

**Community Livability Under Urban Shrinkage in China:
A Case Study in Fuxin and Ziyang Cities**

中国の縮小する都市における居住環境維持に関する研究：
阜新市と資陽市の事例を通して

FY 2024

Graduate School of Global Environmental Studies
Kyoto University
Doctoral Program in Global Environmental Studies

ZHANG Yuqi

Acknowledgements

I would like to thank the following people, without whom I would not have been able to complete this research, and without whom I would not have made it through my doctoral degree.

First and foremost, I would like to extend my heartfelt thanks to my supervisor, Associate Professor Chiho Ochiai, for her consistent guidance, support, and encouragement. Whenever I encountered difficulties in my research, she provided me with valuable suggestions and directions to move forward. Her passion for research has always inspired me. Beyond the academic sphere, she also greatly helped me adapt to life in Japan. The times we traveled together to attend conferences are cherished memories. I would also like to thank my co-supervisor, Professor Hirohide Kobayashi, for always offering insightful suggestions and comments, and for encouraging me to pursue my research with confidence. Additionally, I would like to thank Professor Izuru Saizen for providing excellent feedback on my thesis.

I am sincerely thankful to all the respondents from Wenxinyuan and Mijia Communities in Fuxin City, as well as Xiangyang and Guihuajing Communities in Ziyang City, for taking the time to complete questionnaires and participate in interviews. I am grateful for their trust and the sincere sharing of their views, which enabled me to conduct in-depth research and uncover valuable insights.

I would also like to thank all the lab members for their helpful suggestions during the lab seminars. Thanks to their companionship and support, we shared wonderful times together in Kyoto, which made my life truly enjoyable.

And my deepest thanks go to my parents. Your unwavering support and encouragement sustained me through the challenges I faced while studying abroad. I hope I've made you proud. Special thanks to my fiancé, Shoupeng Liu, for always being there for me, for your steadfast support and encouragement throughout my doctoral studies, and for taking care of me in our daily lives. I also extend my thanks to my relatives for their constant care and concern.

Finally, I would like to acknowledge the support of the Japanese Government (Monbukagakusho: MEXT) scholarship, which enabled me to live and study in Japan. I am also grateful to The Obayashi Foundation for supporting my field research in China.

Executive Summary

1. Research Background

Nowadays, urban shrinkage has become a global phenomenon, accompanied by significant population loss, economic decline, and urban space deterioration. In recent years, this trend has become particularly evident in China. While many cities are experiencing rapid urbanization and growth, some researchers have noticed a continuous population decline in numerous cities across China. Urban shrinkage poses significant challenges to urban management and development, while also placing unique pressures on local communities that require more attention. Buildings in these areas often suffer from aging and lack of maintenance, and vacant houses are common. Essential infrastructure, such as heating, water supply, and sewage systems, also faces poor maintenance. Furthermore, the social fabric of communities suffers, with fewer social interactions and weakening neighborly ties. Given these pressures, it is necessary to prioritize community livability in shrinking cities and pay close attention to the people living there. Creating more livable communities can play a crucial role in retaining the population in shrinking cities. Currently, in response to urban shrinkage, various policies and strategies have been implemented across the economic, population, and land use sectors. At the community level, efforts primarily focus on reducing vacancy rates and reusing vacant land. However, in China, there is a lack of specific strategies for managing vacant land and properties. Although there are no specific community strategies targeting shrinking cities, the central government introduced a policy in 2015 aimed at the renovation of old residential communities, which has been implemented nationwide, including in shrinking cities. This policy can be seen as a proactive measure to address community decline. However, compared to growing cities, there is less research focused on how these policies are implemented in shrinking cities and on their effectiveness.

2. Research Objectives and Questions

This research aims to understand the current status of shrinking cities in mainland China, investigate community livability within different types of shrinking cities, and evaluate the effectiveness of government-led community renovation projects. The study will begin by examining the overall situation of shrinking cities in mainland China through the statistical analysis of demographic, economic, and other related data. Following this, representative case study sites will be selected for in-depth analysis through field surveys, questionnaires, and interviews. The study will explore residents' perceptions of urban shrinkage and their evaluations of community livability, examine whether perceived shrinkage influence their assessments of livability, investigate whether community renovation projects can enhance livability, and determine whether residents' evaluations of community livability affect their relocation intentions.

The research questions are as follows:

- *Macro-Level:*

What are the spatio-temporal distribution, types, and influencing factors of shrinking cities in mainland China?

- *Micro-Level:*

Q1: How do perceptions of urban shrinkage impact assessments of community livability?

Q2: Have government-led community renovation projects improved community livability?

Q3: Do perceptions of shrinkage influence individuals' willingness to relocate, and can enhancing community livability reduce residents' willingness to relocate?

3. Research Findings

1) From Macro-Level Analysis (the overall situation in mainland China)

Since 2000, China has experienced a phenomenon of population shrinkage. Over the past 20 years, the number of cities with shrinking populations has increased to more than half. Severe population shrinkage has been particularly evident in Northeast China, the Inner Mongolia Autonomous Region, and the provinces of Shaanxi and Sichuan. Compared to cities with population shrinkage, cities with economic shrinkage emerged later, beginning around 2015, primarily in the northeastern regions. Regarding the types of shrinking cities, currently, most are characterized by solely population shrinkage. However, since 2015, there has been a notable increase in cities experiencing both population and economic shrinkage. Additionally, cities experiencing continuous shrinkage make up the largest proportion. Furthermore, higher rates of shrinkage are observed in small and medium-sized cities, as well as in resource-based cities.

As for the factors influencing urban shrinkage, migration, aging, industrial transformation, and local government fiscal revenues have a significant impact nationwide. These factors vary across regions and change over time. In most regions, the impact of population migration and aging is increasing. In southwestern China, large-scale labor migration and rising aging rates are the major causes of urban shrinkage. Deindustrialization and industrial restructuring are the main reasons for the decline of most resource-based industrial cities in northern China. Additionally, local public fiscal revenue has the most significant impact on shrinking cities in the northeastern regions.

2) From Micro-Level Analysis (Communities in shrinking cities)

Residents in severely shrinking cities have a stronger perception of urban population decline and economic recession. Additionally, in shrinking cities with stronger local fiscal capacity, residents tend to have a higher evaluation of community livability. Within each city, residents' perceptions of community decline and their evaluation of community livability vary by neighborhood. This variation is influenced by the geographic location of communities and proximity to facilities. Residents in centrally located communities with well-developed amenities generally have a weaker perception of community decline and a higher evaluation of community livability. Additionally, the study indicates that perceptions of urban shrinkage can influence community livability assessments to some extent, but mild shrinkage does not noticeably impact community livability. Furthermore, economic recession has a greater impact than population decline. Interestingly, residents' perceptions of community population decrease or increased vacant housing do not significantly affect their evaluation of community livability, except for Fuxin's Wenxinyuan Community. Although the direct impacts of community decline are not yet fully apparent, potential issues related to infrastructure, the housing market, and social interaction within communities are beginning to emerge.

The effectiveness of government-led community renovation projects varies across different communities. Four key factors influence the success of these projects: funding sources, project content, resident participation, and post-renovation management. Communities with more funding, especially those designated as model communities for renovation, are more likely to secure the necessary resources. Projects that focus on enhancing social infrastructure tend to have higher resident satisfaction. Additionally, the more involved residents are in the renovation process, the higher their satisfaction tends to be. Effective post-renovation management also plays a crucial role in achieving higher satisfaction levels. Despite the

varying effectiveness of renovation projects across communities, they generally improve community livability, including public facilities, the environment, roads, and public activity spaces. This demonstrates that implementing renovation projects can be an effective strategy for enhancing community livability. However, the implementation of these projects in shrinking cities faces significant challenges. First, funding is a major issue, with limited investment from the private sector. Second, residents' willingness to participate in renovation projects and in post-renovation community management is relatively low. Current management is overly reliant on top-down government initiatives, with insufficient resident self-management.

Regarding residents' relocation intentions, most residents prefer to stay in their current communities. Among those who wish to relocate, only a few express a desire to move to other cities, while the majority prefer to stay within the same city. Further analysis shows that in the mild or early stages of urban shrinkage, residents are more sensitive to the phenomenon, and negative views on shrinkage may drive them to relocate. Additionally, residents with higher evaluations of community livability are less likely to want to move. Convenient shopping facilities and transportation are the main reasons residents prefer to stay in their current communities. However, in severely or long-term shrinking cities, residents' perceptions of urban shrinkage and their assessments of community livability do not significantly affect their willingness to relocate, particularly among low-income residents. Instead, factors such as income and age have a greater influence on the decision to relocate. This suggests that improving community livability is crucial for retaining the population in shrinking cities to a certain extent.

4. Significance of the Study

First, this study provides a comprehensive understanding of the current status of shrinking cities in mainland China, contributing to the global discourse on urban shrinkage. It helps policymakers recognize and consider this issue within the Chinese context, which may face long-term population decline in the future. Second, the findings highlight the impact of perceived urban shrinkage on community livability and advocate for a paradigm shift towards more livability-focused urban planning strategies. Third, the study reveals the potential and the challenges of government-led community renovation projects in enhancing community livability in shrinking cities. The study proposes several recommendations to improve the effectiveness of these renovation projects and to enhance community livability in the context of urban shrinkage.

Table of Contents

ACKNOWLEDGEMENTS.....	I
EXECUTIVE SUMMARY.....	II
TABLE OF CONTENTS	V
LIST OF FIGURES	IX
LIST OF TABLES.....	XII
LIST OF ACRONYMS.....	XIV
1. INTRODUCTION.....	1
1.1 Research Background.....	1
1.1.1 The Globalization of Urban Shrinkage and Its Emergence in China.....	1
1.1.2 Challenges and Opportunities in Shrinking Cities.....	2
1.1.3 Policies and Strategies in Response to Urban Shrinkage	3
1.1.4 Community Livability and Community Strategies in Shrinking Cities.....	5
1.2 Research Objectives and Research Questions	6
1.2.1 Research Objectives	6
1.2.2 Research Questions.....	7
1.3 Research Framework and Methodology.....	8
1.3.1 Research Framework	8
1.3.2 Data Collection and Analysis Methods.....	8
1.3.3 Thesis Structure	11
1.4 Significance of the Study.....	12
References	13
2. LITERATURE REVIEW.....	15
2.1 Urban Shrinkage.....	15
2.1.1 An Overview of Urban Shrinkage Research.....	15
2.1.2 Definition and Identification of Shrinking Cities	20
2.1.3 Factors Contributing to Urban Shrinkage and Its Impacts	20
2.1.4 Policy Responses to Urban Shrinkage.....	22
2.1.5 Summary.....	23
2.2 Community in China and Community Livability	25
2.2.1 Concept of Community and Its Definition in China.....	25
2.2.2 The Concept of Community Livability.....	27
2.2.3 Measurement of Community Livability	28

2.2.4 Community Livability in Shrinking Cities	31
2.3 Community Renovation Projects in China	32
2.3.1 Policy Background of the Community Renovation Projects	32
2.3.2 Specific Projects and Implementation Process of the Renovation	33
2.3.3 Research Gaps	33
References	34

3. AN OVERVIEW OF SHRINKING CITIES IN CHINA39

3.1 Methodology.....	39
3.1.1 Research Subjects and Objectives	39
3.1.2 Identifying Cities with Population or Economic Shrinkage	39
3.1.3 Assessing the Degree of Urban Shrinkage.....	40
3.1.4 Exploring the Influence Factors of Urban Shrinkage	41
3.2 Spatio-temporal Distribution of Shrinking Cities in China	43
3.2.1 Cities with Shrinking Populations	43
3.2.2 Cities with Shrinking Economies	45
3.3 Types of Shrinking Cities	47
3.3.1 Based on Dimensions of Shrinkage.....	47
3.3.2 Based on Shrinking Periods.....	48
3.4 Distribution Variations Across Different Urban Contexts	49
3.4.1 Differences by City Size.....	49
3.4.2 Differences Between Resource-Based and Non-Resource-Based Cities.....	51
3.5 Influencing Factors of Urban Shrinkage in China	52
3.5.1 Assessing the Degree of Urban Shrinkage.....	52
3.5.2 Impact Factors of Urban Shrinkage	53
3.5.3 Spatial Autocorrelation Analysis of Shrinking Cities	54
3.5.4 Spatial Heterogeneity Analysis of Impact Factors.....	55
3.6 Discussion and Conclusion.....	59
Notes.....	61
References	61

4. RESIDENTS' PERCEPTIONS OF SHRINKAGE AND ASSESSMENTS OF COMMUNITY LIVABILITY63

4.1 Study Area	63
4.1.1 Selection of the Case Study Sites	63
4.1.2 Overview of the Case Study Sites	65
4.2 Methodology.....	81
4.2.1 The Measurement of Perceptions of Shrinkage.....	81
4.2.2 Establishing an Evaluation Framework for Community Livability in Shrinking Cities	81
4.2.3 Analyzing the Impact of Perceived Shrinkage on Community Livability Assessment	83
4.2.4 Research Hypothesis.....	83
4.2.5 Socio-Economic Characteristics of Survey Respondents.....	84

4.3 Residents' Perceptions of Urban Shrinkage.....	87
4.3.1 Residents' Perception of Changes in Communities	87
4.3.2 Residents' Perception of Changes in Cities	91
4.3.3 Differences in Perceptions Among Residents with Different Socioeconomic Characteristics.....	101
4.4 Residents' Assessments of Community Livability	103
4.4.1 Evaluation of Community Livability.....	104
4.4.2 Differences in Community Livability Assessments.....	108
4.5 The Impact of Perceived Shrinkage on Community Livability Assessment	112
4.5.1 The Impact of Perceived Community Changes on Livability Assessments	112
4.5.2 The Impact of Perceived Urban Shrinkage on Livability Assessments.....	114
4.6 Discussion and Conclusion.....	116
Notes.....	118
References	118

5. GOVERNMENT-LED COMMUNITY RENOVATION PROJECTS AND THEIR IMPACTS ON COMMUNITY LIVABILITY..... 120

5.1 Methodology.....	120
5.2 Community Renovation Projects in Case Study Sites	120
5.2.1 In Fuxin City.....	120
5.2.2 In Ziyang City.....	126
5.3 Residents' Satisfaction with Community Renovation Projects	134
5.3.1 The Analysis of Overall Satisfaction	134
5.3.2 Aspects of Satisfaction and Dissatisfaction	135
5.3.3 Differences in Satisfaction with Community Renovation Projects	143
5.4 The Impact of Community Renovation Projects on Community Livability.....	145
5.4.1 Overall Analysis of the Impact	145
5.4.2 Differences in Impact Across Socioeconomic Groups	147
5.5 Factors Influencing the Implementation Effectiveness	149
5.5.1 Funding Sources of the Renovation Projects.....	149
5.5.2 Contents of Renovation Projects	150
5.5.3 Resident Involvement in the Implementation Process.....	151
5.5.4 Post-Renovation Management.....	152
5.6 Discussion and Conclusion.....	154
References	157

6. RESIDENTS' WILLINGNESS TO RELOCATE AND THE IMPACT OF COMMUNITY LIVABILITY ON IT..... 159

6.1 Methodology.....	159
6.2 Residents' Relocation Intentions	160
6.2.1 Statistics on Residents' Intentions to Settle or Relocate.....	160
6.2.2 Differences Across Socioeconomic Groups	161
6.2.3 Reasons for Wanting to Settle or Relocate	164

6.3 Impact of Perceived Urban Shrinkage on Relocation Intentions.....	168
6.4 Impact of Community Livability on Relocation Intentions.....	169
6.4.1 Overall Analysis of the Impact of Community Livability on Relocation Intentions.....	169
6.4.2 Differences in Impact Across Socioeconomic Groups	171
6.4.3 The Mediating Role of Community Livability in the Impact of Community Renovation Projects	175
6.5 Discussion and Conclusion.....	177
References	178

7. CONCLUSIONS AND RECOMMENDATIONS 180

7.1 Key Findings	180
7.1.1 Shrinking Cities in Mainland China	182
7.1.2 Residents' Perceptions of Shrinkage and Community Livability Evaluation.....	182
7.1.3 The Effectiveness of Community Renovation Projects on Enhancing Community Livability.....	183
7.1.4 The Impact of Community Livability Evaluation on Residents' Willingness to Relocate ...	184
7.2 Recommendations	185
7.2.1 General Principles.....	185
7.2.2 Specific Implementation Framework for the Renovation Project	188
7.2.3 Strategies for Various Community Types	191
7.3 Research Contributions, Limitations, and Future Prospects.....	194
7.3.1 Research Contributions.....	194
7.3.2 Research Limitations	195
7.3.3 Future Prospects	195
References	195

APPENDICES 197

Appendix 1: Questionnaire Survey Form.....	198
Appendix 2: Interview Summaries	201

List of Figures

Figure 1.1 Satellite Map of the Distribution of Global Shrinking Natural Cities by NPP-VIIRS (2013–2018).....	1
Figure 1.2 A Conceptual Model of Urban Shrinkage	4
Figure 1.3 Research Framework.....	8
Figure 1.4 Structure of the Thesis.....	11
Figure 2.1 Number of Publications.....	16
Figure 2.2 Geographical Distribution of Research Objects by Continents and Countries	17
Figure 2.3 Trend of Publications in Different Countries	18
Figure 2.4 Frequency and Proportion of Focus Topics in Publications.....	18
Figure 2.5 Development of Focus Topics in Publications	19
Figure 2.6 Research scale of publications	20
Figure 2.7 Time range of publications.....	20
Figure 2.8 Main findings	24
Figure 2.9 Typical Community Patterns.....	26
Figure 2.10 Composition of a Residential Compound (Xiaoqu).....	26
Figure 2.11 Keywords in the Concept of Community Livability	28
Figure 2.12 Dimensions of Community Livability.....	31
Figure 3.1 Distribution of Shrinking Cities	44
Figure 3.2 Distribution of Shrinking Cities	45
Figure 3.3 Distribution of Shrinking Cities (In terms of the GRDP)	46
Figure 3.4 Distribution of Shrinking Cities (In terms of per capita GRDP).....	47
Figure 3.5 Types of Shrinking Cities (Based on two dimensions)	48
Figure 3.6 Types of Shrinking Cities.....	49
Figure 3.7 Proportion of Each Type in.....	49
Figure 3.8 Shrinking Cities in Different City Sizes.....	50
Figure 3.9 Proportion of Cities by Size in Various Types of Shrinkage	51
Figure 3.10 Distribution of Resource-based Cities in China (Prefecture-level cities)	51
Figure 3.11 Proportion of (Non-)resource-based Cities among Shrinking Cities.....	51
Figure 3.12 Proportion of Shrinking Cities among Resource-based Cities	52
Figure 3.13 Proportion of (Non-)resource-based Cities among Various Types of Shrinking Cities.....	52
Figure 3.14 Spatial Distribution of Shrinking Cities and Their Degree of Shrinkage.....	52
Figure 3.15 Results of Local Moran's I.....	55
Figure 3.16 Local R^2 of the Two Models (2000-2010 and 2010-2020).....	55
Figure 3.17 The Spatial Distribution of the Local Coefficient of Population Migration	56
Figure 3.18 The Spatial Distribution of the Local Coefficient of Aging Rate	57
Figure 3.19 The Spatial Distribution of the Local Coefficient of the Advanced Industrial Structure Index	58
Figure 3.20 The Spatial Distribution of the Local Coefficient of the General Public Budget Revenue..	58
Figure 4.1 The Locations of the Two Case Study Cities	65
Figure 4.2 Photos of the Current State of Fuxin City	67
Figure 4.3 Photos of the Current State of Ziyang City	69

Figure 4.4 The Locations of WXY and MJ Communities in Fuxin City.....	73
Figure 4.5 The Layout of the Case Study Communities in Fuxin City	74
Figure 4.6 Current Photos of the Case Study Communities in Fuxin City.....	75
Figure 4.7 The Locations of XY and GHJ Communities in Ziyang City	75
Figure 4.8 The Layout of the Case Study Communities in Ziyang City	76
Figure 4.9 Current Photos of the Case Study Communities in Ziyang City.....	77
Figure 4.10 The Distribution of Facilities Around Each Community	80
Figure 4.11 Residents' Perceptions of Community Population Changes	87
Figure 4.12 Residents' Perceptions of Changes in Vacant Housing in the Community	89
Figure 4.13 Residents' Perceptions of the Impact of Vacant Housing.....	91
Figure 4.14 Residents' Perceptions of Urban Population Changes	92
Figure 4.15 From Perceptions of Changes in Urban Population to Future Expectations	94
Figure 4.16 Residents' Perceptions of Urban Economic Changes	95
Figure 4.17 From Perceptions of Changes in Urban Economy to Future Expectations	97
Figure 4.18 Residents' Perceptions of Urban Shrinkage in Two Dimensions	99
Figure 4.19 Categories from Perceptions of Urban Shrinkage to Future Expectations.....	100
Figure 4.20 Likert Scale Chart of Residents' Assessment of Community Livability in Four Communities.....	105
Figure 4.21 Mean of Residents' Assessment in Community Livability	108
Figure 5.1 Categorization of Specific Renovation Contents in Fuxin.....	122
Figure 5.2 Process of Community Renovation Project in Fuxin	123
Figure 5.3 Renovation Timeline of WXY Community	124
Figure 5.4 Scenes During and After the Renovation (WXY)	124
Figure 5.5 Renovation Timeline of MJ Community.....	125
Figure 5.6 Scenes During and After the Renovation (MJ)	126
Figure 5.7 Categorization of Specific Renovation Contents in Ziyang.....	127
Figure 5.8 Process of Community Renovation Project in Ziyang	129
Figure 5.9 Renovation Timeline of XY Community	130
Figure 5.10 Scenes During and After the Renovation (XY).....	131
Figure 5.11 Cultural Elements in the Community Renovation Project (XY).....	131
Figure 5.12 Renovation Timeline of GHJ Community	132
Figure 5.13 Scenes Before and After the Renovation (GHJ).....	133
Figure 5.14 Cultural Elements in the Community Renovation Project (GHJ)	133
Figure 5.15 Residents' Satisfaction with Community Renovation Projects in Four Communities	134
Figure 5.16 Satisfactory Aspects of the Renovation Projects.....	135
Figure 5.17 WXY Community after the Renovation.....	136
Figure 5.18 XY Community after the Renovation	137
Figure 5.19 GHJ Community after the Renovation.....	138
Figure 5.20 Unsatisfactory Aspects of the Renovation Projects.....	139
Figure 5.21 Aspects of Dissatisfaction Among WXY Residents.....	140
Figure 5.22 Aspects of Dissatisfaction Among MJ Residents	141
Figure 5.23 Aspects of Dissatisfaction Among XY Residents	142
Figure 5.24 Aspects of Dissatisfaction Among GHJ Residents.....	143
Figure 5.25 Community Management Models of Four Communities.....	152

Figure 6.1 Residents' Intentions to Settle or Relocate.....	160
Figure 6.2 Reasons for Wanting to Settle	164
Figure 6.3 Reasons for Wanting to Relocate	166
Figure 6.4 Reasons for Wanting to Relocate to Another City.....	167
Figure 7.1 Summary of the Influential Relationships Among the Variables	181
Figure 7.2 Summary of the Key Findings	181
Figure 7.3 Implementation Framework for Community Renovation Projects in Shrinking Cities	190

List of Tables

Table 1.1 Data and Analysis Methods Used in the Macro-Level Analysis.....	9
Table 1.2 Data and Analysis Methods Used in the Micro-Level Analysis	10
Table 2.1 Summary of Dimensions and Indicators used in Community Livability Evaluation	28
Table 3.1 Weight Coefficients of Each Indicator for Calculating the Urban Development Index	41
Table 3.2 The Selected Explanatory Variables	42
Table 3.3 Classification of Shrinking Cities (Based on the shrinkage in two dimensions)	47
Table 3.4 Classification of Shrinking Cities (Based on shrinkage periods)	49
Table 3.5 Results of Panel Regression Analysis.....	53
Table 3.6 Results of Global Moran's I.....	54
Table 3.7 The Comparison of the Impact of Factors in Different Regions and the Changes Over Time	59
Table 4.1 Contextual Information About Two Case Study Cites.....	70
Table 4.2 Contextual Information About Four Case Study Communities	77
Table 4.3 Comparison of the Number of Living Facilities Around Four Communities	80
Table 4.4 Measurement of Residents' Perceptions of Shrinkage.....	81
Table 4.5 Framework for Evaluating Community Livability	82
Table 4.6 Respondents Demographic and Socio-economic Statistics	85
Table 4.7 The Results of Chi-square Analysis.....	101
Table 4.8 Significant Perception Differences Among Residents with Various Socioeconomic Characteristics	102
Table 4.9 The Results of ANOVA for Residents with Varying Socioeconomic Characteristics.....	109
Table 4.10 The Results of ANOVA for Residents with Varying Perceptions of Urban Shrinkage	112
Table 4.11 The Impact of Perceived Community Changes on Livability Assessments.....	113
Table 4.12 The Impact of Perceived Urban Shrinkage on Community Livability Assessments	114
Table 4.13 The Impact Differences Among Residents with Different Income Levels	115
Table 4.14 The Impact Differences Among Residents Engaged in Different Industries	116
Table 5.1 The Results of ANOVA for Residents with Varying Socioeconomic Characteristics.....	144
Table 5.2 Regression Analysis of the Impact of Renovation Projects on Community Livability	146
Table 5.3 Impact Differences Among Residents with Different Socio-economic Attributes	148
Table 5.4 Comparison of General Public Budget Revenue and Expenditure of the City District	149
Table 5.5 Categories of Renovation Projects in Four Communities.....	151
Table 5.6 Residents' Assessment of Involvement During the Renovation Process	151
Table 5.7 Linear Regression Analysis of Community Engagement and Satisfaction with Community Renovation Projects.....	152
Table 6.1 The Results of Chi-square Analysis for Residents with Varying Socioeconomic Characteristics	162
Table 6.2 Results of Ordered Logit Regression Analysis (Impact of Perceived Urban Shrinkage)	168
Table 6.3 Results of Ordered Logit Regression Analysis	170
Table 6.4 Impact Differences Across Age Group (Results of the Binary Logit Regression Analysis)..	171
Table 6.5 Impact Differences Across Income Levels (Results of the Binary Logit Regression Analysis)	172
Table 6.6 Impact Differences Across Education Levels (Results of the Binary Logit Regression	

Analysis).....	173
Table 6.7 Impact Differences Across Length of Residence (Results of the Binary Logit Regression Analysis).....	174
Table 6.8 Impact Differences Across Different Types of Property Ownership (Results of the Binary Logit Regression Analysis).....	175
Table 6.9 Ordered Logit Regression Analysis of the Impact of Community Renovation Projects on Relocation Intentions.....	175
Table 6.10 Results of the Mediation Analysis	176
Table 7.1 Strategies for Various Community Types in Shrinking Cities	191

List of Acronyms

WXY	Wenxinyuan Community
MJ	Mijia Community
XY	Xiangyang Community
GHJ	Guihuaqing Community

Chapter 1

1. Introduction

This chapter provides an overview of the entire Ph.D. thesis. First, the research background is introduced, highlighting the global trend of urban shrinkage and its emergence in China, analyzing its impacts on local communities, comparing various community-centered approaches in shrinking cities, and reviewing China's community renovation projects. Subsequently, the research objectives, questions, and methodology are presented, along with the research framework and structure of the thesis. Finally, the chapter elucidates the significance of the research.

1.1 Research Background

1.1.1 The Globalization of Urban Shrinkage and Its Emergence in China

In recent decades, urban shrinkage has become a global phenomenon, accompanied by significant population loss, economic decline, and urban space deterioration (Richardson & Nam, 2014). Meng et al. (2021) identified 5,004 shrinking cities worldwide, which represent 27% of cities, with 41 countries having more than 20 shrinking cities each, predominantly in Europe, the northeastern United States, and Eastern Asia. A study by Zhai et al. (2022) revealed that out of 21,058 natural cities, 5,237 had experienced shrinkage during the period 2013–2018. The total area affected was 114,158 km², accounting for over 16% of the total area of these cities (Figure 1.1).

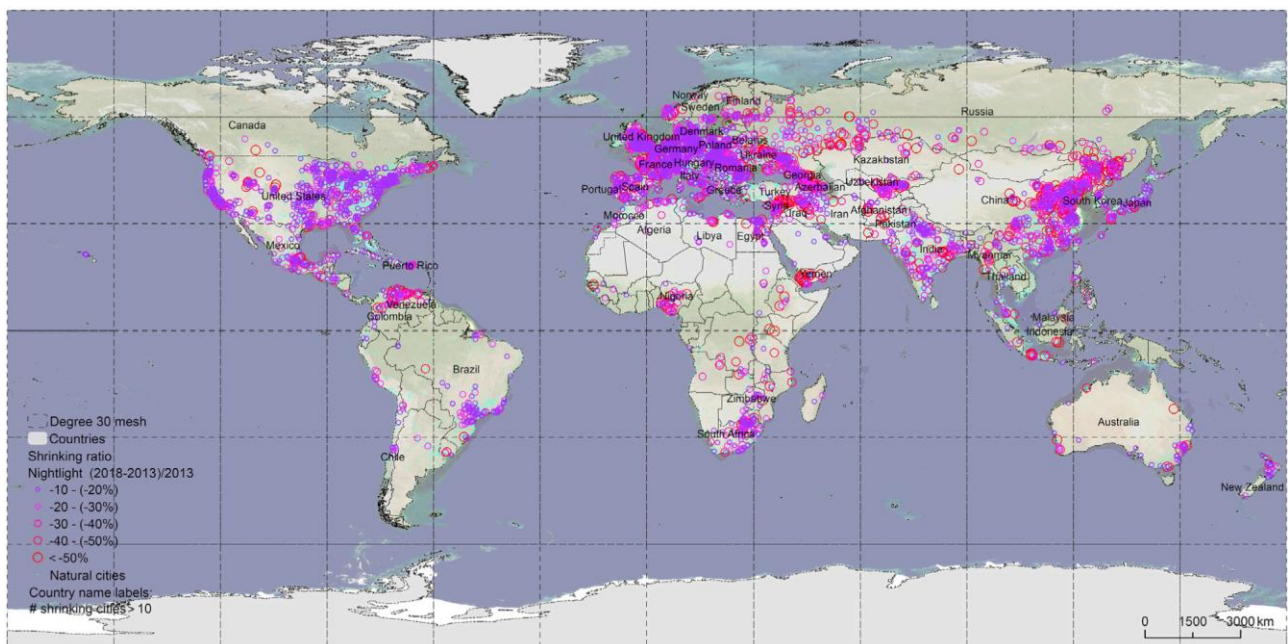


Figure 1.1 Satellite Map of the Distribution of Global Shrinking Natural Cities by NPP-VIIRS (2013–2018)
(Source: Zhai et al., 2022)

Although population loss can be influenced by natural disasters, epidemics, wars, and climate change, the current phenomenon of shrinking cities is predominantly the result of various transformation processes, including deindustrialization, suburbanization, post-socialist changes, and demographic aging (Oswalt, 2005). The phenomenon of urban shrinkage dates to the 1950s. During that period, numerous European and U.S. cities underwent a shared process of urban shrinkage, characterized by a decrease in population and an economic downturn (Hospers, 2014; Mallach, 2017; Schilling & Logan, 2008). In the 1990s, following German reunification, East Germany experienced a significant number of cities undergoing demographic and economic decline. In Japan, urban shrinkage has become a pronounced reality, as the low birth rate and aging population have been challenges for many decades (Hattori, Kaido, & Matsuyuki, 2017).

In recent years, this trend has become particularly evident in China. Although many cities are experiencing rapid urbanization and growth, some researchers are becoming aware of a continuous population decline in numerous cities in China. A study found that, out of 653 cities, 180 were shrinking from 2000 to 2010, including one provincial capital and 39 prefectural-level cities, according to population data from 2000 and 2010 (Long & Gao, 2019). Research on Chinese shrinking cities began to gain attention in 2014, and the Shrinking City Research Network of China (SCRNC) was established to explore this phenomenon across various regions (Long & Wu, 2016). However, the issue of urban shrinkage in China is still academically undervalued and largely unaccepted by most policymakers, highlighting the need for increased attention to this issue.

1.1.2 Challenges and Opportunities in Shrinking Cities

Urban shrinkage poses significant challenges to urban management and development, encompassing both physical and non-physical issues. Physical issues include the vacancy, abandonment, and decay of buildings, land, infrastructure, and public service facilities, as well as the degradation of the environment and landscape. Non-physical issues include reduced investment, economic instability, exacerbated inequality and poverty, and declining urban safety.

Vacant properties and abandoned buildings are visible symptoms of urban shrinkage. These areas can quickly fall into disrepair, becoming hotspots for illegal dumping and vandalism. The degradation of landscapes and environments in shrinking cities is not just an aesthetic issue; it can lead to significant public health concerns. Moreover, the decay of infrastructure and public service facilities means that people have limited access to essential services like healthcare, education, and transportation. Additionally, high vacancy rates can affect property values, leading to a lack of investment in cities. Declining local tax revenues pose a significant challenge for city governments to maintain services and infrastructure with a reduced budget. This financial strain often leads to a vicious cycle where services are cut, further driving away residents and businesses, thereby exacerbating the problem of shrinkage (Ryan, 2012). The physical decay in shrinking cities is compounded by a range of social challenges. Social inequalities can be exacerbated. The reduction in access to essential services like healthcare, education, and transportation disproportionately affects low-income residents, who are less able to relocate to areas with better services. Consequently, this can lead to increased poverty, reduced social mobility, and greater disparities in health and educational outcomes (Mallach, 2018). City safety is another critical issue, as areas with high vacancy rates can become hotspots for crime, further driving away remaining residents and compounding the cycle

of decline. Additionally, urban cohesion often suffers as well, as population decline can lead to the breakdown of social networks and support systems (Hollander et al., 2009).

Despite these challenges, some scholars think that shrinking cities also present unique opportunities for innovative urban planning and development. One potential opportunity is the repurposing of vacant land for green spaces or urban agriculture, which can improve local environmental quality and provide fresh produce to residents. These green spaces can also serve as urban hubs, fostering engagement and revitalization (Schilling & Logan, 2008). Another opportunity lies in the adoption of smart decline strategies, where urban planners focus on managing population decline in a way that enhances the quality of life for remaining residents. This could involve the strategic consolidation of services and infrastructure to more sustainable levels, creating more efficient and resilient urban environments (Pallagst, 2010).

Shrinking cities in China also face the above challenges, with additional unique circumstances. One significant challenge specific to China is the heavy reliance of local governments on “land finance,” which involves selling land use rights to increase local fiscal revenue. However, in shrinking cities, the limited ability to attract investment makes it difficult to generate revenue through the sale of land use rights, a primary source of local fiscal income. This dependency creates a financial strain on these cities, making it challenging to fund public services and infrastructure maintenance. However, another system that may alleviate some of the financial pressure on local governments is the fiscal transfers from the central government. Local governments in shrinking cities can receive financial subsidies from the central government, which can help alleviate some of the financial pressures and support the provision of essential public services and infrastructure.

Despite these challenges, shrinking cities in China also present opportunities for innovative urban planning and development. The repurposing of vacant land for green spaces or urban agriculture is one potential solution. Additionally, exploring new industrial developments, such as Heihe leveraging its geographic proximity to the Arctic for activities like cold-weather testing and tourism, can open new growth opportunities for these cities.

1.1.3 Policies and Strategies in Response to Urban Shrinkage

Currently, many studies are exploring how to address urban shrinkage, and these can be broadly categorized into two paradigms at the macro level. The first is growth-oriented, focusing on economic revitalization policies. The second is adaptation-oriented strategies, such as “smart shrinkage.” Many cities attempt to achieve urban regeneration through policies aimed at revitalizing city centers and developing cultural and creative industries. Examples include Liverpool and Leipzig, which achieved regrowth after experiencing shrinkage (Haase et al., 2021). Other strategies include promoting economic transformation by developing competitive high-tech manufacturing industries (Bartholomae et al., 2017). However, not all shrinking cities can revive through growth-oriented strategies, as many continue to face persistent decline. This has led to a rethinking of planning paradigms to adapt to shrinkage. Wiechmann and Pallagst (2012) argue that growth-oriented planning can exacerbate the negative impacts of urban shrinkage and suggest that “Smart Shrinkage” may offer a new perspective for shrinking cities. The concept of smart shrinkage is “less planning, fewer residents, fewer buildings, and less land use” (Popper & Popper, 2002). Additionally, other planning concepts have emerged, such as “smart decline” and “right-sizing.” These concepts, while

seeking alternative industries, also emphasize reducing land use. They advocate for shrinking the built-up area, converting land to public green spaces or non-development land, and efficiently utilizing land to restore the balance between the built environment and population, thereby improving the quality of urban life (Hollander, 2011; Rhodes, 2019).

Specific strategies for addressing urban shrinkage encompass multiple aspects, including economic, demographic, land use, and so on. Economic restructuring is a key focus, such as creating a competitive high-tech manufacturing sector (Bartholomae et al., 2017). In addition to economic strategies, countries like Japan also focus on attracting people, increasing the fertility rate, and adapting to an aging society. For instance, the “Kitakyushu Settlement and Migration Promotion Project” in Kitakyushu (a shrinking city in Japan) offers subsidies for renting and purchasing homes to residents who move into the city. The “Kitakyushu Community Welfare Plan” provides welfare services for children and the elderly. Moreover, addressing vacant housing and lands is a critical policy focus. Strategies include demolishing abandoned or underused buildings to stabilize the housing market (Wiechmann & Pallagst, 2012), and transforming vacant land into urban green spaces to provide ecosystem services (Haase et al., 2014).

Different countries have varying approaches and strategic priorities. For example, in the United States, some cities have adopted growth-oriented plans, while others, like Youngstown, have experimented with smart shrinkage strategies. These strategies focus on developing a new economy and promoting viable neighborhoods. In Japan, many cities are promoting the development of “compact cities,” with strategies centered on addressing vacancy issues and introducing social welfare policies to attract population and increase fertility rates. In Germany, growth-oriented plans dominate, with the government tackling vacancy-related housing market challenges through comprehensive urban regeneration initiatives. In China, the primary strategy remains growth-oriented, with a focus on economic revitalization policies and optimizing and intensifying land use.

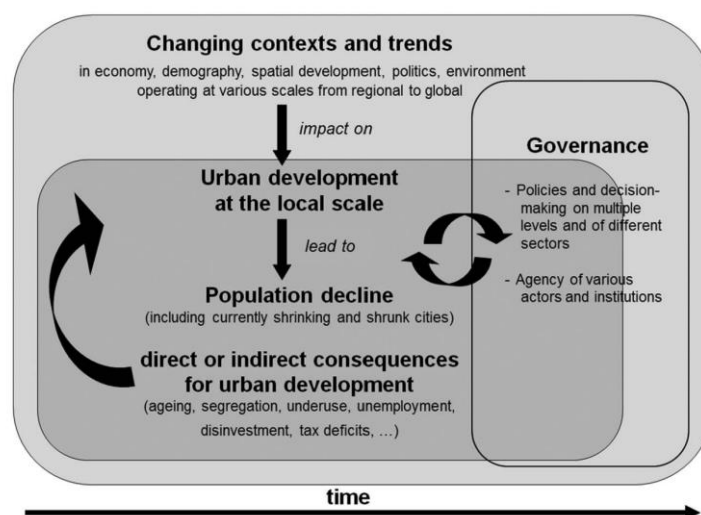


Figure 1.2 A Conceptual Model of Urban Shrinkage
(Source: Haase et al., 2016)

In summary, urban shrinkage is a complex process. Haase et al. (2016) argue that there is no ‘one-size-fits-all’ explanatory approach to shrinkage. They provide a conceptual model that combines the factors

influencing shrinkage, the impacts of shrinkage, and the interaction between urban shrinkage and governance, situating these elements within the context of locally based urban trajectories. Urban shrinkage is driven by various factors at different spatial levels, leading to population decline at the local scale. These drivers may include economic downturns, demographic changes, and alterations in settlement systems. The consequences of shrinkage manifest either directly from population loss, such as housing vacancies, underused infrastructure, and decreasing tax revenues, or as immediate effects of these macro-processes, like the emergence of brownfield sites. Additionally, the unique trajectory of urban shrinkage is shaped by specific governance arrangements operating across different spatial levels, from local to global, and over time. It is also influenced by various actors and their decision-making processes.

1.1.4 Community Livability and Community Strategies in Shrinking Cities

Shrinking cities place unique pressures on local communities that require more attention. Buildings in these areas often suffer from aging and lack of maintenance, leading to structural deterioration and safety hazards. Vacant and abandoned houses are common, contributing to blight and reducing the appeal of neighborhoods. Essential infrastructure such as heating, water supply, sewage systems, and electrical circuits also face poor maintenance. The quality of the built environment deteriorates, making these communities less attractive for both current residents and potential new inhabitants (Wiechmann & Pallagst, 2012). Besides, property values in residential communities are impacted as more residents move away, leading to decreased demand for housing and, consequently, lower property prices. This devaluation of real estate not only undermines the financial stability of homeowners but also deters potential investors (Ryan, 2012). Furthermore, the social fabric of residential communities suffers in shrinking cities. As residents leave in search of better opportunities, the remaining population often becomes more isolated. The reduction in population leads to fewer social interactions, weakening neighborly ties and diminishing community cohesion. The breakdown of social networks can result in a loss of communal support, making it harder for residents to collectively address local issues (Hollander et al., 2009). Additionally, increased crime rates in areas with high vacancy rates further erode the sense of safety and community (Hospers, 2014).

Given these unique pressures, it is necessary to prioritize community livability in shrinking cities. Enhancing community livability, including access to essential services, environmental quality, safety, and social cohesion, can significantly improve the overall well-being of residents in these cities. More resilient and vibrant communities can help retain population in shrinking cities. Historically, evaluations of the success of planning and strategies in shrinking cities have primarily focused on whether they achieved population regrowth and economic revitalization, often neglecting aspects such as quality of life, happiness, and life satisfaction. In recent years, however, more scholars have recognized the importance of resident-oriented goals. Hollander (2018) argued that evaluation metrics should shift from mainly focusing on population growth, income, and employment, to emphasizing the subjective well-being of the people who live, work, and play in these areas. Moreover, several studies have suggested that local governments should prioritize the quality of life for residents who remain (Cunningham-Sabot & Fol, 2009; Peters, Hamideh, Zarecor, & Ghandour, 2018).

Currently, strategies at the community level mainly focus on reducing vacancy rates and reusing vacant land. For example, Youngstown, the first city in the United States to implement a “smart shrinkage”

strategy, launched a neighborhood planning initiative in 2013. The communities were divided into different strategy areas: 1) neighborhood action plan areas; 2) acquisition strategy areas; 3) asset-based micro plan areas; and 4) existing plan areas. The neighborhood action plans address residents' top priorities, including demolishing vacant housing, providing loans to low-income residents, greening abandoned land, addressing crime and safety concerns, and encouraging economic development. In acquisition strategy areas, land is acquired and assembled for economic development or conservation as open space. The asset-based micro plans focus on property and infrastructure issues in blocks near certain institutions. For the existing plan areas, the city continues with the current plan (Youngstown Neighborhood Revitalization Strategy Report). Additionally, there is an emphasis on building community consensus through collaborative community planning, in which policymakers and planners actively engage stakeholders in the community, empowering residents to participate in initiatives (Hollander & Nemeth, 2011). As an example, the community development council in the Edamitsu area of Yahata district, Kitakyushu City, Japan, was established in 2006. The council, actively involving local residents, the ward council, and Kyushu University, launched the Residential Environment Check and Improvement Program. Specific improvement actions include repairing or demolishing decaying buildings, revitalizing vacant land for use as disaster shelters and community vegetable gardens, and organizing greening and maintenance activities for vacant land, such as grass cutting (Yamazaki et al., 2010).

Compared to cases in the United States and Japan, community-level strategies in China are relatively limited, with most efforts still focused on urban industrial development. Additionally, China currently lacks specific strategies to manage vacant land and properties. Most residential areas in Chinese cities consist of closed or semi-closed multi-story or high-rise buildings, unlike the detached houses commonly found in the United States, Europe, and Japan. This structural difference poses challenges for the demolition and reuse of vacant housing. Although there are no specific community development strategies targeting shrinking cities, the central government introduced a policy in 2015 aimed at the renovation of old residential communities, which has been implemented nationwide. Shrinking cities are also engaging in community renovation projects, which can be seen as a proactive measure to address community decline. These interventions are designed not only to improve physical infrastructure but also to enhance social vitality, forming an integral part of the country's approach to urban regeneration.

1.2 Research Objectives and Research Questions

1.2.1 Research Objectives

This study aims to investigate the impact of perceived urban shrinkage on community livability assessment and evaluate the effectiveness of community renovation projects in enhancing community livability in shrinking cities. First, the study will examine the overall situation of shrinking cities in mainland China through the statistical analysis of demographic, economic, and other related data. Next, representative case study sites will be selected for in-depth analysis through field surveys, questionnaires, and interviews. The study will investigate residents' perceptions of shrinkage, their evaluations of community livability, satisfaction with renovation projects, and relocation intentions. It will then explore whether these perceptions influence their evaluations of livability, assess whether government-led community renovation projects can improve livability, and determine if perceived shrinkage and livability evaluations impact residents' relocation intentions.

The following are the specifics:

- 1) To provide a comprehensive overview of urban shrinkage in mainland China.
 - *Map the spatio-temporal distribution of shrinking cities across mainland China.*
 - *Identify the types of shrinking cities.*
 - *Analyze the key factors influencing urban shrinkage and their special heterogeneity.*
- 2) To examine the impact of perceived urban shrinkage and community decline on assessments of community livability.
- 3) To evaluate the effectiveness of government-led community renovation projects.
 - *Assess residents' satisfaction with government-led community renovation projects.*
 - *Examine the impact of these projects on enhancing community livability in shrinking cities.*
- 4) To examine the impact of perceived shrinkage and community livability assessments on residents' settlement and relocation intentions.
 - *Explore how perceived shrinkage influence residents' intentions to relocate.*
 - *Evaluate whether improving community livability reduces residents' willingness to relocate.*
- 5) To provide actionable recommendations for enhancing community livability through more effective implementation of renovation projects and improved community management.

1.2.2 Research Questions

This research aims to answer the following questions regarding urban shrinkage and community livability in shrinking cities:

Macro level:

What are the spatio-temporal distribution, types, and influencing factors of shrinking cities in Mainland China?

Micro level:

Q1: How does perceived shrinkage impact community livability?

Q2: Have government-led community renovation projects improved community livability in shrinking cities?

Q3: Do perceptions of shrinkage and evaluations of community livability influence individuals' willingness to relocate or stay in shrinking cities?

1.3 Research Framework and Methodology

1.3.1 Research Framework

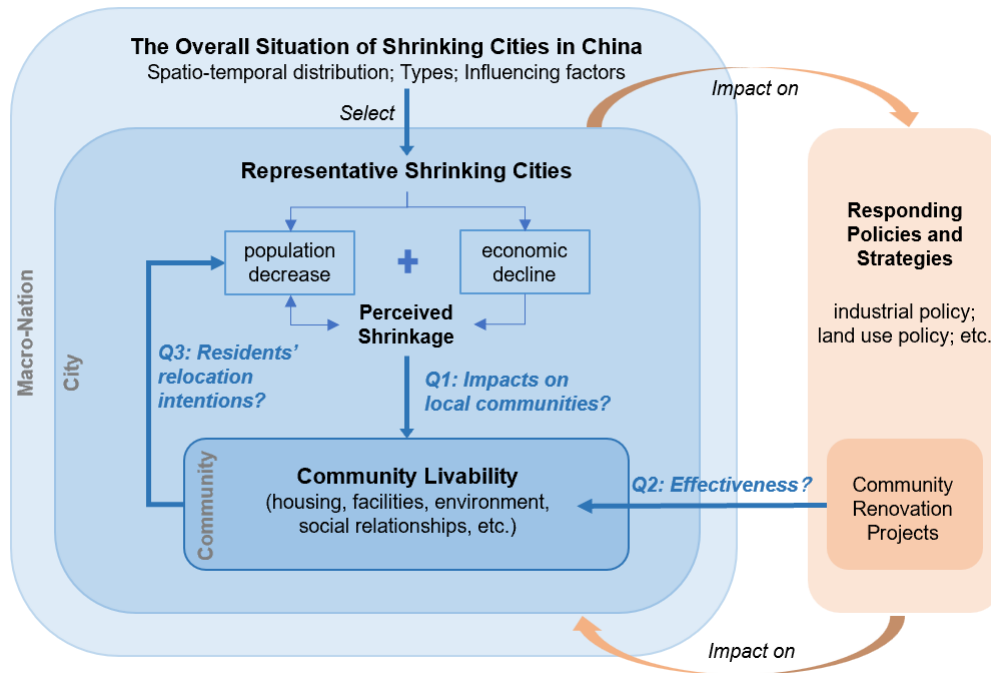


Figure 1.3 Research Framework

Figure 1.3 presents the research framework, based on the model by Haase et al. (2016). This study begins with a macro-level analysis of the overall situation of shrinking cities in China, followed by a micro-level examination at the community level. It further explores the impact of perceived urban shrinkage, in terms of population and economic dimensions, on community livability (Q1). The study also examines response policies, particularly focusing on community renovation projects, to evaluate their effectiveness in enhancing community livability in shrinking cities (Q2). Additionally, it investigates how perceived shrinkage and community livability assessment influence residents' willingness to settle or relocate in shrinking cities (Q3).

1.3.2 Data Collection and Analysis Methods

1) Macro-Level Analysis (National Level)

Research Scope:

All 297 prefecture-level cities in mainland China (including the four municipalities directly administered by the Central Government).

Table 1.1 presents the data and analysis methods used to evaluate the situation of shrinking cities across mainland China.

Table 1.1 Data and Analysis Methods Used in the Macro-Level Analysis

Research Objectives	Data to be Collected	Sources	Analysis Method
Understand the spatio-temporal distribution of shrinking cities and classifying the types of shrinking cities	• permanent residents in each city in 2000, 2005, 2010, 2015, 2020; • the gross regional domestic product (GRDP) and per capita GRDP of each city in 2000, 2005, 2010, 2015, 2020 • urban area size of each city	• The fifth, sixth, and seventh National Population Census of Mainland China; • China City Statistical Yearbooks (in 2001, 2006, 2011, 2016, 2021); • Provincial Statistical Yearbooks (in 2000, 2005, 2010, 2015, 2020)	1. Through statistical analysis of population and GRDP changes to identify shrinking cities; 2. Using GIS to map the geographical distribution of shrinking cities
Explore the factors influencing urban shrinkage across different regions	Data related to influencing factors: • permanent resident, registered population; • the proportion of people over 65 years old; • the proportion of permanent urban residents in the total permanent population; • the proportion of the natural population increased in the total population; • the ratio of the tertiary industry to the secondary industry; • general public budget revenue; • general public budget expenditure; • the number of industrial enterprises business with an annual income of more than 20 million yuan from their main business; • the ratio of green coverage area to the built-up area; • the number of hospitals in the total city		1. Using panel data regression to analyze the significant impact factors; 2. Using Geographically Weighted Regression (GWR) to examine the spatial heterogeneity of these impact factors

2) Micro-Level Analysis (Community Level)

Research Scope:

Four communities in two shrinking cities. The two case study cities are Fuxin and Ziyang. The case study communities in Fuxin city are Wenxinyuan (WXY) Community and Mijia (MJ) Community, while the case study communities in Ziyang city are Xiangyang (XY) Community and Guihuaqing (GHJ) Community.

(Note: In this study, the term “community” was used specifically to refer to “xiaoqu.” In urban China, communities are commonly structured as gated or open residential areas, known as “xiaoqu (小区)” in Chinese. According to Wallenwein (2014), a xiaoqu is considered a fundamental structural unit in urban residential district planning.)

This research conducted field surveys in selected communities, including pilot surveys and formal surveys. From May 18 to June 2, 2023, a pilot survey was conducted in the first case study city, Fuxin, followed by a pilot survey in the second case study city, Ziyang, from June 7 to June 22, 2023. During the pilot surveys, the research examined the development history of the cities, identified case study communities, and

collected data on the communities' histories, current built environments, and the status of community renovation projects. Interviews were conducted with residents and staffs of community residents committee to develop questionnaires for the formal surveys. The formal surveys took place from October 4 to October 23, 2023, in two communities in Fuxin, and from November 5 to November 24, 2023, in two communities in Ziyang. During these surveys, questionnaires were distributed, yielding a total of 213 valid responses. Specifically, 53 questionnaires were collected from WXY Community (Fuxin), 54 from MJ Community (Fuxin), 52 from XY Community (Ziyang), and 54 from GHJ Community (Ziyang). Additionally, during the questionnaire distribution, further interviews were randomly conducted with some respondents to understand the reasons behind their views, such as the factors contributing to their perceptions of shrinkage, their reasons for being satisfied or dissatisfied with the community renovation projects, and so on.

Table 1.2 presents the data and methods used for analysis at the community level.

Table 1.2 Data and Analysis Methods Used in the Micro-Level Analysis

Research Objectives	Data to be Collected	Sources	Analysis Method
Explore the impact of perceived shrinkage on community livability assessments	• residents' perceptions of urban shrinkage and community decline; • residents' assessments of community livability	• Questionnaire survey • Interviews	• Quantitative Analysis (statistical analysis on the survey results; regression analysis) • Qualitative Analysis (analysis of interview texts)
Investigate the effectiveness of community renovation projects in enhancing community livability	• residents' satisfaction with community renovation projects; • residents' assessments of community livability		
Explore the impact of perceived shrinkage and community livability on residents' relocation intentions	• residents' relocation intentions; • residents' perceptions of urban shrinkage; • residents' assessments of community livability		

1.3.3 Thesis Structure

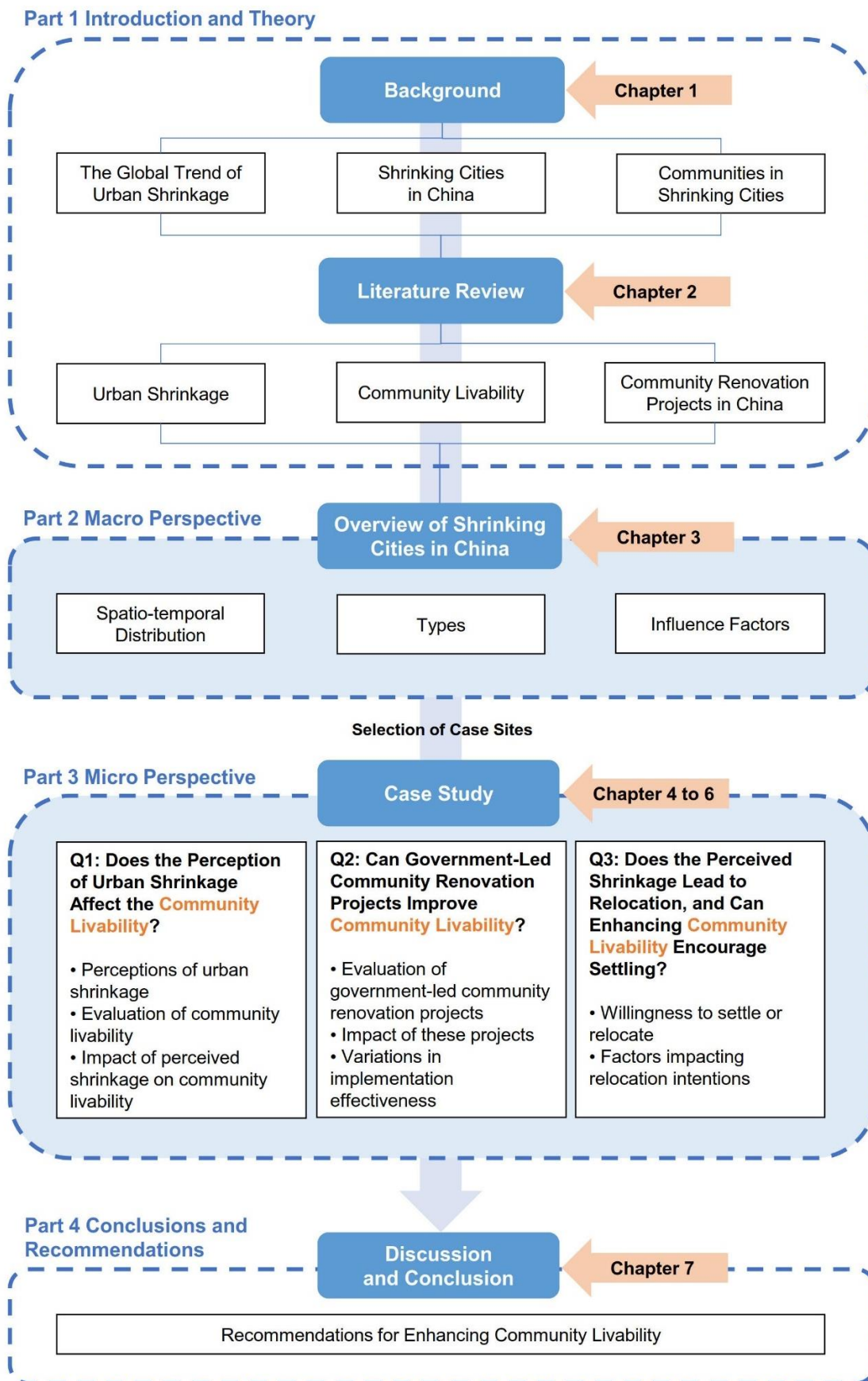


Figure 1.4 Structure of the Thesis

Figure 1.4 shows the structure of the thesis, which is divided into four main parts.

Part 1: Introduction and Theory includes two chapters. Chapter 1 provides the research background by discussing the global trend of urban shrinkage and its emergence in China. It emphasizes the importance of focusing on community livability in shrinking cities. Chapter 2 continues with a literature review that delves into key themes such as urban shrinkage, community livability, and the implementation of community renovation projects in China. This section lays the theoretical foundation for the research, drawing on existing studies to frame the current investigation.

Part 2: Macro Perspective is detailed in Chapter 3, which provides an overall view of shrinking cities in mainland China. This chapter examines the spatio-temporal distribution of these cities, categorizes them based on the extent and dimension of shrinkage, and explores various factors influencing this phenomenon in different regions. It offers a broad perspective that contextualizes the specific case studies discussed later in the thesis.

Part 3: Micro Perspective adopts a case study approach, discussed in Chapters 4 to 6, focusing on the key concept of “community livability” and addressing three critical questions.

Chapter 4 focuses on Question 1: Does the perception of urban shrinkage affect community livability assessment? It explores residents’ perceptions of urban shrinkage, their evaluation of community livability, and examines how these perceptions impact their overall assessment of livability.

Chapter 5 addresses Question 2: Can government-led community renovation projects improve community livability? This chapter investigates residents’ evaluations of the effectiveness of these projects, examines their impacts on community livability, and identifies differences in implementation effectiveness across various contexts.

