example, some residents can only upgrade their living environment by renovating the facade and repainting the walls, but are unable to carry out a comprehensive structural renovation.

- Impact of government control: The government has certain control over the architectural style of the villages, which to a certain extent influences the spontaneous construction behaviour of the residents. The number of floors, appearance and style of buildings need to comply with government regulations (A19, A42), which to some extent limits the residents' freedom of transformation. However, residents still had the flexibility to remodel within the scope allowed by the government to meet their own living needs.

The analysis of the more specific coding results described above further clarified the interrelationships and influences among the factors in the transformation of traditional Bai dwellings, and revealed the complex connections between residents' living habits, modern living needs, and the transformation of dwellings. These results provide an important reference for understanding the transformation path of Bai dwellings in the modernisation process.

CHAPTER 5
DISSCUSION CONCLUSION

This chapter provides an in-depth summary and discussion of the results of this study, as well as detailed suggestions for future research in light of the problems and limitations identified during the research process. Through the research on the current situation of traditional houses in Dali Xizhou Town and Fengyangyi Village and interviews with the residents, this study explores the impact of modern living habits and behaviours on the transformation of traditional houses.

5.1 CONCLUSION

The core objective of the study is to reveal the transformation needs of the traditional dwellings of the Bai ethnic group in Dali, Yunnan Province, in the process of modernisation and their inherent laws, and through the coding results, we have systematically analysed four aspects, namely, the current situation of the traditional dwellings, the living habits of the residents, the needs of modern living and the law of spontaneous construction, as well as the relationship between them.

5.1.1 Current Situation and Preservation of Bai Traditional Houses

Through the study, we found that the current situation of traditional houses is the primary focus of our research, and the preservation, use, architectural form, building structure and spatial layout of traditional houses constitute the current situation of traditional houses. The better preserved traditional houses show a more complete architectural form and spatial layout, but in the process of use, they gradually show incompatibility with the needs of modern life. The architectural forms

are varied, ranging from monolithic buildings to compound buildings, reflecting the diversity and richness of Bai folk dwellings. In terms of building structure, traditional houses usually adopt wooden and earth-wood structures, which have certain anti-seismic performance and geographical adaptability. However, these traditional structures face many challenges in modern life, such as the lack of modern facilities and low space utilisation. In terms of spatial layout, traditional houses focus on the use of courtyards and interaction within the family, but in modern living patterns, the functionality and actual utilisation of courtyards has decreased, and the spatial layout needs to be adapted to meet the needs of modern life.

5.1.2 Influence of residents' living habits and behavioural patterns on the transformation of Bai traditional houses

Through our research, we found that the living habits and behavioural patterns of the current residents are important factors influencing the renovation of dwellings, and that the living habits and behavioural patterns of Bai residents are deeply influenced by traditional culture, including their lifestyles, eating habits, family structures and cultural beliefs. Residents' living habits, such as drying clothes and using the kitchen and bathroom, present a direct demand and motivation for renovation of residential houses. In terms of cultural beliefs, Bai residents focus on family harmony and respect for ancestors, and these beliefs are reflected in the architectural design and spatial layout, such as the installation of ancestor halls and family gathering spaces. Residents' behavioural patterns, such as group activities and family gatherings, require larger public spaces and multi-functional areas. Living habits and behavioural patterns not only influence residents' maintenance and use of traditional houses, but also have a profound impact on the demands of modern life.

5.1.3 Conflict and Integration of Modern Living Patterns and Living Space

Through the study, we find that the demand for living space in modern living mode significantly influences the direction of the transformation of traditional houses, and is the core driving force for the transformation of traditional houses. Modern living

emphasises functional partitioning, equipment and facilities, and environmental comfort. In terms of functional zoning, modern families need more private spaces, such as separate bedrooms and bathrooms, and public activity areas, such as living rooms and dining rooms. These needs place new demands on the spatial layout of traditional homes. In terms of equipment and facilities, modern families need modern kitchens, bathrooms and heating facilities, the installation and use of which pose challenges to the structure and layout of traditional houses. In terms of environmental comfort, modern families focus on the comfort of the living environment, including lighting, ventilation and temperature regulation, and these needs need to be realised through the renovation and optimisation of the design of traditional folk dwellings.