Chapter 6 centers on Question 3: Does the perception of shrinkage lead to relocation, and can enhancing community livability encourage settling? This chapter investigates residents’ willingness to settle or relocate, analyzes the factors that influence these decisions, and assesses whether improvements in community livability can mitigate relocation intentions.

Part 4: Conclusions and Recommendations is presented in Chapter 7, which summarizes the findings from the previous chapters and offers actionable recommendations for enhancing community livability through community renovation projects. It emphasizes the importance of multi-stakeholder participation and resident self-governance, and proposes targeted strategies based on different community types.

1.4 Significance of the Study

1) Comprehensive Insight into Urban Shrinkage in China

This study addresses a critical gap in urban planning and policy-making in China by focusing on urban shrinkage—a phenomenon that has been extensively studied in the Western context but is increasingly relevant in Asia due to rapid urbanization, deindustrialization, and demographic shifts. By mapping the spatio-temporal distribution, identifying the types, and analyzing the influencing factors, this research provides a comprehensive understanding of the current status of shrinking cities in mainland China. It contributes to the global discourse on urban shrinkage, and aids policymakers in recognizing and understanding the specifics of this issue within the Chinese context.

2) Advocacy for Livability-Focused Urban Planning

The findings of this study underscore the critical impact of urban shrinkage on community livability. By systematically analyzing how perceptions of reduced population and economic decline affect residents' lives, the research advocates for a paradigm shift towards more livability-focused urban planning strategies, emphasizing the concept of a "smaller but better" city. Given China's anticipated long-term population decline and intensified urban shrinkage, it is crucial to reconsider urban development goals and adapt the growth-oriented planning models to better fit this new reality.

3) Actionable Recommendations for Community Development in Shrinking Cities

This study examines government-led community renovation projects in shrinking cities and evaluates their effectiveness in enhancing community livability. It also investigates how residents' perceptions of urban shrinkage influence their intentions to relocate and whether improvements in community livability can retain or even attract new residents. The findings provide actionable recommendations to enhance the effectiveness of renovation projects and community management, ultimately improving community livability and promoting sustainable urban development.

References

- Bartholomae, F., Woon Nam, C., & Schoenberg, A. (2017). Urban shrinkage and resurgence in Germany. *Urban Studies*, 54(12), 2701-2718.
- Cunningham-Sabot, E., & Fol, S. (2009). Shrinking cities in France and Great Britain: A silent process. The future of shrinking cities: Problems, patterns and strategies of urban transformation in a global context, 17-28.
- Haase, A., Bontje, M., Couch, C., Marcinczak, S., Rink, D., Rumpel, P., & Wolff, M. (2021). Factors driving the regrowth of European cities and the role of local and contextual impacts: A contrasting analysis of regrowing and shrinking cities. *Cities*, 108, 102942.
- Haase, A., Bernt, M., Großmann, K., Mykhnenko, V., & Rink, D. (2016). Varieties of shrinkage in European cities. *European urban and regional studies*, 23(1), 86-102.
- Haase, D., Haase, A., & Rink, D. (2014). Conceptualizing the nexus between urban shrinkage and ecosystem services. *Landscape and Urban Planning*, 132, 159-169.
- Hospers, G. J. (2014). Policy responses to urban shrinkage: From growth thinking to civic engagement. *European Planning Studies*, 22(7), 1507-1523.
- Hollander, J. B., Pallagst, K., Schwarz, T., & Popper, F. J. (2009). Planning shrinking cities. *Progress in Planning*, 72(4), 223-232.
- Hollander, J. B., & Németh, J. (2011). The bounds of smart decline: A foundational theory for planning shrinking cities. *Housing policy debate*, 21(3), 349-367.
- Hollander, J. B. (2018). A research agenda for shrinking cities. Edward Elgar Publishing Limited. DOI 10.4337/9781785366338
- Hattori, K., Kaido, K., & Matsuyuki, M. (2017). The development of urban shrinkage discourse and policy response in Japan. *Cities*, 69, 124-132.
- Long, Y., & Wu, K. (2016). Shrinking cities in a rapidly urbanizing China. *Environment and Planning A*,

48(2), 220-222.

- Long, Y., & Gao, S. (2019). Shrinking cities in China: The overall profile and paradox in planning. *Shrinking cities in China: The other facet of urbanization*, 3-21.
- Mallach, A. (2017). What we talk about when we talk about shrinking cities: The ambiguity of discourse and policy response in the United States. *Cities*, 69, 109-115.
- Mallach, A. (2018). *The Divided City: Poverty and Prosperity in Urban America*. Island Press.
- Meng, X., Jiang, Z., Wang, X., & Long, Y. (2021). Shrinking cities on the globe: Evidence from Land Scan 2000–2019. *Environment and Planning A: Economy and Space*, 53(6), 1244-1248.
- Oswalt, P. (2005). *Shrinking Cities: Volume 1: International Research*. Ostfildern-Ruit: Hatje Cantz.
- Popper, D. E., & Popper, F. J. (2002). Small can be beautiful. *Planning*, 68(7), 20-20.
- Peters, D. J., Hamideh, S., Zarecor, K. E., & Ghandour, M. (2018). Using entrepreneurial social infrastructure to understand smart shrinkage in small towns. *Journal of Rural Studies*, 64, 39-49.
- Pallagst, K. (2010). The planning research agenda: shrinking cities—a challenge for planning cultures. *Town Planning Review*, 81(5), i-vi.
- Ryan, B. D. (2012). *Design After Decline: How America Rebuilds Shrinking Cities*. University of Pennsylvania Press.
- Richardson, H. W., & Nam, C. W. (2014). *Shrinking cities: A global perspective*. London: Routledge/ Taylor & Francis Group.
- Rhodes, J. (2019). Revitalizing the neighborhood: the practices and politics of rightsizing in Idora, Youngstown. *Urban geography*, 40(2), 215-236.
- Schilling, J., & Logan, J. (2008). Greening the rust belt: A green infrastructure model for right sizing America's shrinking cities. *Journal of the American Planning Association*, 74(4), 451-466.
- Wallenwein, F. (2014). *The Housing Model xiaoqu: the Expression of an Increasing Polarization of the Urban Population in Chinese Cities?* Master's thesis. Heidelberg University. DOI: 10.11588/heidok.00017143
- Wiechmann, T., & Pallagst, K. M. (2012). Urban shrinkage in Germany and the USA: A comparison of transformation patterns and local strategies. *International journal of urban and regional research*, 36(2), 261-280.
- Yamazaki, T., Shiga, T., & Takeshita, T. (2010). Construction of a local living environment check and improvement program for residents' community development. *Annual Meeting of Architectural Institute of Japan, E-1, Architectural Planning I, Various Buildings and Regional Facilities, Design Methods, Structural Planning, Planning Basics*, pp53-56. [山崎貴幸, 志賀勉, & 竹下輝和. (2010). 住民まちづくりにおける地域住環境点検・改善プログラムの構築. 日本建築学会大会学術講演梗概集, E-1, 53-56.]
- Zhai, W., Jiang, Z., Meng, X., Zhang, X., Zhao, M., & Long, Y. (2022). Satellite monitoring of shrinking cities on the globe and containment solutions. *Iscience*, 25(6).

Chapter 2

2. Literature Review

This chapter provides a comprehensive literature review on three key topics: urban shrinkage, community livability, and community renovation projects in China. In the section on urban shrinkage, the emergence of research in this field, the key discussion topics, factors influencing urban shrinkage, and strategies for addressing it are analyzed. The review also identifies current research gaps, including a lack of studies at the community level and from the residents' perspective. The review of community livability studies defines the concepts of community and community livability, explores the evaluation indicators of livability, and discusses its importance in the context of shrinking cities. Regarding the research on China's community renovation projects, this section introduces the background of the policy, its implementation content, processes, participants, and funding. Additionally, it highlights the research gaps in the implementation of these projects in shrinking cities.

2.1 Urban Shrinkage

This section provides a comprehensive review of studies related to urban shrinkage using both quantitative and qualitative methods. The quantitative analysis reveals the emergence of research on urban shrinkage, its geographical distribution, prevalent topics, research scale, and time range. The qualitative analysis examines the definitions and identification of shrinking cities, factors contributing to urban shrinkage, and the impacts of urban shrinkage. It also summarizes the evolution of scholars' understanding of urban shrinkage and the corresponding policy responses. Finally, the research gaps are identified, including the lack of studies at the community level, the absence of the residents' perspectives, and insufficient attention to social aspects.

2.1.1 An Overview of Urban Shrinkage Research

To understand the basic state of research on urban shrinkage, this study conducted a quantitative analysis, beginning with retrieving and collecting related publications. Five steps of literature retrieval were performed to collect publications from the popular academic database Scopus, which covers a wide range of journals, particularly those published after 1990 (Chadegani et al., 2013).

First, keywords were identified, including “shrinking/shrinkage” and “urban/city/town.” The first search strings in Scopus were finalized as “TITLE-ABS-KEY (shrink*)”, and “TITLE-ABS-KEY (urban OR cit* OR town),” and the retrieval returned 4925 documents. Secondly, a set of inclusion criteria was established to eliminate low-relevance publications, selecting only articles that meet the criteria of being open access, categorized as an article (document type), sourced from a journal (source type), and written in English (Language). In this phase, 1114 articles were selected. Next, articles were selected by subject area, including Social Sciences, Engineering, Multidisciplinary, Arts and Humanities, and 547 articles were selected. Finally, the Scimago Journal Rank was used as a benchmark for journal quality to ensure that only

peer-reviewed and high-quality articles were reviewed. Articles from journals in the first quartile (Q1) with an SJR above 0.8 were selected, resulting in a total of 102 articles. Finally, by looking through abstracts and full texts, a total of 98 articles that were directly relevant to the urban shrinkage were selected. The following are results of the quantitative analysis.

(1) Publication Year

This research analyzed the year of the publications. As Figure 2.1 shows, the first article meeting the selection criteria was published in 2007 and a limited number of articles were published between 2007 and 2011. It should be noted that the phenomenon of urban shrinkage emerged decades ago, with numerous studies conducted in the latter half of the 20th century. However, during that time, the discourse primarily utilized terms like “urban decline,” “decay,” and so on, while the term “shrinkage” only gained widespread use in the early 21st century. Due to the set keywords in this study, many early papers discussing urban decline and those using the term “shrinkage” but not published in journals meeting the selection criteria have not been included in the review.

In 2012, the International Journal of Urban and Regional Research published a Special Issue on the studies of shrinking cities (Martinez - Fernandez, Audirac, Fol, & Cunningham - Sabot, 2012; Wiechmann & Pallagst, 2012; Martinez-Fernandez, Wu, Schatz, Taira, & Vargas-Hernández, 2012; Audirac et al., 2012). Since then, there has been a noticeable increase in articles, particularly after 2020. This suggests that research on urban shrinkage has been gaining momentum. The growing attention to urban shrinkage aligns with the global demographic trend. According to the World Bank, there has been a consistent decline in worldwide growth rates from 2000 to 2022, indicating a shift towards slower population expansion. Specifically, a gradual decline was observed from 2000 to 2008, with rates stabilizing between 1.35% and 1.25%. The decline intensified after 2008, reaching 1.20% by 2011. Despite a slight increase in 2012, the growth rate resumed declining, reaching 1.19% by 2015 and further to 1.01% by 2020. This decline accelerated after 2020, with dropping to 0.83% in 2022. Fertility rates have also declined, from 2.72% in 2000 to 2.27% in 2021, with a more rapid drop since 2017 (data from the World Bank). Additionally, the UN’s “World Social Report 2023” notes the number of older people has increased in all regions of the world from 1980 to 2021 and is expected to continue growing.

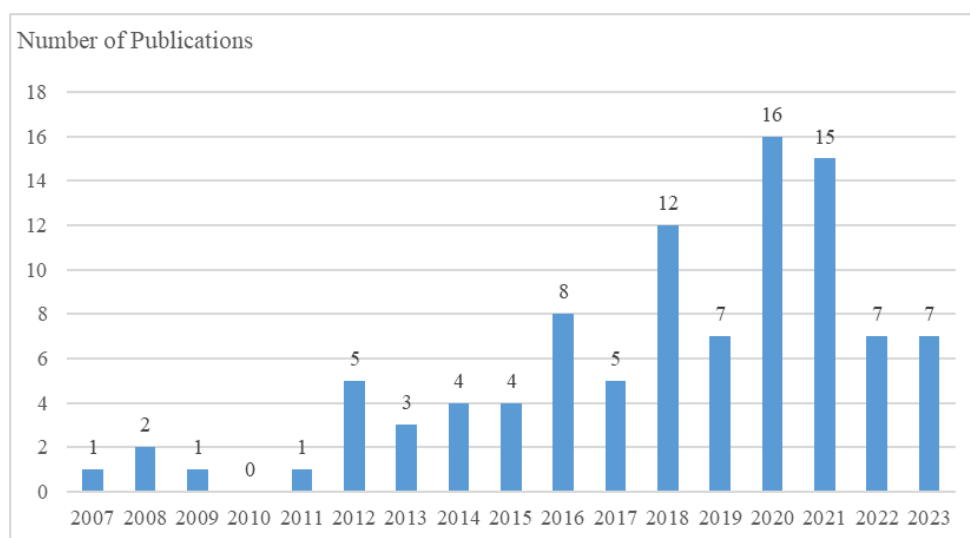


Figure 2.1 Number of Publications

(2) Geographical Distribution

Regarding the geographical distribution of the research objects, seven of the 98 selected articles did not mention specific geographical locations and 12 articles studied multiple countries. The total number of appearances for all countries in the literature was 116. This research counted the frequency of each country, and as Figure 2.2 shows, more than 40% of the articles studied European cities, with shrinking cities appearing in 16 countries. Germany received the most extensive attention in European countries, with the most significant proportion (14 out of 116, 12.07%). Studies on Asia and North America account for 26.73% and 25.85%, respectively. Moreover, among all countries, the United States has the most significant proportion (26 out of 116, 22.41%), followed by China (18 out of 116, 15.52%) and Japan (13 out of 116, 11.21%).

Furthermore, this study examines the year of publications investigating cases from various countries. The findings are shown in Figure 2.3, which reveals that case studies on Germany and the UK were published first, dating back to 2007. From 2008 to 2016, a relatively small number of articles were published, mainly focusing on European cities. However, starting in 2017, there was an increase in case studies on shrinking American cities, although the number of articles declined after 2020. In recent years, there has been an increase in studies on Japan in 2020 and a remarkable surge in studies on China since 2021. Overall, research on shrinking cities has expanded to encompass a broader geographical scope. It not only focuses on European countries and the United States but also reflects a growing interest in the Asian region. This trend suggests that the phenomenon of urban shrinkage is becoming increasingly globalized.

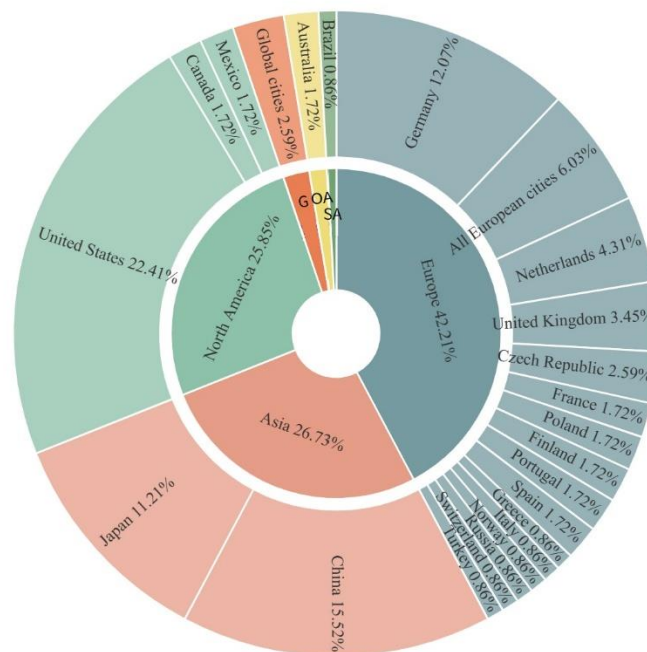


Figure 2.2 Geographical Distribution of Research Objects by Continents and Countries

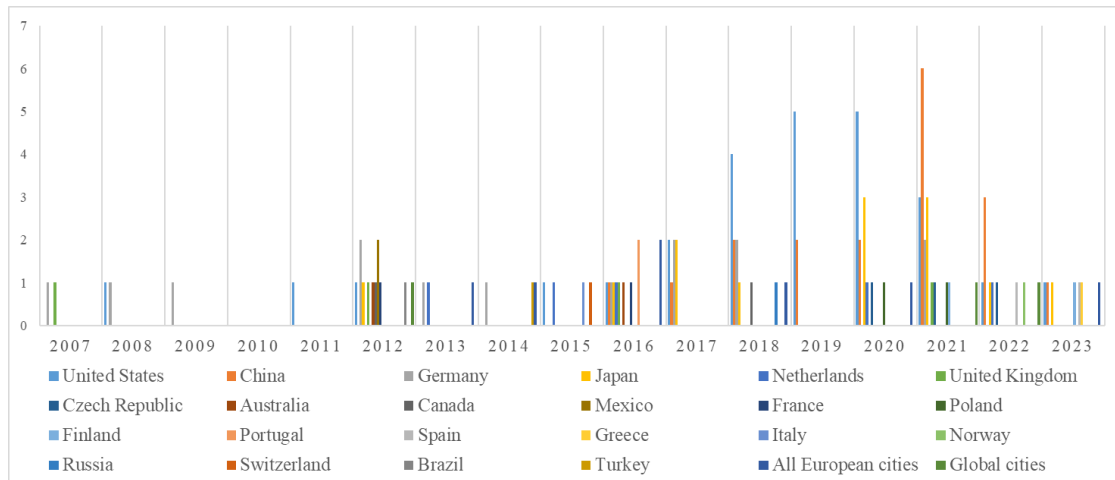


Figure 2.3 Trend of Publications in Different Countries

(3) Prevalent Topics

By conducting a frequency analysis of various topics covered, the results (Figure 2.4) reveal that the majority of articles focus on examining the “causes and dynamics of urban shrinkage” and the “policy response,” accounting for 30.6% (30 out of 98), respectively. Additionally, 18.4% (18 out of 98) of the studies evaluate the effects of response policies. Moreover, 15.3% (15 out of 98) of the studies investigate the spatial-temporal distribution of shrinking cities. Other topics account for less than 10% each, such as types of shrinking cities (7.1%), urban governance (7.1%), effects of urban shrinkage (6.1%), urban change theory (5.1%), literature review (4.1%), planning culture/paradigm (3.1%), urban regrowth (3.1%), residents' perception (3.1%), evolution trend simulation (2.0%), and vacant land (2.0%).

This study further analysis the topics of the articles for each year (Figure 2.5). The results indicate an increasing number of studies focusing on response policy, and in 2020, the number of studies on policy assessment is the largest. Studies on the causes of the shrinkage peaked in 2018 and then decreased. The year 2021 witnessed the largest number of studies on the spatial distribution of shrinking cities, with a significant portion focusing on China.

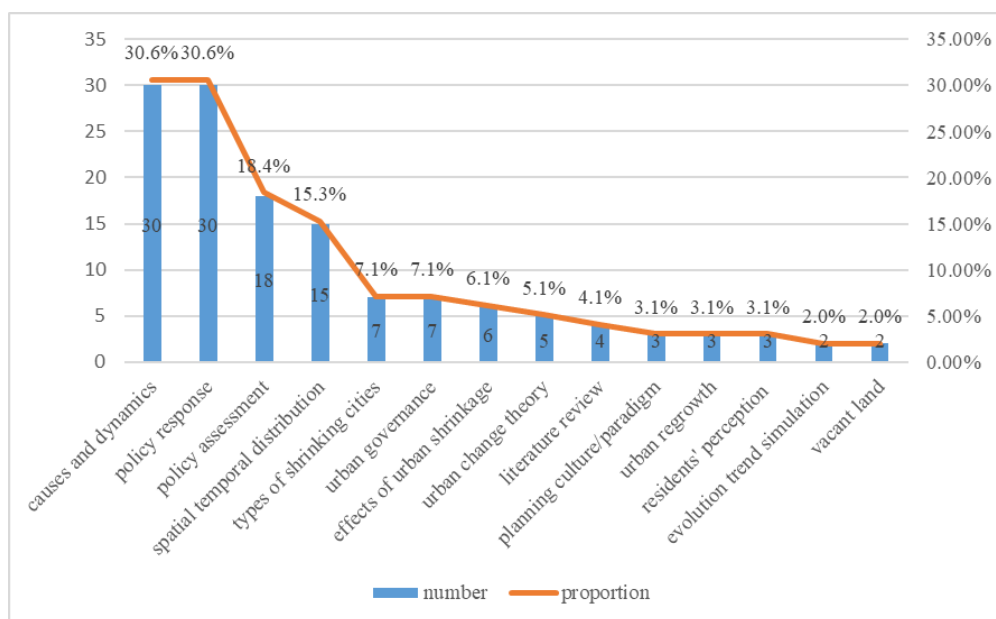


Figure 2.4 Frequency and Proportion of Focus Topics in Publications

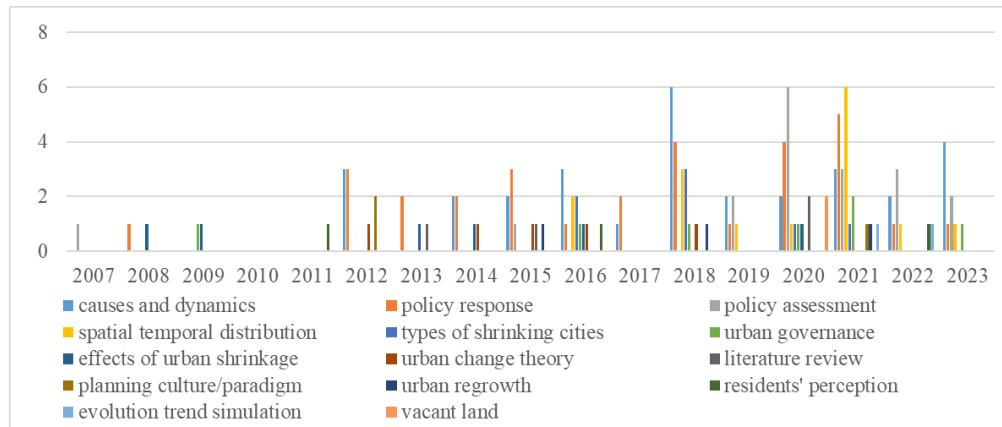


Figure 2.5 Development of Focus Topics in Publications

Moreover, this study analyzed the keywords that appeared in each topic. Regarding the identification of shrinking cities, a total of 21 articles have discussed the definition of shrinking cities or indicators for identifying them. Among these, the majority utilize population as the primary indicator (12/21, 57.1%). In recent years, some scholars have also employed nighttime lights to identify shrinking cities (4/21, 19.0%). Among the causes of urban shrinkage, industrial transformation is the most prevalent factor (18/30, 60.0%), followed by demographic factors (16/30, 53.3%), including aging, low fertility, and migration. In the studies on response policies, economic transformation is a key point, with 53.3% (16/30) of the studies appealing to the development of substitute industries. Dealing with vacant lands and buildings is also a policy priority, with 43.3% (13/30) of the studies arguing shrinkage offers great potential to re-create urban green space and 23.3% (7/30) discussing demolishing vacant buildings and closure of public facilities.

(4) Research Scale and Time Range

In terms of the research scale (Figure 2.6), the result shows that nearly half of the articles are studied at the city level, accounting for the most significant proportion (44/98, 44.9%), followed by 15.3% (15/98) of articles studied at the national level. While relatively few articles are studied at the neighborhood and regional levels, both account for 9.2% (9/98). In addition, 8.2% (8/98) of the articles are transnational studies.

Regarding the time range of studies (Figure 2.7), there are 28 articles with a specified study period. Among them, the 10 to 20 years accounted for the most significant proportion of 39.3% (11/28). Moreover, the 5 to 10 years and 20 to 30 years both accounted for 17.9% (5/28). In comparison, there are relatively few articles with a research time range of less than five years or more than 30 years. It indicated that most scholars think that urban shrinkage is a long-term process that needs to be observed over a long period.

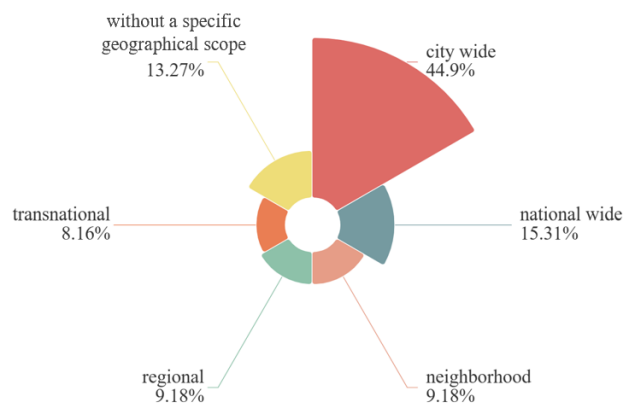


Figure 2.6 Research scale of publications

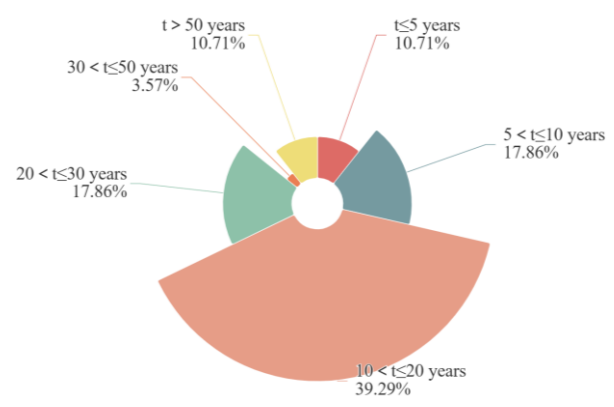


Figure 2.7 Time range of publications

2.1.2 Definition and Identification of Shrinking Cities

Urban shrinkage appeared in Europe and the United States in the 1950s. However, it was not discussed publicly until the late 1990s and 2000s. The term “shrinkage” was proposed by German scholars and is regarded as a more neutral term compared to words that evoke negative connotations, such as “decline” and “blight” (Bernt, 2016). Since 2000, shrinking cities have increasingly gained the attention of researchers and planners.

Although numerous articles discuss urban shrinkage, there is no consensus on how to define shrinking cities, and scholars used varied identification indicators and thresholds to characterize them. Generally, population and economy are two crucial aspects in determining whether a city is experiencing shrinkage. The Shrinking Cities International Research Network (SCIRN) formulates a “shrinking city” as a densely populated urban area that has faced a population loss in large parts of it and is undergoing an economic transformation with some symptoms of a structural crisis (Pallagst, 2008). However, recent studies on Germany and the United States (Bartholomae et al., 2017; Hartt, 2018; Hartt, 2019) have shown that population loss does not necessarily lead to economic decline.

Since population data is easily accessible and analyzed, the population has become the dominant indicator of urban shrinkage (Wolff & Wiechmann, 2018). In recent years, alternative indicators of the population have emerged, such as household size (Hartt & Hackworth, 2020) and human capital (Yang & Pan, 2020). Moreover, the nighttime light (NTL) data is also used to identify shrinking cities since it is considered to have a positive linear correlation with human activities and socio-economic conditions (Zhou et al., 2021; Ma et al., 2022).

2.1.3 Factors Contributing to Urban Shrinkage and Its Impacts

(1) Factors Contributing to Urban Shrinkage

Research on the causes of urban shrinkage has become more comprehensive. While early studies focused on macro factors such as demographic change, industrial transformation, political institutions, and globalization, recent studies have gone beyond these aspects to include factors such as city size, urban traffic conditions, the built environment, and social factors.

Urban shrinkage is always thought to be associated with demographic change, including the aging population, low fertility rates and out-migration, and the long-term post-industrial transition (Wiechmann & Pallagst, 2012; Hospers, 2014). Martinez-Fernandez et al. (2012a) argue that globalization has profoundly impacted this process since globalization encourages migration between nations and regions, and many industrial cities have struggled to find a niche in the international economic environment. Political factors are also a significant cause of urban shrinkage; the collapse of the communist system led to the decline of many European cities (Martinez-Fernandez et al., 2016).

In addition, urban shrinkage is considered to be correlated with the size of a city; smaller cities are more prone to experiencing shrinkage (Zhou et al., 2021; Guo et al., 2021). Furthermore, shrinkage is also associated with traffic conditions. Cities with poor traffic conditions are more likely to undergo shrinkage (Zhou et al., 2021), and connecting to the high-speed rail network can aggravate population loss (Deng et al., 2019).

The shrinkage of different areas within the city is influenced by the built environment and socioeconomic attributes. Ma et al. (2022) show that urban shrinking is influenced by bus stop density, road intersection density, housing price, distance to the nearest park, and so on. Xie et al. (2018) argued that socio-spatial inequality, such as racial segregation and low education endowment, had a more significant impact on urban shrinkage than industrial causes. Additionally, a recent study revealed that the COVID-19 pandemic contributed to population decline in some European cities (Wolff & Mykhnenko, 2023).

(2) Impacts of Urban Shrinkage

Urban shrinkage is often perceived negatively due to its numerous adverse effects. First, when people and capital flow out of cities, they leave a large number of abandoned land and vacant buildings (Bernt, 2009; Hospers, 2014; Haase et al., 2016), which significantly lowers house prices (Maennig & Dust, 2008) and posing challenges for real estate development (Bernt, 2009; Hospers, 2014). Second, it poses economic and technical difficulties for operating infrastructure networks due to decreased customers, such as water provision, long-distance heating, and sewage disposal (Bernt, 2009; Hospers, 2014). Third, a declining population and economy also result in issues with the revenue sources of municipal budgets (Bernt, 2009; Hospers, 2014) due to the poor real estate market and the weak attractiveness to investors. Moreover, on the social side, urban shrinkage will induce transformations in the socio-demographic structure as young people leave the cities while the elderly and underprivileged remain, resulting in the weakening or dissolution of established social networks (Hospers, 2014).

However, some studies suggest that urban shrinkage does not always have a negative impact, and they strive to explore the potential benefits of shrinking cities. One notable advantage is that housing in shrinking cities tends to be more affordable compared to growing cities, primarily due to the abundance of low-cost housing options (Seymour et al., 2020). In addition, shrinking cities have opportunities to expand and enhance urban green spaces on a small scale through demolition and re-use of vacant sites (Schilling & Logan, 2008; Haase et al., 2014), although population loss does not necessarily lead to an increase in urban green space on a large scale (Kabisch & Haase, 2013).

2.1.4 Policy Responses to Urban Shrinkage

The policy responses to urban shrinkage are closely related to how decision-makers and planners perceive the shrinkage. The perception of urban shrinkage can be divided into four categories from unacceptance to acceptance: 1) “ignoring,” decline is perceived as a temporary phenomenon; 2) “observation without acceptance,” decline is recognized as a persistent phenomenon but not fully accepted; 3) “certain acceptance with or without limited public communication,” public authorities are discussing strategies to address decline; and 4) “acceptance,” no longer pursuing urban growth (Farke, 2005).

As the perception of shrinkage changes, coping strategies also adapt accordingly. When shrinkage is ignored or not accepted, the government usually does not take countermeasures, i.e., passive strategies, which may lead to a vicious cycle of continued population loss and economic downturn. However, when policymakers observe shrinkage or certainly accept it, they will adopt active strategies. Pallagst et al. (2021) distinguish three types of active strategies: 1) expansive strategy, expansion zoned areas and attracting people through major projects; 2) maintenance strategy, developing existing land use; and 3) planning for the decline, aiming at reduction development.

In empirical case studies of shrinking cities in the United States and Europe, there are two typical planning paradigms: growth-oriented planning and shrinkage-adapted planning. Growth-oriented planning attempts to achieve revitalization through urban renewal projects. This paradigm has been dominated in the past since “shrinking” was widely regarded as problematic outside academic circles (Mallach, 2017). However, over the past decade, shrinkage-adapted planning, encompassing concepts like “smart shrinkage” and “right-sizing,” has attracted attention among scholars and policy-makers. These concepts aim to explore the potential of shrinking cities and achieving a high quality of life despite population decline (Peters et al., 2018). The main idea is to stabilize cities in terms of demography, economy, infrastructure, and environment through resource consolidation, addressing vacancy issues, enhancing services, and attracting investments (Rhodes, 2019). Specific measures include the demolition of abandoned buildings, targeted treatment of vacant land and buildings through land banks or empty house banks, conversion of vacant land into green open spaces, and downsizing services and infrastructure.

However, right-sizing and smart shrinkage are also contested areas of policy experimentation (Coppola, 2019). Ryan & Gao (2019) argue that implementing smart shrinkage encounters various challenges in their case study on Youngstown, the first city in the US to implement “smart shrinkage.” Most of the downsizing recommendations outlined in the master plan remained unimplemented since potential resistance from legislators against the codification of reduced populations, the driving need for economic investment, and the changing political regimes. Additionally, some scholars have questioned the feasibility of right-sizing policies. Right-sizing involves delineating urban areas where physical reconstruction is promoted or discouraged; it is a subjective and value-based process that prompts the redistribution of resources, which will lead to the reproduction of inequality in shrinking cities (Silverman, 2020; Markus & Krings, 2020). Furthermore, a case study in Flint (USA) shows that the right-sizing does not align with the city’s context, neglecting many financial, public health, and social justice issues (Sadler et al., 2021).

Among the practices of specific planning strategies, the most discussed are economic restructuring and dealing with vacancy issues. First, developing extended or substitute industries is a top priority. Many shrinking cities actively seek new economic foundations by capitalizing on their existing strengths, such as

their industrial base or close ties to universities or foundations. For instance, in Youngstown (USA), there is a drive to enhance local businesses in the fields of health, education, and culture; in Dresden (Germany), the government is dedicated to fostering a highly competitive high-tech industry through collaboration with a technical university (Wiechmann & Pallagst, 2012). Neffs et al. (2013) discussed the potential for developing health tourism in Walcheren (Netherlands) and Leipzig (Germany). In the case of Kitakyushu (Japan), efforts have been made to integrate manufacturing know-how with knowledge of pollution abatement and improve the local economy (Ortiz-Moya, 2020).

Second, numerous studies discuss the management and reuse of vacant land, such as converting vacant land into valuable green infrastructure and providing ecosystem services (Schilling & Logan, 2008; Kabisch & Haase, 2013; Haase et al., 2014). Kim et al. (2020) emphasized the importance of community engagement in terms of understanding the potential value of vacant land, financial support, and regulation for vacant land projects. In addition to vacant land, demolishing and renovating empty houses is also a policy focus (Wiechmann & Pallagst, 2012; Schenkel, 2015; Camarda et al., 2015). Moreover, it is encouraged to involve owners in the new use of their properties and seek creative solutions (Camarda et al., 2015).

2.1.5 Summary

Although the phenomenon of urban shrinkage emerged in the 1950s, research on the subject began in the 2000s, with a significant surge in publications over the past decade. The majority of these studies have been conducted at the city level, and long-term studies spanning 10 to 20 years are predominant. Regarding the main themes in shrinking city research, as illustrated in Figure 2.8, the majority of articles focus on the identification and spatial distribution of shrinking cities, the influence factors of urban shrinkage, the consequences of shrinkage, and the policies and strategies employed to cope with it. The causes of urban shrinkage have evolved from early factors such as demographic and industrial changes to a more comprehensive understanding that includes the built environment and social factors. Policies or strategies dealing with shrinkage are closely tied to how decision-makers perceive urban shrinkage. The ongoing discussion on growth-oriented versus shrinkage-adapted planning reveals an evolution of how to address urban shrinkage, with a focus on stabilizing cities despite population decline. Additionally, comparative analysis across countries reveals distinct processes of urban shrinkage, influencing factors, policy responses, and actor involvement in diverse national contexts.

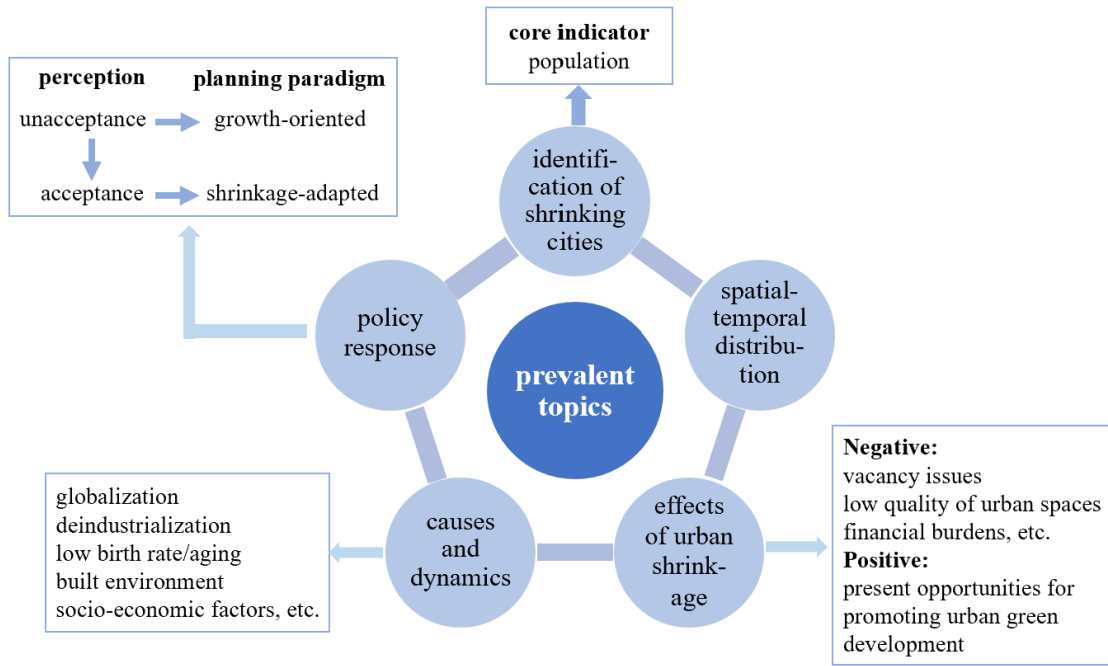


Figure 2.8 Main findings

Based on the above findings, several points can be further discussed.

- (1) There is a noticeable trend towards a more globalized perspective in urban shrinkage research. While historical literature predominantly focused on cities in the USA and Europe, there has been an increase in studies on Asian countries, suggesting a broader geographical scope. The impact of globalization and the deceleration of global population growth has led some cities in various countries to experience similar processes of urban shrinkage. This broader perspective allows for a comprehensive analysis of the emergence and causes of urban shrinkage.
- (2) Establishing a unified definition for shrinking cities remains a challenge. Recent studies have adopted multidimensional indicators such as household size, human capital and nighttime light data instead of solely relying on population to identify shrinking cities. However, using varied identification indicators and thresholds makes it difficult to compare findings across research.
- (3) Comparative analyses across countries highlight contextual variations in responding policies. This emphasizes the importance of understanding the unique challenges and opportunities that shrinking cities face in different regions and the necessity of considering context-specific approaches.
- (4) Coping with urban shrinkage has become a focal point of research, while the practical implementation of policies remains challenging. Policy implementation may encounter obstacles such as political barriers and resistance from those affected. Addressing these challenges requires a deeper understanding of the complexities in policy-making and the involved stakeholders.

Furthermore, this study found some research gaps in the current literature should be considered in future studies. First, in terms of research scale, most of the research is carried out at the urban level, while lacking studies conducted at macro-regional or micro-community scales. Therefore, there is a need for more extensive studies at these scales. Conducting regional studies is important since urban development, such as industrial division, is influenced by the surrounding urban agglomerations. In addition, research at the community level should also be considered since both growing and declining communities exist in

shrinking cities, which need to be analyzed on a smaller scale. Second, in terms of research perspective, most studies on response policies have been conducted from the perspective of government and planners, and there is a lack of research from the perspective of residents. In the future, residents' perspectives should be considered to understand why residents stay or leave and their visions of shrinking cities. Third, most studies focus on economic development and urban built environment, while less attention is paid to social aspects. The challenges of social aspects of shrinking cities, such as urban inequalities, should be further discussed in the future. Four, it is necessary to discuss how to measure the effects of policies responding to shrinkage, considering what the criteria for success are, such as a stable population, economic growth, or the improved quality of life. At last, future studies could investigate the impact of the new technological revolution and emerging urban development trends on shrinking cities. For example, whether the rapid growth of telecommuting and AI technology and the affordability of shrinking cities can attract young people and bring new opportunities to shrinking cities.

2.2 Community in China and Community Livability

This section introduces the concept of community and its forms in China, and reviews the literature related to community livability. It clarifies the concept of community livability and its evaluation framework. Additionally, it examines studies on community livability in shrinking cities and identifies research gaps in this area.

2.2.1 Concept of Community and Its Definition in China

(1) General Concept of Community

The concept of community generally encompasses a group of people living in the same place or having particular characteristics in common. Tönnies (1887) introduced the distinction between *Gemeinschaft* (community) and *Gesellschaft* (society), highlighting that communities are often defined by strong social bonds, shared values, and mutual support. Park (1915) emphasized the importance of geographical proximity, suggesting that communities typically form within physical neighborhoods, towns, or cities. Wellman (2001) expanded this concept by discussing how communities can also form around shared interests or identities, such as professional groups or online communities. Putnam (2000) highlighted the significance of social capital, underscoring how regular interaction and cooperation within communities foster a sense of belonging and collective identity among their members. Overall, this definition of community emphasizes social cohesion, geographical boundaries, shared interests, and the importance of mutual support and interaction. Whether formed around physical neighborhoods or shared interests, communities play a critical role in creating a sense of belonging and identity for their members.

(2) Definition of Community (shequ, 社区) in China

In China, the concept of “community” (shequ, 社区) has unique historical, social, and political contexts. Traditionally, Chinese communities were organized around familial and clan ties. Since 1951, a danwei-based welfare system was established, with the danwei (单位) or work-unit system serving as the foundation of urban community formation. Each danwei was not only a workplace but also provided its workers with housing, childcare, schools, clinics, shops, and other essential services (Rowe, Forsyth, &

Kan, 2016). However, rapid urbanization has led to significant changes in the structure and function of Chinese communities. After 1980, housing shifted from the danwei system to a more commercialized model. This transformation became especially pronounced in the 1990s when many traditional housing units were replaced by higher-density developments with larger dwellings (Rowe et al., 2016). In contemporary China, the term “community (shequ)” is clearly defined by administrative boundaries, even though in other countries, the concept of “community” is often debated as a physical space, a perceived environment, or a socio-economic unit (Rowe et al., 2016).

Community is a broadly residential area, usually situated within a well-bounded megaplot and often encompassing one or two city blocks (Rowe et al., 2016). It could be subdivided into a variety of settlement compounds, and most of them could be regarded as territory-based sub-communities, such as xiaoqu (小区, gated or open) and danwei (work unit compound). Figure 2.9 shows several typical community patterns. Some communities consist of several old, open-ended xiaoqu compounds, which may have originally been welfare housing provided by danwei (Xu & Yang, 2009). Other communities are composed of large gated residential complexes built by private developers. These compounds, as highlighted by Wu (2015), are a key feature of urban living in modern China. Typically characterized by high-density housing units, such as apartment buildings, these residential compounds often include a variety of amenities like small squares, playgrounds, green spaces, retail shops, senior service centers, healthcare, kindergartens, and community centers (see Figure 2.10).



Figure 2.9 Typical Community Patterns

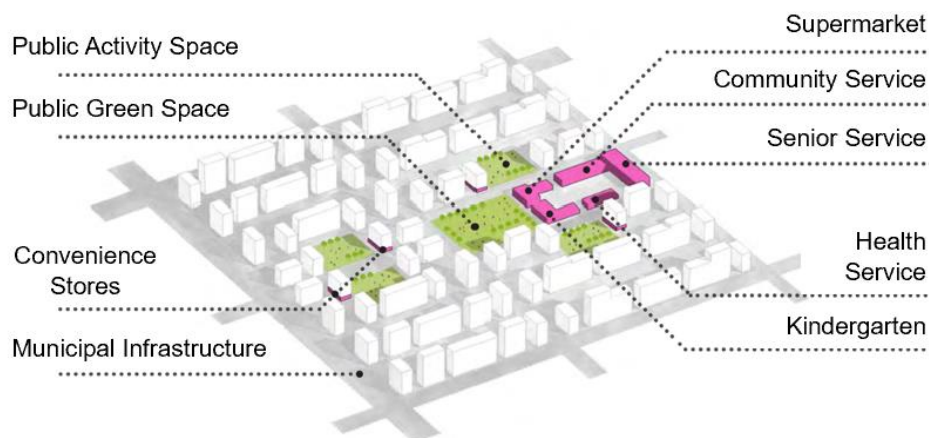


Figure 2.10 Composition of a Residential Compound (Xiaoqu)

(Source: Guidelines for the Construction of Complete Residential Communities issued by the Ministry of Housing and Construction of China.)

These communities are integrated into the administrative and social framework overseen by community committees (Juminweiyuanhui, 居民委员会). The Community Committee, an officially autonomous residents' organization, is theoretically responsible for representing residents' interests, making decisions democratically, and overseeing its activities through democratic control (Di, 2013). However, in practical, it acts as grassroots units of local governance. While members of this group are typically elected, these elections are controlled by the Communist Party, indicating that governance is not purely local but involves coordination with higher levels of authority (Rowe et al., 2016). According to Bray (2006), these committees are responsible for implementing government policies, managing public affairs, and providing social services, such as healthcare, education, and elderly care. Read (2003) emphasized how these community committees facilitate local administration and social control. In addition to the top-down management by community committees, homeowners' associations also play a role in governance. Especially, in commercial housing, homeowners' associations—permitted since at least 1999—provide a certain level of self-governance, particularly in matters like hiring and firing the management companies responsible for maintenance. However, this model of self-governance has only emerged in some communities and has not been fully developed everywhere. Overall, there remains a high dependence on government-led (top-down) management, with low levels of self-governance and resident participation. This is largely because the government plays a central role in resource allocation, infrastructure, and the provision of public services. As a result, most residents view community affairs as the government's responsibility.

2.2.2 The Concept of Community Livability

Concerns about livability started gaining attention in the 1970s. During this period, scholars such as Donald Appleyard were particularly concerned with the livability of streets and the general urban environment (Whelan, 2012). Afterwards, in 1977, the organization Partners for Livable Communities was established in America with the aim of improving the quality of life and economic and social wellbeing of low- and moderate-income communities through technical assistance, leadership training, workshops, charrettes, research, and publications (Partners for Livable Communities, 2024). Nowadays, livability has become an important global issue. Maintaining and enhancing the livability of cities has become a key focus for local and national governments, urban planners, civil society, and businesses (Kaal, 2011).

Currently, there is no universally accepted definition of community livability due to its complex and multi-dimensional nature. Broadly, the Webster dictionary defined livability as “suitability for human living” (Merriam-Webster, 2024), while Okulicz-Kozaryn defined it as “the quality of life, standard of living, or general well-being of a population in some area” (Okulicz-Kozaryn, 2011). More specifically, according to the organization Partners for Livable Communities, “Livability is the sum of the factors that add up to a community's quality of life—including the built and natural environments, economic prosperity, social stability and equity, educational opportunity, and cultural, entertainment and recreation possibilities” (Partners for Livable Communities, 2024). Newman (1999) claimed that livability refers to the human requirement for social amenity, health, and wellbeing, and includes both individual and community well-being. Blanco (2012) argued that elements such as a sense of identity or belonging, diversity of the population, and economic opportunities are vital for the livability of a community. Keyes and Benavides (2020) believed that a livable community represents a vision centered on land-use elements to support

residents of all ages and abilities to live, work, and play within their community. In summary, the concept of community livability covers a broad range. It is associated with physical aspects, social characteristics and economy.



Figure 2.11 Keywords in the Concept of Community Livability

2.2.3 Measurement of Community Livability

Numerous studies are centered on the evaluation of community livability. These evaluations quantify the needs of residents and aid in decision-making for urban governance and community development. However, given the varied conceptualizations of community livability, there is still no agreement on a measurement framework and indicators to this day. Table 2.1 provides an overview of various dimensions and indicators used in literature to evaluate community livability.

Table 2.1 Summary of Dimensions and Indicators used in Community Livability Evaluation

Literature	Dimension	Sub-dimension	Indicators
Leby & Hashim (2010)	Social dimension (Social relations)	Behavior of neighbors	Behavior of neighbors
		Community life and social contact	Relationship with neighbors; Sociability of people; Cordiality of people; Friendship with people; Close distance to friends; Close distance to relatives
		Sense of place	Sense of community
	Physical dimension (Residential environment)	Environment quality; Maintenance of built environment	Maintenance of streets; Rubbish collection service; Ground vibration by traffic; Noise by heavy traffic
		Open spaces	Maintenance of open spaces; Availability of open spaces
	Functional dimension (Facilities and services)	Accessibility; Availability and proximity of amenities	Easiness to get health facilities; Provision and proximity of Schools; Access to shopping centers
		Employment opportunities	Amount of employment; Ease of finding employment
	Safety dimension (Crime and sense of safety)	Crimes	Personal safety from crime
		Accidents	Personal safety from accidents
		Feeling of safety	Safety of personal property; Availability of police protection; Availability of fire brigade service; Availability of security guards

Norouzian-Maleki, Bell, Hosseini & Faizi (2015)	Built-form factors		An alternative appearance to the facades; Housing form; The proportion and scale of the spaces enclosed by buildings; The existence of color and material harmony; The provision of mixed-use buildings; Number of storeys; Contribution of buildings of different periods; Disused buildings
	Spatial quality factors		Amount of green space; Presence of trees and natural elements; Presence of water features; Management of the spaces; The sense of hierarchy between public and private spaces; Quality of access to the residential public spaces; Easy way-finding in the neighborhood spaces; Visibility of public spaces
	Social and Community Factors		Usability of routes; Quality of pavements and footpath surfaces; Volume and speed of vehicles; Separation of pedestrian and road traffic; Lighting during the night-time; Territorial functioning; Presence of a variety of people in neighborhood public spaces; Joint activities opportunities; The sense of intimacy
Liu, Han & Wang (2020)	Peace and harmony	Safety	Crime intensity value
	Complete services	Service facilities	Parking; Fuel station; Bank/ATM; Fire station; Police station; Library; Post office/box; Administrative offices; Place of worship
	Comfortability	Natural environment/views	Peak; Coastline
	Well-equipped facilities	Leisure facilities	Sports area; Eating & drinking places; Community centers; Children playroom; Parks; Museum; Theatre
		Transportation	Highway/main road; Subway stations; Bus stops; Ferry
		Hospitality (health)	Hospital; Clinic; Child assessment center; Elderly center; Dental office
		Education	Kindergarten; Primary school; High school; Higher educational institutes
	Residents' satisfaction	Housing price	Average housing price
		Demographic information (including Employment)	Population density; Income level; Age level; Education level
		Residents' emotion	Sentiment score
Zhu, Guo, Zhang, Meng, Ju, Zhang, & Tang (2020)	Environmental health		Annual PM2.5 concentration; Duration of thermal comfort
	Environmental comfort		Percentage of greenspace; Building density; Population density; Walking distance to the nearest park; Entropy of land use
	Living amenity		Driving distance to the nearest hospital; Driving distance to the nearest school; Driving distance to the nearest shopping mall; Number of shops within 0.5-km buffer zone; Number of restaurants within 0.5-km buffer zone
	Travel convenience		Walking distance to the nearest bus stop; Driving distance to the nearest bus, railway, and airway stations; Driving distance to the administrative center; Probability of traffic congestion
Amin, Islam, Haseeb & Saleemi (2020)	Housing		Type of housing (permanent or temporary); Problems faced during the last 12 months
	Neighborhood		Proximity to destinations (like grocery, parks, libraries, and workplaces); Safe and walkable neighborhood
	Transportation		Convenient transport options; Street signs

	Health		Health behaviors; Health-care services; Quality of health services
	Environment		Air quality; Water quality
	Engagements		Civic and social engagements (like cultural, art, and entertainment institutions)
	Opportunity		Economic opportunities; Educational opportunities
Liang, Liu & Qiu (2020)	Security of residence		Accessibility of fire-fighting equipment; Accessibility of emergency shelter
	Health of the environment		Air quality; Water quality; Solid waste pollution; Noise pollution
	Convenience of transportation		Accessibility of public transportation; Accessibility of private transportation
	Completeness of supporting facilities		Accessibility of educational facilities; Accessibility of medical facilities; Accessibility of commercial service facilities; Accessibility of recreational facilities; Accessibility of other supporting facilities
	Comfort of living		Residential density; Per capita green areas; Per household parking; Plot ratio; Accessibility of landscape
Luo, Shu, Zhao, Qi & Huang (2022)	Community management	Community management	Public sentiment
	Residence environment	Natural environment	Water system; Noise; Greening rate
		Built environment	Floor area ratio; Building age
	Facilities service	Transportation	Coverage of bus stops/metro stations; Parking
		Business services	Convenience stores/ supermarkets; Shopping center
		Education services	Kindergarten; Primary school; Middle school
		Cultural and sports services	Square/park; Cultural facilities; Sports facilities
		Medical services	Clinic; Community health service; Large hospitals
	Safety and health	Community public security	Special personnel; Electronic monitoring
Owusu, Mensah, Fynn, Kwang, Arthur & Adu-Boahen (2023)	Economy		Rent cost; Food cost; Availability of jobs
	Social		Crime prevalence; Type income community; Opportunities the community offer
	Environment		Sanitation situation; Flood susceptibility
	Transportation and accessibility		Availability of public transport; Traffic congestion; Distance to work
	Culture and recreation		Availability of entertainment

Although the dimensions and indicators of community livability may differ among scholars, in general, there are six dimensions and some indicators that are widely mentioned, as following (Figure 2.12):

- Housing Dimension: Residential density; Building age
- Environmental Dimension: Air Quality, Greenspace; Solid waste pollution; Noise pollution; Maintenance of open spaces
- Functional Dimension: Transportation (Subway stations; Bus stops); Access to schools; Access to business services (Convenience stores, Supermarkets, Shopping centers); Access to health facilities; Access to leisure facilities (Sports area, Parks); Other facilities (Parking, Fuel station, Bank/ATM, Fire station, Police station, Library, Post office/box, administrative offices);
- Social Dimension: Behavior of neighbors; Relationship with neighbors; Close distance to friends; Close distance to relatives; Sense of community
- Safety Dimension: Crime and Sense of Safety; Availability of police protection; Security guards
- Economic Dimension: Housing price; Economic opportunities; Rent and food costs.



Figure 2.12 Dimensions of Community Livability

2.2.4 Community Livability in Shrinking Cities

In shrinking cities, population decline and strained local finances create challenges for the maintenance of buildings, infrastructure, public facilities, and public green spaces. Additionally, the reduction in community population leads to fewer social interactions among residents and a decreased willingness to participate in community activities, resulting in diminished community vitality. The continuous outflow of population and economic decline can further deteriorate community livability. Therefore, compared to growing cities, the community livability of shrinking cities requires greater attention.

Currently, there is no established framework for evaluating community livability in shrinking cities, though some research on migration talking about this topic. Some scholars contend that greater satisfaction with livability reduces residents' tendency to relocate (Yanmei, 2012). Dustmann and Okatenko (2014) reported that people are less likely to move away from their current place of residence if they are satisfied with local amenities, safety, air quality and governance. Chi and Marcouiller (2011) argue that natural amenities attract migrants in times of economic growth, but economic opportunities matter more during economic downturns. Therefore, improved livability in shrinking cities has been found to encourage residents to stay and even attract new settlers, reversing population decline and rejuvenating the local economy.

Livability in shrinking cities can be improved in various ways, including by expanding green spaces, investing in public amenities and constructing affordable housing (Nefs et al., 2013; Schetke & Haase, 2008). According to Bogataj et al. (2016), age-friendly facilities and amenities could counteract urban shrinkage caused by ageing populations. Elsewhere, Bontje (2004) found that Leipzig, Germany, aimed to generate new employment opportunities by improving public facilities to consequently attract investment. Safety is another critical livability indicator for shrinking cities. Frazier et al. (2013) found that revitalization policies designed to address shrinkage changed the spatial patterns of crime, suggesting that enhancing perceived public security can improve the livability of shrinking cities and increase their attractiveness.

However, there remains a lack of research on understanding whether and how residents' perceptions of

urban shrinkage (population decline and economic challenges) impact their assessment of community livability. Additionally, while several studies have proposed strategies to enhance livability in shrinking cities, there is limited empirical evidence on the effectiveness of these policies and strategies in practice. There is a need to evaluate whether these interventions successfully improve community livability and attract or retain residents in shrinking urban areas.

2.3 Community Renovation Projects in China

The previous review of research on urban shrinkage shows that international measures at the community level mainly address vacant housing and land, including demolishing vacant housing units, repurposing vacant land, and establishing land banks. However, in China, the vacant housing in urban communities are primarily multi-story or high-rise residential buildings, so there are currently less targeted strategies for this issue. In recent years, the renovation of old residential communities, including those in shrinking cities, has been seen as a positive measure. Therefore, this section will introduce the current state and related research on the renovation of old residential communities in China. This includes policy background, renovation content, implementation process, participating actors, funding sources, and identification of research gaps in the context of shrinking cities.

2.3.1 Policy Background of the Community Renovation Projects

Since 1980s, owing to reform and opening-up policies, China has experienced rapid urbanization throughout the real estate industry (Li et al., 2019). This approach boosted economic development in the short term; however, it has resulted in a plethora of older communities today (Xu et al., 2022). Up to 170,000 old urban communities have been reported as requiring renovation in various regions, according to information made public by the Chinese government and preliminary statistics from the Ministry of Urban and Rural Development. These communities typically suffer from subpar building performance, inadequate public facilities, unreasonable road traffic planning and more safety hazards, which seriously affects the satisfaction of residents' living needs and the acquisition of a sense of well-being (Wang et al., 2014). Furthermore, the existence of potential social conflicts also affects the appearance of the city. At the beginning of the 21st century, the concept of urban renewal was widely accepted in China to change the urban landscape through the demolition and renovation of old urban infrastructures and communities as well as to meet the needs of residents for a better living environment (Lai et al., 2018). There are two solutions for the renewal of old communities. The first option is to demolish and redevelop the entire old communities, which can change their aesthetic in the short term. However, demolition and redevelopment can cause the following concerns: (1) resource consumption is high, leading to excessive carbon emissions and threatening the environment, and (2) old communities are predominantly located in urban core areas, where land is expensive and demolition and redevelopment costs are high (Gao et al., 2014) (3) The sense of identity and belonging of the original community is destroyed. Thus, due to the problems associated with demolition and redevelopment, more communities are now choosing to adopt the second option, shifting the renovation method from major demolition and construction to dynamic upgrading and renovation. This both aligns with the sustainable development model and reflects the humanistic values of society.