5.1.4 The Law of Spontaneous Construction of Bai Traditional Folk Houses

The law of spontaneous construction reflects the autonomy and flexibility of residents in the process of renovation and new construction. Residents design and build their own living spaces according to their own economic conditions, living needs and government control. Economy and cost are important considerations for residents' spontaneous construction. Residents usually choose affordable building materials and structures to reduce construction costs while meeting their basic living needs. In terms of government control, residents need to follow certain rules and regulations in the process of remodelling, but within the limits allowed by the government, residents will be as flexible as possible in adjusting the architectural design and spatial layout to meet their own needs. In terms of materials and structures, residents will consider local resources and traditional construction techniques when choosing building materials to ensure construction quality and cost control.

5.1.5 Summary

To sum up, through in-depth analysis of the results of the data analysis, the core factors and internal laws affecting the renovation of Bai folk dwellings have been discovered. The research results show that the current situation of traditional dwellings, the living habits and behavioural patterns of the residents, the demands of

modern life and the laws of spontaneous construction interact with each other, and together they constitute a complex system for the modernisation and renovation of Bai ethnic dwellings.

Based on the results of these studies, targeted and operable design proposals for the renovation of traditional dwellings can be put forward to improve the quality of living and the efficiency of use of dwellings, as well as to effectively protect and pass on the traditional culture of the Bai ethnic group. The demands of modern life have put forward new requirements for the renovation of traditional dwellings. By combining the theory of self-organisation, the study explains the intrinsic law of the evolution of dwellings and the characteristics of spontaneous construction, which provides a scientific basis for understanding and solving the problem of modernising and renovating the dwellings of the Bai ethnic group.

By systematically analysing the current situation of traditional dwellings and the living habits of the inhabitants in Xizhou Town and Fengyangyi Village in Dali, we found that there are certain contradictions between the demands of modern life and the structure and spatial layout of traditional dwellings. Through rational renovation and the introduction of modern facilities, it is possible to improve the living comfort and functionality while maintaining the traditional cultural values.

5.2 DISCUSSION

Through research, it was found that the renovation of traditional Bai residential buildings is closely related to the modern living needs of residents. The key challenge in the adaptive renovation of Bai residential buildings is to find a balance between protecting traditional culture and meeting modern living needs.

5.2.1 Contradiction between modern living needs and traditional houses

In the process of remodelling traditional dwellings, achieving a balance between modern needs and cultural heritage is an important challenge.

1. CONFLICT BETWEEN FUNCTIONAL NEEDS AND TRADITIONAL STRUCTURES

Modern families have increasing demands for living facilities, such as

independent bathroom facilities, modern kitchens and ample storage space. However, the layout of traditional houses usually cannot accommodate these modern facilities. Traditional dwellings are flawed in terms of design and functional differentiation. For example, the traditional hall, which is the main public area and is often open, is now under-utilised, although it was suitable for social and family activities in the past. Although, in conjunction with the ear room, the division of public and private areas, living and production areas was initially realised. But this open form of building distribution can no longer meet the convenience and comfort requirements put forward by the occupants. In order to adapt to the functional needs of modern life, residents have to carry out large-scale structural renovation, which may damage the integrity and historical value of the building.

2. IMPROVEMENT OF LIVING COMFORT

Modern residents have higher requirements for living comfort, including good lighting, ventilation and heat insulation. Although the thick walls and small window designs of traditional dwellings are conducive to keeping warm in winter and cool in summer, they are poorly lit and ventilated under modern demands. As a result, many residents choose to remodel windows, add skylights or install modern ventilation systems. While these remodelling measures improve living comfort, they also have an impact on the appearance and structure of the buildings.