In this context, the central government began promoting the renovation of old residential communities. In

2015, the central government called for the acceleration of renovations of comprehensive improvements in old residential communities, leading to the nationwide launch of comprehensive renovation projects. In 2017, the Ministry of Housing and Urban-Rural Development selected 15 cities for pilot projects. In 2019, the State Council issued the “Guiding Opinions on Comprehensively Promoting the Renovation of Old Urban Residential Areas.” The central government has positioned the renovation projects as a major livelihood and development project. This directive emphasized the need to improve infrastructure, public services, and environmental conditions in aging urban neighborhoods.

2.3.2 Specific Projects and Implementation Process of the Renovation

The scope of the community renovation projects can be divided into three categories: 1) Basic: This category is predominantly for the renovation and upgrading of municipal supporting infrastructure and the maintenance of public parts such as roofs, external walls, stairs and pavements of buildings in the district. 2) Improve: This category is mainly the environment and supporting facilities renovation and construction, building energy-saving renovation within the small area, conditional building retrofitting elevators, etc. 3) Upgrading: This category is predominantly the construction of supporting public service facilities and their intelligent renovation, such as kindergartens and other educational facilities, elderly service facilities, etc. (Xiao et al., 2023).

The renovation process typically follows several phases: 1) Assessment and Planning: Conducting initial surveys to identify community needs and developing detailed renovation plans, including design and budgeting. 2) Community Consultation: Engaging with residents and other stakeholders to gather input and ensure support for the proposed changes. 3) Implementation: Executing the renovation works, often in phases to minimize disruption to daily life. 4) Monitoring and Evaluation: Assessing the outcomes of the renovation projects to ensure they meet the intended goals and gathering feedback for future improvements.

The renovation of old residential communities involves a diverse set of stakeholders: a) Government Agencies: Central and local governments play crucial roles in policy formulation, funding allocation, and project supervision. b) Residents: Active participation from residents is vital for ensuring that renovations meet community needs and preferences (Xiao et al., 2023). c) Private Sector: Construction firms and real estate developers often partner with governments to execute renovation projects, leveraging their expertise and financial resources.

Funding for these renovation projects comes from multiple sources: a) Government Budgets: Both central and local governments allocate substantial funds for urban renewal initiatives. b) Public-Private Partnerships (PPPs): These partnerships enable the leveraging of private investment to supplement public funds, providing a sustainable financing model. c) Resident Contributions: In some cases, residents contribute financially to specific aspects of the renovation, such as enhanced security measures or additional amenities (Wang et al., 2022).

2.3.3 Research Gaps

Although many studies have investigated community renovation projects in China—such as exploring the key actors in the implementation process, understanding residents’ willingness to participate (Xiao et al.,

2023), focusing on factors that influence renovation progress (Yao & Liu, 2022), and analyzing cost allocation strategies (Zhuo & Li, 2022)—there is still a significant lack in research on the implementation and effectiveness of these policies in shrinking cities.

Unlike in growing cities, renovations in shrinking cities are more dependent on government funding. Insufficient financial resources can delay projects, limit their scope, and compromise the quality of renovations. Additionally, renovation strategies must be tailored to the unique challenges of shrinking cities, and the effectiveness of these projects requires further attention.

References

- Audirac, I., Cunningham-Sabot, E., Fol, S., & Moraes, S. T. (2012). Declining suburbs in Europe and Latin America. *International Journal of Urban and Regional Research*, 36(2), 226-244.
- Amin, S., Islam, H. S., Haseeb, A., & Saleemi, A. (2020). Residents' perception of livability: A case study of Quaid-E-Azam Town (Township), Lahore, Pakistan. *Planning Malaysia*, 18.
- Bray, D. (2006). Building 'Community': New Strategies of Governance in Urban China. *Economy and Society*, 35(4), 530-549.
- Bogataj, D., McDonnell, D. R., & Bogataj, M. (2016). Management, financing and taxation of housing stock in the shrinking cities of aging societies. *International journal of production economics*, 181, 2-13.
- Bartholomae, F., Woon Nam, C., & Schoenberg, A. (2017). Urban shrinkage and resurgence in Germany. *Urban Studies*, 54(12), 2701-2718.
- Blanco, H. (2012). Public participation in neighborhood planning, a neglected aspect of community livability: The case of Seattle. In *Community Livability* (pp. 199-213). Routledge.
- Bontje, M. (2004). Facing the challenge of shrinking cities in East Germany: The case of Leipzig. *GeoJournal*, 61(1), 13-21.
- Bernt, M. (2009). Partnerships for demolition: The governance of urban renewal in East Germany's shrinking cities. *International Journal of Urban and Regional Research*, 33(3), 754-769.
- Bernt, M. (2016). The limits of shrinkage: Conceptual pitfalls and alternatives in the discussion of urban population loss. *International Journal of Urban and Regional Research*, 40(2), 441-450.
- Chadegani, A. A., Salehi, H., Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ebrahim, N. A. (2013). A comparison between two main academic literature collections: Web of Science and Scopus databases. *arXiv preprint arXiv:1305.0377*.
- Coppola, A. (2019). Projects of becoming in a right-sizing shrinking City. *Urban Geography*, 40(2), 237-256.
- Camarda, D., Rotondo, F., & Selicato, F. (2015). Strategies for dealing with urban shrinkage: Issues and scenarios in Taranto. *European Planning Studies*, 23(1), 126-146.
- Chi, G., & Marcouiller, D. W. (2011). Isolating the effect of natural amenities on population change at the local level. *Regional Studies*, 45(4), 491-505.
- Di, W. (2013). Operating Norms and Practices of Residents' Committees. *China Perspectives*, 2013(2013/1), 7-15.
- Dustmann, C., & Okatenko, A. (2014). Out-migration, wealth constraints, and the quality of local amenities. *Journal of Development Economics*, 110, 52-63.

- Deng, T., Wang, D., Yang, Y., & Yang, H. (2019). Shrinking cities in growing China: Did high speed rail further aggravate urban shrinkage?. *Cities*, 86, 210-219.
- Farke, A. (2005). Salzgitter will und wird nicht schrumpfen—Wahrnehmungs-und Akzeptanzprobleme im Umgang mit Schrumpfung exemplarisch erläutert an einer Pilotstadt des Stadtumbau West. *Kommunikative Steuerung des Stadtumbaus. Interessengegensätze, Koalitionen und Entscheidungsstrukturen in schrumpfenden Städten*. Wiesbaden, 185-205.
- Frazier, A. E., Bagchi-Sen, S., & Knight, J. (2013). The spatio-temporal impacts of demolition land use policy and crime in a shrinking city. *Applied Geography*, 41, 55-64.
- Gao, B., Liu, W., & Dunford, M. (2014). State land policy, land markets and geographies of manufacturing: The case of Beijing, China. *Land Use Policy*, 36, 1-12.
- Guo, F., Qu, X., Ma, Y., & Tong, L. (2021). Spatiotemporal pattern evolution and influencing factors of shrinking cities: Evidence from China. *Cities*, 119, 103391.
- Haase, A., Bernt, M., Großmann, K., Mykhnenko, V., & Rink, D. (2016). Varieties of shrinkage in European cities. *European urban and regional studies*, 23(1), 86-102.
- Haase, D., Haase, A., & Rink, D. (2014). Conceptualizing the nexus between urban shrinkage and ecosystem services. *Landscape and Urban Planning*, 132, 159-169.
- Hospers, G. J. (2014). Policy responses to urban shrinkage: From growth thinking to civic engagement. *European Planning Studies*, 22(7), 1507-1523.
- Hartt, M. (2018). The diversity of North American shrinking cities. *Urban Studies*, 55(13), 2946-2959.
- Hartt, M. (2019). The prevalence of prosperous shrinking cities. *Annals of the American Association of Geographers*, 109(5), 1651-1670.
- Hartt, M., & Hackworth, J. (2020). Shrinking cities, shrinking households, or both?. *International Journal of Urban and Regional Research*, 44(6), 1083-1095.
- Kim, G., Newman, G., & Jiang, B. (2020). Urban regeneration: Community engagement process for vacant land in declining cities. *Cities*, 102, 102730.
- Kaal, H. (2011). A conceptual history of livability: Dutch scientists, politicians, policy makers and citizens and the quest for a livable city. *City*, 15(5), 532-547.
- Keyes, L. M., & Benavides, A. D. (2020). Creating livable communities. *Sustainable Community Health: Systems and Practices in Diverse Settings*, 71-112.
- Kabisch, N., & Haase, D. (2013). Green spaces of European cities revisited for 1990–2006. *Landscape and urban planning*, 110, 113-122.
- Lai, L. W., Chau, K. W., & Cheung, P. A. C. (2018). Urban renewal and redevelopment: Social justice and property rights with reference to Hong Kong's constitutional capitalism. *Cities*, 74, 240-248.
- Leby, J. L., & Hashim, A. H. (2010). Liveability dimensions and attributes: Their relative importance in the eyes of neighbourhood residents. *Journal of construction in developing countries*, 15(1), 67-91.
- Liu, J., Han, B. I., & Wang, M. (2020). Using multi-source data to assess livability in Hong Kong at the community-based level: A combined subjective-objective approach. *Geography and sustainability*, 1(4), 284-294.
- Luo, Q., Shu, H., Zhao, Z., Qi, R., & Huang, Y. (2022). Evaluation of community livability using gridded basic urban geographical data—a case study of Wuhan. *ISPRS International Journal of Geo-Information*, 11(1), 38.

- Li, X., Hui, E. C., Chen, T., Lang, W., & Guo, Y. (2019). From Habitat III to the new urbanization agenda in China: Seeing through the practices of the “three old renewals” in Guangzhou. *Land Use Policy*, 81, 513-522.
- Liang, X., Liu, Y., & Qiu, T. (2020). Livability assessment of urban communities considering the preferences of different age groups. *Complexity*, 2020 (1), 8269274.
- Mallach, A. (2017). What we talk about when we talk about shrinking cities: The ambiguity of discourse and policy response in the United States. *Cities*, 69, 109-115.
- Martinez-Fernandez, C., Audirac, I., Fol, S., & Cunningham-Sabot, E. (2012a). Shrinking cities: Urban challenges of globalization. *International journal of urban and regional research*, 36(2), 213-225.
- Martinez-Fernandez, C., Wu, C. T., Schatz, L. K., Taira, N., & Vargas-Hernández, J. G. (2012b). The shrinking mining city: Urban dynamics and contested territory. *International Journal of Urban and Regional Research*, 36(2), 245-260.
- Martinez-Fernandez, C., Weyman, T., Fol, S., Audirac, I., Cunningham-Sabot, E., Wiechmann, T., & Yahagi, H. (2016). Shrinking cities in Australia, Japan, Europe and the USA: From a global process to local policy responses. *Progress in planning*, 105, 1-48.
- Markus, G. B., & Krings, A. (2020). Planning, participation, and power in a shrinking city: The Detroit Works Project. *Journal of Urban Affairs*, 42(8), 1141-1163.
- Ma, S., Kumakoshi, Y., Koizumi, H., & Yoshimura, Y. (2022). Determining the association of the built environment and socioeconomic attributes with urban shrinking in Yokohama City. *Cities*, 120, 103474.
- Maennig, W., & Dust, L. (2008). Shrinking and growing metropolitan areas asymmetric real estate price reactions?: The case of German single-family houses. *Regional Science and Urban Economics*, 38(1), 63-69.
- Nefs, M., Alves, S., Zasada, I., & Haase, D. (2013). Shrinking cities as retirement cities? Opportunities for shrinking cities as green living environments for older individuals. *Environment and Planning A*, 45(6), 1455-1473.
- Newman, P. W. (1999). Sustainability and cities: extending the metabolism model. *Landscape and urban planning*, 44(4), 219-226.
- Norouzian-Maleki, S., Bell, S., Hosseini, S. B., & Faizi, M. (2015). Developing and testing a framework for the assessment of neighbourhood liveability in two contrasting countries: Iran and Estonia. *Ecological Indicators*, 48, 263-271.
- Okulicz-Kozaryn, A. (2013). City Life: Rankings (Livability) Versus Perceptions (Satisfaction). *Social Indicators Research*, 110(2), 433–451.
- Owusu, A. B., Mensah, C. A., Fynn, I. E. M., Kwang, C., Arthur, I. K., & Adu-Boahen, K. (2023). Indicator-based assessment of the liveability of communities in the Accra Metropolitan Area, Ghana: A transdisciplinary approach. *Social Sciences & Humanities Open*, 8(1), 100702.
- Ortiz-Moya, F. (2020). Green growth strategies in a shrinking city: Tackling urban revitalization through environmental justice in Kitakyushu City, Japan. *Journal of Urban Affairs*, 42(3), 312-332.
- Peters, D. J., Hamideh, S., Zarecor, K. E., & Ghandour, M. (2018). Using entrepreneurial social infrastructure to understand smart shrinkage in small towns. *Journal of Rural Studies*, 64, 39-49.
- Pallagst, K. (2008). Shrinking Cities. Planning Challenges from an International Perspective. In, *Cities Growing Smaller*. Kent State University’s Cleveland Urban Design Collaborative, Kent State University.

- Pallagst, K., Fleschurz, R., Nothof, S., & Uemura, T. (2021). Shrinking cities: Implications for planning cultures?. *Urban Studies*, 58(1), 164-181.
- Park, R. E. (1915). The City: Suggestions for the Investigation of Human Behavior in the City Environment. *American Journal of Sociology*, 20(5), 577-612.
- Putnam, R. D. (2000). Bowling alone: The collapse and revival of American community. *Touchstone*.
- Read, B. L. (2003). Democratizing the Neighborhood? New Private Housing and Home-Owner Self-Organization in Urban China. *The China Journal*, (49), 31-59.
- Rowe, P. G., Forsyth, A., & Kan, H. Y. (2016). China's urban communities: concepts, contexts, and well-being. *Birkhäuser*.
- Ryan, B. D., & Gao, S. (2019). Plan implementation challenges in a shrinking city: A conformance evaluation of Youngstown's (OH) comprehensive plan with a subsequent zoning code. *Journal of the American Planning Association*, 85(4), 424-444.
- Rhodes, J. (2019). Revitalizing the neighborhood: the practices and politics of rightsizing in Idora, Youngstown. *Urban geography*, 40(2), 215-236.
- Seymour, E., Endsley, K. A., & Franklin, R. S. (2020). Differential drivers of rent burden in growing and shrinking cities. *Applied Geography*, 125, 102302.
- Schilling, J., & Logan, J. (2008). Greening the rust belt: A green infrastructure model for right sizing America's shrinking cities. *Journal of the American Planning Association*, 74(4), 451-466.
- Sadler, R. C., Furr-Holden, D., Greene-Moton, E., Larkin, B., Timlin, M., Walling, D., & Wyatt, T. (2021). Right sizing Flint's infrastructure in the wake of the Flint water crisis would constitute an additional environmental injustice. *Journal of the American Planning Association*, 87(3), 424-432.
- Silverman, R. M. (2020). Rethinking shrinking cities: Peripheral dual cities have arrived. *Journal of Urban Affairs*, 42(3), 294-311.
- Schetke, S., & Haase, D. (2008). Multi-criteria assessment of socio-environmental aspects in shrinking cities. Experiences from eastern Germany. *Environmental Impact Assessment Review*, 28(7), 483-503.
- Schenkel, W. (2015). Regeneration strategies in shrinking urban neighbourhoods—Dimensions of interventions in theory and practice. *European Planning Studies*, 23(1), 69-86.
- Tönnies, F. (1887). *Gemeinschaft und Gesellschaft: Abhandlung des Communismus und des Socialismus als empirischer Culturformen*. Fues.
- Wellman, B. (2001). Physical Place and Cyberplace: The Rise of Personalized Networking. *International Journal of Urban and Regional Research*, 25(2), 227-252.
- Wu, F. (2015). *Planning for Growth: Urban and Regional Planning in China*. Routledge.
- Wang, H., Shen, Q., Tang, B. S., Lu, C., Peng, Y., & Tang, L. (2014). A framework of decision-making factors and supporting information for facilitating sustainable site planning in urban renewal projects. *Cities*, 40, 44-55.
- Wolff, M., & Wiechmann, T. (2018). Urban growth and decline: Europe's shrinking cities in a comparative perspective 1990–2010. *European urban and regional studies*, 25(2), 122-139.
- Wolff, M., & Mykhnenko, V. (2023). COVID-19 as a game-changer? The impact of the pandemic on urban trajectories. *Cities*, 134, 104162.
- Whelan, R. K. (2012). Introduction to community livability. In *Community Livability* (pp. 17-22). Routledge.
- Wiechmann, T., & Pallagst, K. M. (2012). Urban shrinkage in Germany and the USA: A comparison of

transformation patterns and local strategies. *International journal of urban and regional research*, 36(2), 261-280.

- Wang, Y., Yao, Y., Zhang, Y., & Xiang, L. (2022). A framework of stakeholder relationship analysis for an urban regeneration project based on social network analysis: A dynamic perspective. *Journal of Urban Planning and Development*, 148(4), 04022035.
- Xu, M., & Yang, Z. (2009). Design history of China's gated cities and neighbourhoods: Prototype and evolution. *Urban Design International*, 14, 99-117.
- Xiao, S., Li, L., Ma, J., Liu, D., & Li, J. (2023). A study of residents' intentions to participate in the renovation of older communities under the perspective of urban renewal: evidence from Zhangjiakou, China. *Journal of Asian Architecture and Building Engineering*, 22(3), 1094–1109.
- Xu, X., Xue, D., & Huang, G. (2022). The effects of residents' sense of place on their willingness to support urban renewal: A case study of century-old east street renewal project in Shaoguan, China. *Sustainability*, 14(3), 1385.
- Xie, Y., Gong, H., Lan, H., & Zeng, S. (2018). Examining shrinking city of Detroit in the context of socio-spatial inequalities. *Landscape and Urban Planning*, 177, 350-361.
- Yanmei, L. (2012). Neighborhood amenities, satisfaction, and perceived livability of foreign-born and native-born US residents. *Journal of identity and migration studies*, 6(1), 115.
- Yao, W., & Liu, S. (2022). Study on Influence Factors of the Renovation Progress of Old Residential Communities. *Journal of Engineering Management/Gongcheng Guanli Xuebao*, 36(6).
- Yang, Z., & Pan, Y. (2020). Are cities losing their vitality? Exploring human capital in Chinese cities. *Habitat International*, 96, 102104.
- Zhu, L., Guo, Y., Zhang, C., Meng, J., Ju, L., Zhang, Y., & Tang, W. (2020). Assessing community-level livability using combined remote sensing and internet-based big geospatial data. *Remote Sensing*, 12(24), 4026.
- Zhuo, X., & Li, H. (2022). A Study on Cost Allocation in Renovation of Old Urban Residential Communities. *Sustainability*, 14(11), 6929.
- Zhou, Y., Li, C., Zheng, W., Rong, Y., & Liu, W. (2021). Identification of urban shrinkage using NPP-VIIRS nighttime light data at the county level in China. *Cities*, 118, 103373.

Chapter 3

3. An Overview of Shrinking Cities in China

This chapter focuses on all prefecture-level cities in mainland China, providing a comprehensive overview of shrinking cities in China. First, it analyzes the spatiotemporal distribution changes of these cities from 2000 to 2020, looking at demographic and economic aspects. Next, it categorizes shrinking cities based on dimensions of shrinkage and duration of shrinkage. It further explores how the distribution of shrinking cities varies across different urban contexts, including city size and urban resources. Finally, this chapter identifies the factors influencing urban shrinkage through panel data regression analysis and explores the regional differences in the impact of these factors using geographically weighted regression analysis.

3.1 Methodology

3.1.1 Research Subjects and Objectives

This study takes all 297 prefecture-level cities in mainland China, including the four municipalities directly administered by the Central Government, as the research subjects. It analyzes the spatio-temporal distribution, types of shrinking cities, and the factors influencing urban shrinkage across different regions. Spanning 20 years from 2000 to 2020, the study tracks the long-term changes in urban shrinkage, since the shrinkage is spatially and temporally uneven (Haase et al., 2016) and thus requires long-term observation. The year 2000 was chosen as the starting point, considering the significant transformations China has experienced since the turn of the century, particularly following its accession to the World Trade Organization (WTO) in 2001. Regarding the geographical unit of analysis, the study focuses on prefecture-level cities based on the availability of demographic and economic data for all cities in specific years, although cities have complex delineations regarding administration and function.

The research objectives are as follows:

- 1) To understand the overall spatio-temporal distribution of shrinking cities from 2000 to 2020 from both population and economic perspectives.
- 2) To classify shrinking cities by dimensions and periods of shrinkage.
- 3) To compare the distribution of shrinking cities across various urban contexts, investigating where shrinkage is most likely to occur, as urban contexts significantly shape their trajectories (Haase et al., 2017).
- 4) To identify significant factors influencing urban shrinkage and examine the variations of these factors across different regions.

3.1.2 Identifying Cities with Population or Economic Shrinkage

In investigating the spatio-temporal distribution and classification of shrinking cities, the study divides the 20 years into four five-year intervals to capture the dynamic development of cities over these shorter

periods.

1) Population Dimension

Two indicators are considered in identifying population shrinking cities: the total population of permanent residents and the population density of permanent residents. The permanent resident population (“de facto” population) is selected instead of the household registered population (“Hu Kou” population) because the former includes the migrant population. The population density of permanent residents is added, taking into account the influence of changing urban boundaries on urban area size. The average annual growth rate of the total permanent residents and the average annual growth rate of population density of permanent residents are calculated for each period.

$$R=[(P_t-P_{t-5})/P_{t-5}]/5 \quad (1)$$

If the growth rate is negative, this city is considered a population-shrinking city. In addition, the degree of population shrinkage is classified into three levels according to the average annual growth rate (R): slight shrinkage ($-1.0 < R < 0$), moderate shrinkage ($-3.0 < R \leq -1.0$), and severe shrinkage ($R \leq -3.0$).

2) Economic Dimension

In terms of the economy, considering the impact of total population size on the economy, two indicators are considered: the gross regional domestic product (GRDP) and per capita GRDP. The average annual growth rate of the GRDP and the average annual growth rate of the per capita GRDP are calculated for each period.

$$R=[(E_t-E_{t-5})/E_{t-5}]/5 \quad (2)$$

If the growth rate is negative, this city is considered an economically shrinking city. Furthermore, the degree of economic shrinkage is classified into two levels according to the average annual growth rate (R): slight shrinkage ($-5.0 < R < 0$) and severe shrinkage ($R \leq -5.0$). Additionally, cities with low economic growth rates ($0 < R \leq 3$) are also identified.

Data sources include the fifth, sixth, and seventh National Population Census of Mainland China, China City Statistical Yearbooks (in 2001, 2006, 2011, 2016, 2021), and Provincial Statistical Yearbooks (in 2000, 2005, 2010, 2015, 2020).

3.1.3 Assessing the Degree of Urban Shrinkage

The extent of shrinkage was assessed before exploring the factors influencing urban shrinkage. However, as the analysis of the influence factors relies on specific socioeconomic statistics available only in the national census data of the years 2000, 2010, and 2020 for all cities, the evaluation of shrinkage degree and the investigation of its influence factors were conducted over two decades: 2000-2010 and 2010-2020.

When assessing the degree of urban shrinkage, cities exhibiting either population or economic decline between 2000 to 2010 and from 2010 to 2020 were categorized as shrinking cities. Population decline includes negative growth in either the total resident population or the density of the resident population. Economic decline includes negative growth in either the gross regional domestic product (GRDP) or per

capita GRDP.

The degree of urban growth and shrinkage is assessed by integrating changes in both population and economy. Four indicators are used to construct the urban development index: changes in the total resident population, changes in the density of the resident population, changes in the gross regional domestic product (GRDP), and changes in per capita GRDP. The Criteria Importance Through Intercriteria Correlation (CRITIC) method is employed to determine the weight coefficients of each indicator. The CRITIC method is an objective approach for assessing the weight coefficients of evaluation criteria (Diakoulaki et al., 1995). It accounts for the variability of data and the correlations between indicators ⁽¹⁾. Consequently, using the CRITIC method helps eliminate the mutual influence of indicators with strong correlation, thereby facilitating more reliable results.

Table 3.1 shows the result of the weight coefficients for each indicator calculated using the CRITIC method. In general, the weight coefficients for population indicators are greater than those for economic indicators. The weight coefficients for the four indicators are as follows: ‘changes in the total resident population’ at 0.3280, ‘changes in the density of the resident population’ at 0.2829, ‘changes in GRDP’ at 0.1762, and ‘changes in the per capita GRDP’ at 0.2129. Finally, the urban development index for each city is calculated using the weight coefficient of each indicator.

Table 3.1 Weight Coefficients of Each Indicator for Calculating the Urban Development Index

Items	Changes in the total resident population	Changes in the density of resident population	Changes in GRDP	Changes in the per capita GRDP
Weight	0.3280	0.2829	0.1762	0.2129

3.1.4 Exploring the Influence Factors of Urban Shrinkage

1) Selecting Possible Influencing Factors

According to the literature review and data availability, ten variables were selected from three dimensions: demography, economy, and urban built environment and public facility (Table 3.2) ⁽²⁾. Regarding demographic factors, it is considered that population decline is related to population migration, age structure, the urban population ratio, and the natural population growth rate. In terms of economic factors, the index of the advanced industrial structure was selected as a variable, since the industrial transformation can bring about changes in employment and capital flows, thereby affecting urban development. Moreover, the financial capacity of local government, reflected by variables of general public budget revenue and expenditure, relates to government operations and implementation of urban policies, thus impacting urban development. Additionally, the development level of the city’s major industries, indicated by the number of industrial enterprises above the designated size, may also affect a city’s development. In terms of the urban built environment and public facility, variables such as green space ratio and the number of hospitals were selected, which can somewhat reflect a city’s built environment and service level. The urban environment and services can influence a city’s attractiveness to its population. After determining the variables, panel data regression is used to analyze which factors significantly impact urban shrinkage. Data sources include the 5th, 6th, and 7th National Population Census of China, China City Statistical Yearbooks for 2001, 2011, and 2021, and Provincial Statistical Yearbooks from the corresponding years.

Table 3.2 The Selected Explanatory Variables

Classification	Variable	Explanation
Demographic factors	F1 Population migration	Using the difference between the permanent resident population and the registered population to represent the difference between the in-migrant and out-migrant population
	F2 Aging rate	The proportion of people over 65 years old in the resident population
	F3 Urbanization rate	The proportion of permanent residents in the urban area in the total permanent population
	F4 Natural population growth rate	The proportion of the natural population increased in the total population
Economic factors	F5 The index of the advanced industrial structure	The ratio of the tertiary industry to the secondary industry
	F6 General public budget revenue	Including all kinds of tax revenue and non-tax revenue
	F7 General public budget expenditure	Including general public services, public security expenditures, and various social undertaking expenditures coordinated by local governments
	F8 Number of industrial enterprises above designated size	Industrial enterprises with an annual income of more than 20 million yuan from their main business
Urban environment and public facility	F9 Green space ratio	The ratio of green coverage area to the built-up area
	F10 Number of hospitals	The number of hospitals in the total city

2) Analyzing the Spatial Heterogeneity of Influencing Factors

Based on the literature review, it is evident that the main influencing factors for urban shrinkage vary by regions. Therefore, the hypothesis is that impact factors have different effects in different regions. To investigate whether such spatial heterogeneity exists, Geographically Weighted Regression (GWR) analysis⁽³⁾ is used. This method can reflect the variation of parameters in different regions and provide a better fit for data with spatial autocorrelation.

Before analyzing the spatial heterogeneity of the impact factors, it is necessary to conduct a spatial autocorrelation analysis on the explained variables to evaluate whether there is spatial agglomeration. The spatial autocorrelation analysis includes the global Moran's I statistics and local Moran's I statistics. The global Moran's I index ranges from -1 to 1; when it is greater than 0 and significant, it indicates there is positive spatial autocorrelation, and the larger the value, the stronger the spatial correlation; when it is less than 0 and significant, it indicates there is negative spatial autocorrelation; when it is 0, it represents an independent random distribution. The local Moran's I index can further identify the spatial distribution of local clusters or local outliers. There are four classifications: high-high cluster (HH), high-low outlier (HL), low-high outlier (LH), and low-low outlier (LL). In this study, HH refers to clusters of cities with a high urban development index; HL refers to cities with a high urban development index while their neighboring cities have a low urban development index; LH refers to cities with a low urban development index while their neighboring cities have a high urban development index; LL refers to clusters of cities with a low urban development index. If Moran's index is significant, it indicates that the explained variables exhibit spatial autocorrelation, and the geographical attributes of the variables impact the results. Therefore, it is suitable for GWR analysis instead of traditional regression model analysis.

3.2 Spatio-temporal Distribution of Shrinking Cities in China

3.2.1 Cities with Shrinking Populations

Over the past 20 years, as shown in Figures 3.1 and 3.2, the number of cities experiencing population decline has increased significantly. The spatial distribution of these shrinking cities has rapidly expanded—from being limited to the central provinces in China from 2000 to 2005, to covering almost all provinces from 2015 to 2020, with notable increases in northeast China, Inner Mongolia Autonomous Region, Shaanxi, and Sichuan Provinces.

In terms of the total population of permanent residents, the number of shrinking cities in the four periods—2000–2005, 2005–2010, 2010–2015, and 2015–2020—are 57 (19.2%), 99 (33.3%), 91 (30.6%), and 159 (53.5%), respectively. In terms of the population density of permanent residents, the number of shrinking cities during these periods are 65 (21.9%), 105 (35.4%), 102 (34.3%), and 152 (51.2%), respectively.

During 2000–2005, most shrinking cities experienced a slight population decline (below 1% per year), with only 14 cities losing more than 1% of their population annually. The shrinking cities were mainly distributed in the central region, including Chongqing City and the provinces of Sichuan, Hubei, and Hunan. From 2005 to 2010, the distribution of shrinking cities broadened, and the shrinkage became more severe. The number of cities losing more than 1% of their population increased to 32. Furthermore, there are cities with a population decrease rate of more than 3%, such as Guangyuan City in the Sichuan Province. Shrinking cities also emerged in the Guizhou Province in the southwest; Gansu and Shaanxi Provinces in the northwest; Henan and Anhui Provinces in the central region; and Fujian and Zhejiang Provinces in the southeast.

During 2010–2015, there was a slight decrease in the number of shrinking cities, and the shrinkage in southern China was generally mitigated. However, shrinkage accelerated in Heilongjiang and Jilin Provinces in northeast China, and Shanxi and Hebei Provinces in central China. Since 2015, there have been numerous instances of shrinking cities, of which 49.7% (79 out of 159) experiencing moderate (population decline between 1% and 3% per year) or severe shrinkages (population decline of over 3% per year). Continued shrinkage occurred in Heilongjiang, Jilin, and Liaoning Provinces and Inner Mongolia Autonomous Region in northeast China; Hebei and Shanxi Provinces in central China; and Gansu and Shaanxi Provinces in northwest China. Furthermore, cities in Hubei, Hunan, and Sichuan Provinces in central China and Yunnan Province in southwest China showed shrinkage following a brief period of urban growth.

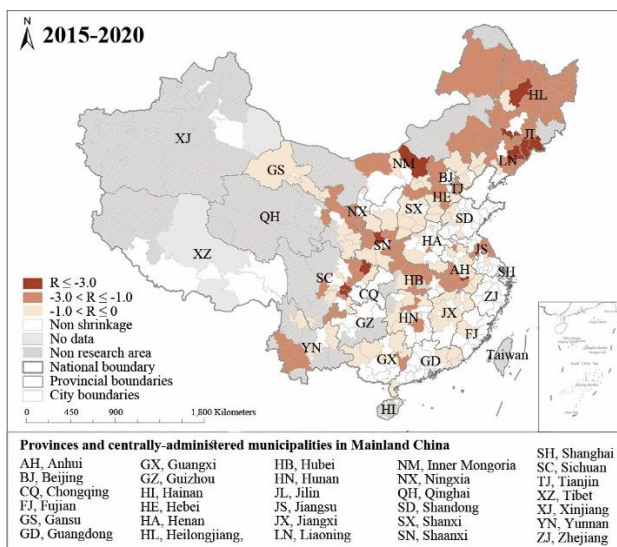
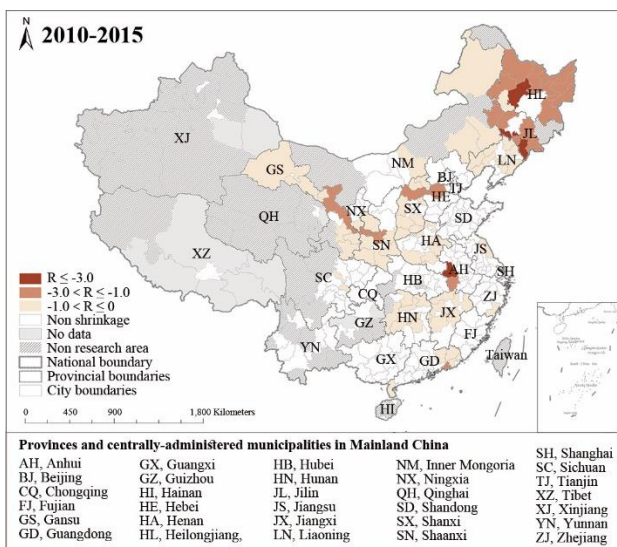
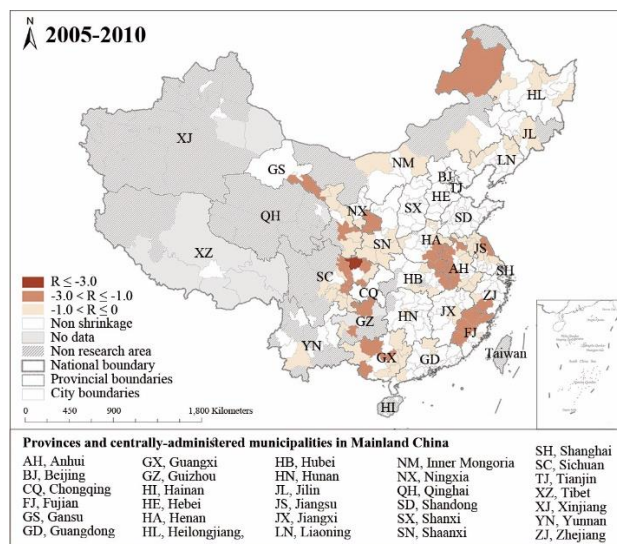
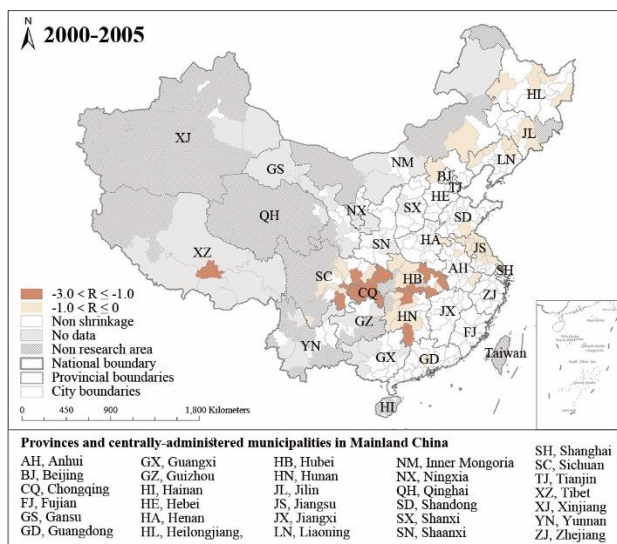
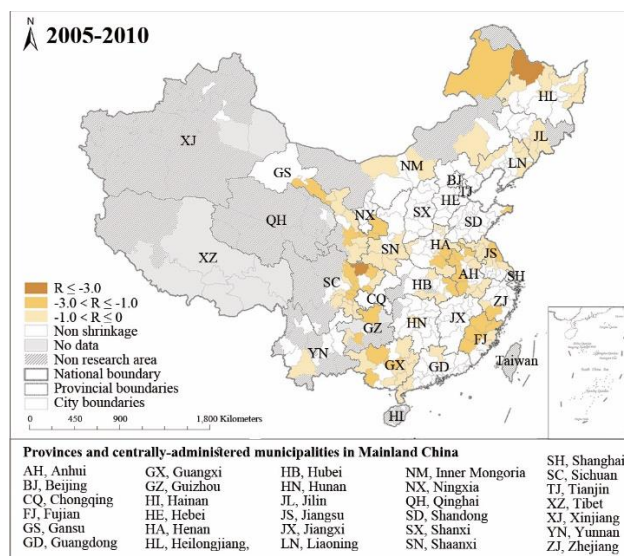
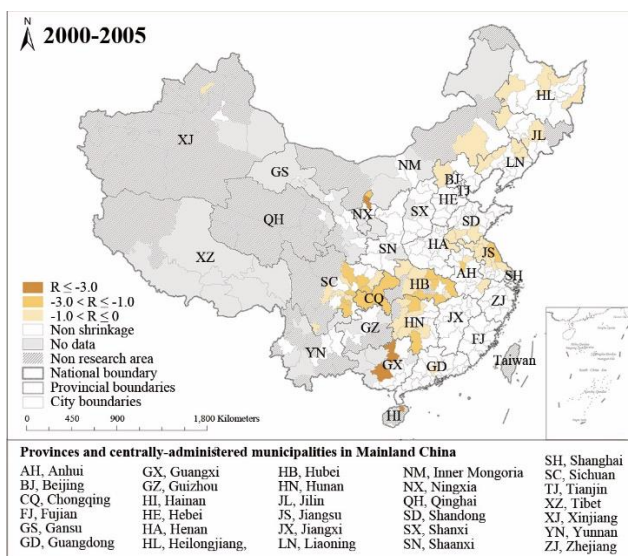


Figure 3.1 Distribution of Shrinking Cities
(In terms of the change in the total population of permanent residents)
(R: Average Annual Growth Rate of Permanent Residents)



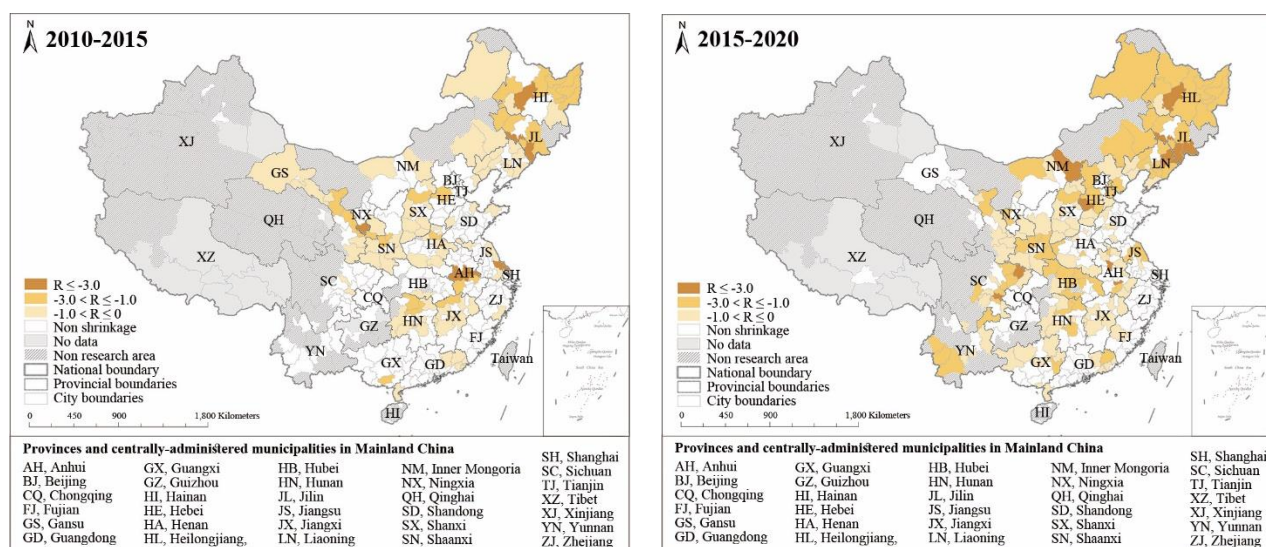


Figure 3.2 Distribution of Shrinking Cities
(In terms of the change in the population density of permanent residents)
(R: Average Annual Growth Rate of Permanent Population Density)

3.2.2 Cities with Shrinking Economies

As Figures 3.3 and 3.4 show, compared to population-shrinking cities, the number of economic-shrinking cities in China is substantially lower. During 2005–2015, only a few cities experienced negative economic growth, and several cities had low economic growth (annual growth rate of GRDP of below 3%). However, since 2015, the number of cities with negative and low economic growth rates has increased significantly, especially in northeast China.

In terms of GRDP, the number of shrinking cities during the periods 2000–2005; 2005–2010; 2010–2015; and 2015–2020 were 0 (0%), 1 (0.3%), 2 (0.7%), and 39 (13.1%), respectively. In terms of per capita GRDP, the proportion of shrinking cities during these periods were 1 (0.3%), 0 (0%), 4 (1.3%), and 37 (12.5%), respectively.

From 2000 to 2005, only Wuzhong City in Ningxia Hui Autonomous Region experienced negative per capita GRDP growth, while the city has shown economic growth since 2005. From 2005 to 2010, only Pingliang City in Gansu Province had negative GRDP growth, but the city stopped negative growth after 2010. From 2010 to 2015, there were five cities with negative GRDP or per capita GRDP growth, located in the Gansu, Anhui, and Heilongjiang Provinces and Xinjiang Uygur Autonomous Region. During 2015–2020, many economic-shrinking cities emerged in Heilongjiang, Jilin, and Liaoning Provinces and Inner Mongolia Autonomous Region in northeast China, as well as in Shandong Province in the east. Among the cities with economic shrinkage, severe-shrinkage cities (annual GRDP growth rate below -5%) accounted for 35.9% (14 out of 39).

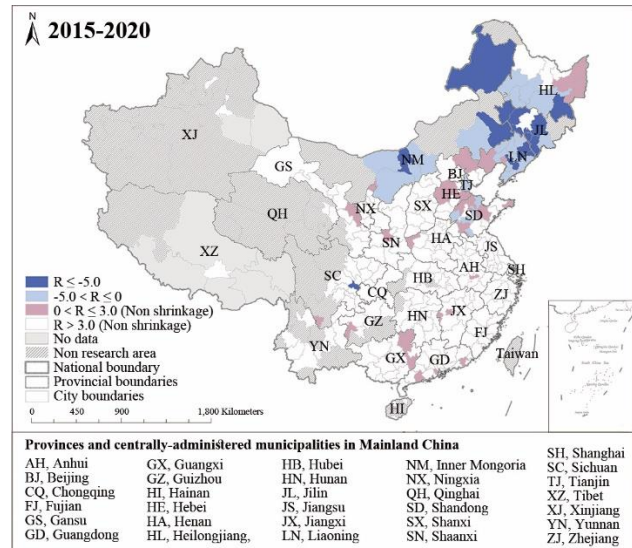
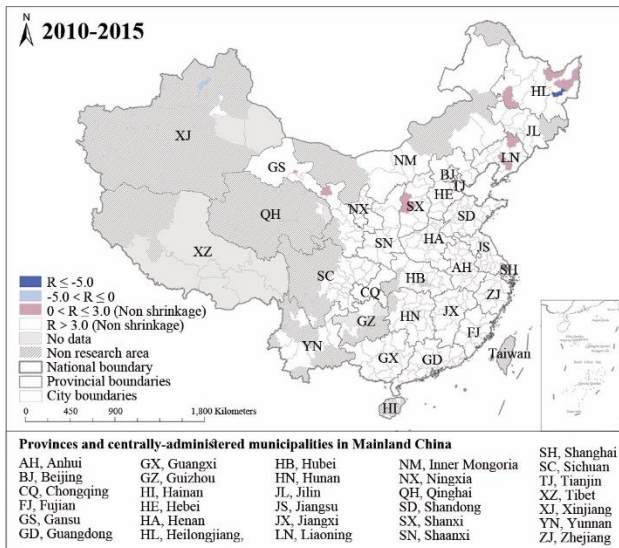
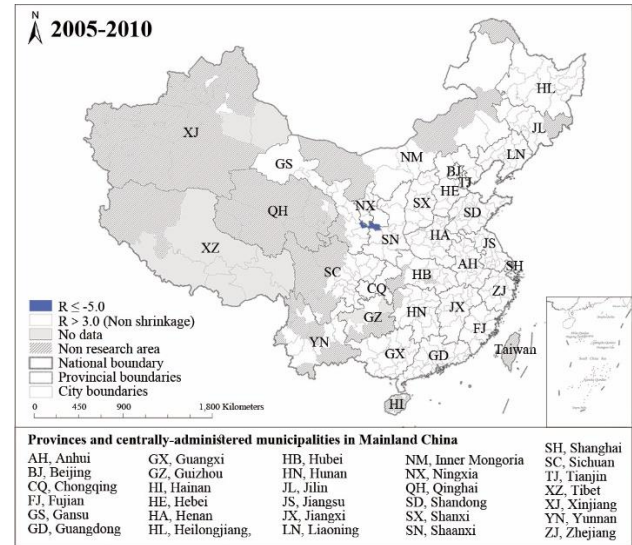
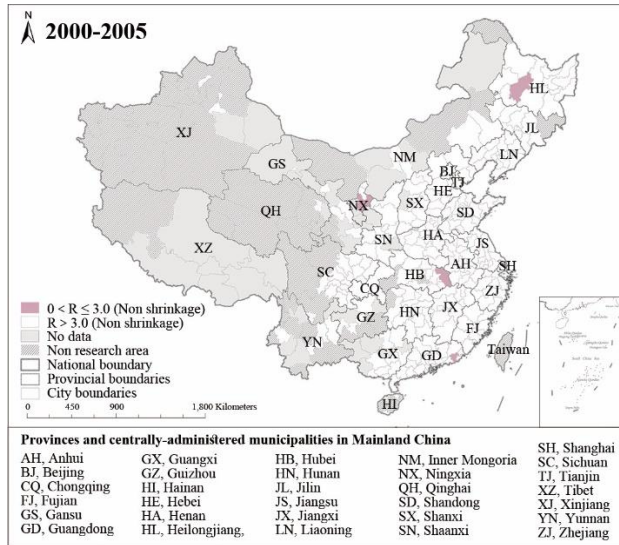
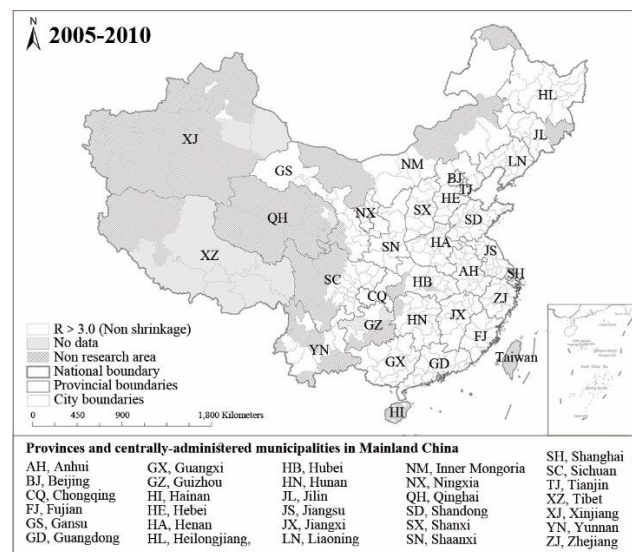
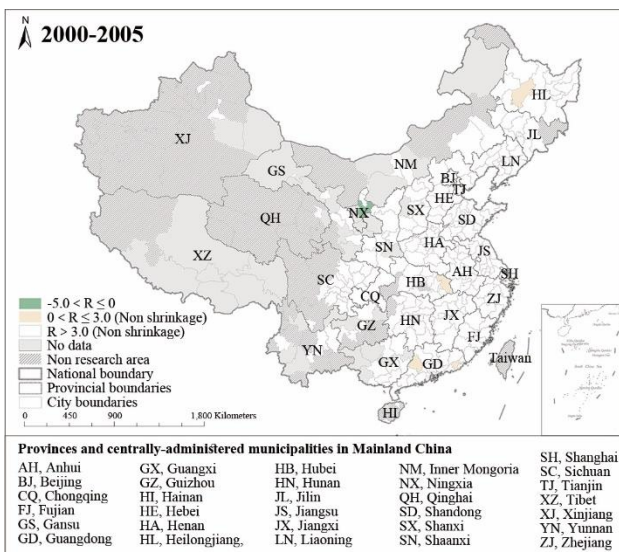


Figure 3.3 Distribution of Shrinking Cities (In terms of the GRDP)
 (R: Average Annual Growth Rate of GRDP)



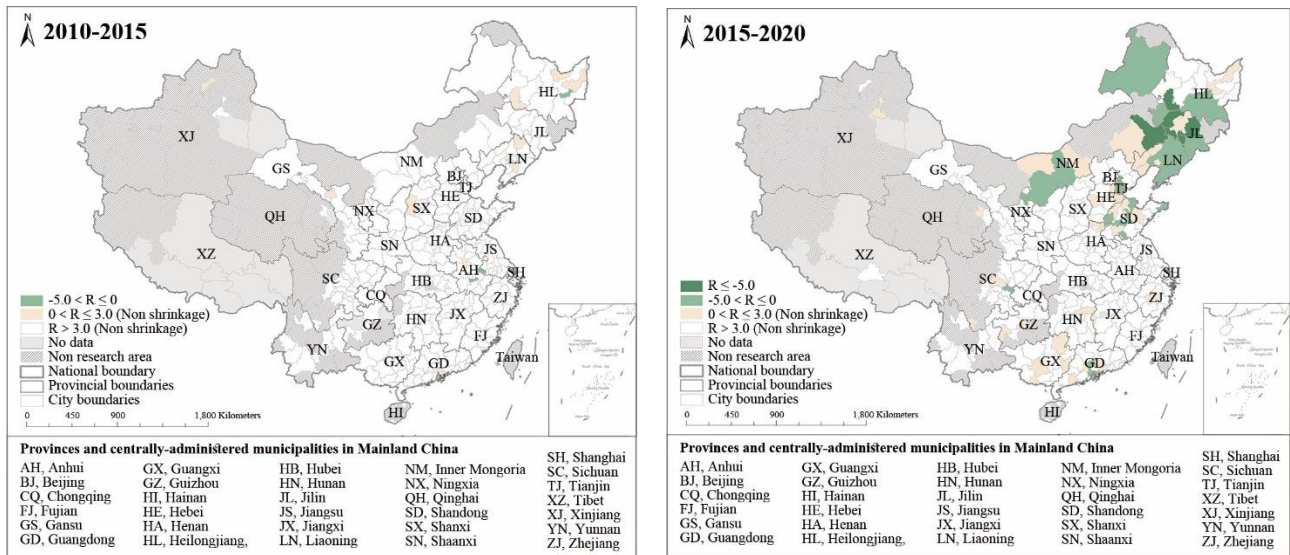


Figure 3.4 Distribution of Shrinking Cities (In terms of per capita GRDP)
(R: Average Annual Growth Rate of Per capita GRDP)

3.3 Types of Shrinking Cities

3.3.1 Based on Dimensions of Shrinkage

Shrinking cities can be classified into three categories based on the dimensions of population and economic shrinkage, as outlined in Table 3.3. The findings presented in Figure 3.5 reveal that shrinking cities have evolved from experiencing primarily population shrinkage in the early stages to exhibiting dual-dimensional shrinkage, particularly since 2015. During 2000–2015, most of the shrinking cities were characterized by rapid economic growth coupled with declining populations, except for several cities that underwent economic decline or low economic growth. From 2015 to 2020, the predominant category, Type II (P_1E_0), accounted for 74.6% (129 out of 173) of all shrinking cities and was widespread across most provinces. The second-largest category, Type I (P_1E_1), constituted 19.7% (34 out of 173), primarily located in the Heilongjiang, Jilin, and Liaoning Provinces and Inner Mongolia Autonomous Region in northeast China. Meanwhile, cities of Type III (P_0E_1) comprised the smallest proportion, accounting for 5.7% (10 out of 173).

Table 3.3 Classification of Shrinking Cities (Based on the shrinkage in two dimensions)

Categories	Population	Economy
I (P_1E_1)	shrinkage	shrinkage
II (P_1E_0)	shrinkage	non-shrinkage
III (P_0E_1)	non-shrinkage	shrinkage

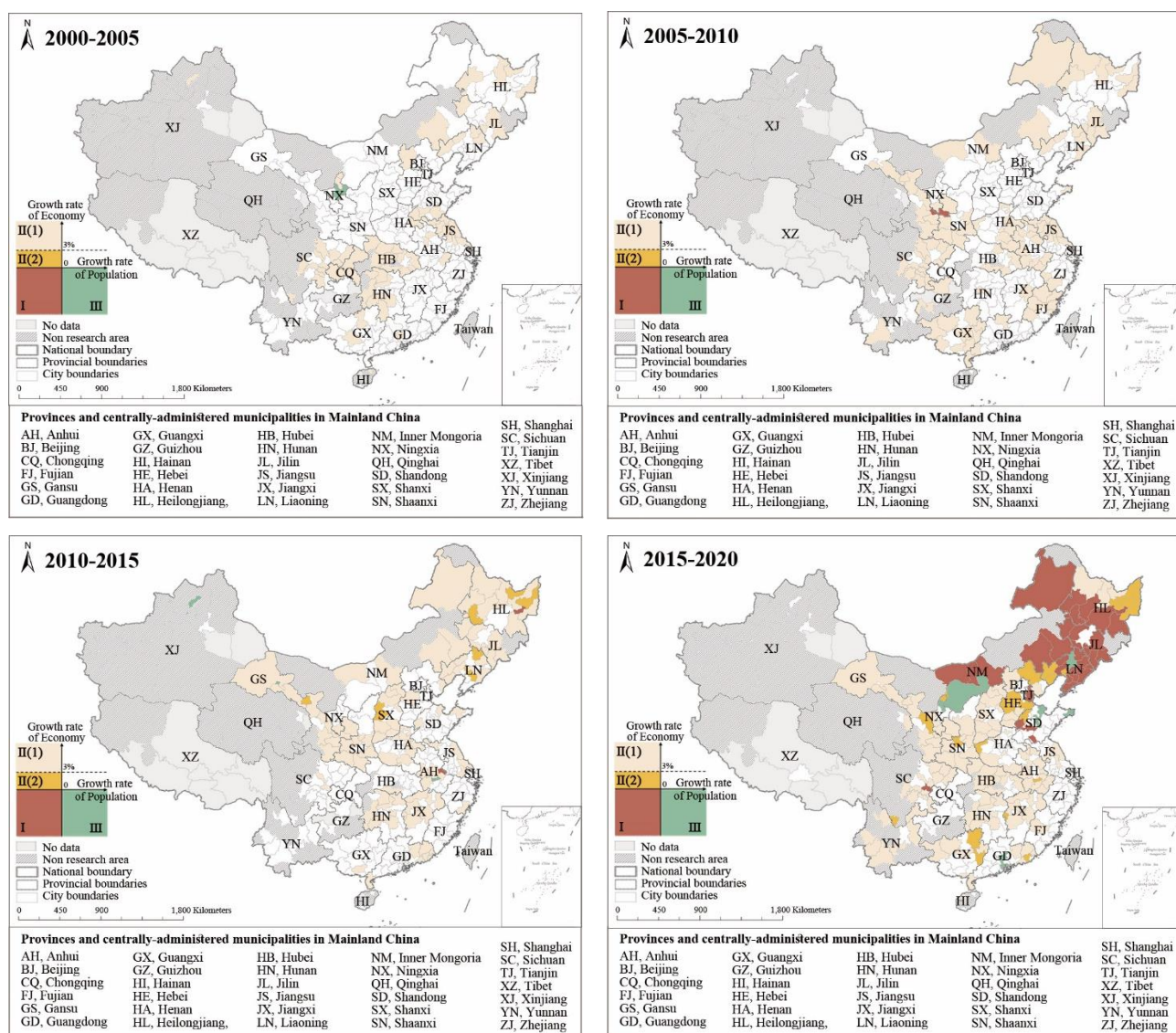


Figure 3.5 Types of Shrinking Cities (Based on two dimensions)

3.3.2 Based on Shrinking Periods

This study defines urban shrinkage as occurring in any demographic or economic dimension and classifies shrinking cities into four categories based on the onset and duration of shrinkage (Table 3.4).

As illustrated in Figure 3.6, the number of cities in the four categories—continuous shrinkage, recent shrinkage, periodic shrinkage, and discontinued shrinkage—are 102 (44.7%), 37 (16.2%), 34 (14.9%), and 55 (24.2%), respectively. Cities with continuous shrinkage represent the largest proportion and are mainly located in the Heilongjiang, Jilin, and Liaoning Provinces and Inner Mongolia Autonomous Region in the northeast; Shanxi and Shaanxi Provinces in the central region; Gansu Province in the northwest; and Hunan, Jiangxi, Anhui, Fujian, and Guangdong Provinces in the south. Cities experiencing recent shrinkage are primarily distributed in northern China and the Yunnan Province in the south. Cities with periodic shrinkage are mostly located in southern China.

Figure 3.7 shows significant differences in the proportion of shrinking cities across provinces. In the

Heilongjiang, Jilin, Shanxi, and Gansu Provinces, over 75% of shrinking cities are classified as continuously shrinking. In Inner Mongolia Autonomous Region and the Liaoning, Shaanxi, Hunan, and Jiangxi Provinces, more than 50% of cities exhibit continuous shrinkage. However, in the Hebei, Qinghai, and Yunnan Provinces, a higher proportion of cities are experiencing recent shrinkage. Regions with a high proportion of cities undergoing periodic shrinkage include Ningxia Hui Autonomous Region, Guangxi Zhuang Autonomous Region, and the Sichuan, Hubei, and Anhui Provinces. Meanwhile, in the eastern coastal provinces such as Guangdong, Fujian, Zhejiang, Jiangsu, and Shandong, the largest proportion consists of cities with discontinued shrinkage or non-shrinkage.

Table 3.4 Classification of Shrinking Cities (Based on shrinkage periods)

Categories	Explanation
I Continuous shrinkage	shrinkage in at least both periods of 2010-2015 and 2015-2020
II Recent shrinkage	shrinkage occurred in 2015-2020 but no shrinkage in the previous three periods
III Periodic shrinkage	shrinkage occurred in 2015-2020 as well as in either 2000-2005 or 2005-2010
IV Discontinued shrinkage	shrinkage occurred during 2000-2015 but no shrinkage in 2015-2020

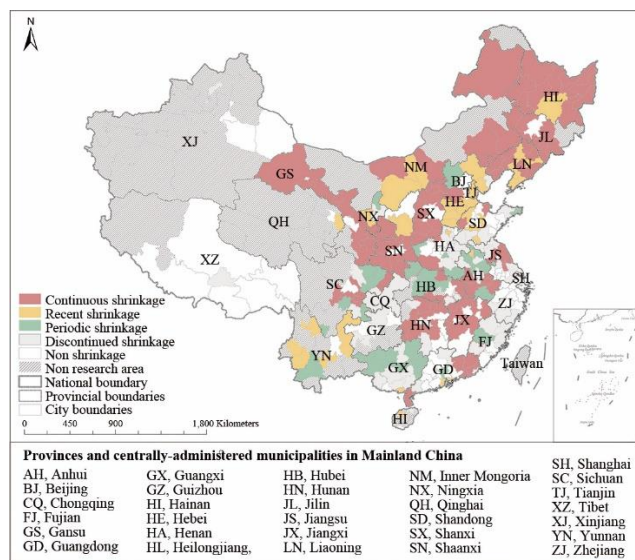


Figure 3.6 Types of Shrinking Cities (Based on shrinking periods)

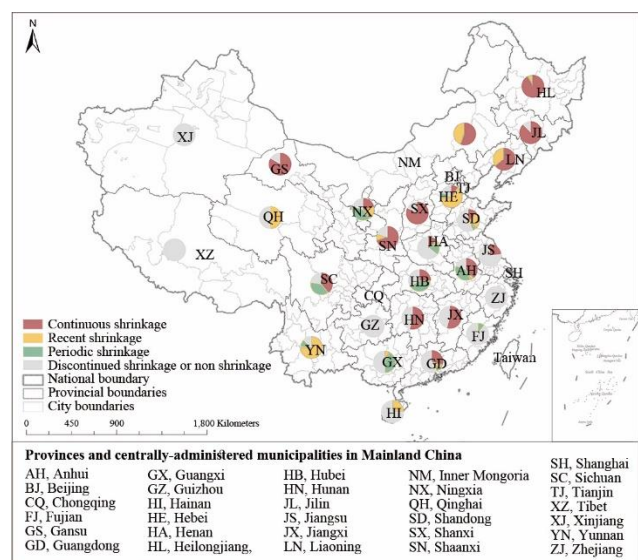


Figure 3.7 Proportion of Each Type in Different Provinces

3.4 Distribution Variations Across Different Urban Contexts

3.4.1 Differences by City Size

According to the “Notice on Adjusting the Criteria for the Classification of City Size” issued by the State Council of China in 2014, city sizes are divided into five categories based on the resident population in urban areas: (I) cities with a resident population of less than 500,000 in urban areas are considered small cities (total number is 36); (II) cities with a resident population of more than 500,000 and less than one million are medium cities (total number is 88); (III) cities with a resident population of more than one million and less than five million are large cities (total number is 142); (IV) cities with a resident population of more than five million and less than ten million are categorized as megacities I (total number

is 21); (V) cities with a resident population of more than ten million are designated as megacities II (total number is 10).

Considering shrinkage in either demographic or economic aspects as urban shrinkage, the study analyzed the proportion of shrinking cities in each city size across four periods (Figure 3.8). The results indicate a high proportion of shrinking cities among small and medium-sized cities. Moreover, the proportion of shrinking cities in small and medium-sized cities increased rapidly, from 18.8% and 22.5%, respectively, during 2000–2005, to 71.8% and 62.2%, respectively, during 2015–2020. Additionally, megacities have also experienced recent shrinkage.

Figure 3.9 displays the proportion of different city sizes within various types of shrinking cities. In cities experiencing continuous shrinkage, small cities make up 39.2% and medium cities 43.1%. Recent shrinkage cities are distributed not only among small, medium, and large cities but also in megacities. In cities with periodic shrinkage, small and medium cities account for 38.2% and 32.4%, respectively. Furthermore, small cities have a lower proportion in discontinued shrinkage cities compared to medium and large cities.

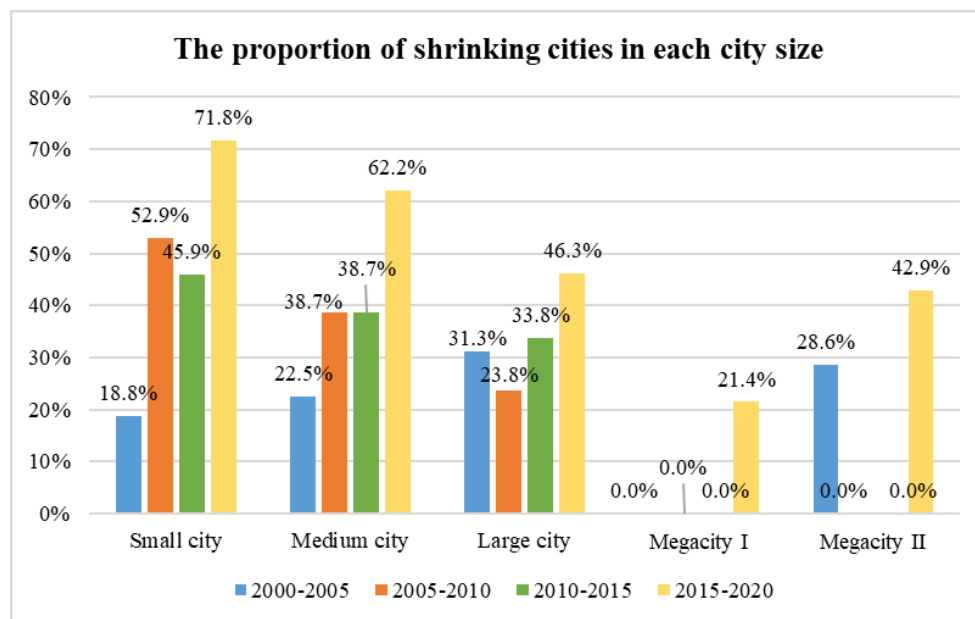
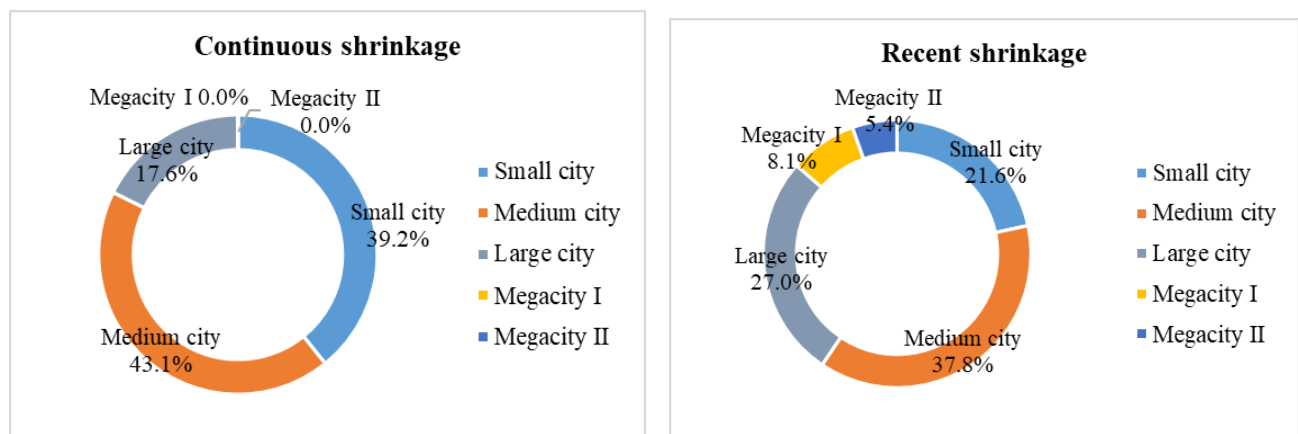


Figure 3.8 Shrinking Cities in Different City Sizes



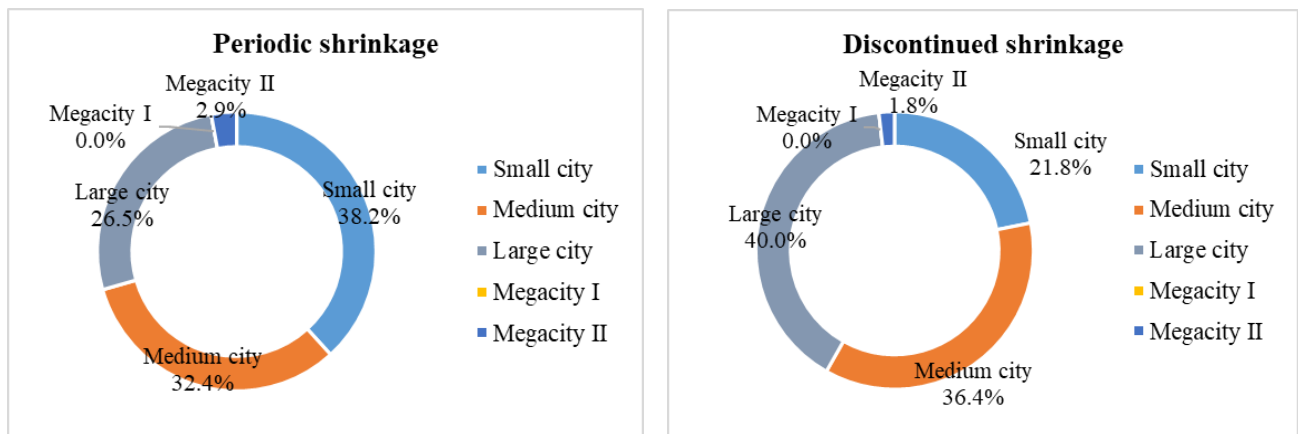


Figure 3.9 Proportion of Cities by Size in Various Types of Shrinkage

3.4.2 Differences Between Resource-Based and Non-Resource-Based Cities

The State Council of China issued the National Sustainable Development Plan for Resource-Based Cities (2013–2020) in 2013. This plan designates resource-based cities, which are cities where mining and processing of natural resources such as minerals and forests are the leading industries. It includes 115 prefecture-level cities (Figure 3.10).

As shown in Figure 3.11, the proportion of resource-based cities among shrinking cities has increased—from 39.7% during 2000–2005 to more than half during 2015–2020. Furthermore, the analysis of the proportion of shrinking cities in resource-based cities (Figure 3.12) shows a significant increase, with nearly four-fifths of resource-based cities being shrinking cities during 2015–2020.

Among the four types of shrinking cities (Figure 3.13), the proportion of resource-based cities is larger than that of non-resource-based cities in both the continuous and recent shrinkage categories. The proportions of resource-based and non-resource-based cities are equal in the periodic shrinkage category. In contrast, among cities in the discontinued shrinkage category, approximately three-fourths are non-resource-based cities.

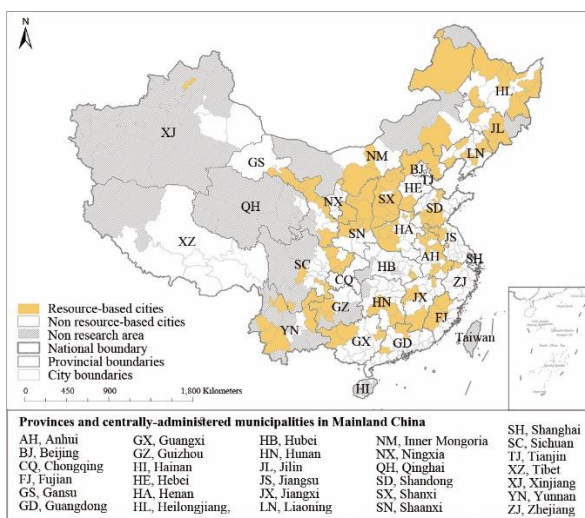


Figure 3.10 Distribution of Resource-based Cities in China (Prefecture-level cities)

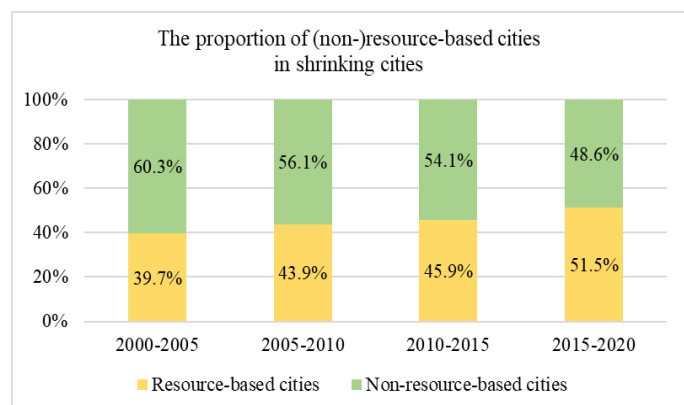


Figure 3.11 Proportion of (Non-)resource-based Cities among Shrinking Cities

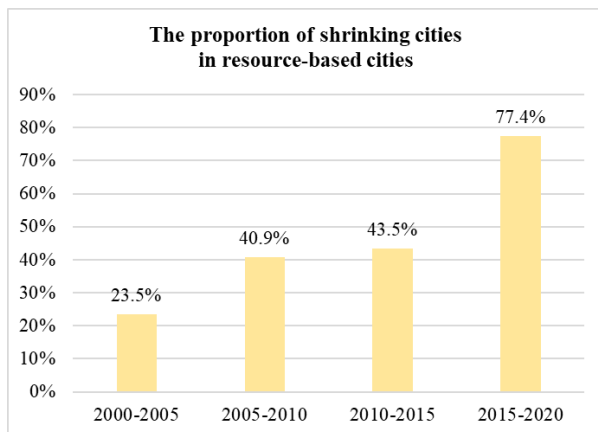


Figure 3.12 Proportion of Shrinking Cities among Resource-based Cities

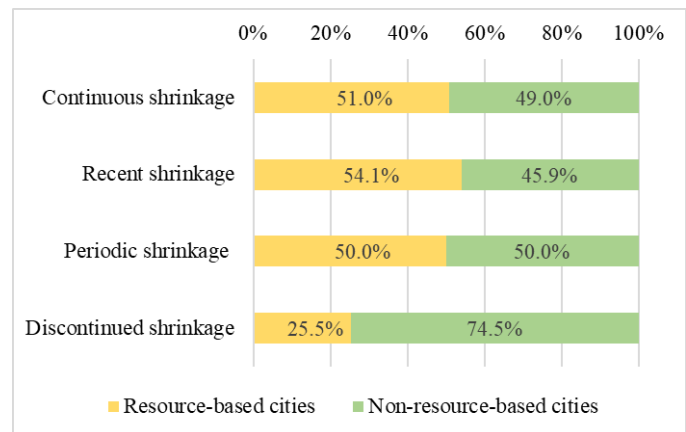


Figure 3.13 Proportion of (Non-)resource-based Cities among Various Types of Shrinking Cities

3.5 Influencing Factors of Urban Shrinkage in China

3.5.1 Assessing the Degree of Urban Shrinkage

The urban development index of each shrinking city is calculated; the lower the index value, the greater the degree of urban shrinkage. Additionally, shrinking cities are classified into slight, moderate, and severe shrinkage categories using the Jenks natural breaks classification method.

The results (Figure 3.14) indicate that from 2000 to 2010, there were 83 (27.9%) shrinking cities, mainly located in the central region, such as Sichuan, Hubei, and Hunan provinces, with a few in northeast and southeast China. All of these cities experienced either slight or moderate shrinkage. From 2010 to 2020, the proportion of shrinking cities increased significantly, with 144 (48.5%) shrinking cities found predominantly in the northeast, central, and western regions. Moreover, the proportion of cities with moderate or severe shrinkage also increased, with the most severe shrinkage occurring in the Heilongjiang, Jilin, and Liaoning provinces of northeast China.

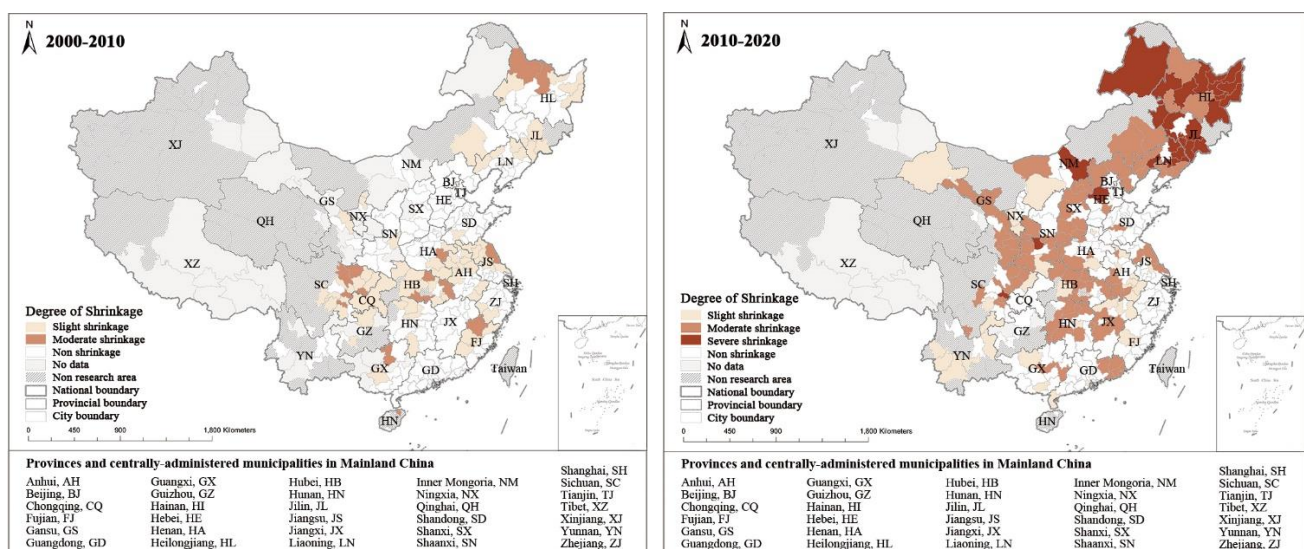


Figure 3.14 Spatial Distribution of Shrinking Cities and Their Degree of Shrinkage (2000-2010 vs. 2010-2020)

3.5.2 Impact Factors of Urban Shrinkage

There are two basic estimation methods for panel data regression: the fixed effects model and the random effects model. The Hausman test is used to select and compare these two models. The results of the Hausman test indicate that the P-value is 0, less than 0.01, suggesting that the fixed effects model is more appropriate than the random effects model.

The results of the panel regression analysis (Table 3.5) show that four factors, namely population migration (F1), aging rate (F2), the index of the advanced industrial structure (F5), and general public budget revenue (F6), reach statistical significance. Among these, population migration and general public budget revenue have a significant positive impact on urban development, while the aging rate and the advanced industrial structure index have a significant negative impact. The dynamics of out-migration, aging, and the transformation of the industrial structure in China are similar to those in other developed countries. However, unlike in Europe and Japan, where low natural population growth rates significantly affect urban shrinkage, this factor has not yet significantly affected Chinese cities. Although China's birth rate has been declining annually since 2016, and the net population growth rate has also declined, the overall population trend is still upward. By contrast, Germany and Japan experienced negative population growth as early as 2003 and 2008, respectively. Therefore, in China, the impact of low natural population growth on shrinking cities has not yet reached a significant level, but it can be predicted that in the future, as China enters an era of negative population growth, the natural population growth rate will become a significant factor. Additionally, the impact of the urban environment and public facility supply on urban shrinkage is not significant.

Table 3.5 Results of Panel Regression Analysis

	Independent variables	Coef.	Std. Err	t-Statistics	p-value	95% CI
	Intercept	0.379	0.009	40.628	0.000**	0.361 ~ 0.397
F1	Population migration	0.275	0.033	8.254	0.000**	0.210 ~ 0.340
F2	Aging rate	-0.007	0.002	-3.961	0.000**	-0.010 ~ -0.003
F3	Urbanization rate	-0	0	-0.617	0.538	-0.001 ~ 0.000
F4	Natural population growth rate	-0	0	-0.549	0.583	-0.001 ~ 0.000
F5	The index of the advanced industrial structure	-0.025	0.007	-3.845	0.000**	-0.038 ~ -0.012
F6	General Public Budget Revenue	0.001	0	2.453	0.015*	0.000 ~ 0.002
F7	General Public Budget Expenditure	-0	0	-0.749	0.454	-0.000 ~ 0.000
F8	Number of Industrial Enterprises above Designated Size	0.001	0.002	0.366	0.715	-0.003 ~ 0.004
F9	Green space ratio	0	0	0.091	0.927	-0.000 ~ 0.000
F10	Number of Hospitals	0.005	0.003	1.525	0.128	-0.001 ~ 0.012
F (10,246) =74.863, p=0.000						
R ² =0.594, R ² (within)=0.733						
* p<0.05 ** p<0.01						

(Note: The analysis excluded 13 cities with missing data from 2010 to 2020, and 37 cities with missing data from 2000 to 2010.)

3.5.3 Spatial Autocorrelation Analysis of Shrinking Cities

The global Moran's I index for the Urban Development Index from 2000 to 2010 and from 2010 to 2020 was calculated. The results, presented in Table 3.6, show that the global Moran's I index for the two study periods is 0.249091 and 0.356425, respectively. Both values reach statistical significance and are greater than 0, indicating a positive spatial autocorrelation among shrinking cities, with an increase in correlation during the second study period. The significant spatial autocorrelation of shrinking cities justifies the use of Geographically Weighted Regression (GWR) analysis, as GWR is well-suited for data with spatial autocorrelation.

Table 3.6 Results of Global Moran's I

Study Period (2000-2010)		Study Period (2010-2020)	
Moran I Index	0.249091	Moran I Index	0.356425
Expected Index	-0.003861	Expected Index	-0.003534
Variance	0.001791	Variance	0.001520
z-score	5.976470	z-score	9.234262
p-value	0.000000	p-value	0.000000

Using local Moran's I, further analysis was conducted to identify spatial clusters and outliers, with the results displayed in Figure 3.15. The spatial clusters are predominantly high-high and low-low clusters, exhibiting significant differences between the two study periods.

From 2000 to 2010, the low-low clusters were mainly distributed in eastern Sichuan Province, Hubei Province, northwestern Anhui Province, southeastern Henan Province, and northern Heilongjiang Province. In contrast, the high-high clusters were primarily located in northern Shaanxi Province, the Yangtze River Delta region (Jiangsu Province and Zhejiang Province), and the Pearl River Delta region (Guangdong Province). From 2010 to 2020, coastal areas such as Zhejiang Province and Guangdong Province continued to be high-high clusters of rapid urban development, while northern Shaanxi province no longer belonged to this category. Additionally, the low-low clusters of low-growth or shrinking cities in northeastern China expanded to include not only Heilongjiang province but also Jilin and Liaoning provinces. Moreover, the previously significant low-low clusters in central China, such as in Sichuan Province and Hubei Province, diminished in prominence.

The clustering of low-growth cities in the Northeast is tied to the prolonged challenge of economic transformation and population loss. The region has traditionally been China's industrial heartland, focusing on heavy industry and mineral exploitation, with a dominance of state-owned enterprises. The depletion of resources has led to a decline in heavy industry, and the reform of the state-owned economy has resulted in widespread layoffs. Concurrently, new industries have not been developed vigorously. These factors have contributed to the continued decline of cities in this region. Conversely, the development of the Yangtze River Economic Belt has significantly influenced Sichuan and Hubei provinces, as well as Chongqing, in recent years, leading to a transformation in the spatial aggregation of low-growth cities. Chengdu (the capital of Sichuan province), Wuhan (the capital of Hubei province), and Chongqing have emerged as important regional intermediary cities within the Yangtze River Economic Belt (Wang et al., 2019),

standing out as the cities with the largest economic volume and strongest impact in the Midwest.

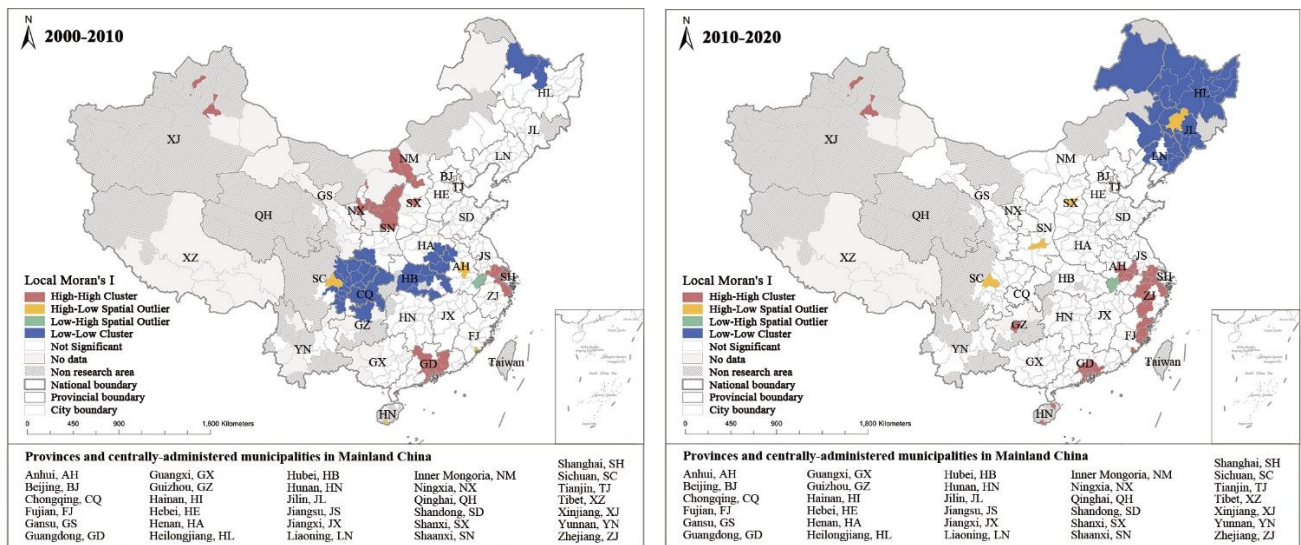


Figure 3.15 Results of Local Moran's I

3.5.4 Spatial Heterogeneity Analysis of Impact Factors

Using geographically weighted regression (GWR), the spatial heterogeneity of four significant factors was analyzed for the periods from 2000 to 2010 and from 2010 to 2020. The adjusted R-squared of the model is 0.676601 and 0.820057, respectively, indicating that the model can explain over 67% and 82% of the changes in urban growth and shrinkage. Figure 3.16 shows the local R^2 values of the two models. In the 2000-2010 model, the local R^2 for each city ranges from 0.48 to 0.72. In the 2010-2020 model, the local R^2 ranges from 0.73 to 0.92, indicating a better fit compared to the earlier model. Overall, the models demonstrate a good level of fit. The results demonstrate significant spatial heterogeneity in the impact of each factor on urban shrinkage, with notable differences between the two time periods.

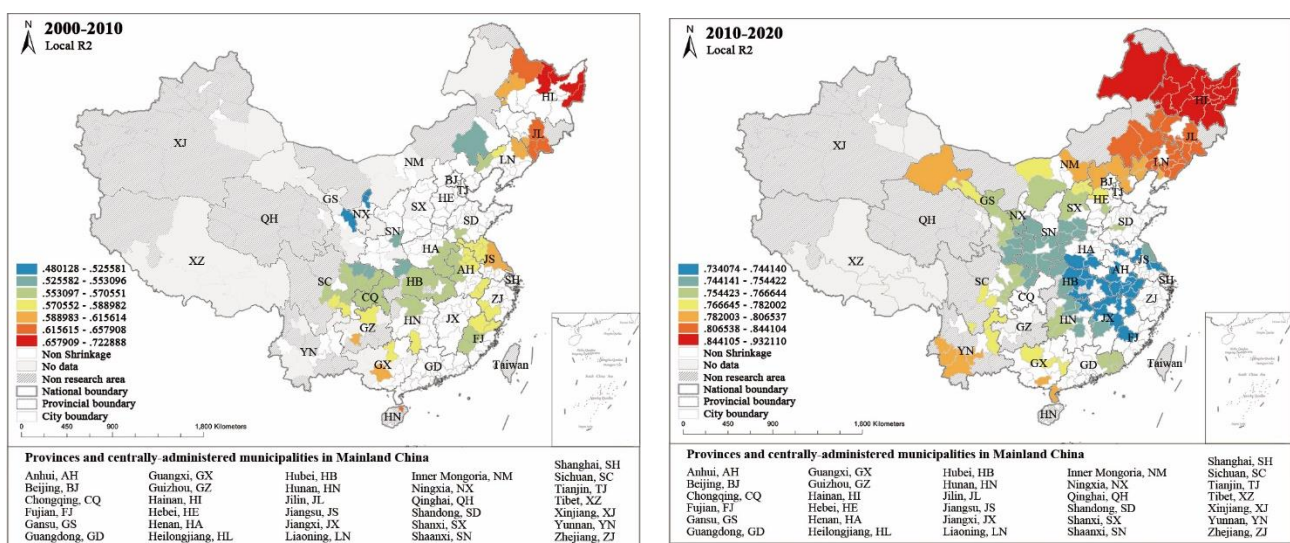


Figure 3.16 Local R^2 of the Two Models (2000-2010 and 2010-2020)

In terms of population migration, as illustrated in Figure 3.17, there is a positive correlation between population migration and the urban development index across all urban shrinkage areas; the greater the

difference between in-migration and out-migration, the higher the urban development index and the lower the degree of urban shrinkage. From 2000 to 2010, the coefficients showed a decreasing trend from northeast to southwest. Northeastern China had the largest estimated coefficients, suggesting that shrinkage in this region was greatly affected by population migration, while shrinkage in Guangxi, Sichuan, Guizhou, and Hunan provinces was relatively less affected. From 2010 to 2020, the impact of population migration on urban shrinkage intensified, and the coefficients showed a decreasing trend from southwest to northeast. The shrinking cities in Yunnan, Guizhou, and Sichuan provinces were the most affected, with increased impact also noted in the central region. In contrast, the impact on the northeast region has diminished.

The outflow of the population in Southwest China is influenced by both topography and economic development. Firstly, the geographic conditions of the region, which is inland and dominated by mountains and hills, hinder economic growth (Liu & Wang, 2009), resulting in lagging agricultural and industrial development. Secondly, there is a trend of population movement from less developed to more developed regions. The rapid development of coastal cities in Southeast China attracts a large number of migrant workers. Yang and Ning (2015) argue that the Southwest region, along with the middle reaches of the Yangtze and Yellow rivers, experiences significant inter-provincial population outflow, primarily toward the Southeast coast, resulting in labor force reduction and urban shrinkage in Southwest China.

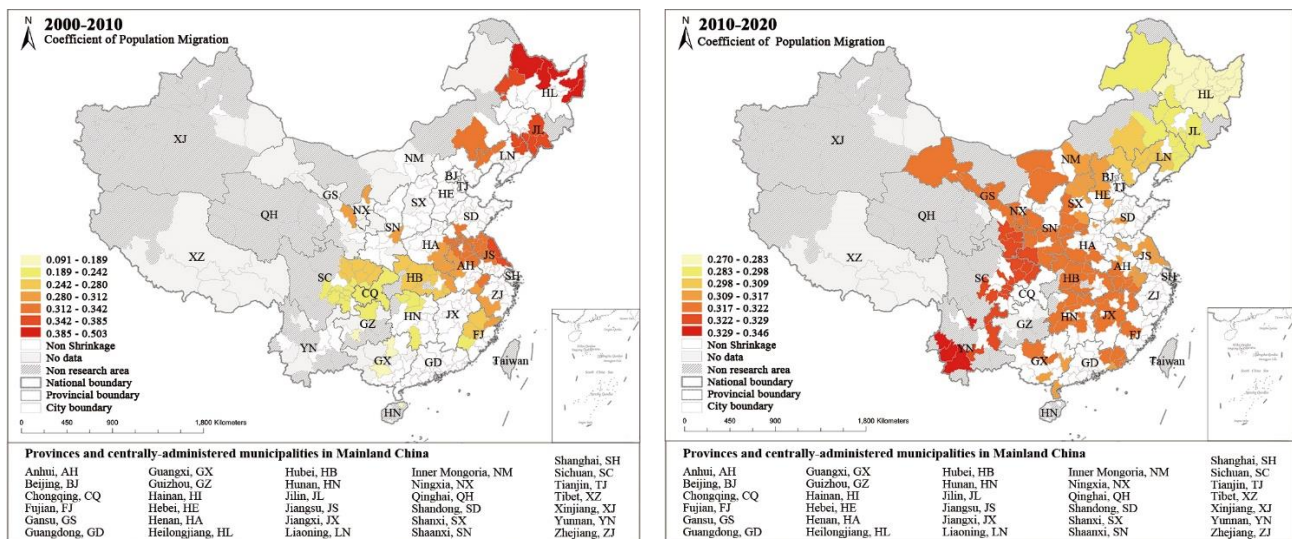


Figure 3.17 The Spatial Distribution of the Local Coefficient of Population Migration

Figure 3.18 illustrates the spatial heterogeneity of the aging rate's influence. There is a significant negative correlation between the aging rate and urban shrinkage, except in a few cities, indicating that urban shrinkage in China is generally influenced by aging. From 2000 to 2010, the coefficient showed a decreasing trend from East to West. Heilongjiang and Jilin provinces in Northeast China and Fujian province in Southeast China were the most affected. Moreover, there is a positive correlation between aging and urban development in several cities in Gansu and Ningxia provinces in Northwest China, possibly due to the return of the retired population to their hometowns, which contributes to an increase in the urban population. From 2010 to 2020, the influence of aging decreased from Southwest to Northeast. The shrinking cities in the Northeast were less affected, while cities in Yunnan, Sichuan, Guangxi, Hunan, and Guangdong provinces were most affected. This trend may be due to the increasing proportion of the elderly population caused by the large-scale out-migration of young laborers from the Southeastern region, which exacerbates urban shrinkage.

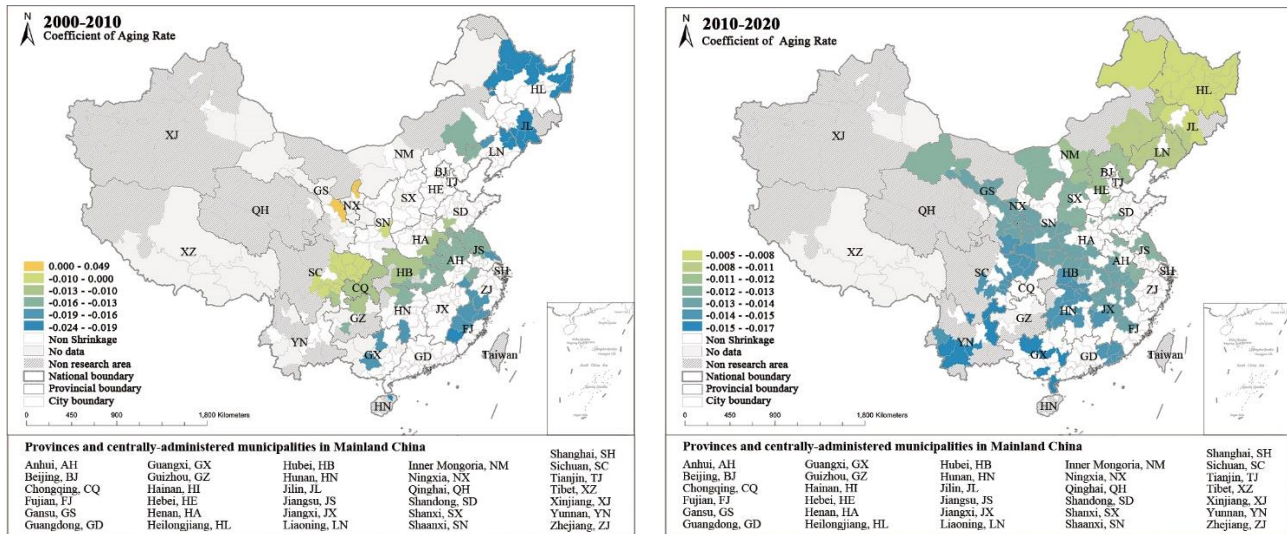


Figure 3.18 The Spatial Distribution of the Local Coefficient of Aging Rate

In terms of the advanced industrial structure index, as shown in Figure 3.19, both positive and negative correlations are observed. The results indicate that industrial structure upgrading has exacerbated the shrinkage of some cities while contributing to the development of others. From 2000 to 2010, except for Heilongjiang Province in the northeast, the upgrading of the industrial structure promoted urban development. From 2010 to 2020, the industrial structure upgrading continued to have a significant positive impact on cities in southern China. However, it had a stronger negative impact on cities in the northeast, especially in Liaoning and Jilin provinces.

This phenomenon is linked to the fact that most cities in northeast China are resource-dependent and dominated by heavy industry. In recent years, the depletion of resources has led to the decline of heavy industry. The severe loss of talent and capital has made industrial transformation difficult. According to the Statistical Yearbook 2020 of Heilongjiang, Liaoning, and Jilin provinces, the proportion of heavy industrial enterprises in state-controlled enterprises in Heilongjiang and Liaoning provinces is 84.8% and 88.4%, respectively; and 58.4% of industrial enterprises above designated size in Jilin province are in heavy industry. Sun and Chen (2021) found that the decline in heavy industry has led to a downward trend in industrial profitability from 2014 to 2019, and the development of high-tech industries in northeast China has lagged far behind the national average (Sun & Chen, 2021). Thus, the upgrading of the industrial structure leads to the decline of pillar industries and an increasing unemployment rate, resulting in population migration and urban shrinkage. Conversely, in cities in southern China, the upgrading of the industrial structure attracts capital and labor to shift from less productive to more productive sectors, contributing to economic growth.

In terms of general public budget revenue, as shown in Figure 3.20, there is a significant positive impact in most cities. From 2000 to 2010, the impact increased from east to west. From 2010 to 2020, the impact expanded from the center to the east and west, particularly in Heilongjiang Province and Jilin Province in the northeast region, where the coefficients are the highest. Local general public budget revenue represents the fiscal capacity of local governments. High fiscal capacity allows local governments to expand expenditures, ensure the supply of public services, and improve living standards, thus mitigating urban shrinkage.

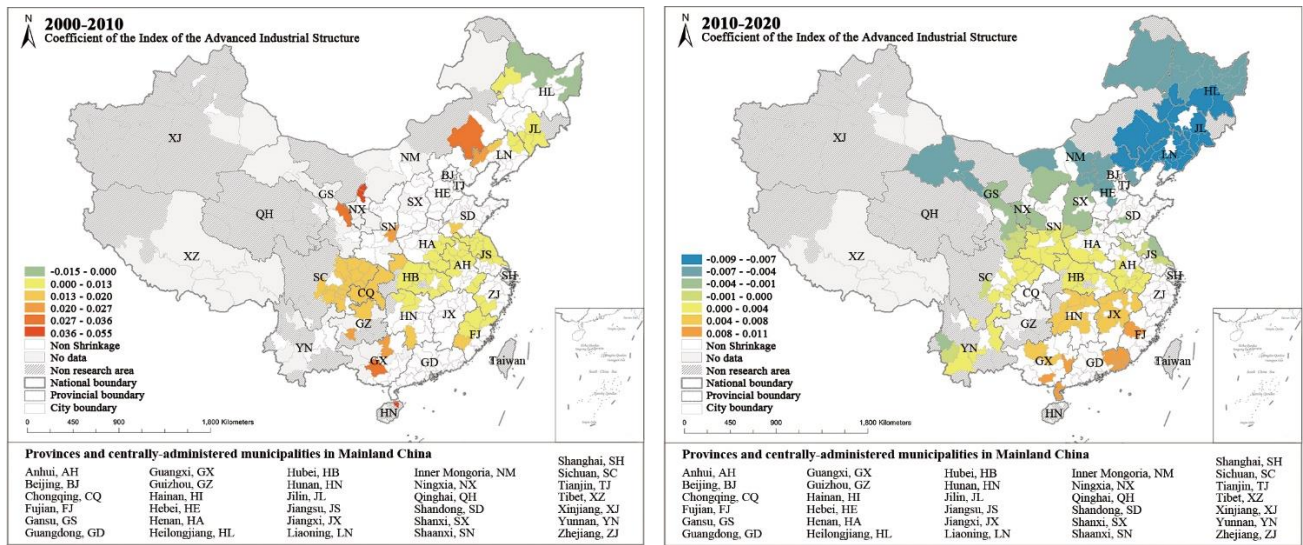


Figure 3.19 The Spatial Distribution of the Local Coefficient of the Advanced Industrial Structure Index

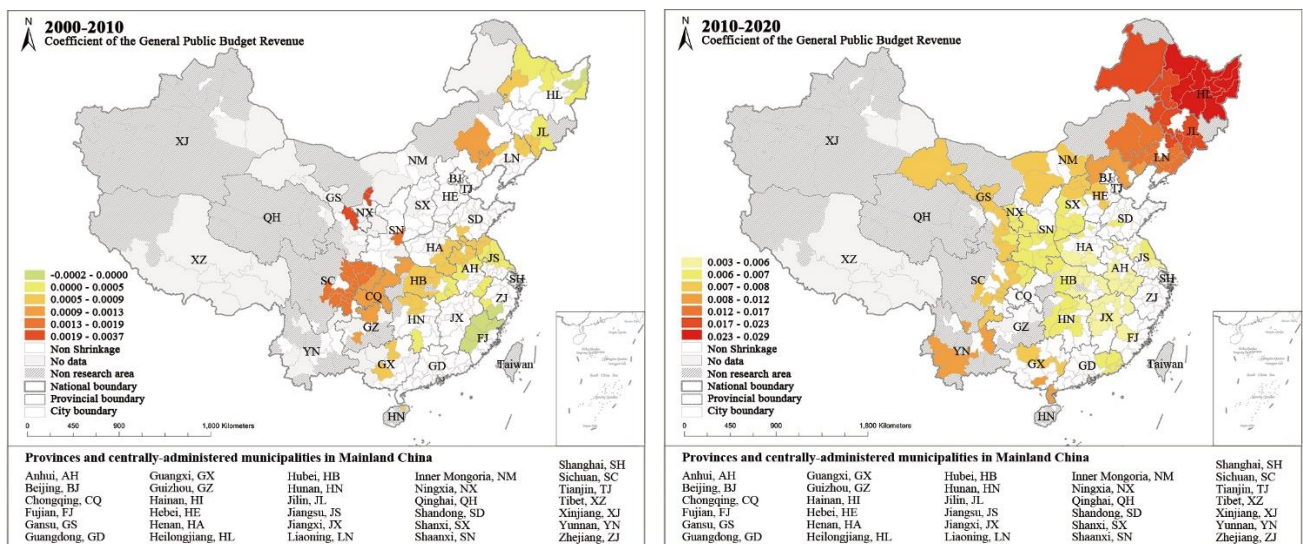
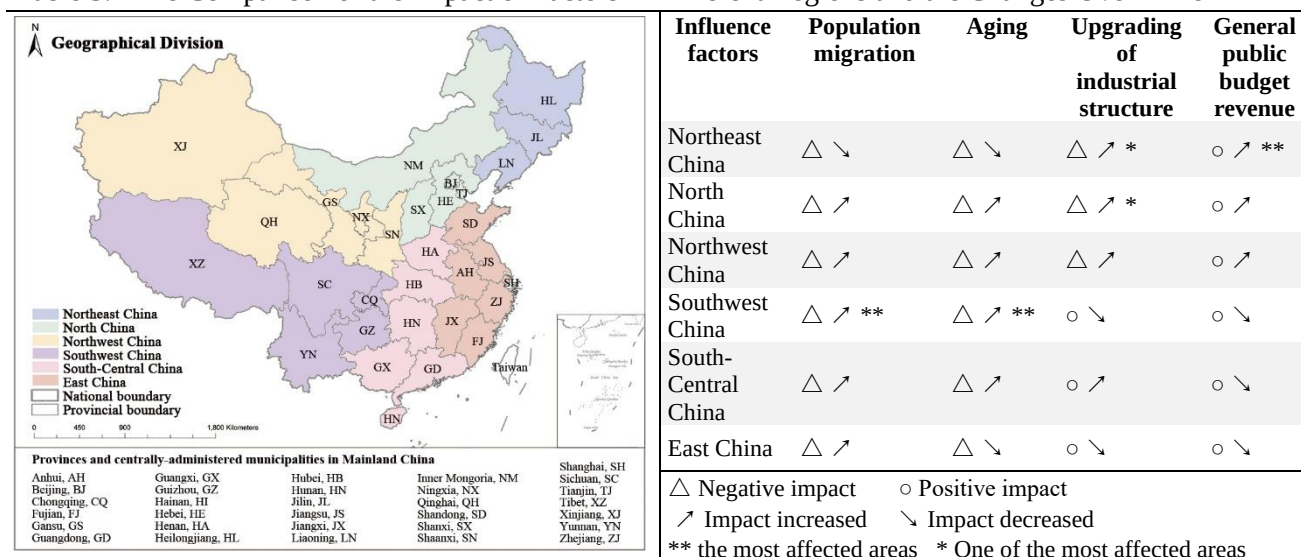


Figure 3.20 The Spatial Distribution of the Local Coefficient of the General Public Budget Revenue

Table 3.7 compares different regions ⁽⁴⁾ affected by each factor and its changes over time. It is evident that northeast China is most affected by industrial transformation and local general public budget revenue, with the impact increasing over time. In North China and Northwest China, the influence of these four factors has also increased, and industrial structure upgrading has a strong impact on North China. In Southwest China, population mobility and aging are the most influential factors. In South-Central China, both the negative impact of aging and population mobility and the positive impact of industrial structure upgrading have intensified. In East China, the impact of population mobility has increased, while the influence of other factors has decreased.

Table 3.7 The Comparison of the Impact of Factors in Different Regions and the Changes Over Time



3.6 Discussion and Conclusion

This chapter describes the temporal and spatial changes in the distribution of shrinking cities in mainland China from 2000 to 2020 in terms of demography and economy. It compares the distribution differences in different city contexts, explores the influencing factors of urban shrinkage through panel data regression, and examines the spatial heterogeneity of these factors using geographically weighted regression (GWR) analysis. This contributes to the understanding of the current status of shrinking cities in China.

(1) Overall Growth Trend of Shrinking Cities in China

Currently, shrinking cities in China have the largest proportion of population shrinkage. The phenomenon of cities with a declining population emerged in 2000, and the proportion has grown from less than one-fifth to more than half over 20 years. The distribution has expanded from the central and southwestern provinces to most provinces, with severe population shrinkage appearing in northeast China, Inner Mongolia Autonomous Region, and Shaanxi and Sichuan Provinces. After 2015, the number of cities experiencing both population and economic shrinkage increased, with cities facing economic decline accounting for approximately 13%, primarily in the northeast region. Among shrinking cities, nearly half are in the continuous shrinkage category.

(2) Economic Decline Often Lags Behind Population Shrinkage

Population shrinkage is often observed before the economic decline. One potential explanation for this is that in some cities, population loss is not directly caused by de-industrialization, so economic decline may manifest after the initial population loss. Haase et al. (2016) argued that an economic downturn is a sufficient but not a necessary cause of population shrinkage, suggesting that other factors, such as demographic changes, should also be considered. In some small cities in southwestern China, high aging rates and the siphoning effect of surrounding large cities have led to significant population declines, and the loss of the labor force may lead to low economic growth afterward. Weaver et al. (2016) also argued that population shrinkage is more predictive of economic shrinkage than the reverse. Another factor is the time it takes for economic growth rates to shift from high to negative. In traditional industrial cities in northeast China, industrial restructuring has led to a decline in manufacturing and fewer job opportunities,

resulting in significant population losses and further economic decline. However, the manifestation of economic decline in GDP, transitioning from lower growth rates to negative growth, requires time. Additionally, national government policies such as The Revitalization Plan of Northeastern China (2007) and The National Plan (2013–2022) for the Adjustment and Transformation of Old Industrial Bases (2013) have played roles in mitigating economic decline.

(3) Dynamic Process of Urban Shrinkage

The development of shrinking cities is dynamic. The number of shrinking cities increased from 2000 to 2010; however, from 2010 to 2015, this number decreased. The likely reason is that following the global financial crisis during 2007–2009, the Central Government of China launched a four trillion yuan investment plan and built extensive infrastructure, including high-speed railways, water conservancy projects, and highways. This significant investment promoted the development of industries such as mining, energy, construction, and public facilities. From 2009 to 2013, China's economic development was in a period of overheating, which mitigated urban shrinkage from 2010 to 2015. At the end of this overheated investment era, China's economy entered a phase of cutting overcapacity, marked by a decline in employment in the secondary industry and the adjustment of the industrial structure. Consequently, more shrinking cities emerged from 2015 to 2020.

(4) Small and Medium-Sized Cities and Resource-Based Cities Are More Prone to Urban Shrinkage

City size and urban resources are linked to the distribution of shrinking cities. The proportion of shrinking cities is higher in small and medium-sized cities and resource-based cities, echoing findings from recent research (Zhou et al., 2021; Wang et al., 2021). Notably, the proportion of shrinking cities among resource-based cities has reached 77.4% in recent years. Urban resources, such as fossil minerals, form the foundation for the production of goods and energy, thereby posing a threat to the economy when these resources are depleted (Oswalt & Rieniets, 2006). Moreover, many state-owned enterprises in China are located in resource-based cities. Since the 1990s, these enterprises have undergone a series of reforms, with many being dissolved or downsized (Jin & Sui, 2021). The restructuring of state-owned enterprises has led to substantial unemployment, resulting in population loss and economic decline, thereby increasing the proportion of shrinking cities among resource-based cities.

(5) Factors Influencing Urban Shrinkage Exhibit Significant Regional Differences

In terms of demographic factors, population mobility and aging have become important causes of urban shrinkage nationwide; however, the impact of the low natural population growth rate and the share of the urban population has not yet reached significance. Economically, the transformation of industry and local government fiscal capacity significantly affect urban shrinkage. In terms of the urban built environment and public facilities, their impact is not significant. However, the influence of these factors varies across regions and changes over time. The impact of population mobility and aging has increased in most regions. In inland cities in southwest China, the migration of a large number of laborers to developed coastal cities and the rising aging rate are the main reasons for shrinkage. Structural unemployment and capital outflow caused by deindustrialization and the transformation of the industrial structure are the primary reasons for the decline of most resource-based industrial cities in northern China. However, industrial upgrading has been beneficial to urban development in southern cities. Additionally, local public revenue has the strongest positive impact on shrinking cities in Northeast China.

Understanding the diversity of causes of urban shrinkage contributes to providing references for governments and urban planners to make urban development policies according to local conditions. Some cities may be experiencing episodic shrinkage. With the adjustment and upgrading of the industrial structure, it is possible to attract populations back and promote economic growth. Meanwhile, some resource-based cities are facing the possibility of continued shrinkage due to resource depletion. For these cities, how to smartly shrink and improve the quality of life becomes an important issue.

Notes

(1) The weights derived by the CRITIC method incorporate both the contrast intensity and the conflict of the evaluation criterion. Contrast intensity is represented by the standard deviation; a larger standard deviation indicates greater fluctuation and suggests that the indicator contains more information, thereby assigning it a higher weight. Conflict is represented by the correlation coefficient; a lower correlation coefficient value between indicators means weaker correlation with other indicators and greater conflict, indicating that the indicator contains relatively independent information, which also results in a higher weight.

(2) Although studies have indicated that high-speed rail can accelerate urban shrinkage, this study does not consider the transportation network as an explanatory variable. This decision is based on two reasons: first, data on transportation networks for all prefecture-level cities in China is currently unavailable, making a nationwide comparison impractical; second, the development of transportation networks may exacerbate the siphoning effect of large cities on smaller cities, which can be reflected in the variable “population migration.”

(3) Geographically Weighted Regression (GWR) is a spatial analysis technique that evolves from Ordinary Least Squares Regression (OLS). It is utilized to explore the possibility that relationships within a regression model may vary across geographical space, thereby allowing for the local variation in the data to be accounted for in the analysis.

(4) The regional division used in this study is based on the six economic cooperation zones established in 1961, which continue to serve as a reference for various regional delineations. This division considers geographical location, climate, and socio-economic development. Economically, it distinguishes between the three major zones from the coast to the interior: east, central, and west. Geographically, it accounts for differences in annual precipitation between the east and the west and temperature variations between the north and the south.

References

- Diakoulaki, D., Mavrotas, G., & Papayannakis, L. (1995). Determining objective weights in multiple criteria problems: The critic method. *Computers & Operations Research*, 22(7), 763-770.
- Haase, A., Bernt, M., Großmann, K., Mykhnenko, V., & Rink, D. (2016). Varieties of shrinkage in European cities. *European urban and regional studies*, 23(1), 86-102.
- Haase, A., Nelle, A., & Mallach, A. (2017). Representing urban shrinkage—The importance of discourse as

- a frame for understanding conditions and policy. *Cities*, 69, 95-101.
- Jin, S. T., & Sui, D. Z. (2021). Do central state interventions cause urban shrinkage in China?. *Journal of Urban Affairs*, 43(9), 1310-1329.
- Liu, Q. C., & Wang, Z. (2009). Research on geographical elements of economic difference in China. *Geographical Research*, 28(2), 430-440.
- Oswalt, P., & Rieniets, T. (2006). *Atlas of shrinking cities*. Hatje Cantz.
- Sun J.W. & Chen C.J. (2021). Exploring the path of regional economic transformation in Northeast China during the 14th Five-Year Plan period. *Economic Review* (10),11. [孙久文, & 陈超君. (2021). “十四五”时期东北区域经济转型路径探索. *经济纵横* (10), 11.]
- Weaver, R., Bagchi-Sen, S., Knight, J., & Frazier, A. E. (2016). *Shrinking cities: Understanding urban decline in the United States*. Routledge.
- Wang, R., Wang, C., Zhang, S., & Ding, X. (2021). A study on the spatial and temporal evolution of urban shrinkage and its influencing factors from a multidimensional perspective: A case study of resource-based cities in China. *Plos one*, 16(10), e0258524.
- Wang, S., Song, Y., Wen, H. & Li, J. (2019). The network structure of urban agglomerations in the Yangtze River Economic Belt under the perspective of two-way linkages - based on time distance and social network analysis methods (in Chinese). *Economic Geography*, 39(02), 73-81. [王圣云, 宋雅宁, 温湖炜, & 李晶. (2019). 双向联系视域下长江经济带城市群网络结构——基于时间距离和社会网络分析方法. *经济地理*, 39 (2), 78-81.]
- Yang, C., & Ning, Y. (2015). The evolution of inter-provincial population migration patterns in China and its impact on urbanization development. *Geographical Research*, 34(8), 1492-1506. [杨传开, & 宁越敏. (2015). 中国省际人口迁移格局演变及其对城镇化发展的影响. *地理研究*, 34 (8), 1492-1506.]
- Zhou, Y., Li, C., Zheng, W., Rong, Y., & Liu, W. (2021). Identification of urban shrinkage using NPP-VIIRS nighttime light data at the county level in China. *Cities*, 118, 103373.

Chapter 4

4. Residents' Perceptions of Shrinkage and Assessments of Community Livability

This chapter transitions from a macro analysis of shrinking cities in mainland China, discussed in the previous chapter, to a micro-scale analysis of communities within these cities. It explores residents' perceptions of urban shrinkage, their assessments of community livability, and how the perceptions of shrinkage influence their evaluations. The chapter begins by detailing the selection process for case study sites and describing their basic characteristics. It then assesses residents' perceptions of shrinkage at both the community and city levels. At the community level, it examines perceptions of changes in community population and vacant housing. At the city level, it investigates perceptions from population and economic dimensions, highlighting differences among residents with varying socioeconomic attributes. Additionally, the chapter explores residents' evaluations of community livability and the differences among various socioeconomic groups. Finally, through regression analysis, it investigates the impact of residents' perceptions of shrinkage on their evaluations of community livability.

4.1 Study Area

This section introduces the case study locations. First, it outlines the criteria for selecting the case study cities and communities. Next, it provides an introduction and comparative analysis of the two case study cities. Finally, it details the history and current development status of the case study communities.

4.1.1 Selection of the Case Study Sites

To investigate community livability within shrinking cities under varying contexts, this study employs a comparative analysis of four communities, selecting two from each of two representative shrinking cities. This approach will also support the formulation of comprehensive recommendations in Chapter 7.

(1) Selection of the Case Study Cities

The selection criteria for the case study cities are as follows:

i) Firstly, based on the analysis of the spatial distribution of shrinking cities across Mainland China presented in chapter 3, it is evident that the Northeast region has long suffered from population and economic declines. Additionally, in recent years, the Southwest region, including provinces like Sichuan, has also experienced a notable increase in cities with declining populations. Consequently, the two case study cities were initially identified within these two regions.

ii) Secondly, the two case study cities should have comparable features. Based on the classifications of shrinking cities in chapter 3, shrinking cities can be divided into three types: population-only shrinkage, economy-only shrinkage, and dual shrinkage in population and economy. Additionally, shrinking cities can be categorized by the duration of shrinkage as continuous, recent, or periodic shrinkage. Since population

shrinkage impacts the job market and consumer power, and economic shrinkage affects public finances, choosing cities that are shrinking in both population and economic allows for a more comprehensive understanding of how urban shrinkage affects residents' quality of life. Furthermore, compared to short-term population changes and economic fluctuations, longer-term shrinkage is likely to have more significant impacts at the community level, such as housing vacancies. Therefore, it is necessary to select cities experiencing continuous shrinkage and dual shrinkage in both population and economy for analysis.

iii) Thirdly, case study cities should exhibit differences, such as in the degree of shrinkage and the factors influencing their shrinkage. In terms of the degree of shrinkage, it is necessary to select one city with severe shrinkage and another with relatively mild shrinkage to reveal how different degrees of shrinkage affect community functions and residents' well-being. Additionally, comparing cities that have shrunk due to different reasons, such as industrial transformations or aging populations, can help explore how various factors affect community development and facilitate the formulation of targeted improvement strategies.

Based on the criteria outlined above, Fuxin City and Ziyang City were chosen as the case studies. They are located in Northeastern Liaoning Province and Southwestern Sichuan Province, respectively, with populations ranging from 1 million to 3 million, placing them in the same city size class. Moreover, both cities have experienced continuous population shrinkage, and both cities have experienced economic decline, with Fuxin's economic downturn occurring earlier than Ziyang's. However, they differ in the degree of shrinkage and the factors influencing that shrinkage.

Fuxin City is a typical shrinking city in the Northeast region. Analysis from Chapter 3 indicates that Fuxin's permanent population has consistently decreased across four periods: 2000-2005, 2005-2010, 2010-2015, and 2015-2020, with the decline becoming more pronounced during 2015-2020. Economically, Fuxin City experienced negative GDP growth from 2015 to 2020. As a city heavily dependent on natural resources, the depletion of coal resources and the industrial transformation have led to the decline of the coal industry, widespread unemployment, population outflows, and an overall economic downturn. In 2001, Fuxin city was established as the first resource-based transformation pilot city in China.