3. CONFLICT BETWEEN CULTURAL HERITAGE AND MODERNISATION

Traditional houses are not only living spaces, but also carriers of cultural heritage. In the process of modernisation, how to meet the needs of modern life while preserving and inheriting traditional culture is an important challenge. For example, although modern building materials and techniques can improve the practicality and comfort of a building, they can lead to the loss of traditional architectural style if they are not used properly. Therefore, during the renovation process, cultural heritage needs to be adequately assessed and protected, and appropriate designs and materials need to be adopted in order to achieve a balance between cultural heritage and modernisation.

5.2.2 Laws and problems of spontaneous construction

Spontaneous renovation reflects residents' flexible response in terms of economy and practicality, but it also exposes irregularities and safety hazards in design and construction. The intervention and guidance of the government and professional organisations are crucial to improving the quality of remodelling and preserving cultural heritage.

1. ECONOMIC AND PRACTICAL CONSIDERATIONS

In the process of spontaneous renovation, residents often choose affordable and durable materials that can meet the needs of daily life but may have an impact on the historical and cultural value of the building. For example, modern aluminium window frames are practical but lack aesthetic and cultural significance compared to traditional wooden windows. In addition, due to the lack of professional guidance, residents may overlook some important structural and safety issues during the renovation.

2. FLEXIBILITY AND LIMITATIONS OF DESIGN

Residents show a high degree of flexibility in spontaneous remodelling, adjusting and remodelling their houses according to their own needs and economic conditions. However, due to the lack of systematic design and planning, these modifications are often sporadic and haphazard, which may lead to inconsistencies in the overall appearance of the house and potential structural safety hazards. For example, the failure to give due consideration to the load-bearing and anti-seismic properties of the houses when making additions or extensions to them may adversely affect the safety of the houses.

3. ROLE OF THE GOVERNMENT AND PROFESSIONAL BODIES

The problems in spontaneous retrofitting show the lack of government and professional institutions in residents' spontaneous retrofitting. The government and professional organisations should provide the necessary technical guidance and policy support to help residents follow scientific and reasonable design and construction norms when carrying out spontaneous renovation, so as to ensure the safety of renovation and the integrity of cultural heritage.

5.2.3 Measures and Suggestions for Effective Protection of Traditional Houses

1. The traditional dwellings of the Bai ethnic group should be treated differently by dividing into categories, and should be protected and developed in parallel in order to truly prevent them from being completely replaced by modern buildings and to provide a realistic basis and conditions for the inheritance and development of the architectural culture of the ethnic minorities. For the Bai folk residence should be used to classify the way of differentiated treatment.

For the village where the large compound with cultural relic value is located and the representative ancient towns and ancient villages in the dwellings, it must be protected in strict accordance with the original form of existence of the traditional dwellings and the original existence of the atmosphere, from the architectural form, the use of materials, the method of construction, decorative arts and so on should be carried out in a traditional way, to ensure that the original ecology of the ancient dwellings, ancient towns, ancient towns and ancient villages.

For the normal use of dwellings in natural villages that are closely related to people's lives should be encouraged to be built, protected and repaired with the main purpose of meeting the requirements of life on the basis of maintaining national characteristics.

2. Under the premise of preserving national cultural characteristics, the architectural function division and layout of Bai residential buildings should be further optimised, and changes in the overall architectural design should be explored in order to meet people's ever-changing living requirements, so as to adapt traditional residential buildings to modern lifestyles. The division of the internal function area cannot meet the modern living requirements, so it is possible to make a new division of the internal space, and at the same time introduce the modern water supply and drainage arrangement and electrical arrangement, and realise the arrangement of the sanitary facilities for modern life.