Ziyang City is a typical shrinking city in the Southwest region, located between Chengdu City and Chongqing City, both of which are megacities with populations exceeding 10 million. Similar to Fuxin City, Ziyang City's permanent population also showed a declining trend during the four five-year periods from 2000 to 2020. Additionally, Ziyang City experienced negative GDP growth from 2015 to 2020. Due to its relatively weak industrial base and the attraction of nearby megacities, Ziyang has seen an outflow of labor and capital. Furthermore, the city has a significant aging population; according to China's seventh national census data (2020), the proportion of the population aged 65 and over in Ziyang reached 22.62%, making it the second highest among mainland Chinese cities. These factors have contributed to the city's shrinkage. Overall, although both are shrinking cities, Ziyang has surpassed Fuxin in both population size and GDP.

(2) Selection of the Case Study Communities

After selecting the case study cities, this research chose two communities within each city for intra-city comparison. The selection criteria included the following points:

i) Firstly, communities with similar population sizes were chosen because population size is a key factor

affecting community function and needs, ensuring comparability of the research.

ii) Secondly, communities located in different urban areas were selected because communities in different locations often have differences in transportation convenience, public facilities, and so on. By comparing these differences, a more comprehensive understanding of how the surrounding environment affects community livability can be achieved.

iii) Thirdly, communities that have undergone community renovation projects were chosen to better assess the effects of these projects across different communities.

Taking into account these criteria, along with field surveys and the selection of communities that receive a certain level of attention on social media—where more public data and resident feedback are available—Wenxinyuan (WXY) Community and Mijia (MJ) Community in Fuxin City, as well as Xiangyang (XY) Community and Guihuajing (GHJ) Community in Ziyang City, were ultimately selected. Detailed information about each community is introduced in the next section.

4.1.2 Overview of the Case Study Sites

(1) Overview of the Case Study Cities



Figure 4.1 The Locations of the Two Case Study Cities

Fuxin City

Fuxin City is located in the northeastern part of China, in Liaoning Province. It borders the provincial capital Shenyang city to the east and Inner Mongolia Autonomous Region to the north. Fuxin’s built-up area of the city district covers 77 square kilometers, with a permanent population of 1.647 million as of 2020 (Fuxin 2020 Statistical Yearbook).

Fuxin City rose to prominence due to its coal resources. It once enjoyed a reputation as a “Coal and Power City,” boasting Asia’s largest open-cast mine and the most productive thermal power station (Fuxin

Development and Reform Commission Government Report, 2012). As early as 1905, Fuxin established its first coal mine, and by 1913, it had built 16 coal mines (Fuxin City Chronicles). After the founding of the People's Republic of China, Fuxin experienced significant development. In 1953, China began its first Five-Year Plan. Among the 156 key national projects, four were located in Fuxin, including the Haizhou Open-Pit Coal Mine and the Fuxin Power Plant, receiving over 416 million RMB of state-designated investment, which was higher than most cities in China (Zhang, 2008). At that time, Fuxin became one of the most prosperous industrial cities, showcasing the advantages of the socialist centrally-planned economy (Hu & Yang, 2018).

At the end of 1978, China began its market reforms, causing Fuxin's centrally planned model of economic development to fade. Starting from the 1980s and 1990s, the depletion of coal resources and rising extraction costs led to the decline of the coal-dominated industry, resulting in the city's economic downturn. Additionally, the 1998 reform of state-owned enterprises forced the closure of loss-making coal mines, leading to numerous factory shutdowns and worker layoffs. Fuxin became a negative example, suffering from typical rust belt issues: firm closures, job losses, population outflow, poverty, and social unrest (Li, Zhang, & Cheng, 2009). Statistics show that by 2000, one-third of local industrial enterprises in Fuxin were either partially or completely shut down. Twenty-three mines had closed, and 156,000 workers, accounting for 36.7% of the city's workforce, were laid off. The urban unemployment rate exceeded 7% (Fuxin City Chronicles). In 2001, Fuxin was designated as the first pilot city in China for the transformation of resource-exhausted cities.

Following this designation, the central government aimed to revitalize Fuxin and restore its position as a model for other rust belt cities (State Council, 2001). Since then, the central government has issued a series of policies, including the "Northeast Revitalization Strategy" since 2003 and the "Transformation of Resource-exhausted Cities" since 2008 (Hu & Yang, 2018). Under substantial national investment inputs, Fuxin began its challenging transformation. Before 2005, the agriculture and food industry briefly became one of the pillar industries in Fuxin. Subsequently, with the support of the central government, Fuxin vigorously promoted the development of wind power. In 2005, when China's Renewable Energy Law was released, the National Energy Bureau selected Fuxin as a pilot city for wind power (Hu & Yang, 2018). Today, Fuxin is one of the largest wind power generators in China, accounting for nearly one-third of all wind power installed capacity in Liaoning Province (CEN, 2017). Fuxin also explored the coal chemical industry, with a centrally-designated investment from China Datang Group in 2010. However, the plans were not fully realized, and the industry mainly focuses on producing low-end coal-chemical products (e.g., synthetic ammonia and formaldehyde). For years, Datang has been operating at a heavy loss in Fuxin. Particularly after the implementation of increasingly stringent environmental regulations, the industry's development has been hindered, and Datang has halted new project construction since 2014 (Hu & Yang, 2018).

Additionally, Fuxin has promoted industrial tourism. In 2009, the abandoned Haizhou Mine was converted into a mine park to attract tourists (Figure 4.2(a)). In 2019, there were attempts to turn mine pits into venues for fashionable events, such as thrilling motor racing tournaments and exciting music festivals. However, this project has not developed as expected. As of 2024, only a few racing events have been held, and despite significant investment, the returns have been limited (Figure 4.2(b)).

In summary, despite various attempts at industrial transformation supported by national policies and funding, Fuxin has achieved some economic improvement but has not yet successfully revitalized. Additionally, long-term population outflow has resulted in a significant number of vacant buildings in the city, including empty residential buildings, unused factories, and unoccupied public facilities (Figure 4.2 (c, d)).



(a) Fuxin Mine Park
(formerly Haizhou Open-Pit Coal Mine)



(b) The Race Track Project
(formerly Xinqiu Open-Pit Coal Mine)



(c) Vacant Residential Building



(d) Vacant Community Activity Center

Figure 4.2 Photos of the Current State of Fuxin City
(by author, in 2023)

Ziyang City

Ziyang City is located in the southwestern part of China, in Sichuan Province. It borders the provincial capital Chengdu city to the north and Municipality Chongqing to the east, making it the only prefecture-level city in Sichuan Province that directly connects these two major cities. Ziyang is also an important central city in the Chengdu-Chongqing economic corridor. In 2021, the built-up area of the city district was 53 square kilometers, and the permanent population in 2020 was 2.3086 million.

Historically, Ziyang was a key water and land transportation hub between the ancient Tuojiang River ferry and the Chengdu-Chongqing ancient post road. However, it did not have a particularly prominent regional role. It is a typical inland agricultural city, rich in agricultural products, with lemon production ranking among the top in the country. However, it lacks mineral resources and has had a weak industrial base for a long time (Ziyang City Master Plan, 2005). It wasn't until 1955, when the Chengdu-Chongqing Railway, the first railway built in the People's Republic of China, was completed and opened, that Ziyang began to see initial industrial development with the establishment of a station in the northern part of the city. By

around 1970, a small, relatively concentrated industrial area had formed in the northern part of the city. The locomotive factory, built in 1972, was one of the largest and most advanced enterprises in Ziyang at the time, with comprehensive living facilities for its employees, spurring development in the northwest region of the city (Ziyang City Master Plan 2017-2035).

After 1990, the city experienced relatively rapid development. In 1995, the Chengdu-Chongqing Expressway was opened, spurring development towards the western highway exit area of the city, leading to the construction of a long-distance bus station, hotels, and the growth of industrial enterprises. In 2000, Ziyang officially became a prefecture-level city, with the original county-level city being reorganized into Yanjing District. Numerous prefecture-level administrative institutions were quickly established, making Ziyang the main growth area in the region. In 2006, the National Development and Reform Commission upgraded the Ziyang Economic and Technological Development Zone, established in 1992, to a provincial-level development zone. It was further upgraded to a high-tech zone in 2017 (Figure 4.3(a)). Before the end of 2003, the development zone primarily focused on real estate development. Later, it began constructing an automobile industrial park and a pharmaceutical and food industrial park, shifting its focus to industrial park development (Ziyang City Master Plan 2017-2035). Currently, the high-tech zone includes a locomotive manufacturing and export base led by CRRC Ziyang Locomotive, a commercial vehicle and parts manufacturing base led by Sichuan Hyundai and Nanjun Automobile, a food and beverage production and distribution base led by Anheuser-Busch InBev, an electronic information technology support industry based on the Ziyang Tianfu (Huawei) Cloud Computing Center, and a dental equipment and materials industry base led by Huaguang Dental (Ziyang High-Tech Industrial Park official website).

Additionally, with the construction of Chengdu Tianfu International Airport starting in 2016, Ziyang established an airport economic zone 12 kilometers southeast of the airport in 2017. The government is vigorously promoting airport-related manufacturing industries, such as medical devices and electronic information, and is equipping the area with residential buildings and schools (Chengdu Tianfu International Airport Economic Zone Planning). However, the zone is still under construction (Figure 4.3(b)), and its investment attraction status remains uncertain. Furthermore, Ziyang is also exploring the development of its tourism industry, leveraging national key cultural relics like the Anyue Grottoes and provincial scenic spots such as Sancha Lake and Longquan Lake.

Despite Ziyang's active efforts to promote its advantageous industries and seek industrial innovation, the overall economic level of the city remains low. In 2023, Ziyang's GDP accounted for only 1.7% of Sichuan Province's total, ranking it among the bottom five of the province's 21 cities. Ziyang's proximity to two mega cities has allowed it to benefit to some extent from regional collaborative development. However, it has also suffered from the siphoning effect of the larger cities, leading to significant population outflow. Chengdu, in particular, has seen rapid development over the past decade, exerting a stronger influence due to its closer proximity. Statistics show that Chengdu's GDP skyrocketed from 861.96 billion RMB in 2012 to 1.9917 trillion RMB in 2021, making it the seventh-largest city in China by GDP. The population has also expanded significantly, with Chengdu's permanent population growing from 16.159 million in 2012 to 21.192 million in 2021, becoming the fourth city in China to surpass 20 million residents. Chengdu has attracted a significant portion of the province's resources. For instance, in 2020, Mianyang, the second-largest city in Sichuan, had a GDP of 301 billion RMB, which was only 17% of Chengdu's GDP. As a

result, many of Ziyang's more capable residents leave for work elsewhere, and young people often choose to develop their careers in Chengdu or Chongqing, leading to a shortage of high-quality labor in the local area (Ziyang City Master Plan 2017-2035). Additionally, the departure of young people has exacerbated the aging problem, with those aged 65 and above accounting for 22.62% of the permanent population in 2022, the second highest in the nation.

Moreover, with the city's expansion to the east, west, and south, many residents have relocated to new districts, resulting in a decrease in the old town's population. Previously bustling streets have become quiet, many old buildings are left without maintenance and are gradually deteriorating (Figure 4.3(c, d)). The infrastructure is aging, and the quality of public services is also declining.



(a) Ziyang High-Tech Zone



(b) The Airport Economic Zone
(currently under construction)



(c) An Old Hotel in Ziyang



(d) An Old Residential Building in Ziyang

Figure 4.3 Photos of the Current State of Ziyang City
(by author, in 2023)

Comparison of the Two Case Study Cities

Table 4.1 compares two cities in terms of location, built-up area, population, economy, industrial development, local general public budget revenue and expenditure, average annual salary of active employees, unemployment rate, urban block patterns, reasons for urban shrinkage, and average annual temperature. It is evident that there are significant differences in the regional development of the two cities. Fuxin's overall degree of shrinkage is higher than that of Ziyang.

Population Trends:

Fuxin's permanent population peaked in 2011 and has been declining since. From 2011 to 2015, the population decreased by 143,000, a decline of 7.44%. Between 2015 and 2020, the population continued to decrease by 130,700, a decline of 7.35%. The annual reduction rate over the decade is about 1.6%, with a

significant drop of 5.69% in 2020 compared to the previous year. Additionally, the city's natural growth rate has sharply declined since 2010. In contrast, Ziyang's permanent population decreased by 179,800 from 2010 to 2015, a decline of 6.93%. From 2015 to 2020, the population decreased by 105,400, a decline of 4.37%. Although the rate of decline has slowed compared to the previous five years, the overall trend remains a decrease in population. The natural population growth rate has also been declining since 2014. Overall, from the population peak to 2020, Ziyang's total population reduction rate (9%) is lower than Fuxin's (14%).

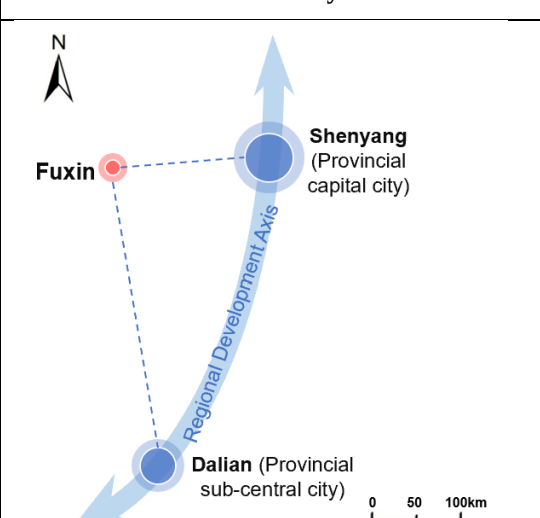
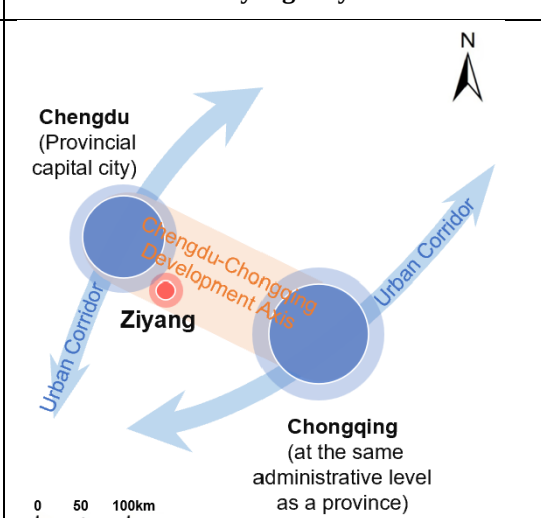
Economic Trends:

Fuxin's overall GDP has consistently been lower than Ziyang's. In terms of per capita GDP, Fuxin peaked in 2013 but then experienced significant negative growth. From 2013 to 2016, per capita GDP decreased by 10,599.5 RMB, a decline of 32.93%. Although the economy began to grow again in 2017, by 2020 it had not yet returned to the 2013 level, remaining 4,410.81 RMB lower, a decline of 13.70%. Conversely, Ziyang's per capita GDP showed continuous growth from 2010 to 2018, although the growth rate slowed. From 2010 to 2014, per capita GDP increased by 16,455.37 RMB, with an average annual growth rate of 22.92%. From 2014 to 2018, per capita GDP increased by 10,959.27 RMB, with an average annual growth rate of 7.96%, significantly lower than the previous period. After peaking in 2018, there was a noticeable decline, but 2020 saw some growth, although not returning to previous levels. Whether it can recover to its original GDP level remains to be seen. Compared to Fuxin, Ziyang's per capita GDP was slightly lower before 2013, but after 2014, Ziyang's economic level surpassed Fuxin's. In the following years, Ziyang's economy continued to grow, while Fuxin entered a period of economic decline. Ziyang only began to experience negative economic growth in 2018. Although Fuxin's economy is now growing, there is still a significant gap compared to Ziyang.

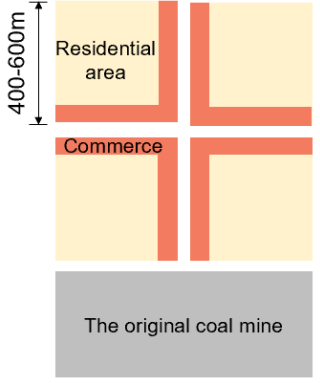
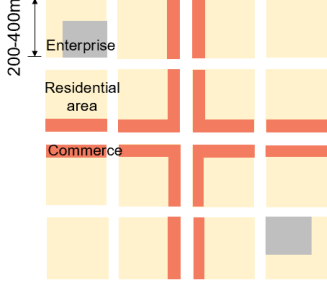
Public Budget and Employment:

Ziyang surpasses Fuxin in local general public budget revenue, local general public budget expenditure, and the average annual salary of active employees. Additionally, Ziyang has a lower unemployment rate compared to Fuxin.

Table 4.1 Contextual Information About Two Case Study Cities

Basic Information	Fuxin City	Ziyang City
Location		

Built-up Area of the City District in 2021	77 square kilometers	53 square kilometers																																																																																																						
Population	Permanent Population from 2010-2020 (in 10,000 persons) <table><caption>Permanent Population (in 10,000 persons)</caption><thead><tr><th>Year</th><th>Ziyang (Exclude Jianyang)</th><th>Fuxin</th></tr></thead><tbody><tr><td>2010</td><td>260</td><td>180</td></tr><tr><td>2011</td><td>255</td><td>190</td></tr><tr><td>2012</td><td>250</td><td>180</td></tr><tr><td>2013</td><td>245</td><td>180</td></tr><tr><td>2014</td><td>240</td><td>180</td></tr><tr><td>2015</td><td>240</td><td>180</td></tr><tr><td>2016</td><td>240</td><td>180</td></tr><tr><td>2017</td><td>235</td><td>180</td></tr><tr><td>2018</td><td>235</td><td>180</td></tr><tr><td>2019</td><td>230</td><td>175</td></tr><tr><td>2020</td><td>230</td><td>165</td></tr></tbody></table> Natural Population Growth Rate (City District) <table><caption>Natural Population Growth Rate</caption><thead><tr><th>Year</th><th>Ziyang</th><th>Fuxin</th></tr></thead><tbody><tr><td>2000</td><td>1.24</td><td>1.24</td></tr><tr><td>2001</td><td>1.24</td><td>1.24</td></tr><tr><td>2002</td><td>1.24</td><td>1.24</td></tr><tr><td>2003</td><td>1.24</td><td>1.24</td></tr><tr><td>2004</td><td>0.11</td><td>1.2</td></tr><tr><td>2005</td><td>0.11</td><td>1.2</td></tr><tr><td>2006</td><td>0.11</td><td>1.2</td></tr><tr><td>2007</td><td>0.11</td><td>1.2</td></tr><tr><td>2008</td><td>0.11</td><td>1.2</td></tr><tr><td>2009</td><td>0.11</td><td>1.2</td></tr><tr><td>2010</td><td>2.22</td><td>2.69</td></tr><tr><td>2011</td><td>2.22</td><td>2.69</td></tr><tr><td>2012</td><td>2.22</td><td>2.69</td></tr><tr><td>2013</td><td>2.22</td><td>2.69</td></tr><tr><td>2014</td><td>2.43</td><td>2.69</td></tr><tr><td>2015</td><td>2.43</td><td>2.69</td></tr><tr><td>2016</td><td>2.43</td><td>2.69</td></tr><tr><td>2017</td><td>2.43</td><td>2.69</td></tr><tr><td>2018</td><td>2.43</td><td>2.69</td></tr><tr><td>2019</td><td>2.43</td><td>2.69</td></tr><tr><td>2020</td><td>4.63</td><td>-4.99</td></tr></tbody></table> (Note: Since the county-level city Jianyang, originally under the jurisdiction of the prefecture-level city Ziyang, was placed under Chengdu's authority in 2016, this data excludes Jianyang.)	Year	Ziyang (Exclude Jianyang)	Fuxin	2010	260	180	2011	255	190	2012	250	180	2013	245	180	2014	240	180	2015	240	180	2016	240	180	2017	235	180	2018	235	180	2019	230	175	2020	230	165	Year	Ziyang	Fuxin	2000	1.24	1.24	2001	1.24	1.24	2002	1.24	1.24	2003	1.24	1.24	2004	0.11	1.2	2005	0.11	1.2	2006	0.11	1.2	2007	0.11	1.2	2008	0.11	1.2	2009	0.11	1.2	2010	2.22	2.69	2011	2.22	2.69	2012	2.22	2.69	2013	2.22	2.69	2014	2.43	2.69	2015	2.43	2.69	2016	2.43	2.69	2017	2.43	2.69	2018	2.43	2.69	2019	2.43	2.69	2020	4.63	-4.99	
Year	Ziyang (Exclude Jianyang)	Fuxin																																																																																																						
2010	260	180																																																																																																						
2011	255	190																																																																																																						
2012	250	180																																																																																																						
2013	245	180																																																																																																						
2014	240	180																																																																																																						
2015	240	180																																																																																																						
2016	240	180																																																																																																						
2017	235	180																																																																																																						
2018	235	180																																																																																																						
2019	230	175																																																																																																						
2020	230	165																																																																																																						
Year	Ziyang	Fuxin																																																																																																						
2000	1.24	1.24																																																																																																						
2001	1.24	1.24																																																																																																						
2002	1.24	1.24																																																																																																						
2003	1.24	1.24																																																																																																						
2004	0.11	1.2																																																																																																						
2005	0.11	1.2																																																																																																						
2006	0.11	1.2																																																																																																						
2007	0.11	1.2																																																																																																						
2008	0.11	1.2																																																																																																						
2009	0.11	1.2																																																																																																						
2010	2.22	2.69																																																																																																						
2011	2.22	2.69																																																																																																						
2012	2.22	2.69																																																																																																						
2013	2.22	2.69																																																																																																						
2014	2.43	2.69																																																																																																						
2015	2.43	2.69																																																																																																						
2016	2.43	2.69																																																																																																						
2017	2.43	2.69																																																																																																						
2018	2.43	2.69																																																																																																						
2019	2.43	2.69																																																																																																						
2020	4.63	-4.99																																																																																																						
Economy	GDP from 2010-2020 (100 million yuan) <table><caption>GDP (100 million yuan)</caption><thead><tr><th>Year</th><th>Ziyang</th><th>Fuxin</th></tr></thead><tbody><tr><td>2010</td><td>450</td><td>350</td></tr><tr><td>2011</td><td>550</td><td>450</td></tr><tr><td>2012</td><td>650</td><td>550</td></tr><tr><td>2013</td><td>750</td><td>600</td></tr><tr><td>2014</td><td>800</td><td>600</td></tr><tr><td>2015</td><td>850</td><td>550</td></tr><tr><td>2016</td><td>900</td><td>450</td></tr><tr><td>2017</td><td>1000</td><td>450</td></tr><tr><td>2018</td><td>1050</td><td>450</td></tr><tr><td>2019</td><td>750</td><td>500</td></tr><tr><td>2020</td><td>800</td><td>500</td></tr></tbody></table> Per Capita GDP from 2010-2020 (Yuan) <table><caption>Per Capita GDP (Yuan)</caption><thead><tr><th>Year</th><th>Ziyang</th><th>Fuxin</th></tr></thead><tbody><tr><td>2010</td><td>18000</td><td>15000</td></tr><tr><td>2011</td><td>25000</td><td>22000</td></tr><tr><td>2012</td><td>30000</td><td>28000</td></tr><tr><td>2013</td><td>35000</td><td>32000</td></tr><tr><td>2014</td><td>38000</td><td>32000</td></tr><tr><td>2015</td><td>40000</td><td>28000</td></tr><tr><td>2016</td><td>42000</td><td>22000</td></tr><tr><td>2017</td><td>45000</td><td>22000</td></tr><tr><td>2018</td><td>48000</td><td>25000</td></tr><tr><td>2019</td><td>35000</td><td>28000</td></tr><tr><td>2020</td><td>35000</td><td>28000</td></tr></tbody></table>	Year	Ziyang	Fuxin	2010	450	350	2011	550	450	2012	650	550	2013	750	600	2014	800	600	2015	850	550	2016	900	450	2017	1000	450	2018	1050	450	2019	750	500	2020	800	500	Year	Ziyang	Fuxin	2010	18000	15000	2011	25000	22000	2012	30000	28000	2013	35000	32000	2014	38000	32000	2015	40000	28000	2016	42000	22000	2017	45000	22000	2018	48000	25000	2019	35000	28000	2020	35000	28000																															
Year	Ziyang	Fuxin																																																																																																						
2010	450	350																																																																																																						
2011	550	450																																																																																																						
2012	650	550																																																																																																						
2013	750	600																																																																																																						
2014	800	600																																																																																																						
2015	850	550																																																																																																						
2016	900	450																																																																																																						
2017	1000	450																																																																																																						
2018	1050	450																																																																																																						
2019	750	500																																																																																																						
2020	800	500																																																																																																						
Year	Ziyang	Fuxin																																																																																																						
2010	18000	15000																																																																																																						
2011	25000	22000																																																																																																						
2012	30000	28000																																																																																																						
2013	35000	32000																																																																																																						
2014	38000	32000																																																																																																						
2015	40000	28000																																																																																																						
2016	42000	22000																																																																																																						
2017	45000	22000																																																																																																						
2018	48000	25000																																																																																																						
2019	35000	28000																																																																																																						
2020	35000	28000																																																																																																						
Development of Leading Industries																																																																																																								
Proportions of Primary, Secondary, and Tertiary Industries	Fuxin (%) <table><caption>Fuxin (%)</caption><thead><tr><th>Year</th><th>Primary industry proportion</th><th>Secondary industry proportion</th><th>Tertiary industry proportion</th></tr></thead><tbody><tr><td>2000</td><td>13.8</td><td>38.9</td><td>47.3</td></tr><tr><td>2005</td><td>24.9</td><td>34.3</td><td>40.8</td></tr><tr><td>2010</td><td>24.5</td><td>41.8</td><td>33.7</td></tr><tr><td>2015</td><td>22.5</td><td>38.2</td><td>39.3</td></tr><tr><td>2020</td><td>22.6</td><td>25.7</td><td>51.5</td></tr></tbody></table> Ziyang (%) <table><caption>Ziyang (%)</caption><thead><tr><th>Year</th><th>Primary industry proportion</th><th>Secondary industry proportion</th><th>Tertiary industry proportion</th></tr></thead><tbody><tr><td>2000</td><td>39.9</td><td>29.8</td><td>30.3</td></tr><tr><td>2005</td><td>34.7</td><td>36.4</td><td>28.9</td></tr><tr><td>2010</td><td>23.1</td><td>53.0</td><td>24.0</td></tr><tr><td>2015</td><td>19.8</td><td>55.3</td><td>24.9</td></tr><tr><td>2020</td><td>20.9</td><td>28.3</td><td>50.7</td></tr></tbody></table>	Year	Primary industry proportion	Secondary industry proportion	Tertiary industry proportion	2000	13.8	38.9	47.3	2005	24.9	34.3	40.8	2010	24.5	41.8	33.7	2015	22.5	38.2	39.3	2020	22.6	25.7	51.5	Year	Primary industry proportion	Secondary industry proportion	Tertiary industry proportion	2000	39.9	29.8	30.3	2005	34.7	36.4	28.9	2010	23.1	53.0	24.0	2015	19.8	55.3	24.9	2020	20.9	28.3	50.7																																																							
Year	Primary industry proportion	Secondary industry proportion	Tertiary industry proportion																																																																																																					
2000	13.8	38.9	47.3																																																																																																					
2005	24.9	34.3	40.8																																																																																																					
2010	24.5	41.8	33.7																																																																																																					
2015	22.5	38.2	39.3																																																																																																					
2020	22.6	25.7	51.5																																																																																																					
Year	Primary industry proportion	Secondary industry proportion	Tertiary industry proportion																																																																																																					
2000	39.9	29.8	30.3																																																																																																					
2005	34.7	36.4	28.9																																																																																																					
2010	23.1	53.0	24.0																																																																																																					
2015	19.8	55.3	24.9																																																																																																					
2020	20.9	28.3	50.7																																																																																																					
General Public Budget Revenue of the City District in 2021	3.19 billion yuan (about 443.41 million USD)	3.86 billion yuan (about 536.54 million USD)																																																																																																						
General Public Budget Expenditure of the City District	7.50 billion yuan (about 1.0425 billion USD)	10.19 billion yuan (about 1.41641 billion USD)																																																																																																						

in 2021		
Annual Average Salary of Active Employees	59,849 yuan (in 2019, about 8,319.01 USD) 45,939 yuan (in 2015, about 6,385.52 USD) 25,348 yuan (in 2010, about 3,523.37 USD)	69,358 yuan (in 2019, about 9,640.76 USD) 50,455 yuan (in 2015, about 7,013.25 USD) 26,323 yuan (in 2010, about 3,658.90 USD)
Unemployment Rate	5.1% in 2021; 3.9% in 2013	3.6% in 2021; 3.7% in 2013
City Size	Large city (Note: Cities with a resident population between one million and five million are considered large cities, which fall into the third tier out of five tiers of city sizes, ranging from small to large.)	Large city
Whether Resource-based City	Resource-based	Non-resource-based
Types of Shrinkage	Long-term population decline; Long-term economic stagnation or decline	Long-term population decline; Recent economic slowdown and decline
Influence Factors of Shrinkage	The depletion of coal resources and the forced industrial transformation have led to population outflows and economic decline.	The weak industrial base, coupled with the attraction of two nearby megacities drawing away population, resources, and capital, has resulted in a population outflow, severe aging, and economic stagnation and decline.
Block Pattern	 Wide road network, large blocks	 Dense road network, small blocks
Annual Average Temperature	8.5°C	17.4°C

(Data sources: Statistical yearbooks of two cities over the years; National population census data for 2000, 2010 and 2020)

(2) Overview of the Case Study Communities

Fuxin City

In Fuxin City, the two selected case study communities are Wenxinyuan (WXY, 文欣苑) Community and Mijia (MJ, 米家) Community. Their locations are shown in Figure 4.4. Both are relocation communities for shantytown redevelopment projects. Shantytowns were a typical form of housing in Fuxin City during the second half of the last century. These dense clusters of low-rise, makeshift houses were mostly built in the 1950s and 1960s near mining areas, railroads, and were meant for coal miners, creating a scene described as “a hundred miles of mines, a hundred miles of shantytowns.” These houses, with their small areas and inadequate facilities, have fallen into disrepair over the years. Ground subsidence caused by coal mining has also left many homes in dangerous conditions, prompting the Fuxin municipal government to initiate shantytown renovation and relocation projects in 2005. WXY and MJ Communities are representative of these resettlement areas.



Figure 4.4 The Locations of WXY and MJ Communities in Fuxin City

WXY Community

WXY Community is located in the southwestern part of Fuxin City, adjacent to the old Fuxin Railway Station (Fuxin South Station). To the southeast is the Haizhou Coal Mine, and to the south, there is a national railway. The area to the east used to house the Fuxin Mining Group's machinery manufacturing company. This community falls under the Wulong Subdistrict of Haizhou District. Historically, this area was inhabited by Mongolians, and it began to flourish in 1934 with the establishment of the Wulong Carbon Plant. During the 1950s, it was a typical industrial and mining living area until the coal mine closed down. In recent years, as Fuxin City has gradually developed northward, with the construction of the new Fuxin High-Speed Railway Station, the old railway station area has become the fringe of the city center.

The current residential buildings were constructed as part of the shantytown redevelopment project in 2006. The community covers approximately 0.25 square kilometers (Figure 4.5(a)), with over 60 residential buildings housing more than 2,000 households and a permanent population of over 5,000, about half of whom are elderly. Most residents are retired coal miners. The community is semi-enclosed, featuring many supermarkets, restaurants, pharmacies, courier shops, small community squares, and a community activity center. In 2019, the community began a renovation project. In the older neighborhoods of Fuxin City, WXY Community's housing conditions are considered mid-range, with an average price of about 2,000 yuan per square meter, compared to the citywide average of around 4,000 yuan per square meter.

MJ Community

MJ Community is located in the northeastern part of Fuxin City, within the Sunjiawan Subdistrict of Taiping District. It is adjacent to the residential areas of the Mining Materials Plant and Coal Plant No. 12, about 5 kilometers northwest of the Xinqiu Coal Mine, situated on the city's outskirts, approximately a 30-minute drive from the city center. Residents have lived in this area since around the 1840s. The Xinqiu Coal Mine's development in the 1950s turned it into a traditional industrial and mining living area, characterized by self-built houses. In 2011, it became a resettlement area for residents from the shantytowns of Haizhou District, Taiping District, and Xinqiu District. It was one of the last shantytown renovation areas in Fuxin City and is one of the largest residential areas in the city. Relocation project began in March 2011, with new residential buildings constructed on the original site. Residents moved

back in 2013.

MJ community covers an area of 1.36 square kilometers, with a building area of 342,000 square meters, accommodating 4,118 households and 8,156 residents. Initially designed as a gated community, it remains open due to financial and staffing issues. The community has a limited number of supermarkets, restaurants, and pharmacies, with incomplete amenities. Due to its large size and population, this study focuses on the eastern section of MJ Community (Figure 4.5(b)), which spans about 0.39 square kilometers and houses 5,449 residents. Most residents are former coal mine employees, with a high proportion of elderly. Unlike WXY Community, MJ Community has a higher rate of unemployment and economically disadvantaged families. As a resettlement area, many residents received 2-3 government-subsidized housing units at little cost, resulting in a high number of vacant properties. Coupled with poor construction quality, remote location, and inadequate facilities, MJ Community has some of the lowest housing prices in Fuxin, averaging about 1,400 yuan per square meter. In 2020, a social media post about a 56-square-meter house selling for just 20,000 yuan drew significant attention. In recent years, the low housing prices have attracted many rural residents from surrounding areas. In 2022, the community began its renovation project.



(a) WXY Community



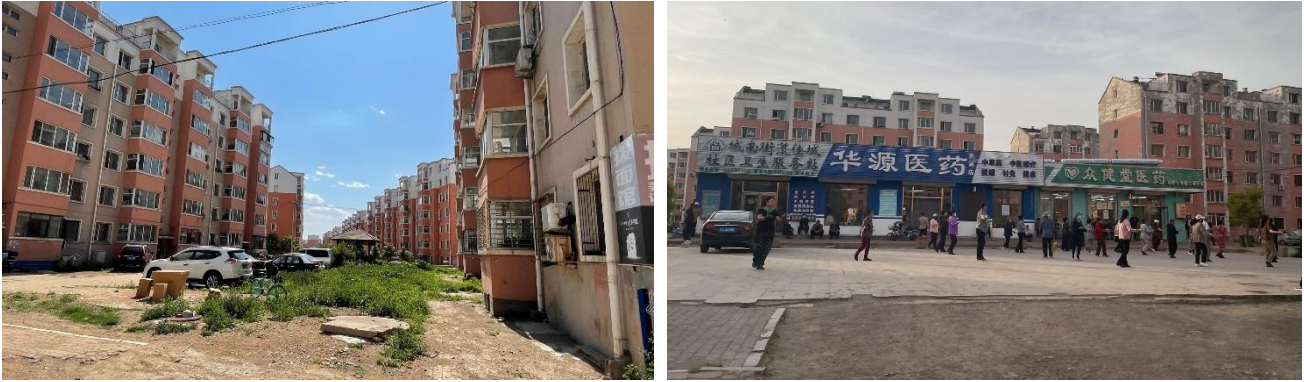
(b) MJ Community

Figure 4.5 The Layout of the Case Study Communities in Fuxin City



(a) WXY Community





(b) MJ Community

Figure 4.6 Current Photos of the Case Study Communities in Fuxin City
(by author, in 2023)

Ziyang City

In Ziyang City, the two selected communities for this study are Xiangyang (XY, 向阳) Community and Guihuajing (GHJ, 桂花井) Community (as shown in Figure 4.7). Both are located in the old town area and are representative of Ziyang's older neighborhoods. Unlike Fuxin's wide road networks and large, gated communities, the neighborhoods in Ziyang's old town area are smaller in scale, often open, and feature a more diverse mix of residential, commercial, and office functions.

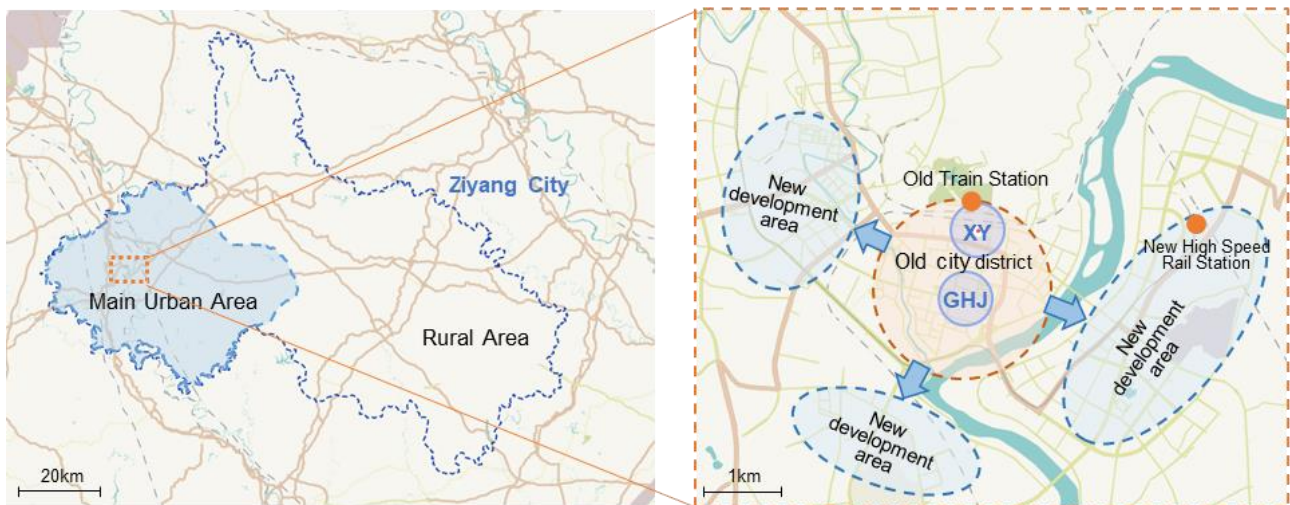


Figure 4.7 The Locations of XY and GHJ Communities in Ziyang City

XYCommunity

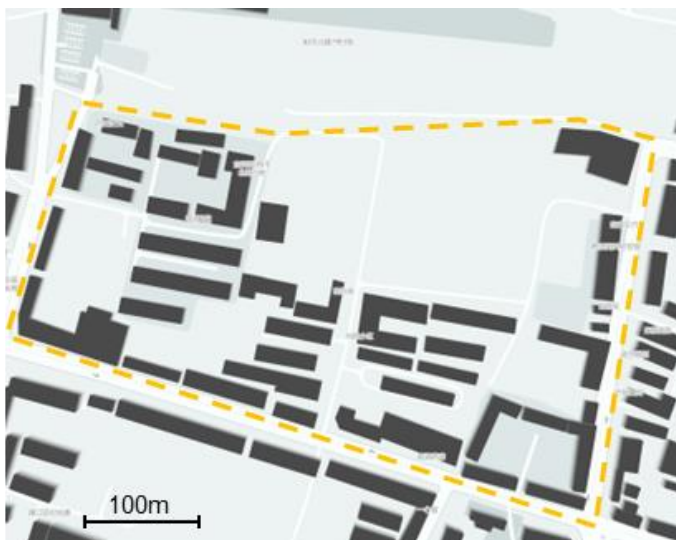
XY Community is situated in the northern part of Ziyang's old town. To the north lies Fengling Mountain Park, and it is adjacent to the old train station. This old station was a stop on the Chengdu-Chongqing Railway, the first railway built after the founding of the People's Republic of China. In the 1950s and 1960s, the area thrived with eight state-owned enterprises, including railway units, the original trading company, and the original sugar and wine company. However, with urban expansion and the construction of the Ziyang High-Speed Railway Station in the new eastern district, passenger services at the old train station ceased, and several state-owned enterprises went bankrupt, leading to a gradual decline in the area's prosperity.

In 2002, XY Community Residents' Committee was established, covering an area of 0.6 square kilometers. The community mainly consists of residential areas for railway workers and employees of restructured or bankrupt enterprises. It encompasses 21 old small residential complexes, such as the representative Tie Er Cun and Jixiangyuan. The community has a permanent population of 5,318, with a significant number of elderly residents. The surrounding area is well-equipped with shops, restaurants, and other living amenities. Currently, the housing price in this community is about 3,900 yuan per square meter, compared to the city's average of 5,000 yuan per square meter. The community began a renovation project in 2019.

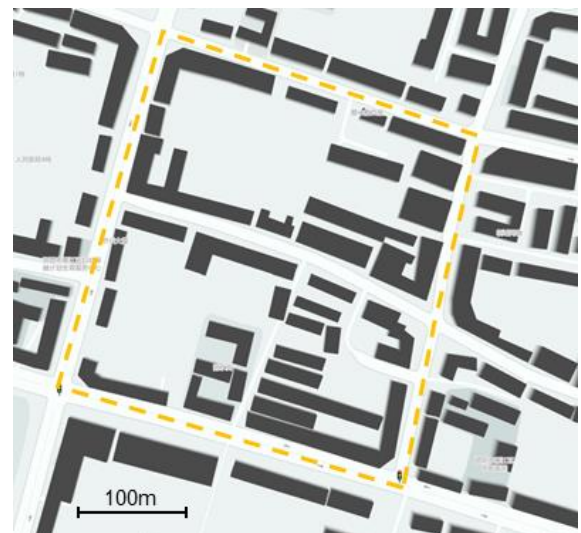
GHJ Community

GHJ Community is located in the center of Ziyang's old town, more centrally positioned than XY Community. This area has a long history and features an old alley, "Shuixiangzi (水巷子)," and an ancient well, "Guihuajing (桂花井)," which are emblematic of old Ziyang life. As early as 1765, Ziyang Old Town had already taken shape. The well is located at the southern gate of the old city, where residents used to gather and chat. With osmanthus trees nearby, it earned the name "Guihuajing." Residents frequently fetched water from the well, wetting the stone-paved alley, thus naming it "Shuixiangzi." In the 1950s and 1960s, as a central urban area, this place was very prosperous. At that time, the Agricultural Bureau, Forestry Bureau, Water Affairs Bureau of Ziyang City, and the government of Yanjing Town were all located around the Guihuajing community.

Most of the current residential buildings were constructed in the 1980s. The community now covers an area of 0.3 square kilometers and has a permanent population of 5,192, with a high proportion of elderly residents. It includes nineteen old small residential complexes. Due to the convenience of nearby shopping, transportation, and schooling, many residents who moved out still rent out their homes, resulting in a low vacancy rate. Additionally, part of the Shuixiangzi area is used by the government as low-rent housing for low-income people. The housing price in this community is about 4,000 yuan per square meter, slightly higher than that of Xiangyang Community. The community began its renovation project in 2018.



(a) XY Community



(b) GHJ Community

Figure 4.8 The Layout of the Case Study Communities in Ziyang City



(a) XY Community



(b) GHJ Community

Figure 4.9 Current Photos of the Case Study Communities in Ziyang City
(by author, in 2023)

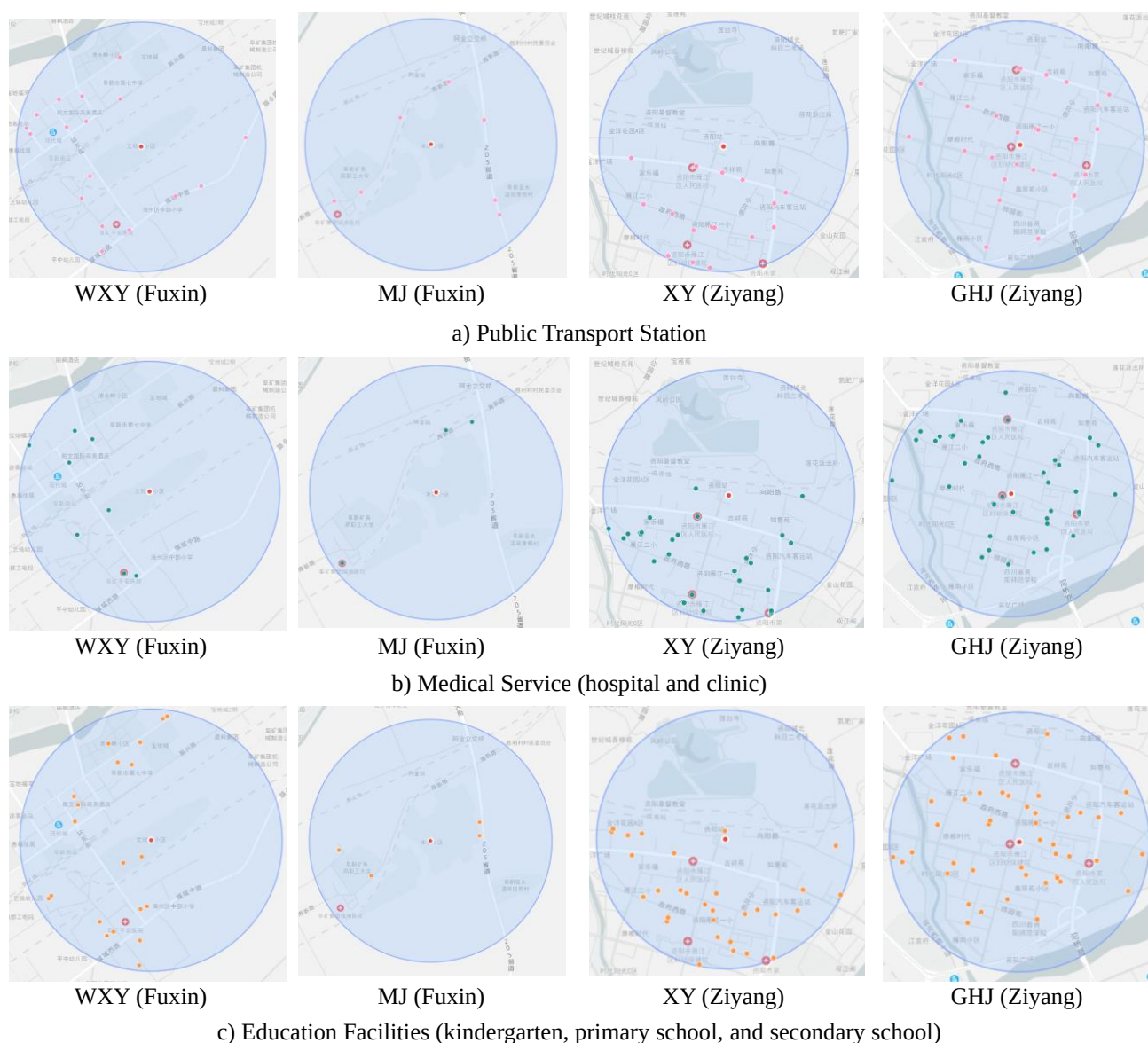
Table 4.2 shows characteristics of four communities in Fuxin and Ziyang Cities, highlighting differences in location, construction year, area, population, population structure, residents' occupations, number of residential buildings, number of floors in residential buildings, year the community renovation project started, and house prices.

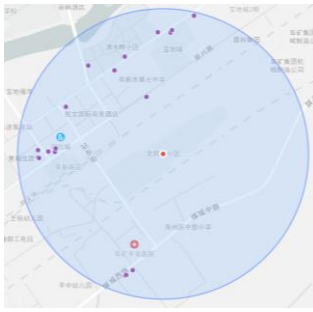
Table 4.2 Contextual Information About Four Case Study Communities

City	Fuxin City		Ziyang City	
Community	WXY	MJ	XY	GHJ
Location	The peripheral area of the city's old town	The outskirts of the city	The peripheral area of the city's old town	The central area of the city's old town
Construction Year	2006	2011	1980s	1980s
Area	0.25km ²	0.39 km ²	0.6 km ²	0.3 km ²
Population	Over 5000	5449	5318	5129
Population Structure	A high proportion of elderly residents	A high proportion of elderly residents and low-income people	A high proportion of elderly residents	A high proportion of elderly residents and low-income people
Residents' Occupations	Mostly retired workers from coal enterprises	Mostly retired workers from coal enterprises	Mostly retired individuals who previously worked at the railway bureau, trading companies, or other state-owned enterprises	Mostly retirees who were engaged in commercial trade or employed at state-owned companies
Number of Residential Buildings	63	89	44	38

Number of Floors in Residential Buildings	5 or 6 floors	6 or 7 floors	5 ~ 8 floors	4 ~ 8 floors
Year the Community Renovation Project Started	2019	2022	2019	2018
House Price	RMB 2,000 yuan/m ²	RMB 1,400 yuan/m ²	RMB 3,900 yuan/m ²	RMB 4,000 yuan/m ²

Due to the different locations of the four communities, the surrounding facilities vary, which can influence residents' perceptions of urban shrinkage and their evaluations of community livability. Therefore, a further comparison of the living facilities in each community was conducted. Using the center point of each community as the focal point, the number and distribution of various facilities within a 1000-meter radius were analyzed. The categories of facilities compared include public transport stations, medical services, educational facilities, financial services, restaurants, retail services, recreational facilities, sports and fitness facilities, and other living services. The results are shown in Figure 4.10.

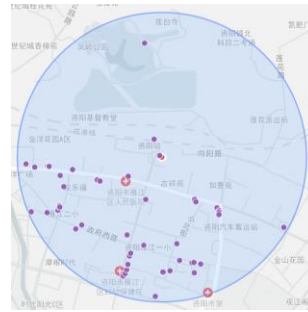




WXY (Fuxin)



MJ (Fuxin)

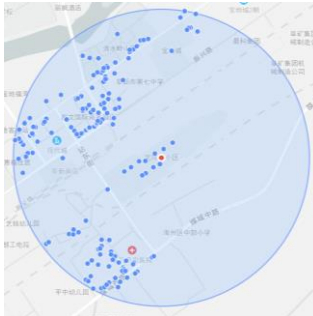


XY (Ziyang)



GHJ (Ziyang)

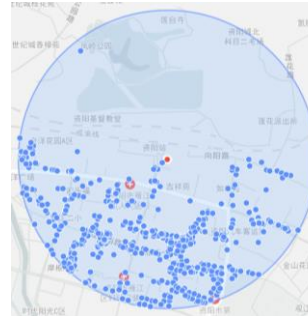
d) Financial Service (bank)



WXY (Fuxin)



MJ (Fuxin)



XY (Ziyang)

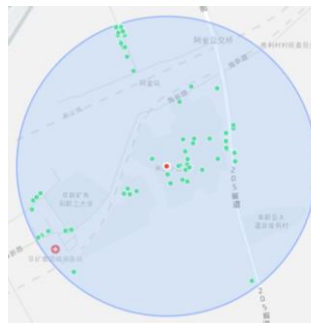


GHJ (Ziyang)

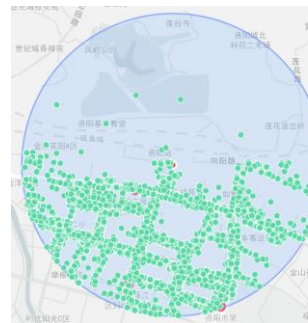
e) Restaurant



WXY (Fuxin)



MJ (Fuxin)

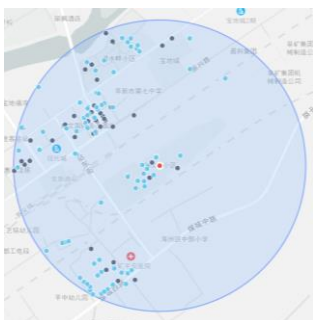


XY (Ziyang)



GHJ (Ziyang)

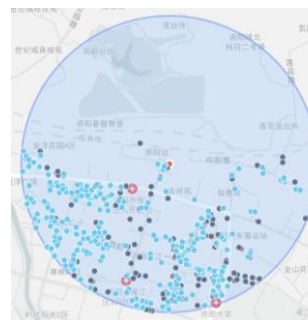
f) Retail Service (supermarket and small shop)



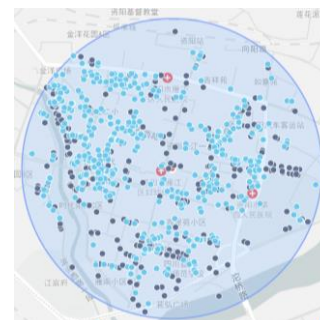
WXY (Fuxin)



MJ (Fuxin)



XY (Ziyang)



GHJ (Ziyang)

g) Recreational Facilities (hair salon, teahouse, sauna bath, karaoke, chess and card room, etc.)

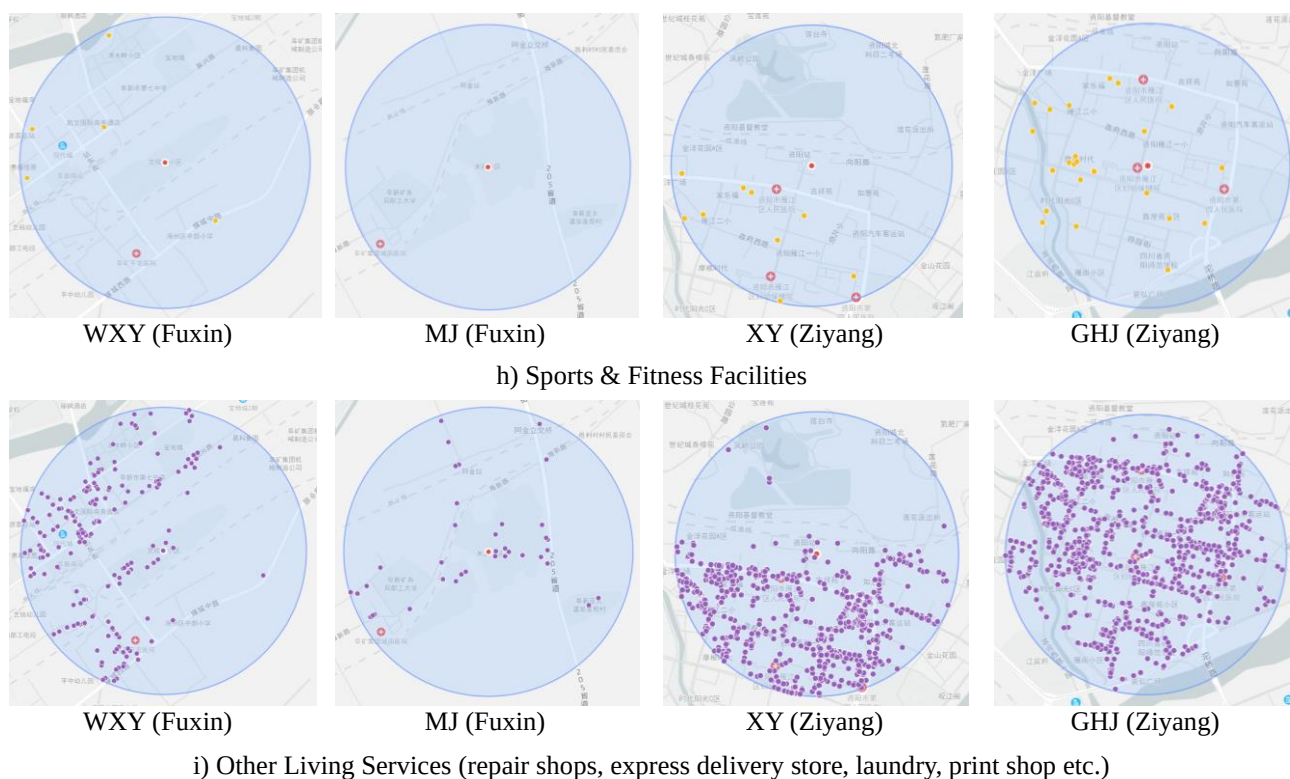


Figure 4.10 The Distribution of Facilities Around Each Community

Table 4.3 shows that GHJ Community in Ziyang City generally has the highest number of living facilities across most categories, followed by XY Community, also in Ziyang City. WXY Community in Fuxin City has more facilities compared to MJ Community, which has the fewest facilities in most categories. This comparison highlights the significant impact of community location on the availability of living facilities. Communities located near the city center, such as GHJ in Ziyang city, generally have a higher number of facilities compared to those in peripheral areas. Central locations benefit from better infrastructure, more diverse services, and greater accessibility, making them more attractive and convenient for residents. Additionally, the economic level of the city also affects the provision of facilities. Ziyang City, with a higher economic level, has more comprehensive facilities compared to Fuxin City.

Table 4.3 Comparison of the Number of Living Facilities Around Four Communities

Number of Facilities	WXY (Fuxin)	MJ (Fuxin)	XY (Ziyang)	GHJ (Ziyang)
Public Transport Station	18	7	16	27
Medical Service	9	3	31	42
Education Facilities	21	4	29	45
Financial Service	18	1	50	73
Restaurant	185	17	584	1021
Retail Service	410	76	2120	2936
Recreational Facilities	145	10	465	813
Sports & Fitness Facilities	6	0	9	26
Other Living Services	219	42	675	987

4.2 Methodology

In the pilot fieldwork phase, interviews were conducted to gain preliminary insights into residents' perceptions of urban shrinkage and their evaluations of community livability. For the subsequent large-scale survey, a questionnaire was used. Since each community has a population of approximately 5,000, a 1% sampling rate was used. Therefore, this study plans to collect around 50 questionnaires from each community. The following section introduces the measurement indicators utilized in the questionnaire.

4.2.1 The Measurement of Perceptions of Shrinkage

When measuring residents' perceptions of urban shrinkage, both community and city levels were considered (Table 4.4). This dual-level approach allows for a comprehensive understanding of how urban shrinkage impacts residents on localized and broader scales.

Table 4.4 Measurement of Residents' Perceptions of Shrinkage

Items		Decrease	Stable	Increase
Community Level	Changes in Community Population			
	Changes in Vacant Housing			
City Level	Changes in Urban Population			
	Changes in Urban Economy			

At the community level, perceptions of community population changes and vacant housing changes were investigated. Researches indicate that the decline in community population and the increase in vacant housing significantly affect residents' perceptions of their community. Elshof and Bailey (2015) found that the consequences of population decline primarily affect tangible aspects of the living environment, such as the reduction of services. Additionally, both individual and communal social capital may be significantly impacted. Hollander (2010) notes that vacant properties can become sites of vandalism and crime, further deteriorating the sense of security and stability within a neighborhood.

At the city level, perceptions of urban population changes and urban economic changes were assessed. Understanding these perceptions provides insights into residents' broader sense of urban vitality. Residents who perceive significant urban population and economic decline may be more likely to experience reduced confidence in local governance, diminished sense of pride, and uncertain future prospects, all of which can influence their overall satisfaction.

4.2.2 Establishing an Evaluation Framework for Community Livability in Shrinking Cities

Based on the literature review on community livability in Chapter 2 and considering the unique characteristics of shrinking cities, this study establishes a framework for evaluating community livability in shrinking cities, as shown in Table 4.5. Twenty-four indicators are selected from seven aspects: Housing, Environmental Quality, Access to Services and Amenities, Transportation, Economic Stability, Social Relations, and Safety and Security.