3. Reasonable use of new materials in Bai traditional houses, and establishment of a reasonable mechanical model of the houses built with new materials. Provide theoretical support for the standardised design of Bai residential buildings. The Bai

traditional houses are mainly made of wood, which is a huge amount and requires high quality. Insufficient supply of wood will affect the development of Bai traditional houses. The introduction of new building materials to replace part of the load-bearing components, maintenance structures and decorative components is a solution to the problem.

The introduction of new materials should pay attention to several factors: ① the use of new materials can not destroy the overall architectural style of the traditional houses of the Bai people; ② new materials can meet the requirements at the same time with the original building to form a good combination of the role of complementary to each other, each take advantage of each other, complement each other insufficient.

4. Through the introduction of scientific design, management tools, the establishment of the Bai traditional houses from the overall planning, architectural design, structural design, construction technology, construction management of the overall standardised management system, to ensure that the Bai traditional houses in the construction process in accordance with the rules.

The design and construction process of Bai folk houses is basically a synthesis of the master's will and craftsmen's experience. In the design and construction process, there is no professional and reasonable planning and design, structural design, and no scientific construction management. In view of the existing problems, first of all, the establishment of institutionalised Bai residential construction mode, actively exploring the combination of the construction characteristics of Bai traditional residential buildings, for the institutionalised management of Bai traditional residential buildings to put forward a practical approach. The planning, design and construction processes of residential buildings are regulated.

Secondly, professional designers and design methods should be introduced, and professional design atlases compatible with the Bai traditional houses should be compiled to form a scientific and rigorous design process. For the traditional dwellings that meet the requirements for residence, scientific and reasonable improvements are made to the traditional dwellings on the basis of preserving the style of the traditional Bai dwellings to the maximum extent possible. While providing a professional basis for the actual construction of Bai traditional houses, different design methods are provided

for different requirements of Bai traditional houses, so as to solve the contradiction between the protection of traditions and the satisfaction of modern needs.

Finally, the construction techniques of Bai traditional houses are collated and documented, the traditional mode of hand-to-mouth and master-to-disciple teaching is changed, and construction specifications and model design methods suitable for Bai traditional houses are compiled with reference to wooden structure design methods and ancient building model design methods.

5.3 RESEARCH LIMITATIONS

5.3.1 Limited sample size

Due to the limitations of the research time and resources, the research sample was mainly concentrated in Xizhou Town and Fengyangyi Village, and 10 Bai traditional houses were selected as the sample, which may not be able to comprehensively represent the situation of Bai traditional houses in the whole Dali region, which may affect the wide applicability of the research results.

5.3.2 Difficulty of Data Acquisition

Some traditional houses are uninhabited or not properly protected, making it difficult to collect complete and accurate data, which in turn affects the comprehensiveness and reliability of the research results. In addition, the low level of education of the villagers can create communication barriers, and household surveys require privacy, making it difficult to obtain data from most houses. These factors have made data collection difficult and may further affect the research findings.

5.3.3 Subjectivity of Interview Data

The data collection process of interviews and fieldwork may be affected by the subjective factors of the researcher and interviewees due to the resistance or reservation of some of the residents to the interviews. It may lead to incomplete data

collection and information bias. Interview data are somewhat subjective, and residents' personal experiences and opinions may have affected the objectivity of the data. Future research should incorporate more objective data for analysis to improve the scientific nature of the study.

5.3.4 Limitations of the Study Scope

This study mainly focuses on functional needs and comfort enhancement, with less consideration of cultural heritage, socio-economic factors and policy implications. Future research should explore and analyse these aspects in greater depth.

5.4 SUGGESTIONS FOR FUTURE RESEARCH

To compensate for the problems and shortcomings in this study, future research can improve and deepen in the following aspects:

1. EXPANDING THE SAMPLE SIZE AND STUDY SCOPE

Future research should expand the sample size to cover more regions and types of traditional houses in order to obtain more comprehensive and representative data. At the same time, cultural heritage, socio-economic factors and policy implications should be studied in depth to provide more systematic and comprehensive analyses.