Table 4.5 Framework for Evaluating Community Livability

Evaluation Dimensions	Specific Evaluation Indicators
Housing	• Quality of Buildings • Essential Utility Services
Environmental Quality	• Green Spaces • Sanitary Conditions • Sound Environment
Access to Services and Amenities	• Primary and Secondary Schools • Kindergartens • Elderly Care Facilities • Entertainment Facilities • Healthcare • Financial Facilities • Shops • Restaurants • Sports Facilities
Transportation	• Public Transportation • Parking Lots
Economic Stability	• Income • Price Level • Housing Affordability • Employment Opportunities
Social Relations	• Community Engagement • Neighborhood Relationships • Sense of Place
Safety and Security	• Feeling of Safety

1) In the Housing aspect, the indicators selected are Quality of Buildings and Essential Utility Services. Galster (2019) indicates that in shrinking cities, residential properties often experience physical decay because the economic incentives for maintaining these properties are insufficient to counter the effects of aging and wear-and-tear. Additionally, Hospers (2014) suggests that the financial difficulties faced by shrinking cities lead to a decline in the scope and quality of local public services.

2) In Environmental Quality, the selected indicators are Green Spaces, Sanitary Conditions, and Sound Environment. Lewis (2022) stress the value of green spaces in shrinking cities to provide social and ecological benefits.

3) In Access to Services and Amenities, similar to other cities, the selected indicators include Primary and Secondary Schools, Kindergartens, Elderly Care Facilities, Entertainment Facilities, Healthcare, Financial Facilities, Shops, Restaurants, and Sports Facilities.

4) In Transportation, the selected indicators are Public Transportation and Parking Lots. Public transportation is particularly important, as Balaban and Puppim de Oliveira (2022) highlights the necessity of sustainable transportation policies in areas with declining populations, such as using Light Rail Transit and bus routes as the backbone of the transportation system.

5) Additionally, the evaluation framework places a strong emphasis on the Economic aspect, including Income, Price Level, Housing Affordability, and Employment Opportunities. Economic stability is crucial for residents' overall quality of life and is often challenged in shrinking cities facing job losses and economic downturns. A study by Guimarães et al. (2016) also shows that residents of shrinking cities place greater importance on policies and actions aimed at economic revitalization.

6) In Social Relations, shrinking cities also require more attention, including the indicators Community

Engagement, Neighborhood Relationships, and Sense of Place. Strong community engagement fosters a sense of belonging and collective efficacy, which are particularly important in maintaining community spirit in shrinking cities. Additionally, fostering good neighborhood relationship and a strong sense of place can help counteract the negative impacts of urban shrinkage. As Ročak (2022) indicates, social capital (place attachment, trust, participation and empowerment) holds potential in regeneration and governance of shrinking cities.

7) Lastly, Safety is a crucial criterion because it is the guarantee of residence. Hollander (2010) notes that vacant properties can become sites of vandalism and crime, deteriorating the sense of security within the community.

The questionnaire uses a five-point Likert scale for measurement, with 1 representing “very dissatisfied,” 2 “dissatisfied,” 3 “neutral,” 4 “satisfied,” and 5 “very satisfied.”

4.2.3 Analyzing the Impact of Perceived Shrinkage on Community Livability Assessment

After understanding residents’ perception of shrinkage and their evaluation of community livability, this study employed linear regression analysis to investigate whether residents’ perception of shrinkage affects their evaluation of livability. The dependent variable is the overall assessment of community livability. Four separate regression models were constructed using the following independent variables: changes in community population, changes in vacant housing, changes in urban population, and changes in urban economy.

To conduct the regression analysis, the perceptions of shrinkage were converted into dummy variables as follows:

- 1) Changes in Community Population: population decrease is coded as 1, population stability is coded as 2, and population increase is coded as 3;
- 2) Changes in Vacant Housing: a decrease in the number of vacant housing units is coded as 1, stability in the number of vacant housing units is coded as 2, and an increase in the number of vacant housing units is coded as 3;
- 3) Changes in Urban Population: urban population decrease is coded as 1, urban population stability is coded as 2, and urban population increase is coded as 3;
- 4) Changes in Urban Economy: urban economy decrease is coded as 1, urban economy stability is coded as 2, and urban economy increase is coded as 3.

4.2.4 Research Hypothesis

Hypothesis 1: Due to the more severe urban shrinkage in Fuxin City, residents in Fuxin have a stronger perception of shrinkage compared to those in Ziyang City.

Hypothesis 2: Since Ziyang City’s economic situation is better than that of Fuxin City, it is likely that more investment has been made in community development and public services, resulting in higher community livability ratings among Ziyang City residents.

Hypothesis 3: Perceptions of urban shrinkage affect community livability assessment, with residents who have stronger perceptions of shrinkage rating community livability lower.

4.2.5 Socio-Economic Characteristics of Survey Respondents

In four communities across two cities, a total of 213 valid questionnaires were collected. Specifically, 53 were collected from WXY Community (Fuxin), 54 from MJ Community (Fuxin), 52 from XY Community (Ziyang), and 54 from GHJ Community (Ziyang).

Table 4.6 provides a summary of the demographic and socio-economic profiles of the respondents. Regarding ages, the majority of respondents are aged 60-70 years, with those over 65 years old making up 48.8% of the total, while respondents under 50 are less common. In Fuxin city, over 60% of respondents are aged between 56-70 years, with the aging rate in WXY community (52.8%) notably higher than in MJ community (35.2%). In Ziyang city, nearly half of the respondents are aged between 61-75 years, with those over 65 comprising 53.8% of the total, which is higher than in Fuxin city (43.9%). Among the communities in Ziyang, GHJ community has a slightly higher aging rate (55.6%) compared to XY community (51.9%).

Gender distribution is fairly balanced overall, with a higher proportion of female respondents in Fuxin city (54.2%) compared to Ziyang city (49.1%). Regarding education level, respondents across all communities generally have a low educational attainment, predominantly at the junior high school level, followed by high school, which is due to the limited access to educational resources during their youth. In terms of marital status, many elderly are living alone, particularly in the communities in Fuxin city compared to those in Ziyang city. Regarding household size, the four communities are similar, with two-person households being the most common. The ratio is slightly higher in Ziyang city (62.3%) compared to Fuxin city (59.8%). Typically, these households consist of elderly couples whose children live elsewhere.

In terms of employment, 84.1% of respondents from Fuxin City and 76.4% from Ziyang City are retired, with the highest rate reaching 90.6% in WXY Community of Fuxin City. This high rate of retirement correlates with the significant aging population in the case sites. In China, the retirement age is set at 60 for men and varies for women—55 for white-collar workers and 50 for blue-collar workers. Additionally, a small portion of respondents in Fuxin City are unemployed, particularly in MJ Community. Regarding the industry of employment, significant differences are observed between the two cities, including their jobs before retirement. In Fuxin, once a thriving coal city, 37.4% of respondents have worked in the coal industry, with slightly higher participation in WXY compared to MJ Community. In MJ Community, agriculture ranks second, likely due to the area's low housing costs attracting residents from nearby rural areas in recent years. In contrast, Ziyang City shows a lower percentage in traditional industries. The industries vary significantly between the two communities in Ziyang. For instance, 53.8% of respondents from XY Community work in wholesale and retail, many of whom have worked for a nearby food company, followed by 13.5% in transportation, since this community includes public housing of the railway bureau. GHJ Community shows a more diverse range of industries among its respondents.

Regarding monthly income, the most common range in Fuxin City is 2000-3000 yuan (46.7%), while in Ziyang City, it is 3000-4000 yuan (48.1%). There are also more people in Fuxin with a monthly income of less than 1000 yuan. Thus, the overall income level in Ziyang City is higher than in Fuxin City. Furthermore, income levels vary within different communities in the cities; WXY Community in Fuxin has higher incomes than MJ Community, and XY Community in Ziyang has higher incomes than GHJ Community.

Regarding the length of residence, overall, the respondents have lived in their communities for a long time, with those in Ziyang City having lived there longer than those in Fuxin City. This is primarily because the two communities in Fuxin City are resettlement housing built by the government later than those in Ziyang City. Within Fuxin City, the WXY Community has the highest proportion of residents who have lived there for 16-20 years (71.7%), while the MJ Community has the most residents who have lived there for 6-10 years. Notably, 11.1% of respondents in the MJ Community have moved in within the last 1-3 years. In Ziyang City, both communities have a majority of residents who have lived there for over 40 years, with XY Community at 38.5% and GHJ Community at 35.2%. Moreover, in recent three years, GHJ Community has seen a significant influx of new residents, accounting for 20.4%.

In terms of property ownership, over 90% of the houses in Fuxin City are owned by the respondents, with 5.6% renting in the MJ Community, slightly more than in the WXY Community. Property ownership is more complex in Ziyang City due to the presence of government-provided public rental housing for low-income residents. The percentages of privately owned homes are 78.8% in XY Community and 57.4% in GHJ Community. In GHJ, the ratios of government public rental housing and private rentals are both higher than those in the XY Community.

Table 4.6 Respondents Demographic and Socio-economic Statistics

City and Community	In Fuxin City			In Ziyang City			Total
	Fuxin	WXY	MJ	Ziyang	XY	GHJ	
Sample (N)	107	53	54	106	52	54	213
Age							
Less than 18	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18-35	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
36-40	0.9%	0.0%	1.9%	0.0%	0.0%	0.0%	0.5%
41-45	1.9%	1.9%	1.9%	2.8%	1.9%	3.7%	2.3%
46-50	3.7%	1.9%	5.6%	4.7%	5.8%	3.7%	4.2%
51-55	7.5%	3.8%	11.1%	14.2%	17.3%	11.1%	10.8%
56-60	20.6%	20.8%	20.4%	10.4%	13.5%	7.4%	15.5%
61-65	21.5%	18.9%	24.1%	14.2%	9.6%	18.5%	17.8%
66-70	18.7%	22.6%	14.8%	17.0%	13.5%	20.4%	17.8%
71-75	12.1%	15.1%	9.3%	15.1%	19.2%	11.1%	13.6%
76-80	4.7%	3.8%	5.6%	9.4%	7.7%	11.1%	7.0%
Over 80	8.4%	11.3%	5.6%	12.3%	11.5%	13.0%	10.3%
Percentage of Population over 65	43.9%	52.8%	35.2%	53.8%	51.9%	55.6%	48.8%
Gender							
Frequency of Female	54.2%	50.9%	57.4%	49.1%	51.9%	46.3%	51.6%
Educational Level							
Primary school and below	23.4%	17.0%	29.6%	22.6%	15.4%	29.6%	23.0%
Junior high school	53.3%	56.6%	50.0%	48.1%	55.8%	40.7%	50.7%
Senior high school	19.6%	24.5%	14.8%	27.4%	25.0%	29.6%	23.5%
Junior college	1.9%	1.9%	1.9%	0.0%	0.0%	0.0%	0.9%
Bachelor's degree and above	1.9%	0.0%	3.7%	1.9%	3.8%	0.0%	1.9%
Marital Status							
Single	0.9%	1.9%	0.0%	0.0%	0.0%	0.0%	0.5%
Married	81.3%	79.2%	83.3%	89.6%	90.4%	88.9%	85.4%

Divorced/Widowed	17.8%	18.9%	16.7%	10.4%	9.6%	11.1%	14.1%
Household Size							
1	17.8%	20.8%	14.8%	10.4%	9.6%	11.1%	14.1%
2	59.8%	49.1%	70.4%	62.3%	55.8%	68.5%	61.0%
3	14.0%	17.0%	11.1%	25.5%	30.8%	20.4%	19.7%
4	7.5%	11.3%	3.7%	1.9%	3.8%	0.0%	4.7%
5	0.9%	1.9%	0.0%	0.0%	0.0%	0.0%	0.5%
Occupation							
Worker	0.9%	1.9%	0.0%	0.0%	0.0%	0.0%	0.5%
Business and Service Personnel	0.9%	1.9%	0.0%	6.6%	13.5%	0.0%	3.8%
Government Employee	1.9%	1.9%	1.9%	0.9%	1.9%	0.0%	1.4%
Self-Employed	3.7%	1.9%	5.6%	10.4%	9.6%	11.1%	7.0%
Enterprises and Institution Staff	0.9%	0.0%	1.9%	4.7%	0.0%	9.3%	2.8%
Retired	84.1%	90.6%	77.8%	76.4%	73.1%	79.6%	80.3%
Job Seeker	0.9%	0.0%	1.9%	0.9%	1.9%	0.0%	0.9%
Unemployed	6.5%	1.9%	11.1%	0.0%	0.0%	0.0%	3.3%
Industry of Employment							
Agriculture	12.1%	1.9%	22.2%	9.4%	3.8%	14.8%	10.8%
Manufacturing	7.5%	3.8%	11.1%	11.3%	5.8%	16.7%	9.4%
Coal Industry	37.4%	39.6%	35.2%	0.0%	0.0%	0.0%	18.8%
Electricity/Gas/Water Production and Supply	9.3%	15.1%	3.7%	4.7%	0.0%	9.3%	7.0%
Construction	1.9%	3.8%	0.0%	6.6%	7.7%	5.6%	4.2%
Transportation	4.7%	5.7%	3.7%	8.5%	13.5%	3.7%	6.6%
Wholesale and Retail	7.5%	9.4%	5.6%	33.0%	53.8%	13.0%	20.2%
Accommodation and Catering	0.0%	0.0%	0.0%	6.6%	7.7%	5.6%	3.3%
Public Facility Management	0.0%	0.0%	0.0%	10.4%	0.0%	20.4%	5.2%
Residential Services	6.5%	9.4%	3.7%	5.7%	5.8%	5.6%	6.1%
Education	0.9%	0.0%	1.9%	0.0%	0.0%	0.0%	0.5%
Health/Social Welfare	0.9%	1.9%	0.0%	0.0%	0.0%	0.0%	0.5%
Others	11.2%	9.4%	13.0%	3.8%	1.9%	5.6%	7.5%
Monthly Income Per Household Member (yuan)							
Less than 1000	5.6%	3.8%	7.4%	0.0%	0.0%	0.0%	2.8%
1000-2000	28.0%	18.9%	37.0%	18.9%	7.7%	29.6%	23.5%
2000-3000	46.7%	50.9%	42.6%	33.0%	46.2%	20.4%	39.9%
3000-4000	18.7%	26.4%	11.1%	48.1%	46.2%	50.0%	33.3%
4000-5000	0.9%	0.0%	1.9%	0.0%	0.0%	0.0%	0.5%
More than 5000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Length of Residence (Years)							
1-3	7.5%	3.8%	11.1%	10.4%	0.0%	20.4%	8.9%
4-5	6.5%	1.9%	11.1%	1.9%	0.0%	3.7%	4.2%
6-10	43.0%	7.5%	77.8%	6.6%	13.5%	0.0%	24.9%
11-15	7.5%	15.1%	0.0%	6.6%	13.5%	0.0%	7.0%
16-20	35.5%	71.7%	0.0%	10.4%	15.4%	5.6%	23.0%
21-30	0.0%	0.0%	0.0%	6.6%	7.7%	5.6%	3.3%
31-40	0.0%	0.0%	0.0%	20.8%	11.5%	29.6%	10.3%
More than 40	0.0%	0.0%	0.0%	36.8%	38.5%	35.2%	18.3%

Property Ownership							
Private Ownership	95.3%	96.2%	94.4%	67.9%	78.8%	57.4%	81.2%
Public Rental Housing	0.0%	0.0%	0.0%	16.0%	9.6%	22.2%	8.5%
Personal Renting	4.7%	3.8%	5.6%	16.0%	11.5%	20.4%	10.3%

4.3 Residents' Perceptions of Urban Shrinkage

This section analyzes residents' perceptions of urban shrinkage, divided into community and city levels. At the community level, it includes perceptions of changes in community population and the number of vacant housing units in the community. At the city level, it encompasses perceptions of changes in urban population and urban economy. Finally, it examines the perceptual differences among residents with different socioeconomic characteristics.

4.3.1 Residents' Perception of Changes in Communities

(1) Perception of Community Population Changes

Survey results on perceptions of population changes in communities (Figure 4.11) indicated significant perceptual differences between two cities and their respective case study communities. In Fuxin, over half of the respondents (53.27%, 57 out of 107) believed that their neighborhood's population had decreased recently. However, nearly 28.97% (31 out of 107) noticed an increase due to new arrivals, while the smallest group, representing 17.76% (19 out of 107), viewed the population as stable. In contrast, in Ziyang City, the majority of respondents, 65.1% (69 out of 106), perceived their neighborhood population as stable, followed by 31.13% (33 out of 106) who observed a decrease, and only 3.77% (4 out of 106) reported an increase. This data suggests that the population dynamics in Ziyang's case study communities were relatively stable, with a more even balance of in-migration and out-migration compared to Fuxin City.

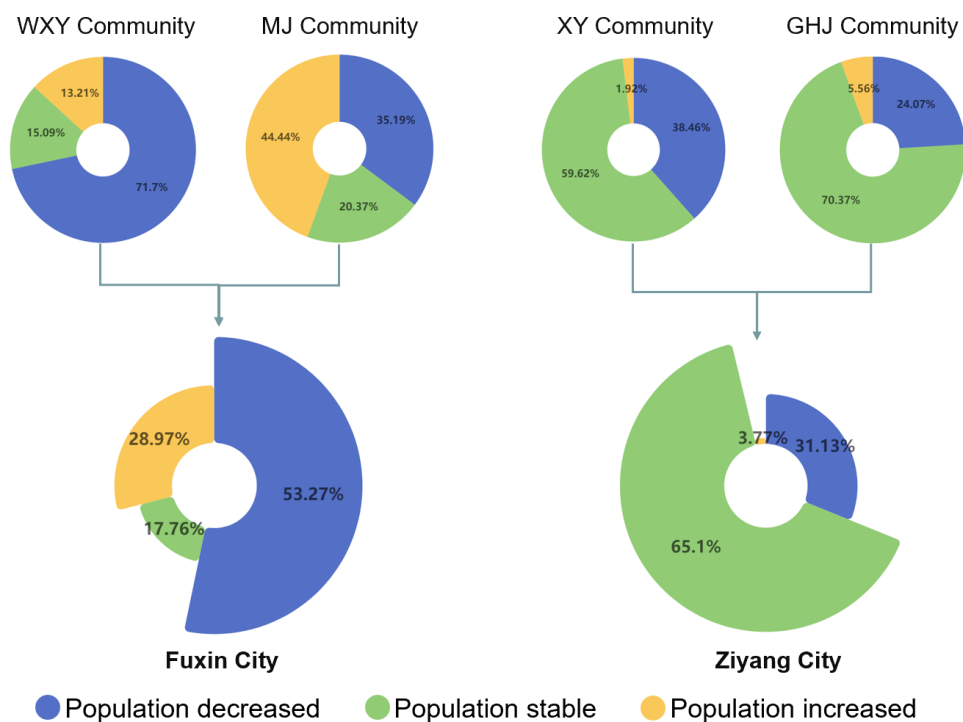


Figure 4.11 Residents' Perceptions of Community Population Changes

In two communities within Fuxin City, there are significant differences in how residents perceived population changes. In WXY Community, a substantial majority (71.7%, 38 out of 53) believed that the population was decreasing. In contrast, in MJ Community, only about half that number, 35.19% (19 out of 54), perceived a decline. Conversely, in MJ Community, a notable 44.44% (24 out of 54) of residents felt the population was increasing, compared to just 13.21% in WXY Community, where it represented the smallest proportion. Additionally, the percentage of residents who considered the population stable is relatively low in both communities, at 15.09% in WXY and 20.37% in MJ. Overall, MJ Community may have been experiencing a greater influx of migrants compared to WXY Community.

Respondents from WXY Community who thought the population was declined said:

“People with better economic conditions have moved to the new neighborhood in the north of the city over the past few years.” (WXY-2 ⁽¹⁾)

“Young people have left the community; after going to college or getting married, they moved elsewhere, leaving mainly the elderly behind.” (WXY-3)

“Many residents moved away to ensure their children could attend better schools.” (WXY-13)

“The population decline in the community is due to many elderly people passing away, especially after the pandemic.” (WXY-26)

However, there were also respondents who noted that:

“While many people have left, some elderly people from nearby poorer neighborhoods or rural areas have moved in, so the overall population hasn’t changed much.” (WXY-19)

Some even believe that the influx of rural residents has led to a slight population increase compared to previous years.

In contrast, in MJ Community, many respondents reported that:

“Housing prices have been very low in recent years, and shopping in the area is cheap, attracting many rural residents. Although many elderly people have passed away in recent years, a significant number of new residents have moved in, so the overall population has remained relatively stable.” (MJ-6)

In two communities in Ziyang City, the majority considered the population to be stable. This perception was particularly strong in GHJ Community, where 70.37% (38 out of 54) of residents felt this way, compared to 59.62% (31 out of 52) in XY Community. Furthermore, a higher percentage of respondents in XY Community believed that the population had decreased, at 38.46%, versus 24.07% in GHJ Community. However, the proportion of residents who thought the population had increased was notably low, at 1.92% in XY and 5.56% in GHJ Community. Overall, the population in both communities was generally stable, although XY may have been experiencing greater out-migration.

A resident from XY Community stated:

“Many original residents, particularly railway workers with better economic conditions, have sold their houses. Now, nearly half of the residents are newcomers, with many renting their homes. Despite this, the overall population has not changed significantly.” (XY-1)

Another interviewee thought the community’s population was declined said:

“The community’s population is decreasing, leaving mostly elderly people. Besides, many older residents

who live in higher-floor have also moved away.” (XY-4)

However, in GHJ Community, more respondents believed that the population had not changed much:

“Although many old residents have moved to new areas, the good location, convenient transportation, and proximity to schools have kept the area attractive. Almost all the apartments are rented out, maintaining the original population level.” (GHJ-5)

It is shown that while the overall urban population has declined, population changes vary across different communities. Communities in central urban areas, with convenient transportation and comprehensive facilities, tend to maintain or even increase their population. In contrast, those in less advantageous locations are more likely to experience population decline. Additionally, in peripheral urban areas, low housing prices and living costs can attract lower-income rural residents. However, as urbanization reaches a certain level, these communities may also face the risk of population decline.

(2) Perception of Changes in Vacant Housing

Residents’ perceptions of changes in vacant housing within their communities generally correspond with their views on community population changes (Figure 4.12). Specifically, those who observed a decrease in community population also reported an increase in vacant housing. In Fuxin City, a significant 52.34% (56 out of 107) of respondents perceived an increase in vacant housing, considerably higher than in Ziyang City, where only 31.13% (33 out of 106) shared this view. In Ziyang, the majority, 65.1% (69 out of 106), believed the number of vacant housing units has remained stable. A cross-community comparison reveals the highest perception of increased vacant properties in WXY (Fuxin), at 71.7% (38 out of 53); followed by XY (Ziyang), at 38.46% (20 out of 52); MJ (Fuxin), at 33.33% (18 out of 54); and GHJ (Ziyang), where only 24.07% (13 out of 54) of respondents reported an increase. This rise in vacant housing is an inevitable consequence of population outflow from these communities.

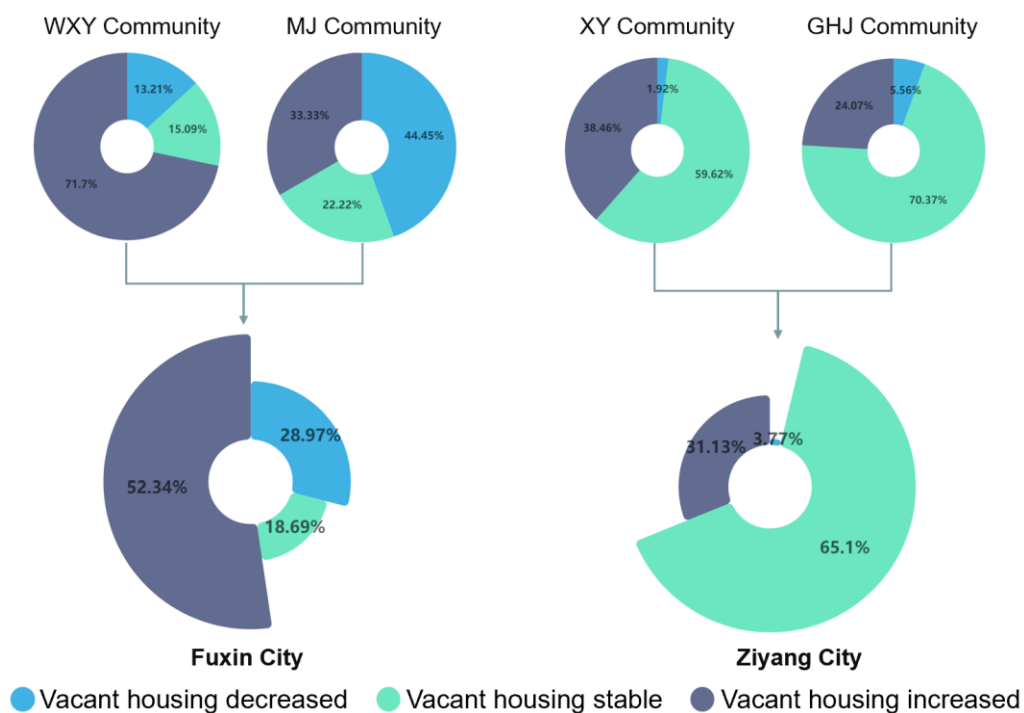
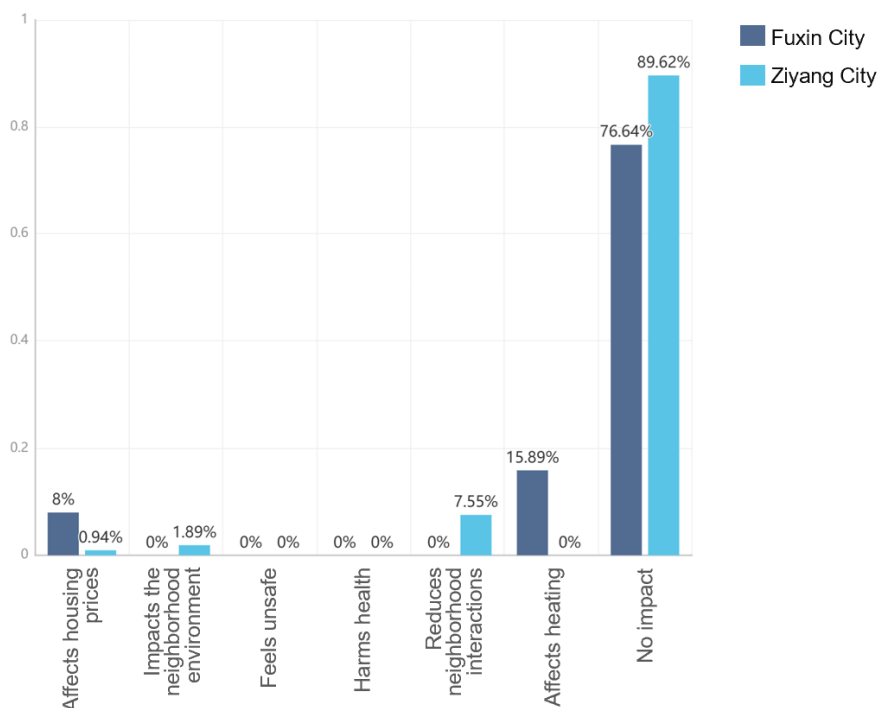


Figure 4.12 Residents’ Perceptions of Changes in Vacant Housing in the Community

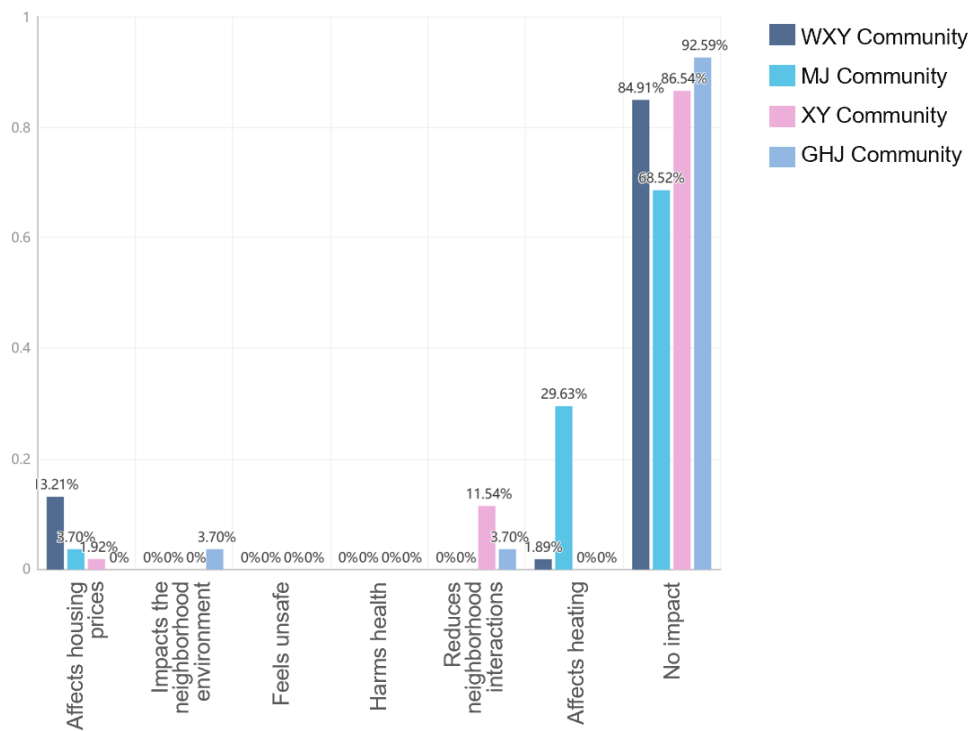
Research further explored residents' perceptions of the impacts that vacant housing has on their communities. The findings (Figure 4.13) showed that, in both Fuxin City and Ziyang City, the majority of residents perceived no significant effects from vacant housing, with this proportion being higher in Ziyang, where 89.62% (95 out of 106) felt this way, compared to 76.64% (82 out of 107) in Fuxin. Additionally, in Fuxin, located in northeastern China with its cold winter climate and equipped with heating systems, 15.89% (17 out of 107) of respondents believed that vacant housing negatively impacted the efficiency of the heating system. Also, 8% (9 out of 107) of the residents felt that vacant housing led to lower property values. In Ziyang, 7.55% (8 out of 106) of the respondents thought that an increase in vacant housing diminished neighborhood interactions. Moreover, typical concerns seen in Western countries, such as causing feelings of insecurity and impacting health, were not perceived by the respondents.

In Fuxin City, a greater number of respondents from WXY Community (84.91%, 45 out of 53) believed that vacant housing has no impact, compared to those in MJ Community (68.52%, 37 out of 54). Additionally, in WXY, 13.21% (7 out of 53) of the residents thought that vacant housing contributed to lower property values, a perception that accounted for only 3.7% in MJ. Conversely, in MJ, a larger proportion of residents, 29.63% (16 out of 54), felt that vacant housing adversely affected winter heating, a concern that was less common in WXY, affecting only 1.89%.

In two communities in Ziyang City, a significantly larger proportion of respondents from GHJ Community believed there was no impact, at 92.59% (50 out of 54), while XY Community also recorded a high rate of 86.54% (45 out of 52), both surpassing the figures from the communities in Fuxin City. Additionally, in XY, 11.54% (6 out of 52) of respondents believed that vacant housing had affected neighborhood interactions, compared to only 3.7% in GHJ. Furthermore, in XY, a small number of respondents (1.92%) believed that a surplus of vacant housing affected property values; meanwhile, in GHJ, a few respondents (3.7%) felt that vacant housing impacted the community environment.



(a) Residents of Two Cities



(b) Residents of Four Communities

Figure 4.13 Residents' Perceptions of the Impact of Vacant Housing

Overall, the current impacts of vacant housing are not significant. This may be because the decline at the community level is still in its early stages, and the negative effects of vacant housing have not yet fully manifested. Unlike the single-family homes common in the United States and Japan, the residential areas in the case study communities primarily consist of multi-story apartment buildings. Therefore, physical issues such as landscape deterioration are less prevalent. Regarding neighborhood interactions, although there has been a decrease in population, the overall population density remains relatively high. Therefore, while some residents have noticed a reduction in neighborhood social interactions, this is not significant on a broader scale. However, responses from some interviewees indicate that the impact of vacant housing is starting to emerge. The most noticeable effect is in northern cities, where infrastructure, particularly heating systems, is affected. Additionally, the presence of numerous vacant housing units has led to an oversupply in the housing market, which is expected to significantly affect property values in the future.

4.3.2 Residents' Perception of Changes in Cities

(1) Perception of Urban Population Changes

Regarding residents' perceptions of urban population changes, the results (Figure 4.14) showed that there was a perceived decrease in population in both cities. However, there were significant differences between the perceptions of residents from the two cities, with Fuxin City having a higher percentage of residents who perceived a decrease in population compared to Ziyang City. This result also corresponds to the actual population decline in the two cities, with Fuxin experiencing a more significant decrease than Ziyang.

In Fuxin City, 58.88% of respondents (63 out of 107) believed the city had experienced a population decline, representing the majority view. Another 28.97% (31 out of 107 respondents) thought the

population had remained stable, while only 12.15% (13 out of 107 respondents) perceived an increase in the urban population over the past five years. Zooming in on two specific communities, a greater proportion of residents in WXY Community—64.15% (34 out of 53 respondents)—believed that the city had undergone a population decline, compared to 53.71% (29 out of 54 respondents) in MJ Community. Moreover, in WXY, the percentages of residents who thought the population had remained stable or had increased were 24.53% (13 out of 53) and 11.32% (6 out of 53), respectively. In contrast, in MJ, these figures were slightly higher, with 33.33% (18 out of 54) viewing the population as stable and 12.96% (7 out of 54) perceiving population growth.

While in Ziyang City, only 22.64% of residents (24 out of 106) perceived a decrease in population, representing the smallest proportion. The majority, 48.11% (51 out of 106), believed the population had remained stable, and 29.25% (31 out of 106) felt the population had increased. Focusing specifically on the XY and GHJ Communities, a slightly higher percentage of residents in XY (23.08%, 12 out of 52) believed the urban population had decreased compared to GHJ (22.22%, 12 out of 54). Nevertheless, a marginally higher percentage of residents in XY (30.77%, 16 out of 52) perceived an increase in the urban population than in GHJ (27.78%, 15 out of 54). Additionally, in both communities, the dominant view was that the urban population had remained stable, accounting for 46.15% (24 out of 52) in XY and 50% (27 out of 54) in GHJ.

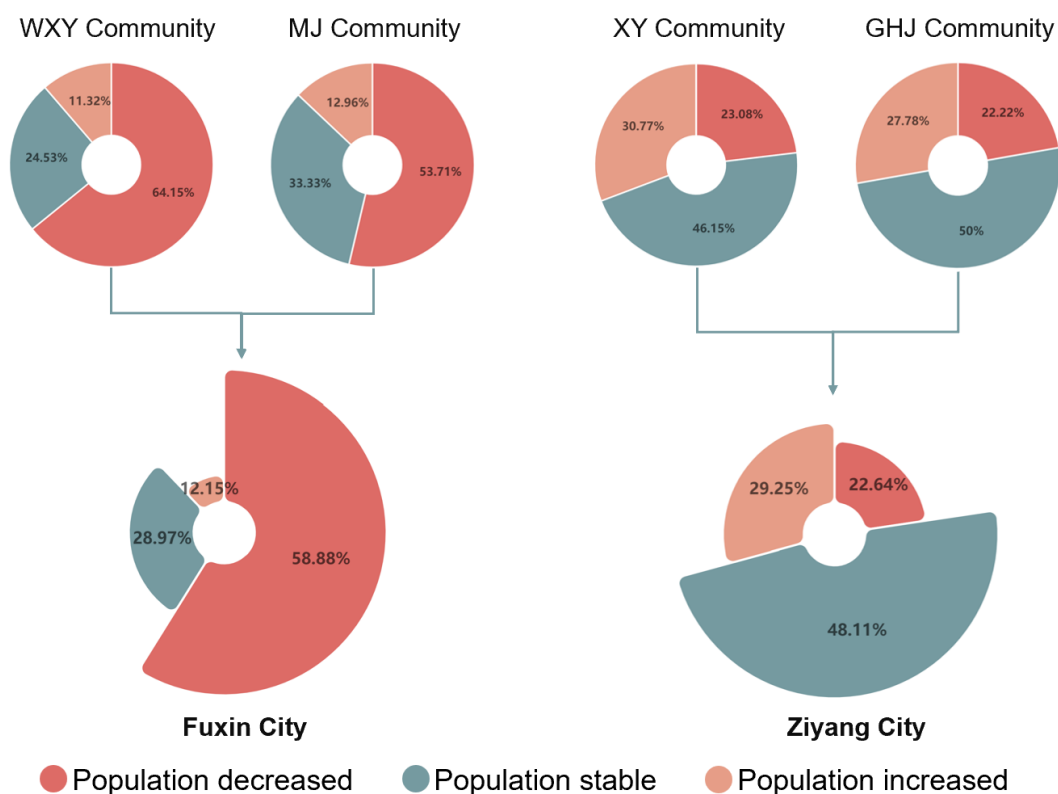


Figure 4.14 Residents' Perceptions of Urban Population Changes

A respondent from WXY (Fuxin) mentioned that:

“In recent years, very few college graduates have returned to work in the city. Fuxin now has a large elderly population, with very few young people remaining.” (WXY-3)

Similarly, a respondent from MJ (Fuxin) noted that:

“Many young people have moved away, although some individuals from rural areas have relocated to the city, mitigating the overall population decrease somewhat.” (MJ-5)

In contrast, most people in Ziyang City feel that the population hasn’t changed much.

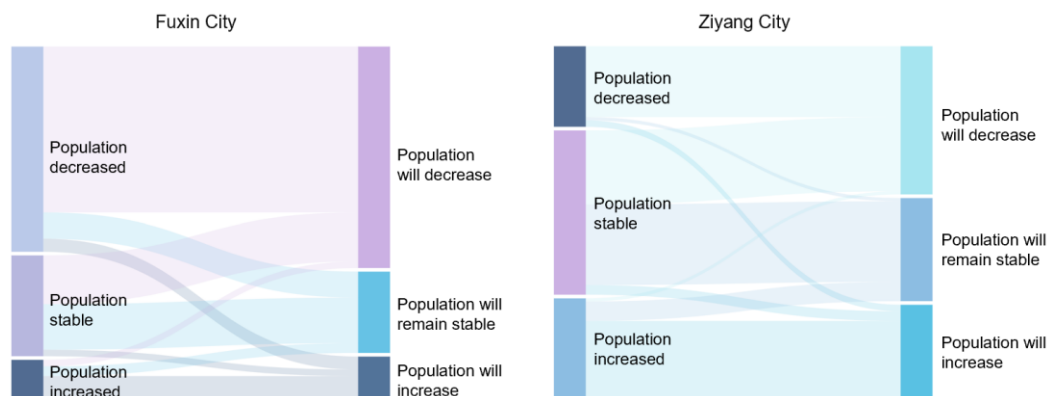
However, some residents from GHJ (Ziyang) noted that:

“There are fewer young people in the city now, as many have moved to Chengdu, Chongqing, or southern cities for work.” (GHJ-5)

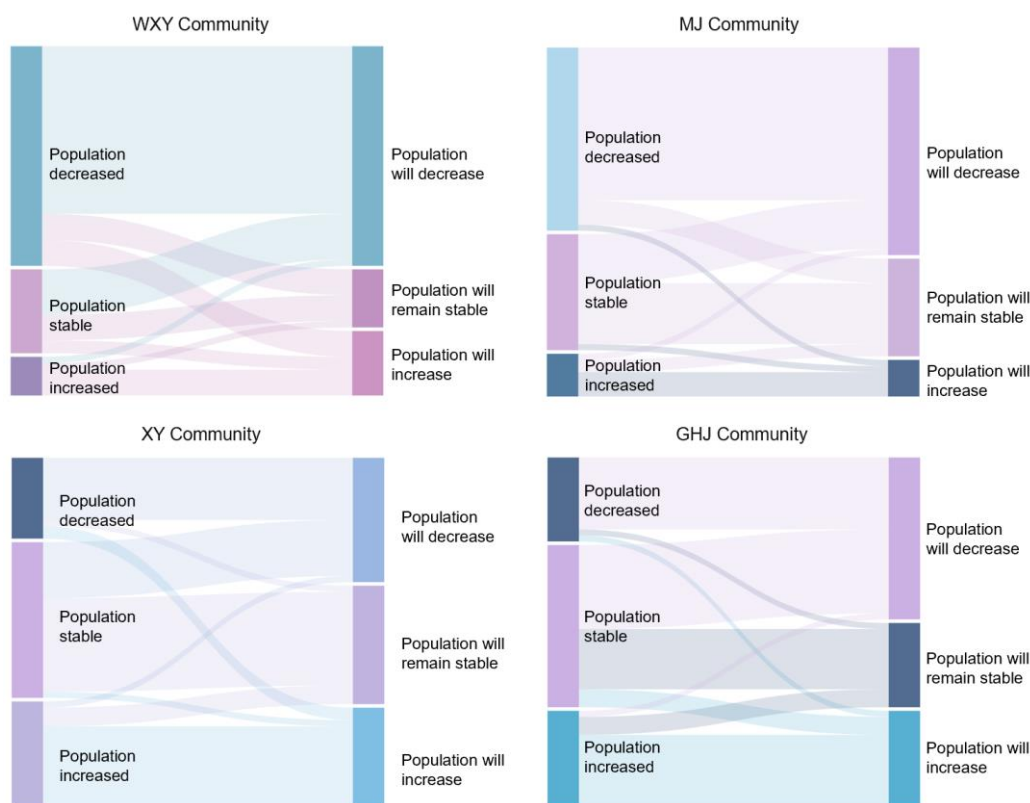
It suggests that the primary factor contributing to the perceived population decline is the outflow of young people. The lack of good job opportunities in these cities leads capable young individuals to seek better prospects in larger urban areas, a trend that is particularly pronounced in Fuxin.

This study further asked residents about their expectations for future urban population growth, as shown in Figure 4.15, the majority in both cities believed that the population would decrease, particularly in Fuxin City where 63.55% of respondents held this view, and in Ziyang City where 42.45% thought similarly. Concurrently, the proportion of respondents who believed that the population would increase was the smallest in both cities, at 13.07% in Fuxin City and 28.3% in Ziyang City. Clearly, residents are not optimistic about future population developments.

Comparing residents’ perceptions of past urban population changes with their expectations for future developments, in both cities, more respondents believed the population would shrink in the future than those who believed it had shrunk in the past. Among those who thought the population had already decreased, most expected this trend to continue. Additionally, nearly half of those who believed the population was stable in the past now think it will decrease in the future. Moreover, those who believed that the urban population had increased in the past generally maintain a positive attitude regarding future population growth. Furthermore, in Fuxin City, a minority of respondents who perceived a past decrease in population believe it will remain stable or increase in the future. Specifically, within the four communities, respondents from WXY (Fuxin) are more optimistic compared to those in MJ (Fuxin). In WXY, more residents who believed the population had decreased in the past now think it will stabilize or grow in the future. In Ziyang City, among the two communities, residents who believed the urban population had decreased in the past predominantly expect it to continue decreasing. However, in GHJ, more respondents who though the population was stable in the past now believe it will decrease in the future.



(a) Residents of Two Cities



(b) Residents of Four Communities

Figure 4.15 From Perceptions of Changes in Urban Population to Future Expectations

In Fuxin, residents believe that the future population will decline primarily due to two main factors: the continued outflow of young people and a low birth rate. A respondent from MJ stated,

“If the economy remains as it is now, it will be very difficult to retain young people. As we older folks gradually pass away, the population will continue to decrease.” (MJ-23)

Another respondent from WXY mentioned,

“The expenses of raising children are too high nowadays. Young people’s salaries are low, and they can’t afford it. Every month, I have to subsidize them. I feel that fewer young people will be willing to have children in the future.” (WXY-33)

In Ziyang, most residents feel similarly to those in Fuxin, but some believe the population could increase. A resident from XY Community said,

“I feel that the city’s population could still grow in the future because many rural people will move to the city.” (XY-14)

It indicates that, in addition to the current reduction in the young population, a low birth rate will also become a challenge for keeping the population in the future. Notably, even in Ziyang, where more residents believe the current population has not decreased, there are concerns about a potential decline.

(2) Perception of Urban Economic Changes

Regarding residents’ perceptions of urban economic changes (Figure 4.16), there were notable differences between the two cities. A larger proportion of residents in Fuxin perceived an economic decline compared to those in Ziyang. This results also corresponds to the actual economic development in the two cities, with

Fuxin experiencing a more significant decrease than Ziyang.

In Fuxin, 52.34% of residents (56 out of 107), believed the economy had declined. This perception marks a 6.54% decrease from the proportion who perceived a population decline. Furthermore, 34.58% of respondents (37 out of 107) felt that the economy had remained stable over the past five years. Those who viewed the economy as growing were in the minority, with only 13.08% (14 out of 107), which is slightly more than the percentage who believed the population had increased. In the communities of WXY and MJ within Fuxin, the distribution of respondents across these three categories was quite close. In WXY, a marginally higher percentage (52.83%, 28 out of 53) believed in an economic downturn compared to MJ (51.85%, 28 out of 54). Conversely, the proportion of residents in MJ who considered the economy stable (35.19%, 19 out of 54) was slightly greater than in WXY (33.96%, 18 out of 53). As for economic growth, the figures were similar, with WXY at 13.21% (7 out of 53) and MJ at 12.96% (7 out of 54).

In Ziyang, the proportion of residents who believed the economy had declined was significantly lower than in Fuxin, at 34.91% (37 out of 106). However, in contrast to Fuxin, this percentage exceeds that of those who believed the population had decreased. The percentage of those who felt the economy had remained stable was also higher than those who perceived a decline, and it constituted the largest proportion at 38.68% (41 out of 106). Moreover, the proportion who saw economic growth was about twice that of Fuxin, at 26.41% (28 out of 106), suggesting a more optimistic view of economic development compared to Fuxin. In the specific communities of XY and GHJ, the proportions of residents who believed the economy had declined were similar, with 36.54% (19 out of 52) in XY and 33.33% (18 out of 54) in GHJ. Notably, most residents in XY believed the economy was stable, with 46.15% (24 out of 52). Conversely, in GHJ, the highest proportion of respondents, at 35.19% (19 out of 54), believed in economic growth, reflecting a more optimistic perception among GHJ residents compared to those in XY.

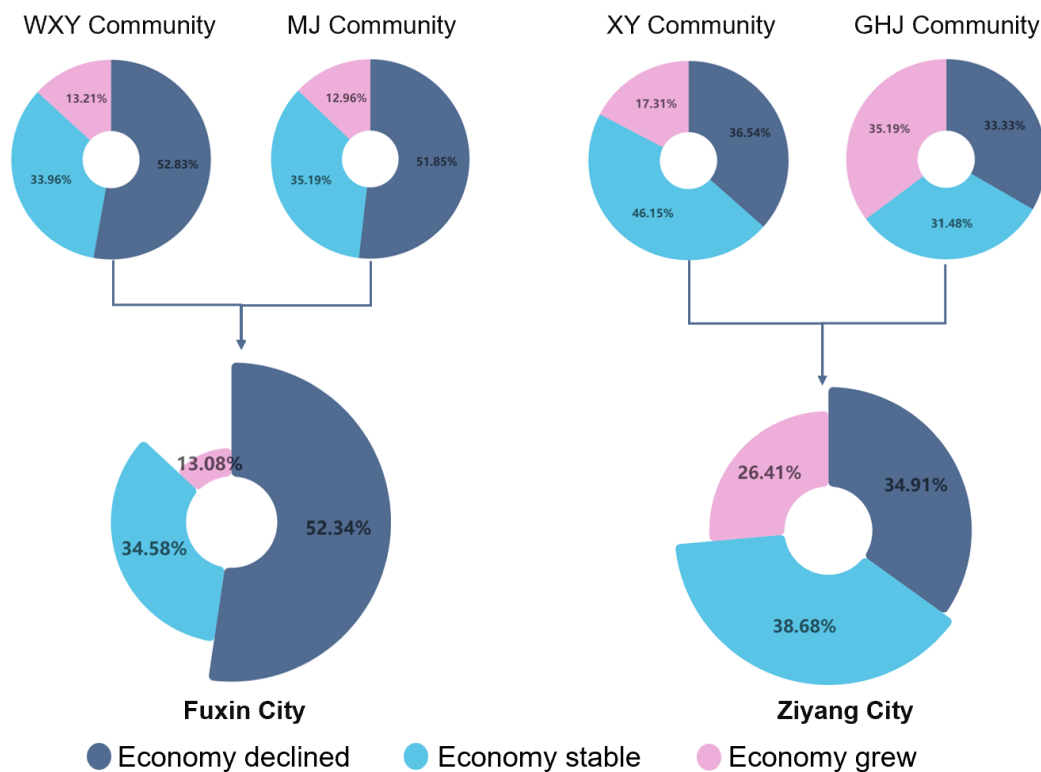


Figure 4.16 Residents' Perceptions of Urban Economic Changes

In Fuxin, many residents have expressed that the economy has been in decline ever since the coal enterprises went bankrupt. A resident from WXY said,

“Since the coal mines closed down, many factories have gone bankrupt, other industries haven’t developed, there are no big companies, jobs are hard to find, and salaries are low.” (WXY-17)

A respondent from MJ added,

“After the decline of the coal and power generation industries, Fuxin has difficulties in economic transformation, and it ranks last in the province's economy.” (MJ-12)

However, some residents believe there is economic growth. One said,

“In recent years, the city has been expanding outward and has seen a lot of construction, especially around the northern high-speed rail station area.” (MJ-31)

In Ziyang, residents who believe the economy is in decline pointed out,

“Ziyang is poor, there are no big companies, employment is difficult, and tourism hasn’t developed. Relying on agricultural products doesn’t bring in much money.” (XY-21)

“Several major enterprises in Ziyang, such as Nanjun Auto, are not as prosperous as they used to be.” (GHJ-19)

However, more residents have a more positive outlook, noting,

“The construction of new urban areas is progressing rapidly, such as the High-Tech Zone and the Airport Economic Zone, which have seen significant investment and quick development in the past years.” (XY-36)

From the residents’ interviews, it is clear that the decline of the coal industry in Fuxin has deeply affected the livelihoods of residents, creating a sense of pessimism among many. In Ziyang, the impact of industrial decline has been relatively mild, although some residents are pessimistic due to the lack of major industries. Additionally, both cities are caught in a paradox of economic and population decrease while simultaneously experiencing urban expansion. This contradiction leads to divergent views among residents about whether the cities’ economies are declining or growing. The construction of new infrastructure and development projects offers a glimmer of hope to some residents.

When further asked residents’ expectations for future economic development, the results showed residents of both cities had higher expectations for future economic development than for population growth, with expectations in Ziyang being more optimistic than in Fuxin, as shown in Figure 4.17. In Fuxin, 50.47% of residents expect the city’s economy to decline, whereas only 20.76% share this view in Ziyang. Additionally, nearly 40% of respondents in Ziyang believe the city’s economy will continue to grow, compared to only 17.75% in Fuxin. Furthermore, the proportion of residents in both cities who expected the economy to remain stable is similar, ranging from 30% to 40%, with a higher percentage in Ziyang.

Comparing respondents’ perceptions of past economic changes and their expectations for the future, among those who believed the city’s economy had declined, more people in Fuxin think the economy will continue to decline compared to those in Ziyang. Additionally, among those who believed the city’s economy was stable in the past, about half in both cities expect it to remain stable; however, more people in Fuxin think the economy will decline, whereas more in Ziyang believe it will grow. Comparing the two communities in Fuxin, a higher proportion of residents in WXY community who perceived past economic

decline believe the economy will remain stable or grow in the future. In contrast, the majority in MJ community, who also perceived past economic decline, believe the economy will continue to decline. Additionally, in MJ community, more of those who felt the past economy was stable now believe the future economy will decline. In Ziyang's two communities, the shift from perception to expectation regarding economic changes is similar. Among those who believed the past economy declined, nearly half in both communities expect the economy to remain stable or grow. Additionally, in GHJ community, a higher proportion of those who thought the past economy was stable believe the future economy will grow.

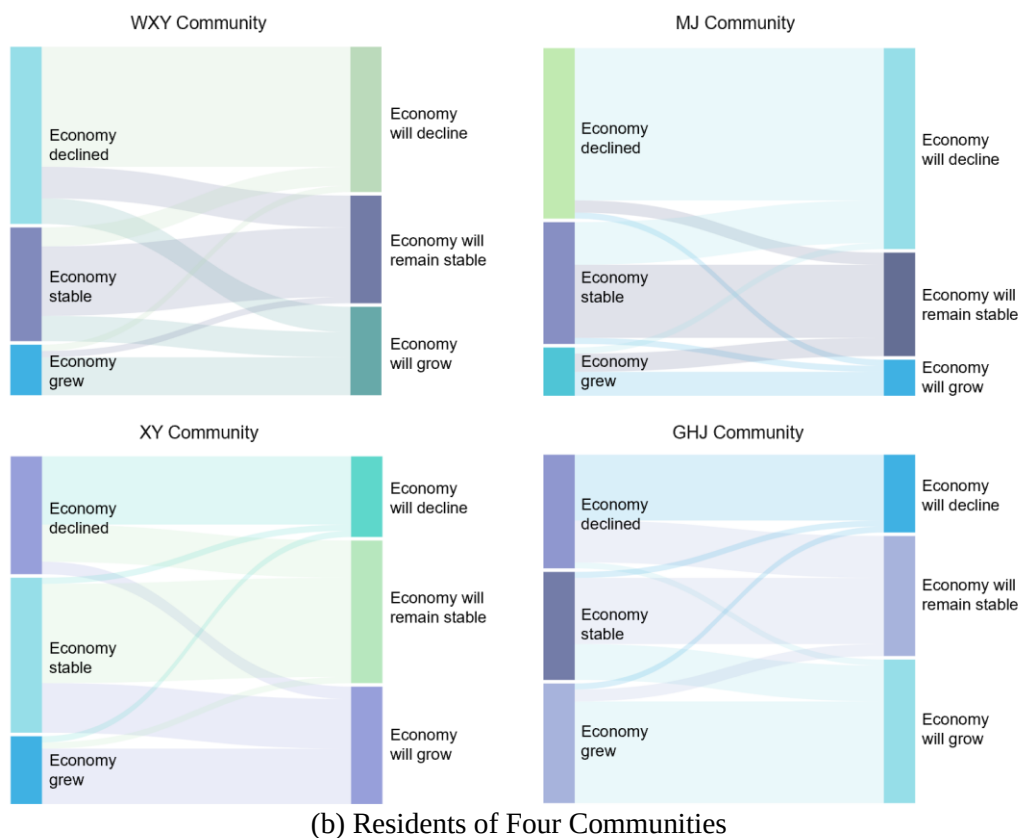
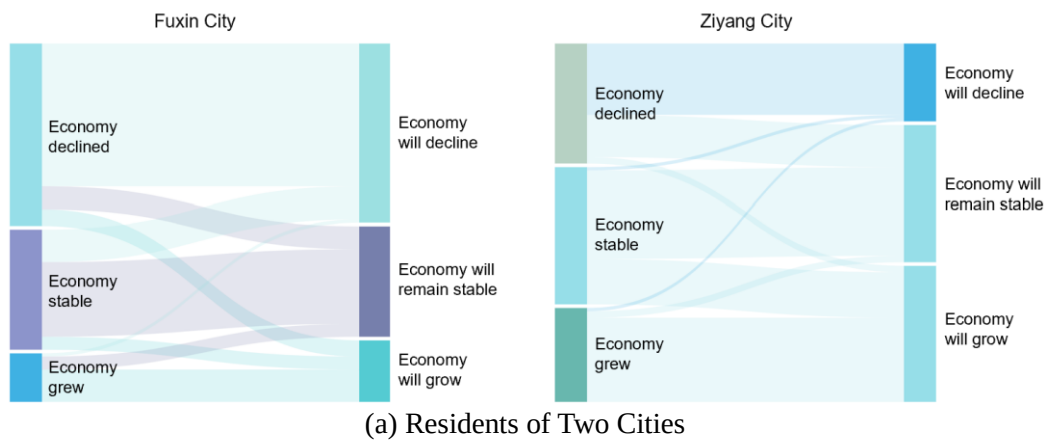


Figure 4.17 From Perceptions of Changes in Urban Economy to Future Expectations

In Fuxin, residents pin their hopes for the city's future economic development on national investment. A resident from WXY said,

"If the central government could increase its investment, the economy might improve in the future;

otherwise, there's not much prospect for development.” (WXY-15)

Similarly, in Ziyang, residents share this opinion. A resident from GHJ said,

“The provincial government doesn't pay much attention to Ziyang. If the provincial government could have better policies and investment, Ziyang could develop better.” (GHJ-11)

Additionally, more residents are optimistic about Ziyang's future development than Fuxin. Many noted,

“Next year (2024), the metro line from Ziyang to Chengdu will be operational, making transportation to Chengdu more convenient. This will bring more investment and development opportunities.”

This suggests that residents do not have high confidence in the city's own development capabilities and instead rely heavily on external investment and policy support. Furthermore, the city's geographical location significantly influences economic expectations. Actively integrating into regional development fosters greater optimism among the residents.

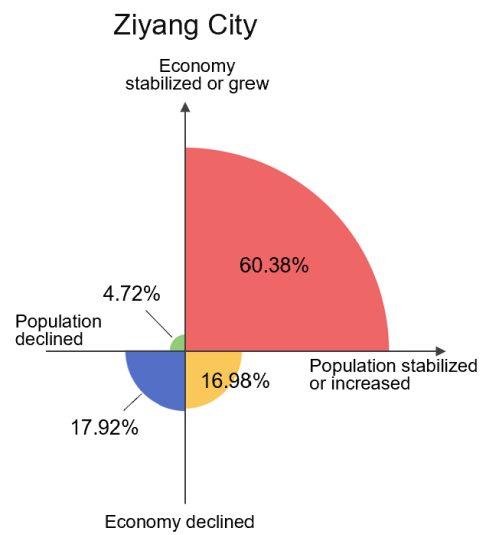
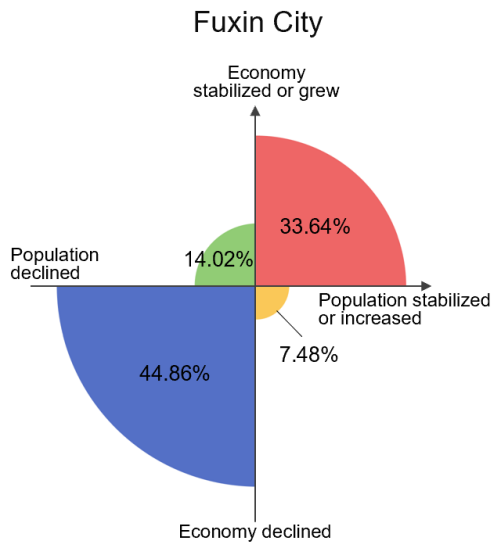
(3) Overall Perception of Urban Shrinkage in Two Dimensions

By analyzing both population and economic dimensions, and considering both stability and growth as non-shrinkage, respondents can be categorized into four groups: 1) those who believe that both the population and economy have declined over the past five years; 2) those who believe the population has declined, but there is no economic shrinkage; 3) those who believe the economy has declined, but there is no population shrinkage; and 4) those for whom neither the population nor the economy has declined. The results (Figure 4.18) indicated significant perceptual differences between the two cities, with the sense of urban shrinkage being more pronounced in Fuxin City than in Ziyang City.