2. MULTI-DIMENSIONAL DATA ACQUISITION AND ANALYSIS

Combine multiple data acquisition methods, such as field measurements, aerial photography by drones and 3D modelling, to carry out a comprehensive assessment and analysis of the current situation. Use quantitative analysis methods to scientifically assess the effect of transformation in order to improve the accuracy and reliability of the study.

3. COMPREHENSIVE CONSIDERATION OF CULTURAL AND SOCIAL FACTORS

In future research, more consideration needs to be given to the impact of cultural heritage, socio-economic factors and government policies on the transformation of traditional houses. Through interdisciplinary cooperation and combining the multidisciplinary perspectives of architecture, sociology and cultural heritage protection, comprehensive analyses will be conducted to provide scientific basis and guidance for the protection and development of traditional dwellings.

4. STRENGTHENING THE GUIDANCE OF THE GOVERNMENT AND PROFESSIONAL BODIES

The study should explore the roles and functions of the government and professional organisations in the renovation of traditional dwellings, and put forward effective policy recommendations and technical guidance to help residents follow scientific and reasonable design and construction specifications during the renovation process, so as to ensure the safety of the renovation and the integrity of the cultural heritage.

5.SUMMARY

This study focused on the townships of Dali Xizhou and Fengyangyi and, through detailed research and analysis of interviews with residents, explored the profound impact of modern living needs on the transformation of traditional dwellings. Not only did the study reveal how residents, in their quest for modern conveniences, strive to strike a delicate balance between modern needs and cultural heritage during the transformation process. However, we also encountered some problems and limitations during the research process. For example, some traditional dwellings were unoccupied or not properly protected, resulting in incomplete data collection. Differences in the level of education of the villagers also created communication barriers that challenged the accuracy and depth of the research.

Nevertheless, our findings provide valuable insights and guidance for future research and practice. In order to better understand the complexity of the transformation of traditional dwellings, future research should focus on expanding the sample size to cover more different types of dwellings and resident groups. At the same time, economic, social, cultural and other multi-dimensional factors need to be fully considered in order to more fully assess the effectiveness and impact of renovation. In addition, strengthening interdisciplinary cooperation, for example by combining expertise in fields such as architecture, sociology and history, will help promote the scientific protection and sustainable development of traditional dwellings.

In short, although this study faced challenges, the results obtained provide a useful exploration of the renovation and protection of traditional dwellings and point the way forward for future research.

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Appendix A

OUTLINE OF THE INTERVIEW ON DALI TRADITIONAL RESIDENTIAL ARCHITECTURE

Outline of the Interview on Dali Traditional Residential Architecture

Interview Opening Words:

Hello, I am a doctoral student at King Mongkut's University of Technology and a teacher at Yunnan College of the Arts. I am researching my dissertation on the design of rural dwellings under the modern mode of living, and I would like to know more about the Bai folk dwellings through interviews, can I delay you for a while to conduct the interviews?

This interview will be conducted mainly through a question and answer format, all the content in the interview will only be used in my academic paper and will not be used for any other purposes, in order to ensure the validity of the interview, please answer each question truthfully, and if there is no question we will start the interview. (If the interviewee agrees, he/she will be asked to sign an informed consent form)

1.Basic information

(1)Gender:

(2) Your age is:

(3) What is your occupation? What is the family's mode of production? What is the source of income of the family?

Examples include: farming (planting and breeding), part-time work (running small-scale businesses and temporary labor during agricultural leisure time), business, intellectuals (working in rural areas in science and technology, education, culture, health care, etc.), rural cadres, villagers left behind (the elderly, empty-nesting families), and migrant workers (itinerant families).

(4) Who are the family members? Who are the permanent residents of the house? Who are the main users?