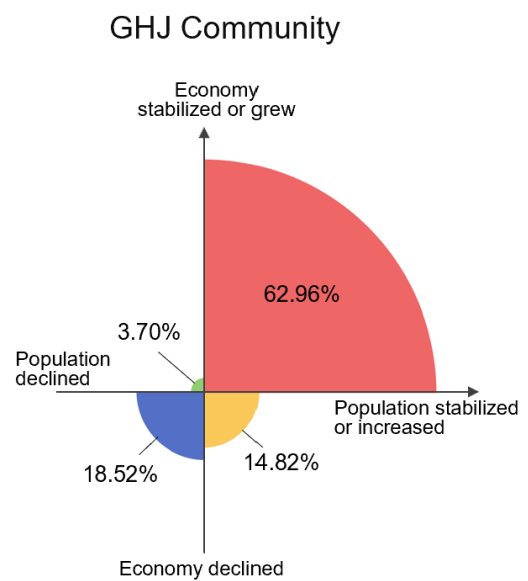
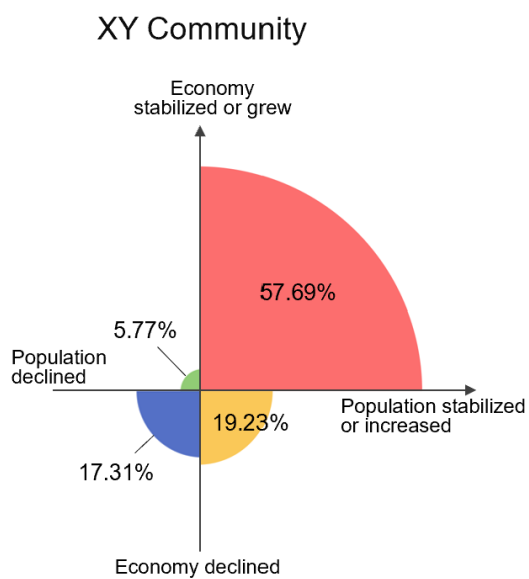
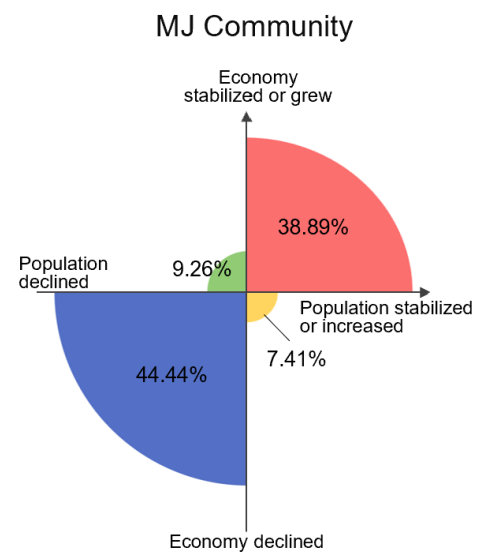
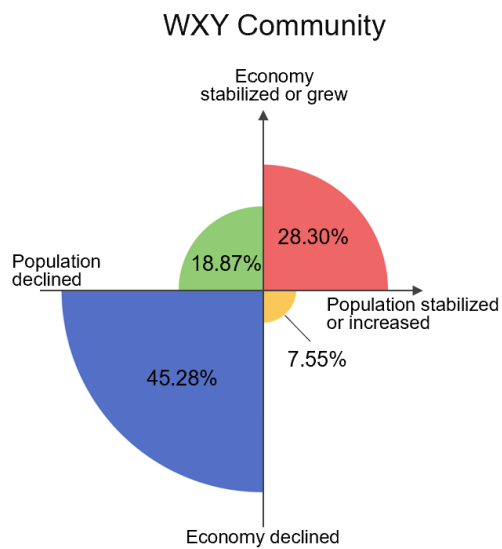
In Fuxin, the largest proportion of respondents, 44.86% (48 out of 107), believed that both the population and economy had shrunk, which was significantly higher than the proportion in Ziyang (17.82%, 19 out of 106). Conversely, in Ziyang, the majority, at 60.38% (64 out of 106), believed that neither the population nor the economy had shrunk, while this category ranked second in Fuxin at 33.64% (36 out of 107). Additionally, in Fuxin, 14.02% (15 out of 107) of respondents believed that the population had declined but the economy had not; however, the smallest proportion, only 7.48% (8 out of 107), believed that the economy had declined while the population had not. In Ziyang, the proportions for these two categories were reversed, with more respondents believing that the population had not declined but the economy had, accounting for 16.98% (18 out of 106), while those who believed the population had declined but the economy had not comprised only 4.72% (5 out of 106).

In Fuxin's communities, most respondents believed both the population and economy had declined, with 45.28% in WXY and 44.44% in MJ holding this view. However, more MJ residents (38.89%) believed neither had shrunk, compared to 28.3% in WXY. In WXY, 18.87% thought the population had decreased but the economy had not, higher than the 9.26% in MJ. The smallest group in both communities (around 7.5%) believed the population remained stable while the economy shrunk. Overall, MJ residents perceived less shrinkage than those in WXY.

In Ziyang's communities, most residents believed neither the population nor the economy had declined, with 57.69% in XY and 62.96% in GHJ holding this view. In XY, 19.23% thought the economy had shrunk while the population remained stable, compared to 14.82% in GHJ. About 18% in both communities felt both had shrunk, while the smallest group believed the population had shrunk but the economy had not. Overall, XY residents had a slightly stronger perception of shrinkage than those in GHJ.



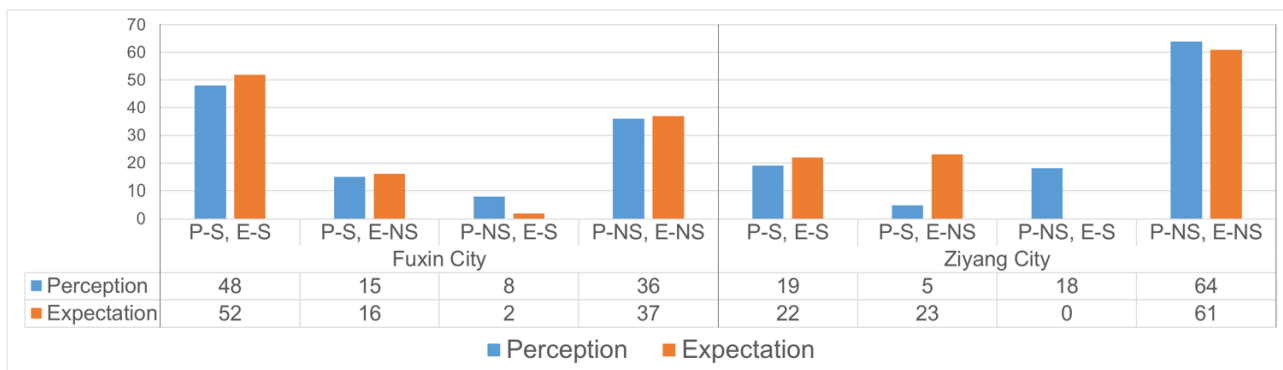
(a) Residents of Two Cities



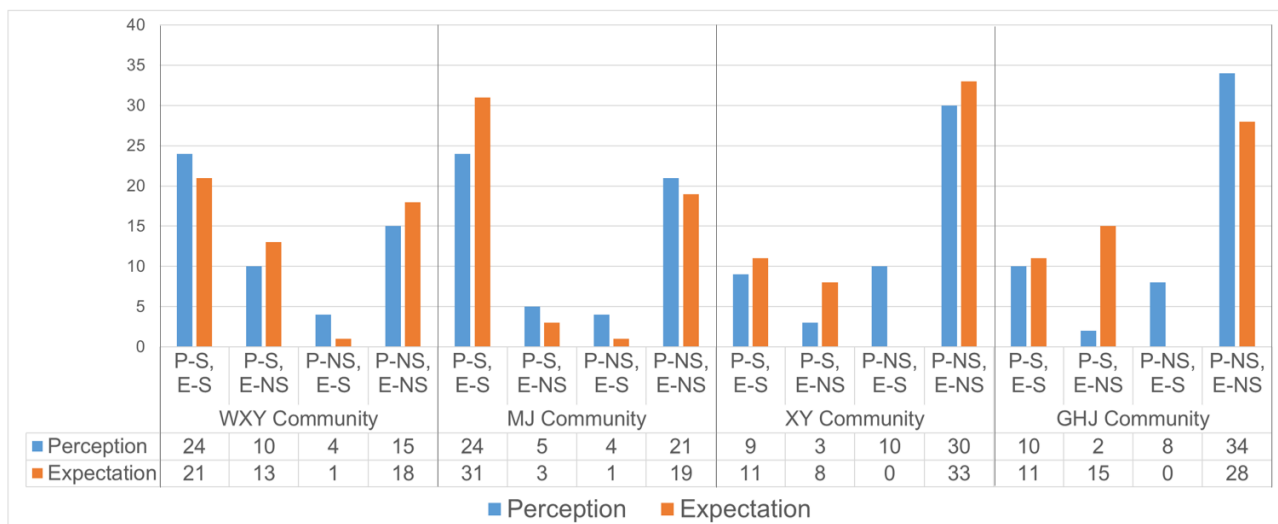
(b) Residents of Four Communities

Figure 4.18 Residents' Perceptions of Urban Shrinkage in Two Dimensions

Comparing residents' perceptions of urban shrinkage in the past with their expectations, it can be observed (Figure 4.19) that in both cities, the proportion of residents who believe the future will see both population and economic shrinkage exceeds those who believe such shrinkage occurred in the past. Moreover, in Ziyang, there is a noticeable increase in respondents who believe the population will decrease but the economy will not, compared to Fuxin. At the community level, the changes within the two neighborhoods in Fuxin are not consistent. In WXY, the number of respondents who believe in both population and economic shrinkage has decreased, while the number who believe neither will shrink has increased; however, in MJ, the trend is the opposite. In Ziyang's two communities, the proportion of respondents in XY who believe there will be no shrinkage in both population and economy has risen, but in GHJ, this proportion has decreased, with more believing in a population decrease but no economic shrinkage. The number of respondents who believe in both population and economic shrinkage has only slightly increased in both communities.



(a) Residents of two cities



(b) Residents of four communities

Figure 4.19 Categories from Perceptions of Urban Shrinkage to Future Expectations

(Note: P-S: Population Shrinkage; P-NS: Population Non-Shrinkage; E-S: Economic Shrinkage; E-NS: Economic Non-Shrinkage)

4.3.3 Differences in Perceptions Among Residents with Different Socioeconomic Characteristics

The study further analyzed the differences in perceptions among people with different socioeconomic characteristics. This analysis helps identify the groups most sensitive to or affected by urban shrinkage and allows for the development of more targeted strategies.

Since chi-square analysis is suitable for examining the relationship between categorical variables, it can be used to determine whether there are significant differences between different groups. Therefore, chi-square analysis was employed to explore the differences in perceptions of community changes and urban shrinkage among residents with different socioeconomic characteristics. The results are shown in the Table 4.7 (It omits the specific counts and proportions of each group, displaying only the significance levels).

The results indicate that there are perception differences among residents with different Industry of Work, Monthly Incomes, and Lengths of Residence regarding changes in the community population and the number of vacant housing units. Additionally, differences in perceptions of urban population changes are evident among residents with different Educational Levels and Lengths of Residence. Furthermore, perceptions of urban economic changes show significant differences not only among residents with different Educational Levels and Lengths of Residence but also among residents of different Age groups and Industry of Work.

Table 4.7 The Results of Chi-square Analysis

Items		Residents' Perception of Changes in Communities		Residents' Perception of Changes in Cities	
		Changes in Community Population	Changes in Vacant Housing in Communities	Changes in Urban Population	Changes in Urban Economy
Age	χ^2	14.028	14.25	26.328	31.872
	p	0.727	0.713	0.092	0.023*
Gender	χ^2	4.411	4.973	1.934	3.471
	p	0.110	0.083	0.380	0.176
Educational Level	χ^2	8.044	8.188	27.371	18.361
	p	0.429	0.415	0.001**	0.019*
Marital Status	χ^2	7.035	8.741	7.507	2.080
	p	0.134	0.068	0.111	0.721
Occupation	χ^2	20.677	19.895	19.569	19.497
	p	0.110	0.133	0.144	0.147
Industry of Work	χ^2	65.499	65.243	36.185	44.359
	p	0.000**	0.000**	0.053	0.007**
Monthly Income	χ^2	25.192	25.028	6.938	9.408
	p	0.001**	0.002**	0.543	0.309
Length of Residence	χ^2	64.282	60.633	37.872	37.828
	p	0.000**	0.000**	0.001**	0.001**

* $p < 0.05$ ** $p < 0.01$

Table 4.8 illustrates the significant differences in shrinkage perceptions among residents of different age groups, educational levels, industries of work, monthly income, and lengths of residence. The results show the following trends:

- Older and middle-aged groups have a higher percentage perceiving a decrease in the urban economy, while younger and middle-aged groups predominantly perceive stability. This difference may be because older individuals have experienced the full cycle of urban economic prosperity and decline.
- Residents with higher education levels are more likely to perceive a decrease in both the urban population and urban economy compared to those with lower education levels. This could be attributed to their greater access to information and their ability to critically assess economic and demographic trends.
- People in the construction, coal industry, public facility management, and residential services sectors have strong perceptions of population decline in their communities. Similarly, those in construction, coal industry, accommodation and catering, and residential services perceive a significant decline in the urban economy. These industries are closely tied to urban development, making their workers more sensitive to changes.
- Individuals with higher incomes have a stronger perception of population decline in their communities compared to those with lower incomes. However, the highest proportion of people perceiving an increase in vacant housing is found in the lowest income groups.
- Residents with longer lengths of residence are more likely to perceive a decrease in community population and an increase in vacant housing. At the city level, perceptions of a decrease in the urban population are significant among residents who have lived in their area for 4-5 years and 16-20 years. Perceptions of a declined urban economy are highest among those who have lived in their area for 16-20 years and 21-30 years.

Table 4.8 Significant Perception Differences Among Residents with Various Socioeconomic Characteristics

Age		36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	Over 80	Total	χ^2	<i>p</i>
Perceptions of Changes in Urban Economy	Decrease	0.00%	0.00%	11.11%	0.00%	12.12%	23.68%	21.05%	17.24%	40.00%	40.91%	19.72%	31.872	0.023*
	Stable	100.00%	100.00%	66.67%	52.17%	48.48%	44.74%	28.95%	44.83%	40.00%	27.27%	43.66%		
	Increase	0.00%	0.00%	22.22%	47.83%	39.39%	31.58%	50.00%	37.93%	20.00%	31.82%	36.62%		

Education		Primary school and below	Junior high school	Senior high school	Junior college	Bachelor and above	Total	χ^2	<i>p</i>
Changes in Urban Population	Decrease	28.57%	36.11%	56.00%	100.00%	100.00%	40.85%	27.371	0.001**
	Stable	34.69%	41.67%	40.00%	0.00%	0.00%	38.50%		
	Increase	36.73%	22.22%	4.00%	0.00%	0.00%	20.66%		
Changes in Urban Economy	Decrease	32.65%	39.81%	58.00%	100.00%	75.00%	43.66%	18.361	0.019*
	Stable	32.65%	40.74%	34.00%	0.00%	25.00%	36.62%		
	Increase	34.69%	19.44%	8.00%	0.00%	0.00%	19.72%		

Industry of Work	Changes in Community Population			Changes in Vacant Housing in Communities			Changes in Urban Economy		
	Decrease	Stable	Increase	Decrease	Stable	Increase	Decrease	Stable	Increase
Transportation	42.86%	50.00%	7.14%	14.29%	50.00%	35.71%	Decrease	Stable	Increase
Accommodation and Catering	28.57%	71.43%	0.00%	0.00%	71.43%	28.57%	64.29%	28.57%	7.14%
Agriculture	0.00%	65.22%	34.78%	34.78%	65.22%	0.00%	85.71%	14.29%	0.00%
Manufacturing	30.00%	35.00%	35.00%	35.00%	35.00%	30.00%	13.04%	43.48%	43.48%

Health/Social Welfare	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	45.00%	25.00%	30.00%
Residential Services	69.23%	23.08%	7.69%	7.69%	23.08%	69.23%	100.00%	0.00%	0.00%
Construction	66.67%	33.33%	0.00%	0.00%	33.33%	66.67%	53.85%	46.15%	0.00%
Wholesale and Retail	34.88%	60.47%	4.65%	4.65%	60.47%	34.88%	11.11%	77.78%	11.11%
Education	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%	30.23%	44.19%	25.58%
Public Facility Management	54.55%	45.45%	0.00%	0.00%	45.45%	54.55%	0.00%	100.00%	0.00%
Coal Industry	65.00%	15.00%	20.00%	17.50%	15.00%	67.50%	72.73%	18.18%	9.09%
Electricity/Gas/Water Production and Supply	53.33%	33.33%	13.33%	13.33%	40.00%	46.67%	52.50%	32.50%	15.00%
Others	31.25%	37.50%	31.25%	31.25%	37.50%	31.25%	40.00%	33.33%	26.67%
Total	42.25%	41.31%	16.43%	16.43%	41.78%	41.78%	56.25%	31.25%	12.50%
χ^2	65.499			65.243			44.359		
<i>p</i>	0.000**			0.000**			0.007**		

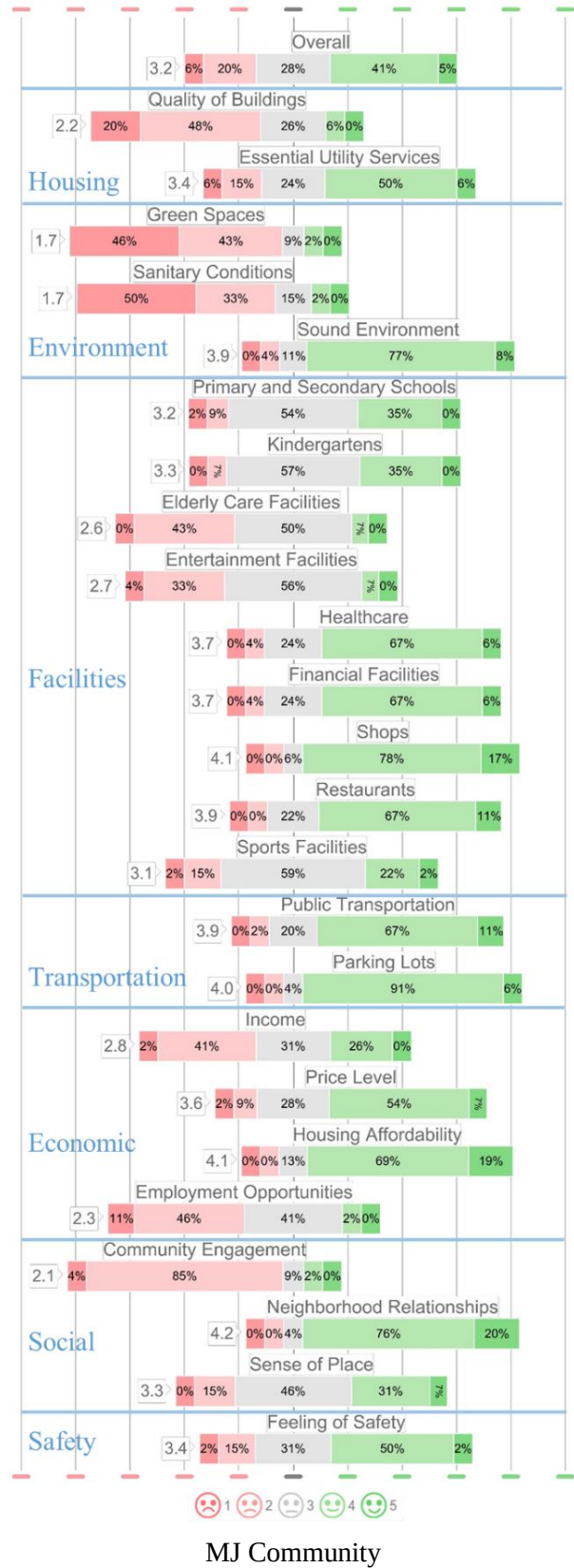
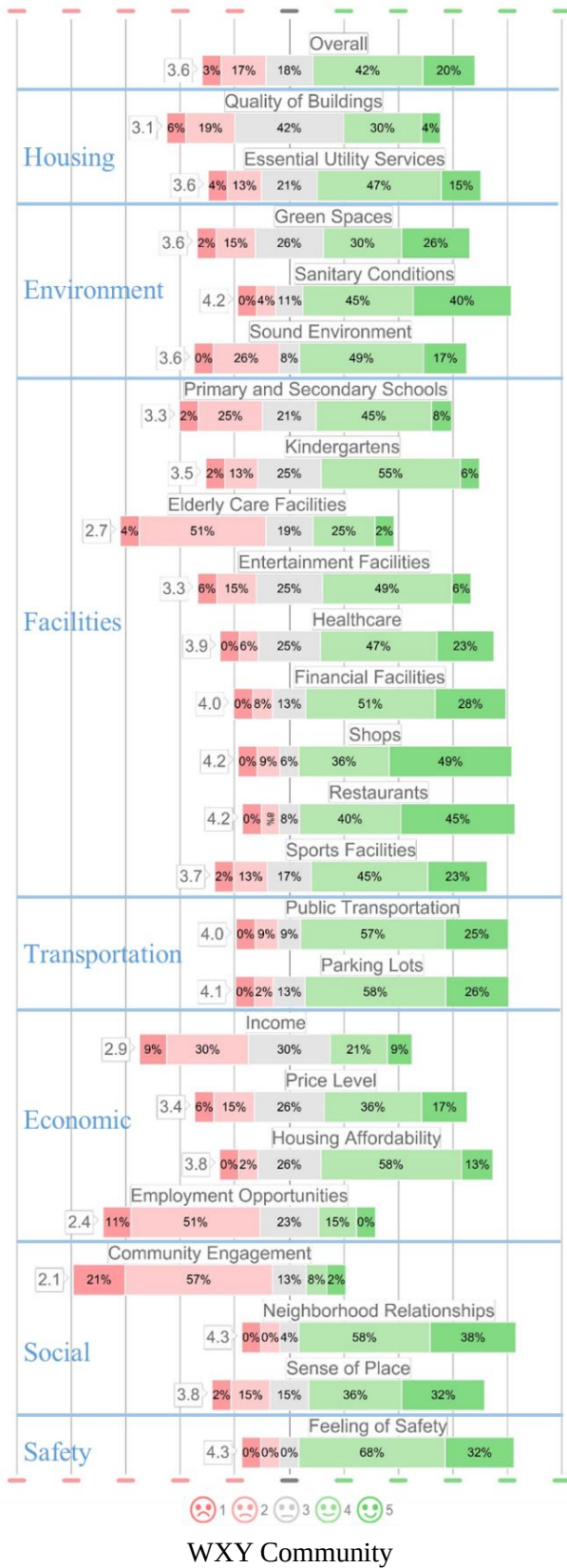
Monthly Income		Less than 1000	1000-2000	2000-3000	3000-4000	4000-5000	Total	χ^2	<i>p</i>
Changes in Community Population	Decrease	33.33%	26.00%	47.06%	47.89%	100.00%	42.25%	25.192	0.001**
	Stable	16.67%	40.00%	41.18%	45.07%	0.00%	41.31%		
	Increase	50.00%	34.00%	11.76%	7.04%	0.00%	16.43%		
Changes in Vacant Housing in Communities	Decrease	50.00%	34.00%	11.76%	7.04%	0.00%	16.43%	25.028	0.002**
	Stable	16.67%	40.00%	42.35%	45.07%	0.00%	41.78%		
	Increase	33.33%	26.00%	45.88%	47.89%	100.00%	41.78%		

Length of Residence (Year)		1-3	4-5	6-10	11-15	16-20	21-30	31-40	Over 40	Total	χ^2	<i>p</i>
Changes in Community Population	Decrease	10.53%	11.11%	32.08%	53.33%	69.39%	42.86%	40.91%	41.03%	42.25%	64.282	0.000**
	Stable	68.42%	44.44%	28.30%	26.67%	30.61%	57.14%	59.09%	51.28%	41.31%		
	Increase	21.05%	44.44%	39.62%	20.00%	0.00%	0.00%	0.00%	7.69%	16.43%		
Changes in Vacant Housing in Communities	Decrease	21.05%	44.44%	39.62%	13.33%	2.04%	0.00%	0.00%	7.69%	16.43%	60.633	0.000**
	Stable	68.42%	44.44%	28.30%	33.33%	30.61%	57.14%	59.09%	51.28%	41.78%		
	Increase	10.53%	11.11%	32.08%	53.33%	67.35%	42.86%	40.91%	41.03%	41.78%		
Changes in Urban Population	Decrease	26.32%	66.67%	47.17%	46.67%	57.14%	28.57%	40.91%	12.82%	40.85%	37.872	0.001**
	Stable	42.11%	11.11%	39.62%	20.00%	36.73%	71.43%	36.36%	46.15%	38.50%		
	Increase	31.58%	22.22%	13.21%	33.33%	6.12%	0.00%	22.73%	41.03%	20.66%		
Changes in Urban Economy	Decrease	31.58%	55.56%	49.06%	26.67%	59.18%	57.14%	36.36%	28.21%	43.66%	37.828	0.001**
	Stable	15.79%	44.44%	37.74%	33.33%	38.78%	14.29%	40.91%	43.59%	36.62%		
	Increase	52.63%	0.00%	13.21%	40.00%	2.04%	28.57%	22.73%	28.21%	19.72%		

4.4 Residents' Assessments of Community Livability

This section analyzes residents' evaluations of community livability across four communities, covering seven aspects and 24 indicators. It also compares the differences in livability evaluations among residents with different socioeconomic attributes and those with varying perceptions of urban shrinkage.

4.4.1 Evaluation of Community Livability



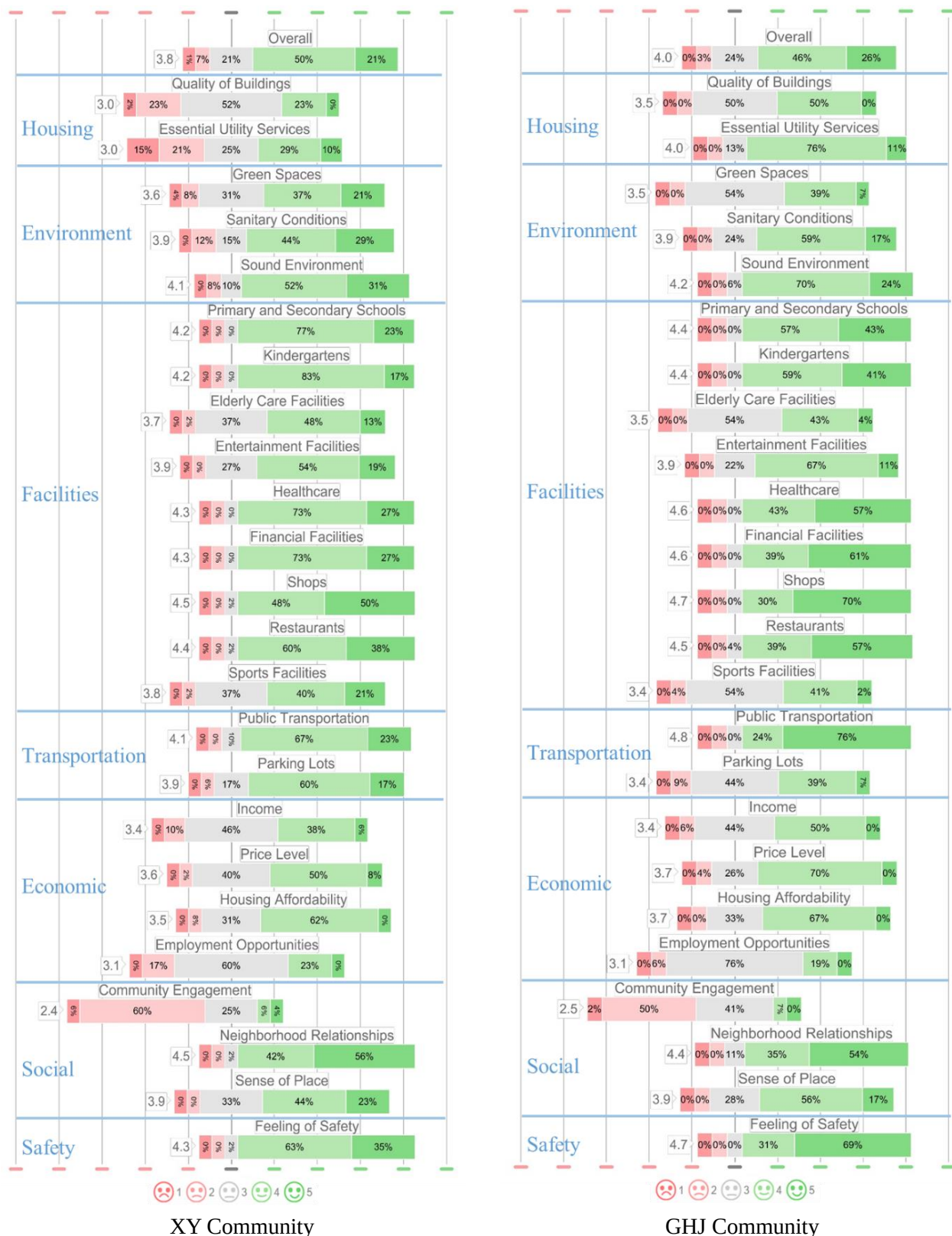


Figure 4.20 Likert Scale Chart of Residents' Assessment of Community Livability in Four Communities

Figures 4.20 presents the residents' assessments of livability in four communities, and Figure 4.21 displays the average scores for each category. In terms of overall community livability, the four communities rank from highest to lowest as follows: GHJ (Ziyang) with a score of 3.95, XY (Ziyang) with a score of 3.82, WXY (Fuxin) with a score of 3.59, and MJ (Fuxin) with a score of 3.20.

From the comparison of seven aspects of community livability in Figure 4.21(a)—Housing, Environmental Quality, Access to Services and Amenities, Transportation, Economic Stability, Social Relations, and Safety and Security—we can see that GHJ consistently scores the highest across most categories, indicating it is the most well-regarded community in terms of livability. In contrast, MJ has the lowest scores across multiple dimensions, particularly in housing, environmental quality, and economic stability. WXY and XY have generally positive scores, with WXY showing particularly strong performance in transportation and safety, and XY excelling in access to services and social relations.

Figure 4.21(b) displays the average scores for each specific item of livability. In WXY, Neighborhood Relationships (4.34), Safety (4.32), Shops (4.25), and Sanitary Conditions (4.21) rank higher, but it scores lower in Income (2.91), Elderly Care (2.7), and Job Opportunities (2.42).

One resident mentioned,

“Our neighborhood is very clean, better than the surrounding areas. We are a model community for sanitation, and the building quality is quite good for a relocated shantytown.”

Another resident said,

“There are many small shops in the neighborhood, and a morning market is not far away, making shopping very convenient. It’s also easy to take the bus.”

However, some residents complained,

“The public spaces are now entirely paved, with very few green plants.” (WXY-32)

MJ performs well in Neighborhood Relationships (4.17), Shops (4.11), Housing Affordability (4.06), and Parking Lots (4.02), but it scores lower in Building Quality (2.17), Community Engagement (2.09), Sanitary Conditions (1.69), and Green Spaces (1.67).

In interviews, a resident mentioned,

“Most of the residents are either former workers from Dongliang Mine or long-time residents of the Mijia area. We all know each other and have been neighbors for years, so the neighborhood relationships are quite good” (MJ-2).

However, many residents complained about the poor sanitation conditions in the community, saying,

“There are lots of weeds that no one clears, and there are no landscaped areas. The roads in the community are also in poor condition. On windy days, there’s dust everywhere, and on rainy days, the roads turn to mud.”

Additionally, the building quality is concerning. One interviewee reported,

“Sometimes the roof leaks, and rainwater flows into the stairwell. The concrete around some balcony windows seem to be crumbling” (MJ-22).

Regarding community engagement, residents have a low willingness to participate. One interviewee expressed,

“We are very disappointed with the community committee and the property management company. They seldom seek residents’ opinions. We’ve reported many issues, such as leaking balconies and weeds, but nothing has been resolved, so we don’t feel motivated to get involved in community affairs anymore.” (MJ-37)

In XY, items that rank higher include Neighborhood Relationships (4.54), Access to various facilities (around 4.0), Safety (4.33), and Public Transportation (4.13). However, it scores lower in Utility Services (2.96), Building Quality (2.96), and Community Engagement (2.42). Interviews showed that overall,

respondents had many positive things to say about Xiangyang Community, such as the convenience of transportation and shopping.

However, a resident mentioned,

“The building quality is not good. After all, these are old buildings made with prefabricated panels, unlike the reinforced concrete used nowadays. The roof panels are thin and sometimes leak” (XY-36).

Another resident noted,

“There are issues with the drainage system. It often gets clogged during rainy days, and we have to find someone ourselves to fix it.” (XY-4)

In GHJ, items that rank higher include Public Transportation (4.76), Safety (4.69), and Access to Shops and Schools. However, it scores lower in Parking Lots (3.44), Sports Facilities (3.41), Job Opportunities (3.13), and Community Engagement (2.54). Similar to XY Community, many residents in GHJ provided positive feedback.

Comments included,

“Living here is very convenient for grocery shopping, healthcare, and my granddaughter’s schooling,” (GHJ-7)

“The neighborhood is quite clean, with sanitation workers cleaning every day” (GHJ-9).

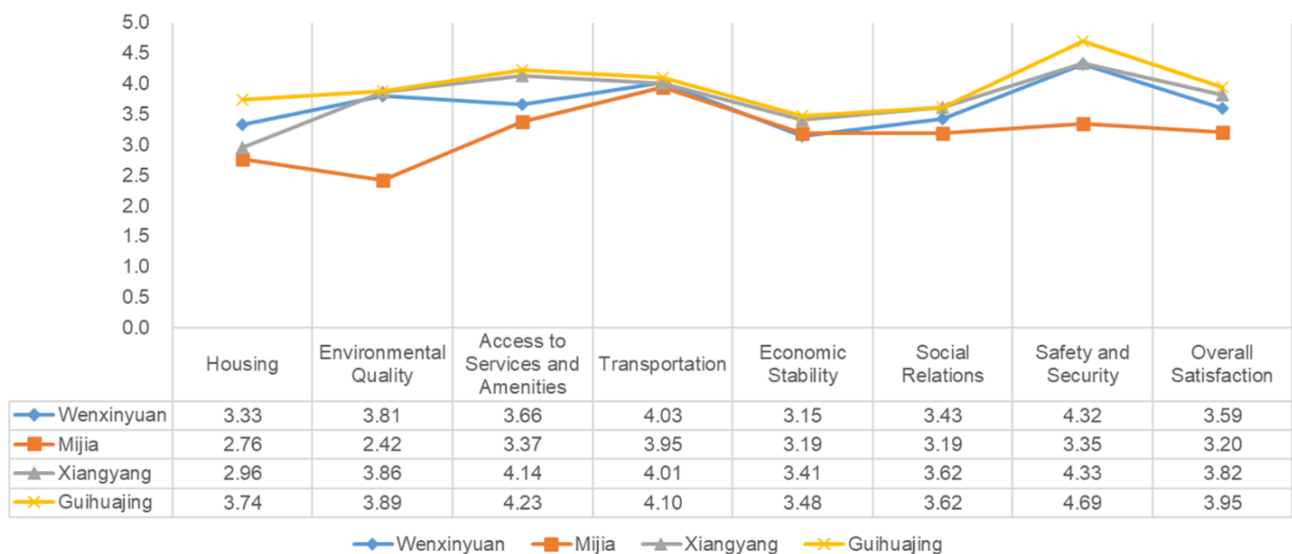
Another resident mentioned,

“The building quality is good. Even though these are older buildings, they withstood the 2008 Wenchuan earthquake and the major floods of the 1990s without any issues” (GHJ-13).

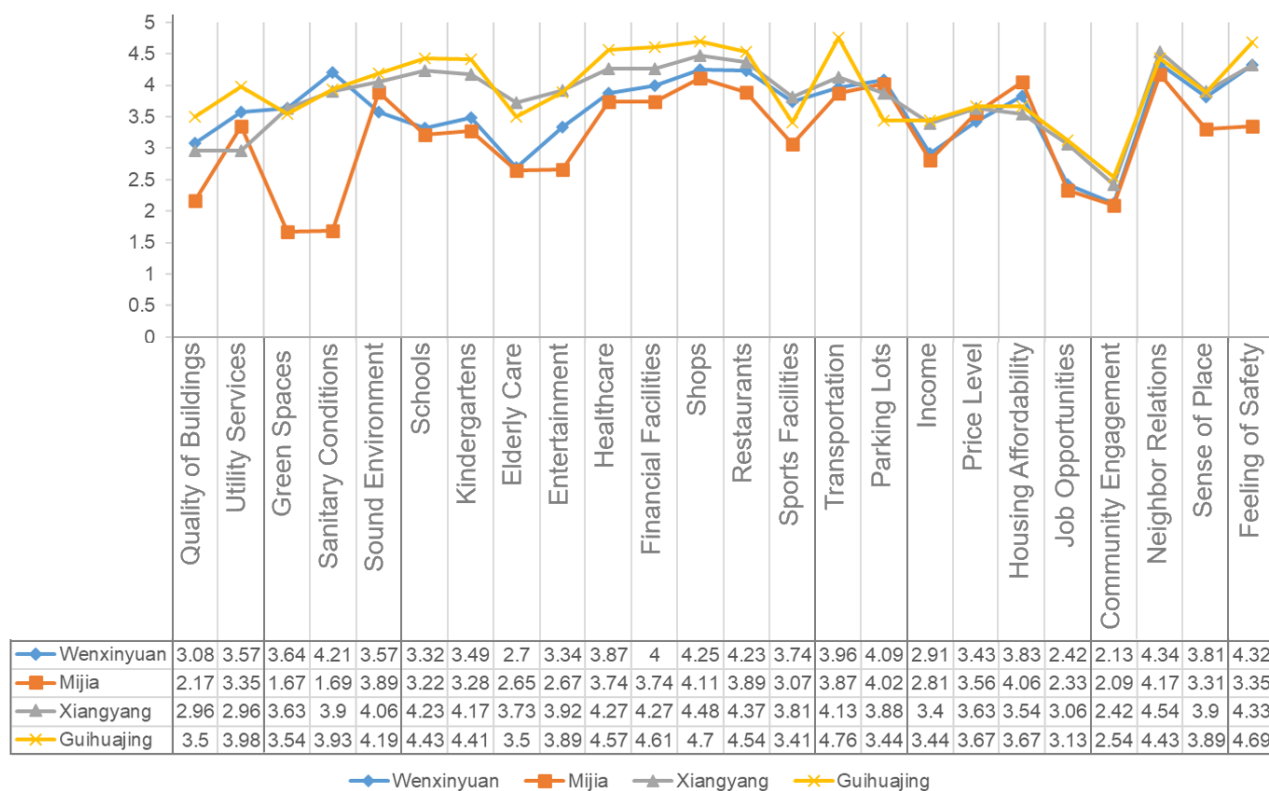
However, a few residents complained,

“The buildings are too densely packed, and there’s no place to park” (GHJ-34)

Overall, all communities generally score relatively high in Neighborhood Relationships, Feeling of Safety, and Shops. However, there is room for improvement in Quality of Buildings, Utility Services, economic aspects (especially Income and Job Opportunities), and Community Engagement.



a) Mean of Each Dimension



b) Mean of Each Indicator
Figure 4.21 Mean of Residents' Assessment in Community Livability

4.4.2 Differences in Community Livability Assessments

1) Differences Among Residents with Different Socioeconomic Characteristics

To better understand which socioeconomic attributes influence residents' evaluations of livability, this study used analysis of variance (ANOVA) to explore the differences. ANOVA is suitable for analyzing the relationship between categorical data and quantitative data.

As shown in Table 4.9, there are significant differences in overall community livability evaluations among residents of different age groups, industry of work, monthly incomes, lengths of residence, and property ownership types. However, there are no significant differences in evaluations based on gender, education level, marital status, household size, and occupation.

Age Groups

Older residents tend to give higher evaluations of livability. The highest scores are observed in the age groups 76-80 (3.85 ± 0.43) and over 80 (3.84 ± 0.44). Conversely, residents under 65 generally rate overall livability at 3.6 or below. This could be because older residents may have a longer history with the community and stronger social ties, contributing to a higher sense of satisfaction.

Industry of Employment

Residents employed in different industries show varying livability scores. Those working in Residential Services (3.88 ± 0.58), Construction (3.84 ± 0.44), Accommodation and Catering (3.80 ± 0.10), and Wholesale and Retail (3.80 ± 0.43) have higher scores. In contrast, residents working in the Coal Industry (3.35 ± 0.49)

have the lowest scores. This discrepancy is likely due to the different industries that residents in the two cities primarily work in. Coal industry workers are predominantly located in Fuxin, where community environments, especially in MJ, are less favorable, resulting in lower evaluations. Conversely, many residents working in accommodation and catering are based in Ziyang, which tends to have a higher overall evaluation.

Income Levels

Residents with a monthly income of 3000-4000 yuan (3.81 ± 0.40) have the highest score, while those with an income of less than 1000 yuan (3.39 ± 0.39) have the lowest score. This may be because higher income generally provides better access to amenities and services, while lower-income residents face fewer job opportunities, higher living costs, limited access to amenities, and fewer opportunities to improve their living conditions.

Length of Residence

Residents who have lived in the community for a longer time tend to give higher livability evaluations. Those who have lived there for more than 40 years (3.96 ± 0.34) and 31-40 years (3.95 ± 0.42) have higher scores. In contrast, residents who have lived there for 4-5 years (3.38 ± 0.43) and 6-10 years (3.32 ± 0.39) have the lowest scores. This is due to the fact that residents who have lived there for over 30 years are from Ziyang, where communities were built much earlier than in Fuxin. Additionally, long-term residents often have stronger social ties, contributing to higher assessments.

Property Ownership

Residents in Public Rental Housing (4.07 ± 0.29) have the highest score, while those with Private Ownership (3.58 ± 0.49) have the lowest score. This might be because public rental housing residents, who are typically low-income and reside in GHJ, benefit from government subsidies that make housing more affordable. They can enjoy good locations and convenient surrounding facilities at a very low cost. Moreover, residents in public rental housing might have different expectations compared to private homeowners. Since public housing represents a significant improvement over their previous living conditions, these residents may rate their livability higher. On the other hand, private homeowners, who have purchased their properties, tend to have higher expectations, leading to lower satisfaction if those expectations are not met.

Table 4.9 The Results of ANOVA for Residents with Varying Socioeconomic Characteristics

Different Socioeconomic Characteristics		Overall Community Livability
Age		
Mean ± Standard Deviation	36-40($n=1$)	2.71±null
	41-45($n=5$)	3.73±0.34
	46-50($n=9$)	3.54±0.43
	51-55($n=23$)	3.60±0.49
	56-60($n=33$)	3.37±0.44
	61-65($n=38$)	3.56±0.46
	66-70($n=38$)	3.71±0.46
	71-75($n=29$)	3.76±0.50
	76-80($n=15$)	3.85±0.43
	Over 80($n=22$)	3.84±0.44
<i>F</i>		3.043
<i>p</i>		0.002**

Gender		
Mean ± Standard Deviation	Female (n=110)	3.65±0.50
	Male (n=103)	3.63±0.45
<i>F</i>		0.136
<i>p</i>		0.712
Educational Level		
Mean ± Standard Deviation	Primary school and below (n=49)	3.58±0.42
	Junior high school (n=108)	3.67±0.53
	Senior high school or technical secondary school (n=50)	3.65±0.41
	Junior college (n=2)	3.81±0.15
	Bachelor's degree and above (n=4)	3.38±0.51
<i>F</i>		0.678
<i>p</i>		0.608
Marital Status		
Mean ± Standard Deviation	Single (n=1)	3.88±null
	Married (n=182)	3.62±0.47
	Divorced/Widowed (n=30)	3.74±0.52
<i>F</i>		1.013
<i>p</i>		0.365
Household Size		
Mean ± Standard Deviation	1 (n=30)	3.77±0.51
	2 (n=130)	3.65±0.47
	3 (n=42)	3.57±0.40
	4 (n=10)	3.32±0.67
	5 (n=1)	4.13±null
<i>F</i>		2.200
<i>p</i>		0.070
Occupation		
Mean ± Standard Deviation	Self-Employed (n=15)	3.60±0.33
	Enterprises and Institution Staff (n=6)	3.64±0.54
	Business and Service Personnel (n=8)	3.85±0.24
	Worker (n=1)	3.46±null
	Job Seeker (n=2)	3.48±0.50
	Government Employee (n=3)	3.82±0.53
	Unemployed (n=7)	3.06±0.37
	Retired (n=171)	3.65±0.49
<i>F</i>		1.903
<i>p</i>		0.071
Industry of Work		
Mean ± Standard Deviation	Transportation (n=14)	3.63±0.40
	Accommodation and Catering (n=7)	3.80±0.10
	Others (n=16)	3.39±0.53
	Agriculture (n=23)	3.54±0.37
	Manufacturing (n=20)	3.72±0.55
	Health/Social Welfare (n=1)	3.54±null
	Residential Services (n=13)	3.88±0.58
	Construction (n=9)	3.84±0.44
	Wholesale and Retail (n=43)	3.80±0.43
	Education (n=1)	3.25±null
	Public Facility Management (n=11)	3.77±0.26
	Coal Industry (n=40)	3.35±0.49
	Electricity/Gas/Water Production and Supply (n=15)	3.76±0.40
<i>F</i>		3.103
<i>p</i>		0.000**

Monthly Income Per Household Member (yuan)		
Mean ± Standard Deviation	Less than 1000 (n=6)	3.39±0.39
	1000-2000(n=50)	3.62±0.48
	2000-3000(n=85)	3.53±0.51
	3000-4000(n=71)	3.81±0.40
	4000-5000(n=1)	3.25±null
<i>F</i>		4.211
<i>p</i>		0.003**
Length of Residence (Years)		
Mean ± Standard Deviation	1-3 (n=19)	3.66±0.43
	4-5 (n=9)	3.38±0.43
	6-10 (n=53)	3.32±0.39
	11-15 (n=15)	3.79±0.24
	16-20 (n=49)	3.57±0.51
	21-30 (n=7)	3.67±0.48
	31-40 (n=22)	3.95±0.42
	More than 40 (n=39)	3.96±0.34
<i>F</i>		10.546
<i>p</i>		0.000**
Property Ownership		
Mean ± Standard Deviation	Private Ownership (n=173)	3.58±0.49
	Personal Renting (n=23)	3.75±0.30
	Public Rental Housing (n=17)	4.07±0.29
<i>F</i>		9.723
<i>p</i>		0.000**

* $p < 0.05$ ** $p < 0.01$ (Note: The overall livability is the mean of all items.)

2) Differences Among Residents Categorized by Perceptions of Urban Shrinkage

The study further investigates whether there are significant differences in livability evaluations among residents with different perceptions of urban shrinkage. Based on residents' perceptions of population and economic shrinkage, they were categorized into four groups: those who believe both population and economy have shrunk (assigned a value of 1), those who believe only population has decreased (assigned a value of 2), those who believe only economy has declined (assigned a value of 3), and those who believe neither population nor economy has shrunk (assigned a value of 4). ANOVA was used to determine whether there are significant differences in community livability evaluations among these groups.

As shown in Table 4.10, the results vary between the two cities. In Fuxin, there are significant differences in livability evaluations among the different shrinkage perception categories. Residents who believe both population and economy have shrunk give the lowest livability scores (3.26±0.49). In contrast, in Ziyang, the differences in community livability evaluations among the groups did not reach a significant level.

The discrepancy between Fuxin and Ziyang can be explained by the higher degree of urban shrinkage in Fuxin. In cities experiencing severe shrinkage, residents are more likely to notice and be affected by changes in population and economic conditions. Moreover, in Fuxin, residents who perceive both population and economic shrinkage are likely more affected by urban shrinkage. They may experience issues such as low wages, high living costs, limited access to facilities, leading to more negative evaluations of livability.

Table 4.10 The Results of ANOVA for Residents with Varying Perceptions of Urban Shrinkage

City	Category		Overall Community Livability
Fuxin	Mean $\pm$ Standard Deviation	1 - Both population and economic shrinkage (n=48)	3.26 $\pm$ 0.49
		2 - Population shrinkage without economic decline (n=15)	3.62 $\pm$ 0.44
		3 - Economic decline without population shrinkage (n=8)	3.53 $\pm$ 0.48
		4 - Neither population nor economic shrinkage (n=36)	3.45 $\pm$ 0.39
	F		3.171
	p		0.027*
Ziyang	Mean $\pm$ Standard Deviation	1 - Both population and economic shrinkage (n=19)	3.81 $\pm$ 0.37
		2 - Population shrinkage without economic decline (n=5)	3.75 $\pm$ 0.29
		3 - Economic decline without population shrinkage (n=18)	3.89 $\pm$ 0.43
		4 - Neither population nor economic shrinkage (n=64)	3.92 $\pm$ 0.32
	F		0.709
	p		0.549

* $p < 0.05$ ** $p < 0.01$

4.5 The Impact of Perceived Shrinkage on Community Livability Assessment

From the analysis in the last section, it is evident that residents' evaluations of community livability vary based on their perceptions of urban shrinkage, especially in Fuxin. Therefore, this section further utilizes linear regression analysis to explore the impact of residents' perceptions of community and urban shrinkage on their evaluations of community livability.

4.5.1 The Impact of Perceived Community Changes on Livability Assessments

In exploring the impact of community change perceptions on livability evaluation, separate regression analyses were conducted for each of the four communities. Since even within the same city, different communities have unique characteristics, separate analyses can provide clearer explanations of the influence in a particular context. For the linear regression analysis, community population decrease was coded as 1, stable population as 2, and population increase as 3; a decrease in the number of vacant housing units was coded as 1, stable number as 2, and increase in number as 3. Changes in community population and the number of vacant housing units were used as independent variables, while overall community livability was used as the dependent variable.

As shown in Table 4.11, the perception of changes in community population and vacant housing significantly impacts community livability assessment only in WXY (Fuxin). In the other communities, this impact is not significant. In WXY, the perception of population change is positively correlated with livability evaluation, meaning that residents who perceive a population decrease rate the livability lower. The perception of vacant housing changes is negatively correlated with livability evaluation, meaning that residents who perceive an increase in the number of vacant housing units rate the livability lower.

These results suggest that a slight decline in population and an increase in vacant housing do not significantly impact community livability. However, when these changes reach a certain threshold, they do affect livability. From the previous analysis on residents' perceptions of community changes, it is evident that in Ziyang's two communities, about 70% of residents believe the community population has remained stable, and only about 4% think that vacant housing has increased. Therefore, changes in population and the number of vacant housing units have had a minimal impact on the overall community environment and have not significantly influenced residents' livability evaluations. In contrast, in WXY, over 70% of residents believe that the community population has decreased, and more than half believe that vacant housing has increased. The proportion of residents perceiving a community population decrease is much higher than in MJ, where only about 35% believe the population has decreased. Thus, this significant perceived shrinkage in WXY suggests that the level of population decline and increase in vacant housing has begun to negatively affect various aspects of community life, including utility services, heating, the landscape, and neighborhood interactions, which in turn reduce the overall community livability.

Table 4.11 The Impact of Perceived Community Changes on Livability Assessments

Community	Variable	Regression Coefficient	95% CI
Fuxin - WXY	Constant	3.270** (21.736)	2.975 ~ 3.565
	Perception of Changes in Community Population	0.228* (2.401)	0.042 ~ 0.414
	R ²	0.102	
	Constant	4.110** (15.935)	3.604 ~ 4.615
	Perception of Changes in Vacant Housing in Communities	-0.200* (-2.080)	-0.389 ~ -0.012
	R ²	0.078	
Fuxin - MJ	Constant	3.027** (29.214)	2.824 ~ 3.230
	Perception of Changes in Community Population	0.081 (1.772)	-0.009 ~ 0.170
	R ²	0.057	
	Constant	3.331** (34.351)	3.141 ~ 3.521
	Perception of Changes in Vacant Housing in Communities	-0.071 (-1.532)	-0.163 ~ 0.020
	R ²	0.043	
Ziyang - XY	Constant	3.998** (21.249)	3.629 ~ 4.367
	Perception of Changes in Community Population	-0.111 (-1.008)	-0.326 ~ 0.104
	R ²	0.020	
	Constant	3.556** (13.385)	3.035 ~ 4.076
	Perception of Changes in Vacant Housing in Communities	0.111 (1.008)	-0.104 ~ 0.326
	R ²	0.020	
Ziyang - GHJ	Constant	4.014** (31.493)	3.764 ~ 4.264
	Perception of Changes in Community Population	-0.034 (-0.508)	-0.167 ~ 0.098
	R ²	0.005	
	Constant	3.876** (25.554)	3.579 ~ 4.174
	Perception of Changes in Vacant Housing in Communities	0.034 (0.508)	-0.098 ~ 0.167
	R ²	0.005	

* $p < 0.05$ ** $p < 0.01$ (The values in parentheses are t-values)

4.5.2 The Impact of Perceived Urban Shrinkage on Livability Assessments

The study then analyzed the impact of perceived urban shrinkage on community livability assessment by conducting separate regression analyses for each case study city. This approach allows for a more accurate exploration of how these factors influence livability within each urban context. For the linear regression analysis, perceptions of urban population decrease were coded as 1, stable population as 2, and population increase as 3. Similarly, perceptions of urban economic decline were coded as 1, stable economy as 2, and economic growth as 3. Urban population changes and urban economic changes were used as independent variables, while overall community livability was used as the dependent variable.

As shown in Table 4.12, in Fuxin, residents' perceptions of changes in urban economy have a significant positive impact on community livability assessment. This means that when residents perceive the city's economy as growing rather than declining, they rate the community's livability higher. However, perceptions of urban population decrease do not significantly affect community livability. In contrast, in Ziyang, neither perceptions of population decrease nor economic decline have a significant impact on community livability evaluations. This may be because economic decline directly affects residents' quality of life, such as lower income, less job opportunities, reduced community investment, and deteriorating services and infrastructure. In contrast, population decline does not immediately impact daily life as visibly as economic changes do. Residents might not feel the effects of population decline unless it reaches a critical level that affects social dynamics or leads to significant reductions in services. In Ziyang, neither perceptions of population decrease nor economic decline have a significant impact on community livability evaluations. This could be because the degree of urban shrinkage in Ziyang is less severe or noticeable compared to Fuxin. If population and economic changes are more moderate, they might not significantly impact residents' daily lives or their perceptions of community livability.

Table 4.12 The Impact of Perceived Urban Shrinkage on Community Livability Assessments

City	Variable	Regression Coefficient	95% CI
Fuxin	Constant	3.242** (30.258)	3.032 ~ 3.452
	Perception of Urban Population Changes	0.098 (1.545)	-0.026 ~ 0.223
	R ²	0.022	
	Constant	3.176** (28.990)	2.962 ~ 3.391
	Perception of Urban Economic Changes	0.134* (2.155)	0.012 ~ 0.257
	R ²	0.042	
Ziyang	Constant	3.704** (36.726)	3.506 ~ 3.901
	Perception of Urban Population Changes	0.088 (1.909)	-0.002 ~ 0.178
	R ²	0.034	
	Constant	3.773** (42.605)	3.600 ~ 3.947
	Perception of Urban Economic Changes	0.059 (1.367)	-0.025 ~ 0.143
	R ²	0.018	

* $p < 0.05$ ** $p < 0.01$ (The values in parentheses are t-values)

In Fuxin, a regression analysis was conducted to further investigate which population groups significantly experience the impact of urban economic decline on community livability. Since the independent variable is urban economic change, and income and the industry of employment are related indicators, this analysis examines whether the impact differs among residents with different income levels and those engaged in

various industries.

The results, as shown in Table 4.13, indicate that for residents with a moderate monthly income (2000-3000 RMB), the urban economic decline significantly affects their evaluation of community livability. However, this impact is not significant in other groups. This might be because that residents with a moderate income are more sensitive to economic changes due to their financial situation, making them more vulnerable to economic downturns. Additionally, compared to lower-income groups, moderate-income residents might have higher expectations for community amenities and services, which can be affected by an economic decline. This combination of vulnerability and higher expectations could be the reasons.

Table 4.13 The Impact Differences Among Residents with Different Income Levels

Monthly Income (yuan)		Regression Coefficient	95% CI	VIF	Tolerance	R ²	Adjusted R ²	F-value
Less than 2000 (n=36)	Constant	3.228** (18.751)	2.890 ~ 3.565	-	-	0.019	-0.010	$F(1,34)=0.660$, $p=0.422$
	Perception of Urban Economic Changes	0.080 (0.812)	-0.113 ~ 0.273	1.000	1.000			
2000-3000 (n=49)	Constant	3.038** (20.652)	2.749 ~ 3.326	-	-	0.089	0.089	$F(1,47)=4.576$, $p=0.038$
	Perception of Urban Economic Changes	0.180* (2.139)	0.015 ~ 0.345	1.000	1.000			
3000-5000 (n=21)	Constant	3.449** (11.052)	2.837 ~ 4.060	-	-	0.017	-0.034	$F(1,19)=0.333$, $p=0.570$
	Perception of Urban Economic Changes	0.102 (0.577)	-0.243 ~ 0.447	1.000	1.000			

* $p<0.05$ ** $p<0.01$ (t-values in parentheses)

In the analysis of residents working in different industries, small sample sizes in some industries might impact the accuracy of the regression model. To improve the model's effectiveness, industries are categorized into three major categories:

- 1) Primary Industry: Agriculture;
- 2) Secondary Industry: Manufacturing, Coal Industry, Electricity/Gas/Water Production and Supply, Construction;
- 3) Tertiary Industry: Transportation, Wholesale and Retail, Residential Services, Education, Health/Social Welfare, and Others.

The results, as shown in Table 4.14, indicate that urban economic decline significantly affects community livability evaluations for residents working in the secondary industry. However, this impact is not significant for those in the primary and tertiary industries. This significant impact on secondary industry workers could be due to the nature of their jobs. Sectors like manufacturing, coal, and construction are more directly influenced by economic cycles. Economic downturns often lead to reduced production, layoffs, and financial instability in these areas. This instability can lower the perceived livability. In contrast, the primary industry (agriculture) is less sensitive to short-term economic changes because agricultural production depends more on natural conditions. Similarly, the tertiary industry, which includes services such as retail, education, and healthcare, provides essential services and has more stable demand, making it less affected by economic downturns.