(5) Floor space:

(6) Interview location:

(7) Interview time:

2. Interview questions

(1) Villagers' demand for residential buildings

	physiological needs	psychological needs
realize	The scale of the building in accordance with economic conditions; functional space to meet the needs of production and life; rational layout of functional space; safety and comfort of the building body and infrastructure;	The space is private and open; Cultural and aesthetic embodiment of individuals and groups.

A. Does **the size of the building** meet current living or production needs?

B. What are **the functional** shortcomings of **the space**? What space can be added? Does **the area** meet the use?

Space division: bedroom, hall, living room, kitchen, bathroom, shrine, storage room, courtyard

Time of use for each space?

For each space's needs? What are the deficiencies? What has changed for each space in the old and new buildings?

C. Is there anything unreasonable about **the spatial layout**? (Unreasonable layout may lead to unreasonable life activity lines, which can be considered in terms of life behaviors)

D. What needs to be done about **the infrastructure**? Is it safe and comfortable? What are the problems with plumbing and heating? For example, is the hot water solar, electric or gas? What do you use for cooking? (Induction stove, gas cooker, traditional cooker)

E. **Privacy and openness of space**

What do you think are private spaces and what are open spaces? What kind of activities take place in these spaces?

What are your thoughts on the privacy and openness of space in traditional homes?

How are private and open spaces represented in new or newly remodeled homes today?

F. Aesthetic concepts (arising from villagers' aspirations for a better quality of life, but also reflecting regional or foreign cultures)

What do you think are the most important White characteristics in building a

house?

Are these architectural features primarily considered for functional use or for aesthetic purposes?

How have these architectural features been shaped by history and culture?

Prefer traditional residential forms or modern architectural forms?

2. Architectural style

(1) Do you think there needs to be a uniformity in the look of the buildings in the village? Or should they be built according to the wishes of each family?

(2) Are the villagers concerned or aware of the architectural style?

(3) Will the government control the appearance of the village? Are there any restrictions on self-built houses?

(4) If your family built a new house what material would you use? For example: wood or modern reinforced concrete? (5) Where did you purchase the materials for building your home? Or is it provided by the construction team?

(5) Regarding the height of the building, how many floors are usually built in the village? Are there any requirements or restrictions imposed by the village or government? Will there be budgetary constraints?

3. Housing construction and implementation

(1) When was your house built? (Including newly built homes and old traditional homes)

(2) Was your house built according to your own wishes? Or did you take the lead in designing and building it through a designer and a local construction team? Do you build your house with reference to the houses built by others in the village? Is there a reference standard?

(3) Can you tell us about your home and the major steps and processes involved in building it?

(4) How did the villagers make decisions and cooperate during the building process?

(5) What was your biggest concern during the building process?

For example: appearance, whether the use of the function meets the needs of life, the rational use of space, the price of construction, and so on.

(6) How are natural factors such as climate, light and orientation taken into

account in the building process?

(7) What factors do you think influenced the completion and quality of the building during implementation?

(8) Were there any difficulties or challenges encountered during the design and implementation process? How were they resolved?

4. Recommendations

(1) What are your suggestions or ideas for the remodeling and design of traditional houses in the countryside under the modern mode of living?

(2) What are the views on the retention or otherwise of old traditional buildings? Should they be remodeled or demolished and rebuilt?

(3) What are the views on the comfort of old traditional buildings and new contemporary self-built homes?

Did your family build a new house other than the old one, that's more of where you live

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Research findings:

1. Xin Gan, Thirayu Jumsai na Ayudhya. "The Enlightenment of Bai Ethnic Residential Architecture Art Decoration on Modern Design under the Background of Multimedia Art" . Pakistan Journal of Life and Social Sciences.

2. Xin Gan, Thirayu Jumsai na Ayudhya. "Adaptive design of traditional residential buildings based on digital intelligence system under selforganization theory" . Pakistan Journal of Life and Social Sciences.