Table 4.14 The Impact Differences Among Residents Engaged in Different Industries

Industry of Employment		Regression Coefficient	95% CI	VIF	Tolerance	R ²	Adjusted R ²	F-value
Primary Industry (n=13)	Constant	3.110** (9.631)	2.477 ~ 3.743	-	-	0.051	-0.035	$F(1,11)=0.596$, $p=0.456$
	Perception of Urban Economic Changes	0.118 (0.772)	-0.182 ~ 0.418	1.000	1.000			
Secondary Industry (n=60)	Constant	3.066** (21.758)	2.790 ~ 3.342	-	-	0.095	0.080	$F(1,58)=6.111$, $p=0.016$
	Perception of Urban Economic Changes	0.196* (2.472)	0.041 ~ 0.352	1.000	1.000			
Tertiary Industry (n=34)	Constant	3.356** (15.019)	2.918 ~ 3.794	-	-	0.004	-0.028	$F(1,32)=0.116$, $p=0.736$
	Perception of Urban Economic Changes	0.049 (0.340)	-0.232 ~ 0.329	1.000	1.000			

* $p<0.05$ ** $p<0.01$ (t-values in parentheses)

4.6 Discussion and Conclusion

1) Residents' Perceptions of Urban Shrinkage

Firstly, the research findings confirm Hypothesis 1: Due to the more severe urban shrinkage in Fuxin City, residents in Fuxin have a stronger perception of urban shrinkage (both population decrease and economic decline) compared to those in Ziyang City. By comparing the shrinkage conditions of Fuxin and Ziyang, it is evident that Fuxin's shrinkage is more severe and has lasted longer. The population shrinkage in both cities started around the same time, with Fuxin slightly earlier, but the economic shrinkage in Fuxin began significantly earlier and is more severe. Consequently, the negative impacts of urban shrinkage are more pronounced in Fuxin, such as the large-scale layoffs of coal miners. Moreover, this reflects that economic shrinkage has a more profound impact than population decline, likely due to visible consequences such as job losses and reduced public services. Declining cities typically experience higher rates of poverty and have less fiscal capacity compared to growing cities (Manville & Kuhlmann, 2018). Additionally, there are significant differences in residents' perceptions of urban population shrinkage based on education level and length of residence, while perceptions of urban economic shrinkage vary significantly by age, education level, industry of employment, and length of residence.

Furthermore, regarding the perception of community decline, respondents in Fuxin generally have a stronger perception compared to those in Ziyang. However, within the cities, residents in WXY (Fuxin) have a stronger perception of shrinkage compared to those in MJ, and in Ziyang, residents in XY perceive more shrinkage than those in GHJ. This indicates that within shrinking cities, community development varies, and not all communities are declining. This variation is influenced by the location and surrounding facilities of the communities. For example, GHJ, located in the center of Ziyang's old town, has a good location and comprehensive facilities, leading to less resident outflow, fewer vacant housing units, and the weakest perception of community shrinkage among its residents. In contrast, XY, located in the relatively peripheral area of the old town, has a stronger perception of community shrinkage. Similarly, WXY in the peripheral area of Fuxin's old town also has a strong perception of shrinkage. Notably, MJ, located in the suburbs, has relatively fewer residents perceiving community decline due to its low housing prices attracting many rural migrants from the surrounding areas. Additionally, residents' perceptions of community shrinkage significantly vary by industry of employment, income level, and length of residence.

Murdoch III's (2018) study also shows the diversity of community development within shrinking cities. It suggests that communities with diverse economies generally face less shrinkage compared to those with more specialized economies. However, this variation is affected by several other factors, such as high population shrinkage in nearby neighborhoods, rental and seasonal housing, remote workers, large families, and higher levels of income, education, single and nonfamily populations, and migration (Murdoch III, 2018).

2) Residents' Evaluation of Community Livability

The research findings support Hypothesis 2: Since Ziyang City's economic situation is better than that of Fuxin City, it is likely that more investment has been made in community development and public services, resulting in higher community livability ratings among Ziyang residents. By comparing the ratings of specific indicators of community livability, it is clear that the two communities in Ziyang rate higher than those in Fuxin in terms of facilities (such as schools, kindergartens, elderly care, entertainment, healthcare, shops), and public transportation. This is closely related to the local financial situation. Within the cities, communities with better locations receive higher livability ratings, with differences mainly evident in environmental quality, access to services and amenities, and safety and security. Additionally, there are significant differences in residents' evaluations of community livability based on age, industry of employment, income level, length of residence, and property ownership status.

3) Impact of Perceived Shrinkage on Community Livability

The research findings partially support Hypothesis 3: Perceptions of urban shrinkage will affect community livability assessments. However, this hypothesis is only valid in Fuxin City. This indicates that the deterioration of community environment, functions, and social relations only becomes apparent after urban shrinkage reaches a certain extent. This result may also be related to the fact that Fuxin's shrinkage is due to the decline of the coal industry. As Barreira et al. (2017) demonstrated in their study of shrinking cities in Portugal, shrinkage caused by deindustrialization processes is detrimental to residential satisfaction.

Additionally, economic decline has a greater impact on livability than population decrease. Economic decline affects residents' employment opportunities and income levels, influencing their assessments of economic stability. Additionally, economic decline affects local government revenue, impacting the supply and maintenance of essential utility services and facilities, and public transportation. Thus, economic decline has a greater negative impact on people than population decrease. The impact of economic decline perceptions on community livability is most significant among residents with medium incomes (monthly income of 2000-3000 yuan) and those working in secondary industries. Therefore, if city economy is stable, it might be possible for a city to experience a population decrease while still providing a high quality of life for its residents. Several studies also indicate high residential satisfaction in shrinking cities. For instance, Pittsburgh has managed to maintain a high quality of life for both wealthy and low-income residents despite ongoing population decline (Hollander et al., 2009). Similarly, in Yichun City, China, urban shrinkage did not significantly decrease residents' overall life satisfaction. While the lack of employment opportunities, decline in the urban landscape, and reduced livability had negative effects, improvements in the environment and reduced life pressures associated with shrinkage contributed to

increased life satisfaction (Fu et al., 2022).

Regarding the impact of community shrinkage perceptions on community livability, in WXY (Fuxin), residents' perceptions of population decrease and an increase in vacant housing negatively affect community livability. This supports the findings by Lee et al. (2024), which show that neighborhood abandonment is negatively associated with neighborhood satisfaction. In other communities, this impact is not significant, indicating that the current impact of community shrinkage on residents' lives is not yet significant. Since the residential buildings in the case study are multi-story buildings, unlike the predominantly single-family homes in shrinking communities in other countries such as the United States, the appearance of vacant housing has not yet led to environmental deterioration. However, the WXY case highlights the potential problems brought by community shrinkage. When the population decreases or the vacant housing increases to a certain extent, the impact becomes apparent. The more noticeable perception in WXY is due to the increased number of vacant housing units affecting heating efficiency and housing prices, while MJ remains relatively stable due to a balanced number of residents moving in and out in recent years. In the two communities in Ziyang, there are no winter heating, and only a few residents believe that population decrease affects neighborhood interactions. Additionally, since the communities still have a large population, the slight population decrease is not yet significant. In summary, although the direct impact of population decreases and vacant housing is not yet apparent, early signs of potential problems in infrastructure, the housing market, and community interactions are emerging and require timely attention.

Notes

(1) WXY-2 represents the respondent of the second valid questionnaire from the WXY community.

References

- Barreira, A. P., Agapito, D., Panagopoulos, T., & Guimarães, M. H. (2017). Exploring residential satisfaction in shrinking cities: A decision-tree approach. *Urban research & practice*, 10(2), 156-177.
- Balaban, O., & Puppim de Oliveira, J. A. (2022). Finding sustainable mobility solutions for shrinking cities: the case of Toyama and Kanazawa. *Journal of Place Management and Development*, 15(1), 20-39.
- China Energy News (CEN) (2017). The path of 'rebuilding a career' of Fuxin's wind power industry. 20th March.
- Elshof, H., & Bailey, A. (2015). The role of responses to experiences of rural population decline in the social capital of families. *Journal of Rural and Community Development*, 10(1).
- Fu, H., Zhou, G., Sun, H., & Liu, Y. (2022). Life satisfaction and migration intention of residents in shrinking cities: Case of Yichun City in China. *Journal of Urban Planning and Development*, 148(1), 05021062.
- Galster, G. (2019). Why shrinking cities are not mirror images of growing cities: A research agenda of six testable propositions. *Urban Affairs Review*, 55(1), 355-372.
- Guimarães, M. H., Nunes, L. C., Barreira, A. P., & Panagopoulos, T. (2016). Residents' preferred policy actions for shrinking cities. *Policy Studies*, 37(3), 254-273.

- Hospers, G. J. (2014). Policy responses to urban shrinkage: From growth thinking to civic engagement. *European planning studies*, 22(7), 1507-1523.
- Hollander, J. B., Pallagst, K., Schwarz, T., & Popper, F. J. (2009). Planning shrinking cities. *Progress in planning*, 72(4), 223-232.
- Hollander, J. B. (2010). Moving toward a shrinking cities metric: Analyzing land use changes associated with depopulation in Flint, Michigan. *Cityscape*, 12(1), 133-151.
- Hu, X., & Yang, C. (2018). Building a role model for rust belt cities? Fuxin's economic revitalization in question. *Cities*, 72, 245-251.
- Li, H., Zhang, P., & Cheng, Y. (2009). Economic vulnerability of mining city: A case study of Fuxin city, Liaoning Province, China. *Chinese Geographical Science*, 19, 211–218.
- Lewis, O. (2022). A growing field in shrinking cities: a literature review on shrinkage and urban green space. *Handbook on shrinking cities*, 236-249.
- Lee, R. J., Newman, G., & Day, W. (2024). Neighborhood abandonment and quality of life: A comparison of neighborhood satisfaction and housing value measures. *Cities*, 150, 105011.
- Murdoch III, J. (2018). Specialized vs. diversified: The role of neighborhood economies in shrinking cities. *Cities*, 75, 30-37.
- Manville, M., & Kuhlmann, D. (2018). The social and fiscal consequences of urban decline: Evidence from large American cities, 1980–2010. *Urban affairs review*, 54(3), 451-489.
- Ročák, M. (2022). Understanding the role of social capital in regenerating shrinking cities: Insights from the Netherlands. In *Handbook on Shrinking Cities* (pp. 80-93). Edward Elgar Publishing.
- Zhang, P. (2008). Revitalizing old industrial base of Northeast China: Process, policy and challenge. *Chinese Geographical Science*, 18, 109–118.

Chapter 5

5. Government-led Community Renovation Projects and Their Impacts on Community Livability

This chapter reviews the policy background, implementation process, content, and participants of the government-led community renovation projects in two cities. It also details the renovation process of four case study communities. Through surveys and interviews, residents' satisfaction with the renovation projects was assessed, identifying specific areas of satisfaction and dissatisfaction and their underlying causes. Regression analysis was then used to explore whether the renovation projects enhance the assessments of community livability. Finally, based on interview data, the chapter analyzes the reasons for the varying effectiveness of renovation projects across different communities and outlines the challenges faced.

5.1 Methodology

First, through the conduction of interviews and review of news reports, literature, and other relevant sources, the overall progress of the community renovation projects in Fuxin City, Ziyang City, and four case study communities was investigated.

Second, a questionnaire survey was conducted among residents to evaluate their overall satisfaction with the renovation projects, utilizing a Likert five-point scale (1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, 5 = very satisfied). Additionally, inquiries were made about the specific aspects of the renovation they were satisfied and dissatisfied with. Follow-up interviews were conducted to gain deeper insights into the changes pre- and post-renovation, as well as the underlying causes of any dissatisfaction.

Finally, regression analysis was employed to examine whether the renovation projects had an impact on enhancing community livability. Furthermore, by conducting separate regression analyses for residents with different socioeconomic attributes, the demographic groups that were most significantly affected were identified.

5.2 Community Renovation Projects in Case Study Sites

5.2.1 In Fuxin City

(1) The Overall Situation of the Renovation Projects in Fuxin

In Fuxin City, many old residential communities and early shantytown resettlement communities are in a state of disrepair, lack maintenance, and suffer from inadequate municipal and community service facilities. To address this, Fuxin City has implemented several renovation policies aimed at these residential areas. In

2018, the Fuxin Municipal Government issued the “Renovation and Maintenance Implementation Plan for Early Shantytown Resettlement Communities,” specifically targeting shantytown resettlement communities approved before the end of 2009. In 2019, responding to the central government’s call, Fuxin City initiated renovation projects for old residential areas. The city government required the renovation of early shantytown resettlement communities must meet the standards set for the renovation of old residential areas.

A leadership group was established, headed by the deputy mayor, with members from the Municipal Organization Department, the Development and Reform Commission, the Finance Bureau, the Housing and Urban-Rural Development Bureau, the Public Security Bureau, as well as the Fuxin Power Supply Company, the Taxation Company, and the Heating Company. Each district government is the main responsible entity for the renovation, with districts further incorporating street offices, community committees, and other entities into the working group.

The renovation targets residential communities that are in disrepair, lack proper management, and have inadequate municipal and community service facilities. The renovation content includes:

- a) Repair of the main buildings and ancillary facilities, including roof, exterior walls, stairs, and other public areas, as well as energy efficiency improvements. In suitable communities, elevators may be added, with space reserved for elevator installation during underground pipeline renovations.
- b) Upgrading municipal infrastructure, including water supply, drainage, electricity, gas, heating, roads, and communication facilities both within the communities and immediately outside, as well as the organization or underground placement of overhead lines.
- c) Improving the community environment and facilities, including demolishing illegal structures, environmental management, waste sorting, accessibility, elderly-friendly facilities, security, lighting, fire safety, landscaping, smart mailboxes, cultural and recreational facilities, fitness equipment, property management offices, and parking lots.
- d) Supporting the construction of social service facilities, including community service centers, health services, elderly care, childcare, meal assistance, housekeeping, convenience markets, and convenience stores.
- e) Implementing closed management to facilitate property management.
- f) Developing smart communities by leveraging internet and IoT technologies, installing video surveillance, facial recognition, access control systems, and other devices to enhance intelligent management of old residential areas.

(Source: 2020 Fuxin City Urban Old Residential Community Renovation Implementation Plan)

The government has proposed that during the implementation process, the renovation contents can be categorized into basic, improvement, and enhancement classes (Figure 5.1). Based on the actual conditions of each residential area and the availability of renovation funds, the renovations should follow the principle of addressing basic needs first, followed by improvements, and then enhancements. (Source: 2020 Fuxin City Urban Old Residential Community Renovation Implementation Plan)

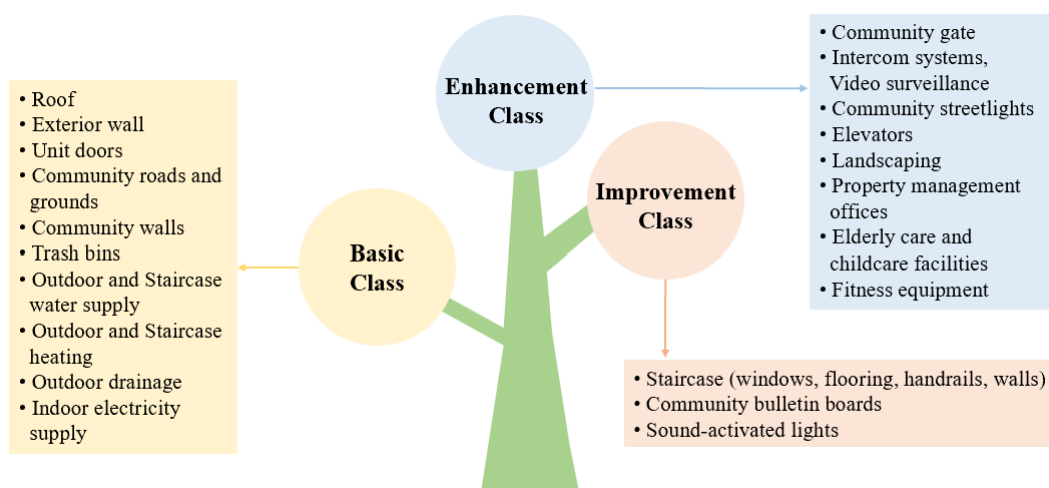


Figure 5.1 Categorization of Specific Renovation Contents in Fuxin

The funding sources for the project mainly come from three areas: a) Provincial subsidies, central budgetary investments, and other renovation-specific funds. b) Professional operating units responsible for upgrading water supply, drainage, electricity, heating, gas, and telecommunications facilities will bear the primary funding responsibility and oversee implementation. c) Following the principle of “those who benefit should contribute,” each district will determine the cost-sharing rules based on local conditions, clearly defining residents’ financial responsibilities.

The entire renovation process can be divided into four stages (Figure 5.2): project initiation, project construction, construction inspection and handover, and post-management. The district government is the responsible entity, overseeing overall advancement and process supervision.

1) Project Initiation Stage: The district government, along with sub-district offices (“Jiedao”) and community committees, will inform residents about the community renovation policies, organize resident representatives to participate in the renovation work, and solicit opinions from community members. The housing and urban-rural development departments will compile the renovation plan based on residents’ concerns and suggestions, and create a schedule for on-site construction and subsequent management. Multiple funding sources will be mobilized. Additionally, the housing and urban-rural development departments will handle necessary approvals related to land, construction, fire safety, and environmental protection. Prior to construction, a bidding process will be conducted to select the construction contractor.

2) Project Construction Stage: The construction contractor selected through the bidding process, along with professional operating units for water supply, electricity, gas, and other services, will carry out the construction. The construction will follow the principles of “main structure first, then auxiliary facilities; building first, then ground; above ground first, then underground.” The housing and urban-rural development departments will coordinate the contractors and manage the progress.

3) Construction Inspection and Handover: Comprehensive inspections will be carried out by the housing and urban-rural development departments, along with the development and reform commissions. Once the inspection is passed, the relevant facilities will be handed over to the subsequent management units. The sub-district offices will organize the community’s self-governing institutions to take over the facilities and evaluate the satisfaction with renovation.

4) Post-Management: Homeowners’ associations will be established, and a commercial property management model will be introduced. For communities where commercial property management is not

feasible, self-management and self-governance will be implemented.

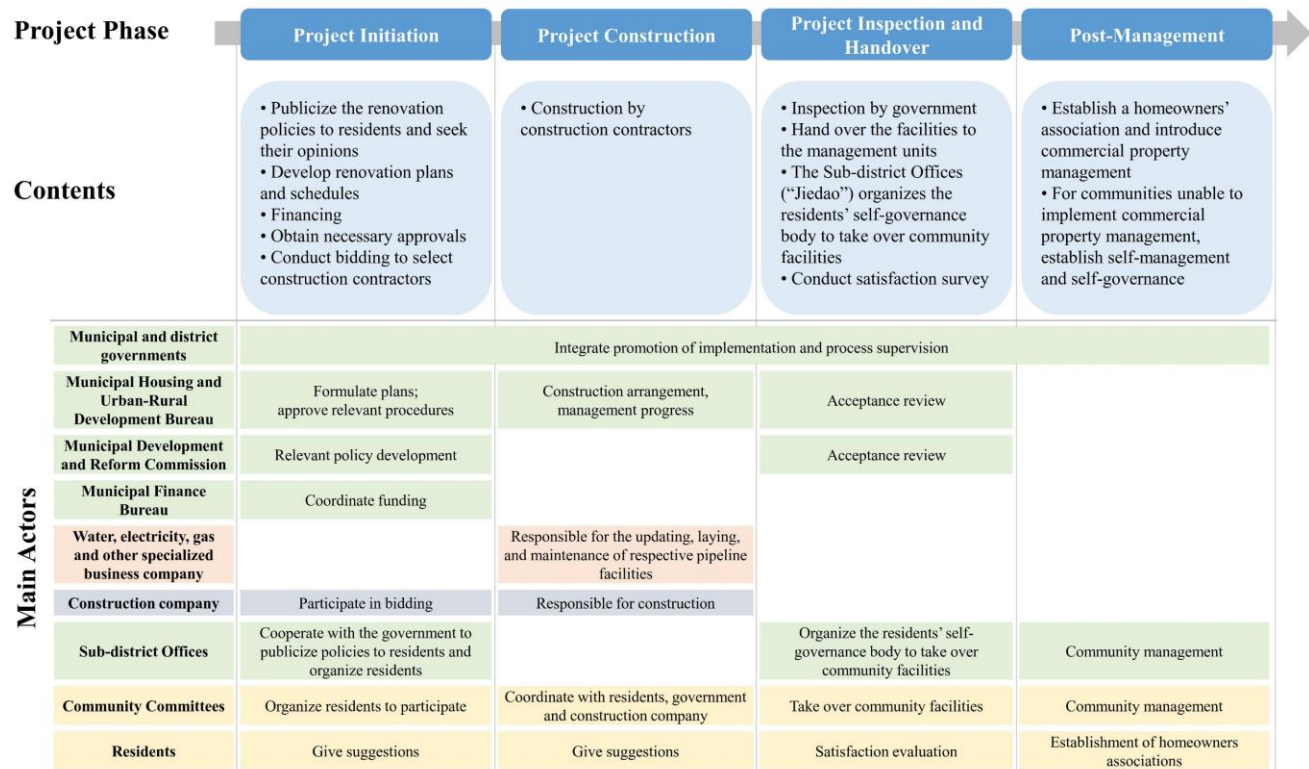


Figure 5.2 Process of Community Renovation Project in Fuxin

(2) The Renovation in WXY Community

The WXY community embarked on the renovation project starting in 2019, which continues to this day with various improvements being made annually (Figure 5.3). It aims to enhance the living conditions, addressing both infrastructure and environmental needs.

At the end of 2018, the Haizhou District Shantytown Renovation Office in Fuxin City initiated the bidding process for the construction contractors. The renovation began in 2019 with an estimated budget of approximately 13 million RMB. The scope of the work included roof waterproofing, exterior wall insulation, repairs to downspouts and water funnels, and repainting of stairwells. In 2020, a new perimeter wall was constructed, and an intelligent recognition barrier gate was installed at the community's main entrance. Previously, the lack of fencing allowed unrestricted access, negatively impacting the community environment and residents' sense of security, prompting strong concerns from the residents. Additionally, the community initially had many trees and overgrown areas, leading to a somewhat disorganized green space. The landscaping was improved to create a more organized green space, and small community squares were constructed. Additionally, the roads and public areas were paved with durable materials. The unit entrance doors were also replaced to enhance security and appearance.

In 2021, leveraging the central policy for maintaining and renovating the infrastructure of state-owned enterprises in Haizhou District, the community began overhauling the heating, water, and drainage systems. This project was undertaken by Fuxin Haifa Construction Engineering Co., Ltd. The first phase in 2021 focused on upgrading the heating pipelines. In 2022, the community implemented an improvement project

for the water supply network, handled by Fuxin Water Group Co., Ltd. The original PVC pipes, which had aged and frequently leaked, were replaced with 7.67 kilometers of ductile iron pipes, significantly reducing the leakage rate. In 2023, the renovation project included upgrading the gas pipelines. Furthermore, electric vehicle charging station wiring was installed.

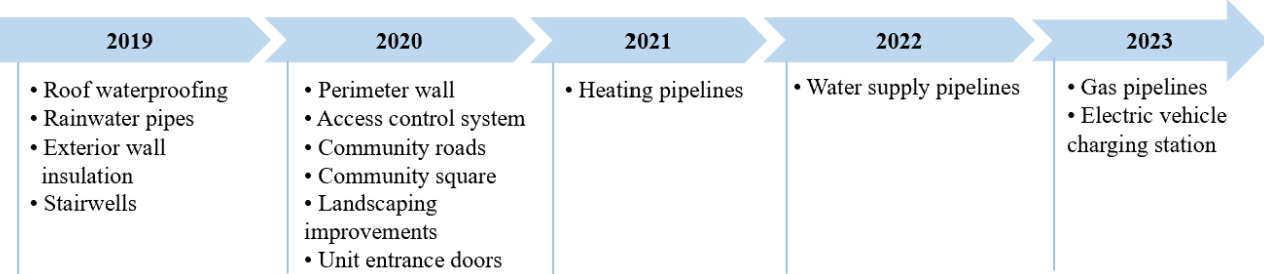


Figure 5.3 Renovation Timeline of WXY Community



Figure 5.4 Scenes During and After the Renovation (WXY)

(3) The Renovation in MJ Community

The renovation of MJ Community began later than that of WXY. In 2022, the Taiping District Government of Fuxin City identified the renovation of MJ Community as a key project to improve living conditions and promote the creation of a civilized city. The Taiping District Housing and Urban-Rural Development Bureau conducted multiple on-site surveys in the community. They held special meetings to address issues

such as aging heating pipelines and roof leaks, established a dedicated project team, and formulated a construction plan along with project supervisors.

The renovation focused primarily on basic infrastructure projects, including a) Building Renovations: Roof waterproofing for both accessible and non-accessible roofs, Stairwell heating, Exterior wall painting; b) Outdoor Facilities Renovations: Heating pipelines, Road sewage manhole covers, Water pipelines. Before the renovation, the heating pipelines in the buildings were all iron pipes, which had gradually aged over time, resulting in inefficient heating. During the renovation, the iron pipes were replaced with heat-fused pipes. Additionally, the water supply pipes were upgraded to reduce leaks. Missing or damaged sewage manhole covers on the roads were also repaired to ensure road safety.

In 2023, the community embarked on the construction of a community canteen as part of its enhancement projects. With over half of the local population being elderly, including nearly 300 individuals who are extremely poor, live alone, are widowed, or are very old and childless, cooking and eating independently had become a significant challenge. To address the dining needs of the elderly, Sunjiawan sub-district, which includes MJ Community, received support from the Municipal Civil Affairs Bureau and a 100,000 RMB renovation fund from the Municipal Charity Association. The community repurposed an unused building, renovated it, and selected a professional catering company to operate the canteen. The hall, with a building area of 400 square meters and a capacity to accommodate 100 people at once, began operations in May 2023. In 2023, the government also planned to use small unused plots on the east and south sides of MJ to construct pocket parks; however, construction has not yet started.

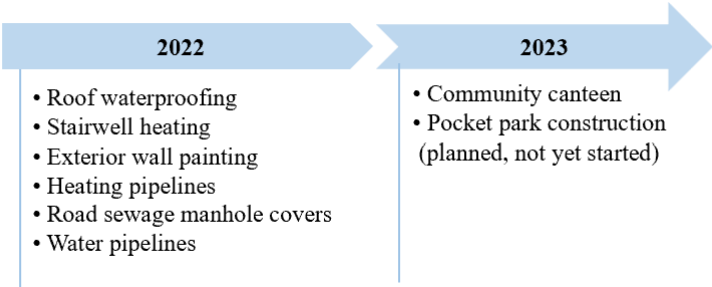


Figure 5.5 Renovation Timeline of MJ Community



a) Roof waterproofing renovation



b) Water pipeline renovation



c) Renovated community square



d) Newly built community canteen

Figure 5.6 Scenes During and After the Renovation (MJ)

5.2.2 In Ziyang City

(1) The Overall Situation of the Renovation Projects in Ziyang

Most of the old residential communities in Ziyang were built in the 1980s and 1990s and are concentrated in densely populated urban areas. These neighborhoods face significant issues, including damaged roads, overflowing sewage, lack of streetlights, chaotic parking, and littering. In response to the national policy promoting the renovation of old residential areas, Ziyang has launched a renovation project for these communities, making it a key civic improvement initiative. In 2020, the Ziyang municipal government released “The Implementation Plan for the Renovation of Old Residential Communities in the City’s Central Area.” The plan emphasizes government leadership and community collaboration. It aims to strengthen the government’s guiding role and leverage the leadership of sub-district offices and community committees in the renovation process. The plan respects the primary role of residents, encouraging their initiative for renovation while mobilizing various social forces to participate in the entire renovation process. District governments are responsible for the renovation within their jurisdictions, with sub-district offices and community committees handling specific implementations. Relevant municipal departments provide policy support and technical guidance.

The renovation targets primarily residential communities in the central urban area that were built before the end of 2000. These communities must have legal property rights, safe building structures, and be unsuitable for complete demolition and reconstruction. They should also suffer from severe neglect, incomplete municipal facilities, inadequate social services, insufficient community service capabilities, and a strong desire for renovation among residents. In 2020 and 2021, Ziyang completed the renovation of 132 old residential communities. The plan for 2022 aimed to renovate 202 communities, benefiting over 17,000 households. In 2023, 91 old residential communities were renovated. The city plans to complete the renovation of 939 communities, encompassing 94,000 households, 3,629 buildings, and 9.14 million square meters by 2025 (according to the Ziyang Municipal Housing and Urban-Rural Development Bureau).

The renovation contents can be divided into three categories (Figure 5.7): basic, improvement, and enhancement.

a) Basic renovations include addressing fire hazards, environmental sanitation, illegal constructions, and housing safety issues. It also covers the basic renovation of electrical facilities, water supply and drainage

networks, natural gas facilities, damaged roads and auxiliary facilities, and lighting facilities.

b) Improvement renovations focus on greening and landscaping within the community, security facilities, parking management, sports and fitness facilities, building, convenience facilities, cultural facilities, elevator installations, public management rooms, and overall management level.

c) Enhancement renovations involve the construction and smart upgrading of public service facilities around the community. This includes the renovation or construction of comprehensive community service facilities, public health facilities such as health service stations, educational facilities like kindergartens, intelligent sensing facilities for perimeter protection, and community-specific service facilities such as elderly care, childcare, meal assistance, housekeeping, convenience markets, convenience stores, and postal service stations.

The renovation content for each community is determined by comprehensively considering various factors such as the location conditions, current characteristics, project packaging, and residents' demands. (Source: The Implementation Plan for the Renovation of Old Residential Communities in the City's Central Area.)

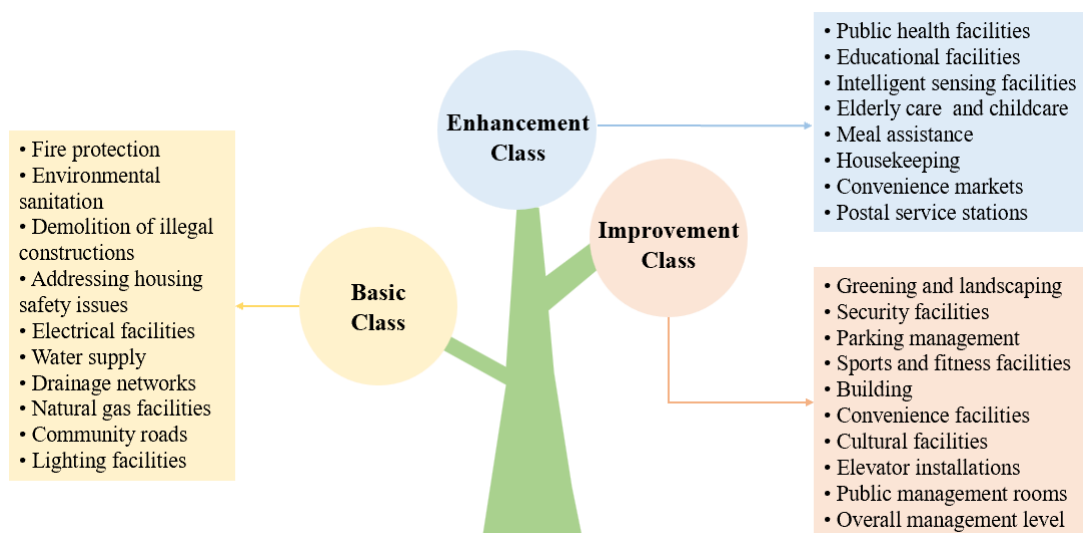


Figure 5.7 Categorization of Specific Renovation Contents in Ziyang

The Ziyang municipal government has proposed multiple channels to raise funds for the project. a) First, government fiscal funds include provincial subsidy funds and central budgetary investments. When central and provincial government subsidies are insufficient, local government special bonds can be issued to ensure funding, with city and district finances sharing the costs equally. Professional operating units such as water, electricity, and gas are also expected to contribute to relevant pipeline renovations, with partial government funding. b) Second, homeowner funds. Residents are encouraged to participate in the renovation by sharing costs, surrendering community public income, and using special maintenance funds for residential properties. They are also encouraged to support the renovation through donations, voluntary labor, and materials. Homeowners can withdraw from their housing provident funds for home improvements such as elevator installations. c) Third, social funds. Original property owners are encouraged to financially support the renovation of their employees' residential communities. Public housing property owners should contribute to the renovation. The government will also coordinate with policy banks to increase loan support. Commercial banks, insurance companies, and other financial institutions are encouraged to provide loan support. d) Fourth, professional operating units participating in

the renovation will receive tax and fee reductions, such as for institutions providing elderly care, childcare, and housekeeping services in the community.

The project implementation process can be divided into four stages (Figure 5.8): project initiation, project construction, project inspection and acceptance, and project handover and post-management.

- 1) Project Initiation: First, establish a community self-governance organization (such as a homeowners' association) to handle policy promotion, opinion collection, drafting of renovation content lists and so on. Then, apply for the project. Conduct intention collection through surveys, courtyard meetings. After public announcement and approval, submit the renovation application. Next, submit the annual renovation plan, conduct a fiscal capacity assessment, and after approval by the municipal government, send it to the Provincial government. Finally, develop the plan. Design the scheme based on residents' demands, encourage designers and engineers to engage with the community, and create targeted renovation plans.
- 2) Project Construction: Organize and construct according to legal construction procedures, handle conflict resolution, and demolish illegal constructions. Follow the principle of "function before landscape, underground before above ground, inside the community before outside the community" during construction.
- 3) Project Inspection and Acceptance: The district government is responsible for project acceptance, project handover, and performance evaluation. For construction project completion acceptance, report to the housing and urban-rural development authorities for record.
- 4) Project Handover and Post-management: Hands over the renovation project to the respective sub-district offices (community self-governance organizations) or property management companies. Initiate property management services or self-governance management. Evaluate the project's renovation effectiveness, conduct resident satisfaction surveys.

The entire process involves multiple entities:

- a) Each district government is the responsible entity, overseeing the comprehensive promotion and organization of renovation work, project application, plan submission, fiscal capacity assessment, project quality and safety supervision, project acceptance and handover.
- b) The Municipal Housing and Urban-Rural Development Bureau leads efforts to secure higher-level subsidy funds and guides the renovation and maintenance of municipal roads, landscaping, and water and gas pipelines in old residential areas.
- c) The Municipal Development and Reform Commission is responsible for project initiation guidance.
- d) The Municipal Finance Bureau coordinates and allocates fiscal investment funds.
- e) The Municipal Bureau of Natural Resources and Planning provides renovation-related planning services and handles real estate registration for new, renovated, and expanded projects.
- f) The Municipal Bureau of Urban Management and Administrative Law Enforcement addresses illegal constructions and supervises the regulation of street-facing shops in residential areas.
- g) The Municipal Bureau of Civil Affairs guides the establishment of community self-governance organizations.
- h) Specialized business company for water, electricity, and gas are responsible for updating, laying, and maintaining their respective pipeline facilities.

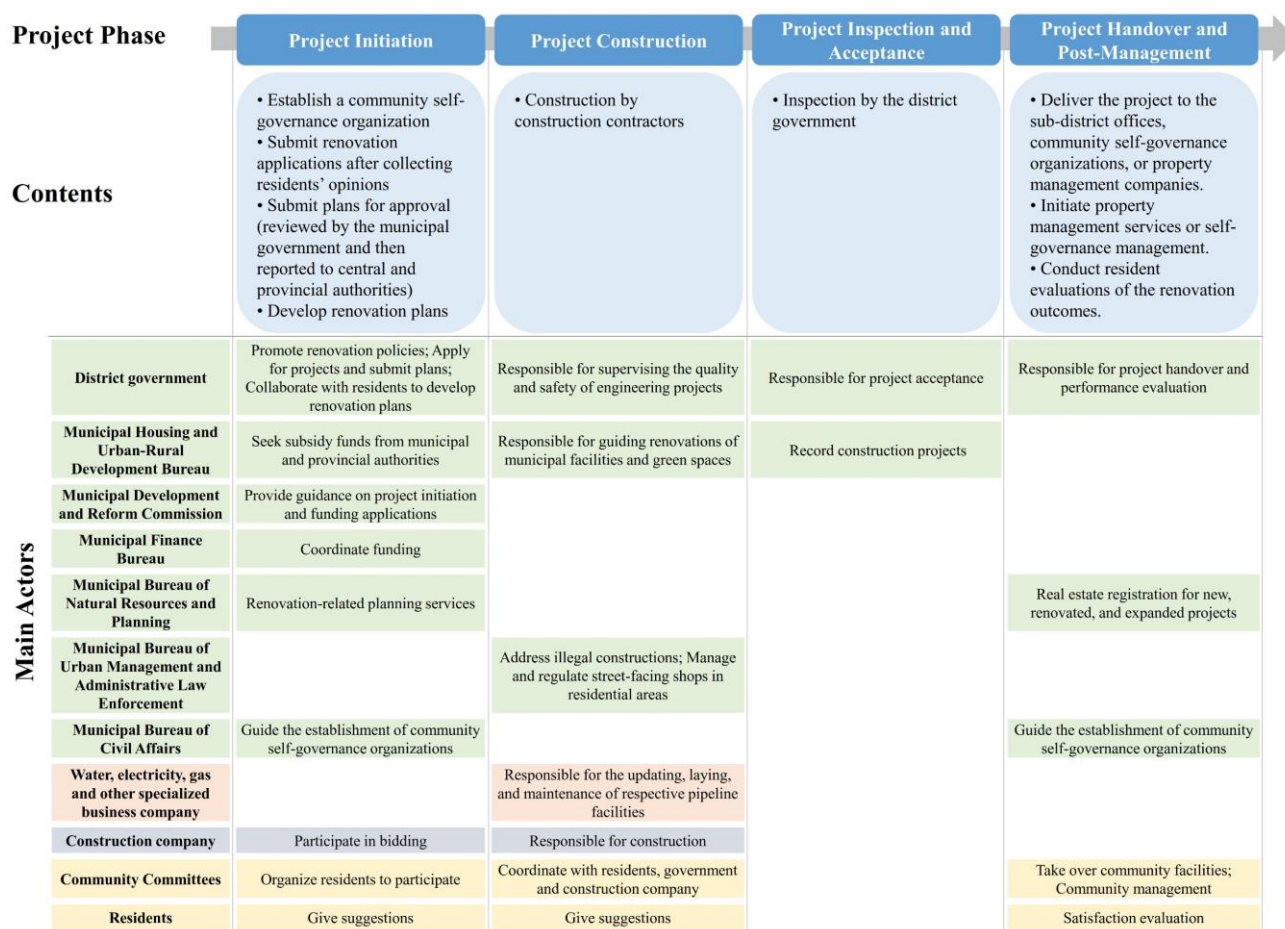


Figure 5.8 Process of Community Renovation Project in Ziyang

(2) The Renovation in XY Community

In the XY community, the residential buildings are old, with outdated infrastructure, numerous illegal structures, poor living conditions, aging electrical wiring, and difficulties in traveling during rainy days. The residents have a strong desire for renovation. With the support of the municipal government, the community began renovation at the end of 2018. The project involves 1,447 households, 48 buildings, and a construction area of approximately 105,100 square meters. Initially, the Urban Management Bureau and the community committee conducted a survey of illegal structures and promoted the renovation policy. In March 2019, the demolition of illegal structures officially began. Due to the complexity of the situation, the work was challenging. From March to August, the Urban Management Bureau, sanitation workers, and community committee were consolidated and demolished more than 18,000 square meters of illegal structures.

In October 2020, renovation construction began, encompassing basic, improvement, and enhancement projects. Specific contents included: Clearing large trash items; Cleaning and renovating drainage systems to separate rainwater and sewage; Roads; Facade renovation, repairing and repainting damaged exterior walls, and matching the color of the street; Roof renovation; Repairing entrance steps and ramps of buildings; Public space renovation, including improving green areas and sports facilities. By March 2021, the renovation of underground infrastructure, including water, electricity, gas, and telecommunications, was completed. The entire renovation project was completed in 2022. As shown in the following pictures,

many public spaces were previously occupied by illegal structures, making travel difficult for residents. After demolition, these areas were transformed into public squares and sports fields for residents to use. Starting in 2023, the XY community has repurposed the 5,000 square meters of space to create the “Happy Yanjiang” Community Complex. This comprehensive community service space focuses on providing services for the elderly and children. The project includes a clinic, a children’s care center, medical rehabilitation facilities, a community canteen, a teahouse, and a small supermarket.

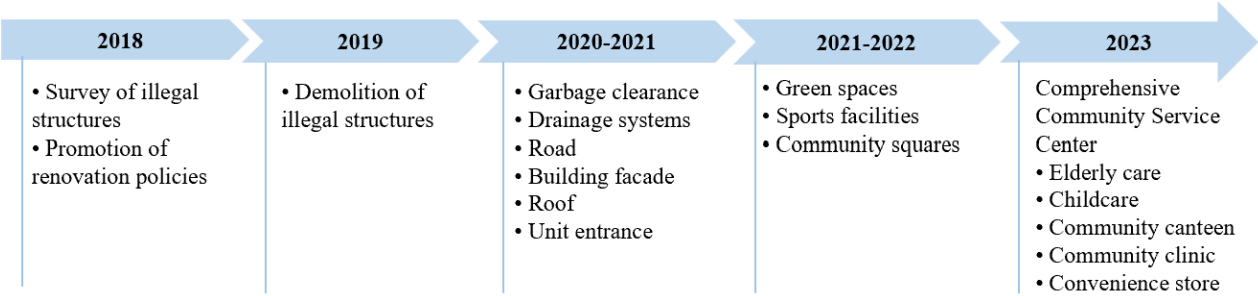


Figure 5.9 Renovation Timeline of XY Community



a) Demolition of illegal structures (location 1)



c) Demolition of illegal structures (location 2)



e) Demolition of illegal structures (location 3)



b) Renovated into a community square (location 1)



d) Renovated into a small basketball court (location 2)



f) Renovated into small leisure spaces (location 3)



g) Demolition of illegal structures (location 4)



h) Renovated into small leisure spaces (location 4)

Figure 5.10 Scenes During and After the Renovation (XY)

Notably, the renovation project also focused on preserving the community’s cultural heritage and memories. The XY community is located near the old Ziyang train station, which holds sentimental value for many residents. To honor this connection, train symbols were painted on the facades of the former railway staff housing buildings. Additionally, a model of a locomotive was placed in the renovated community square. (Figure 5.11)



a) Train symbols on building facades



b) Train model placed in the community square

Figure 5.11 Cultural Elements in the Community Renovation Project (XY)

(3) The Renovation in GHJ Community

The GHJ Community in Ziyang is an old neighborhood. Previously, the exterior walls of buildings were stained, and the roads were dirty and cluttered. Since 2018, the community has utilized the “Backstreet Alley Renovation” and “Old Community Renovation” policies to begin projects aimed at improving infrastructure and environment. Notably, these efforts included restoring the historical and cultural features of GHJ and creating a vintage-style alleyway.

During the backstreet alley renovation project in 2018, the construction team dismantled illegal structures and discovered the long-lost original site of Guihuajing Well. They cleaned the well, removing floating debris, and reinforced the well cover for safety. In 2019, the roads were repaved with permeable materials to reduce surface water accumulation. The walls were repainted to match the retro style, and key alleys were decorated with ancient-style wall bricks. Moreover, the renovation included upgrading the water supply and drainage systems, integrating the drainage pipes into the city’s network, organizing overhead electrical lines, and adding streetlights and fitness facilities. Trees and flowers were planted, and a

community stage was built around Guihuajing Well for residents to perform and hold events. In 2020, “Minsheng Alley” was constructed to address the issues of mobile vendors obstructing traffic. This alley, named for its focus on the well-being of the community, features over 20 stalls where vendors can do business without high rental costs. They primarily sell daily necessities, general merchandise, food, and handmade goods. This initiative provides employment opportunities for disadvantaged residents and helps maintain a clean and orderly environment. Alongside the physical environment improvements, the community residents’ committee has enhanced community services by establishing a Cultural Service Center. This center features a “library reading room”, a fitness room, and a “community school”, offering residents spaces for learning and exercise. In 2024, discussions commenced on the design and renovation plans for the “Happy Yanjiang” community comprehensive service center.

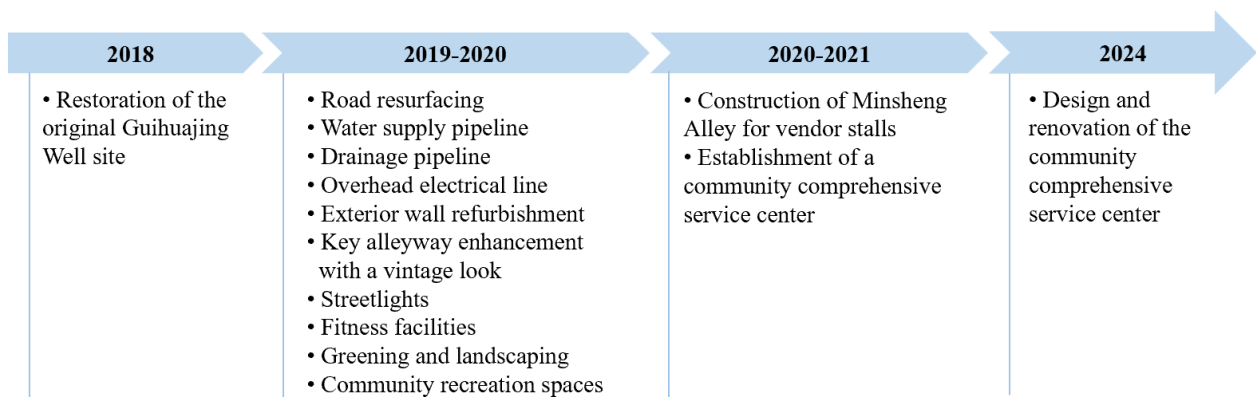


Figure 5.12 Renovation Timeline of GHJ Community



a) Alley (1) before renovation



b) Alley (1) after renovation



c) Alley (2) before renovation



d) Alley (2) after renovation



e) A community stage for hold events



f) Minsheng Alley for vendor stalls

Figure 5.13 Scenes Before and After the Renovation (GHJ)

Similar to XY Community, GHJ Community also emphasizes the exploration of community culture during its renovation (Figure 5.14). At the entrance of “Shuixiangzi” Alley, a display wall has been set up to introduce the historical origins of Guihuajing Well and Shuixiangzi Alley. Additionally, in 2021, the community hired professional mural artists to paint approximately 20 walls within the community. The murals depict scenes such as old-fashioned small shops and teahouses, recreating the lifestyle of Ziyang in the 1950s and 1960s, thus preserving the city’s memories.



a) The board introducing the history



b) Murals in the alley

Figure 5.14 Cultural Elements in the Community Renovation Project (GHJ)

5.3 Residents' Satisfaction with Community Renovation Projects

5.3.1 The Analysis of Overall Satisfaction

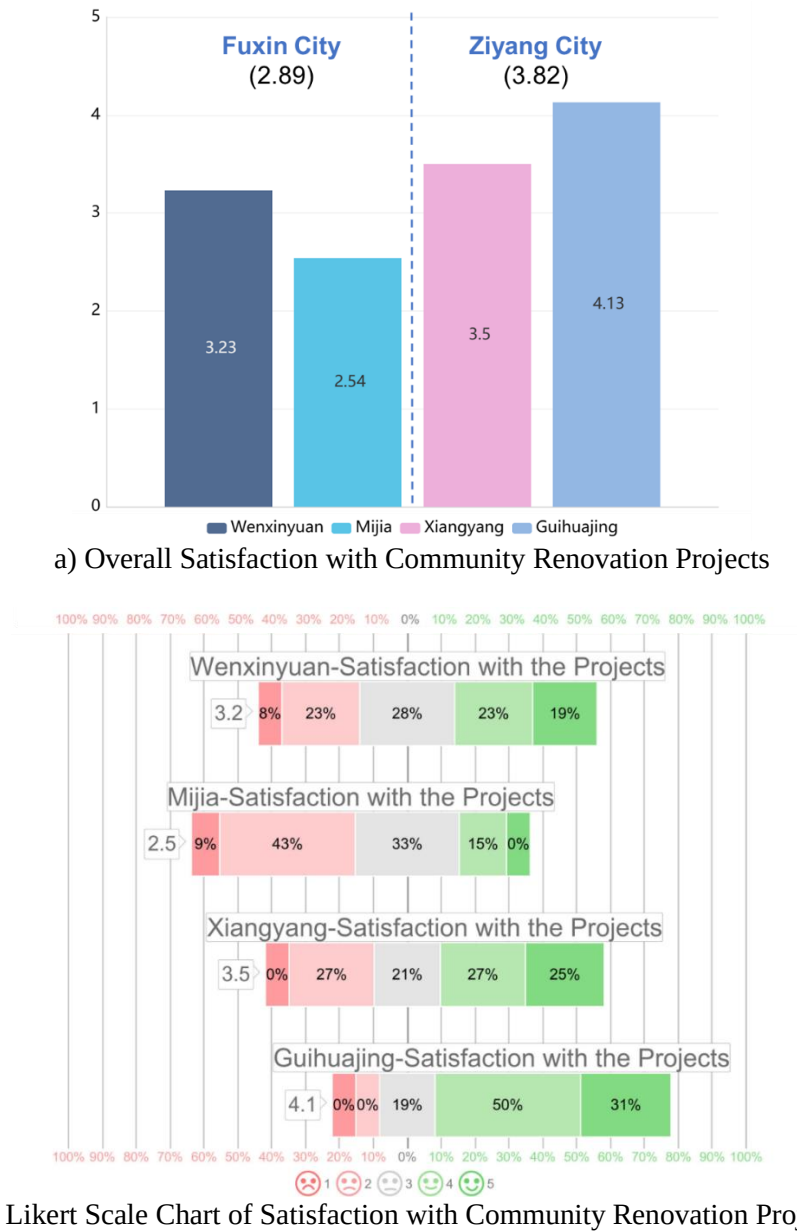


Figure 5.15 Residents' Satisfaction with Community Renovation Projects in Four Communities

Figure 5.15 shows the results of the residents' satisfaction with community renovation projects in four communities. The results indicate that Ziyang City generally has higher resident satisfaction with community renovation projects compared to Fuxin City. Among the individual communities, GHJ (Ziyang) has the highest satisfaction ratings, while MJ (Fuxin) has the lowest. Additionally, although the resident satisfaction in XY (Ziyang) is lower than in GHJ (Ziyang), it is still higher than in WXY, which has the highest satisfaction in Fuxin City.

5.3.2 Aspects of Satisfaction and Dissatisfaction

(1) Aspects of Satisfaction

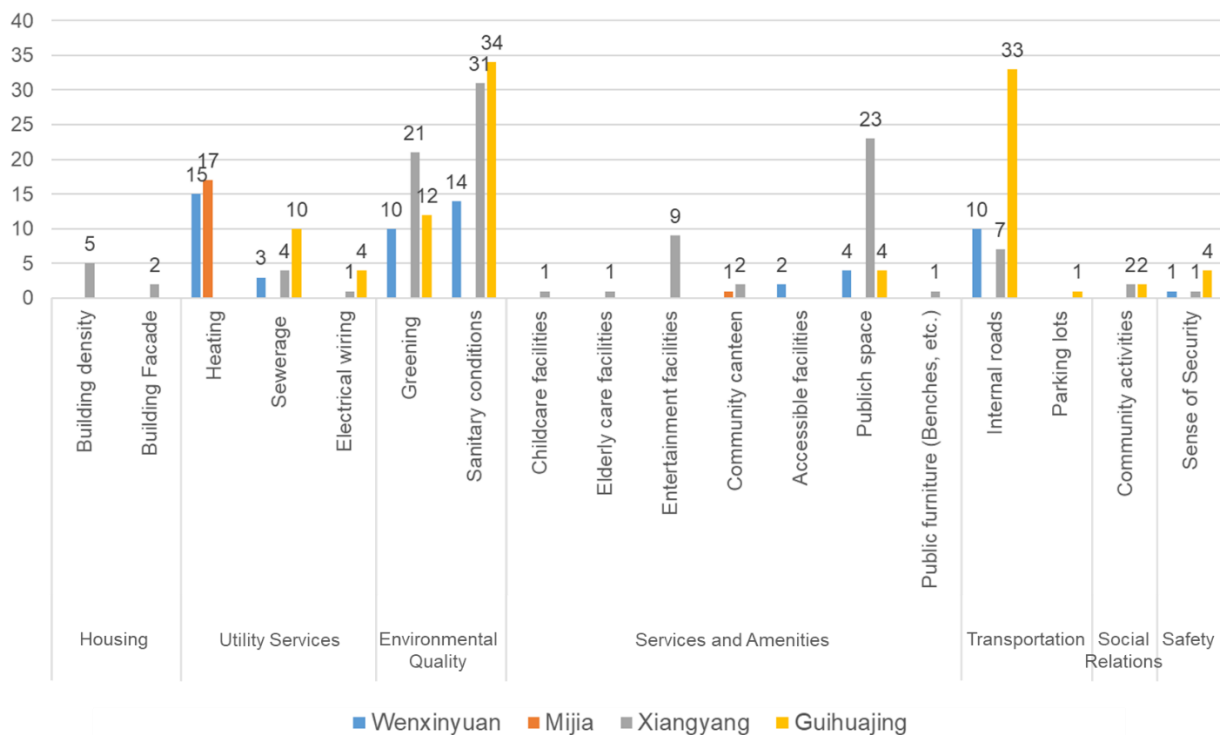


Figure 5.16 Satisfactory Aspects of the Renovation Projects

In a survey, residents were asked to vote on aspects they were satisfied with. Figure 5.16 shows the voting results from four communities. Overall, WXY (Fuxin) shows more satisfaction with heating, sanitary conditions, greening, and roads, while MJ (Fuxin) exhibits the least satisfaction, with most residents only mentioning heating. GHJ (Ziyang) and XY (Ziyang) demonstrate higher satisfaction in multiple areas, especially in sanitary conditions, greening, public spaces, and roads.

Residents of WXY (Fuxin) shared their thoughts on the post-renovation environment of their community:

“Previously, the trees and weeds were all over the place, but now the greenery is well-maintained, and there are no more weeds. The sanitary conditions are also much better, much cleaner than before, and better than the surrounding communities” (WXY-21).

Respondent WXY-13 expressed appreciation for the renovated public leisure spaces:

“I really like the small square after the renovation. The environment is clean, there are pavilions to rest in, and fitness equipment to exercise with. Neighbors come out every day to socialize and chat, it’s very lively.”

Another resident commented on the noticeable improvements in roads and heating:

“The roads are now smooth, and the main road in the community has been upgraded from a cement road to an asphalt road. There is no more mud, and it doesn’t get waterlogged on rainy days, making it more convenient to go out. Another significant improvement is the heating. It has become much better, and it’s no longer cold indoors during winter. Previously, some homes couldn’t even reach 15°C” (WXY-10).



a) Renovated public leisure spaces



b) Renovated road surface

Figure 5.17 WXY Community after the Renovation

In MJ Community (Fuxin), residents have expressed appreciation for the improvements in heating. One resident noted,

“After the renovation, the indoor temperature during winter has increased. The municipal department now checks to ensure the indoor temperature is above 16°C, and it has met this standard” (MJ-2).

Residents have also highlighted the repair of manhole covers on the roads. One resident remarked,

“Previously, many manhole covers on the roads were damaged, which was very unsafe. Once, my car tire even got punctured because of it. Now, this issue has been resolved” (MJ-11).

Another resident praised the newly opened community canteen, saying,

“I often go to the canteen since it opened because I don’t like cooking just for myself. A meal costs 12 yuan and is buffet-style. For seniors over 60, it’s half-price, which is quite affordable” (MJ-4).

In XY Community (Ziyang), residents have expressed high satisfaction with the improvements in sanitation, public space renovation, and greening landscapes. One resident commented,

“After the renovation, the community has become much cleaner, and new plants have been added. Previously, the environment was very dirty, with dirt and garbage everywhere” (XY-1).

Another resident added,

“The community is much cleaner after the renovation. The drainage pipes have been replaced, the roads have been repaved, and protective sleeves have been added to the overhead wires. The small square, in particular, has been transformed. It used to be filled with dilapidated buildings, but now it’s an open area where everyone gathers. Moreover, the renovation incorporated our Ziyang culture, with a train model in the square symbolizing Ziyang. Many people come to take photos” (XY-2).

Resident XY-13 mentioned,

“There are now many fitness equipment and benches, which are great for us elderly folks to exercise, chat, and play cards.”

Another resident appreciated the demolition of privately built illegal structures between residential buildings, saying,

“The space has opened up, and the rooms now get more sunlight” (XY-21).

Residents also noted the improvement in parking:

“There are more parking spaces now, making it easier to park” (XY-40).

Moreover, the upgraded community comprehensive service center has received positive feedback. One

resident said,

“The community services have been upgraded. There is a daycare center for the elderly that also serves as a community canteen. In the afternoons, we can play cards there, which is great. We used to play cards outside, but now we can do it indoors regardless of the weather. There’s also a childcare center where kids can have lunch and take naps, as well as do their homework after school. The fees are quite reasonable” (XY-19).



a) Renovated public leisure spaces (1)



b) Renovated public leisure spaces (2)



c) Overhead wires with protective sleeves



d) Improved parking area



e) The community canteen and card room



f) The childcare center

Figure 5.18 XY Community after the Renovation

In the GHJ Community (Ziyang), residents have expressed numerous positive comments regarding improvements in sanitation, road conditions, greening, and drainage systems. One resident remarked,

“After the renovation, the roads are much easier to walk on. Previously, it was a dark, dirty, and cluttered alley with many potholes, making it very difficult to walk. Now, the roads are wider and smoother, and the surface materials have been upgraded to permeable ones, making it convenient even on rainy days. The small square has also been repaired, and there is fitness equipment” (GHJ-2).

Another resident praised the greening and sanitation improvements, saying,

“The community landscape is really nice now. Flower beds and tree pits have been added in front of the residential buildings, with benches designed around the flower beds where you can sit, look at the flowers, and chat. The sanitation has also improved, with cleaning staff coming regularly to maintain it” (GHJ-3).

Additionally, residents are very satisfied with the upgraded drainage system. One commented,

“The drainage has improved significantly. Previously, our community’s drainage pipes were old and not connected to the city’s system, so the sewage was discharged untreated. Now, it’s all integrated into the city’s network” (GHJ-5).

Another resident mentioned,

“The electrical wiring in the community has been reorganized and standardized, making it much safer to use electricity” (GHJ-16).

One resident appreciated the addition of murals on the building exteriors, saying,

“Some murals have been added to the walls, which look quite beautiful and interesting. Many people come here to take photos” (GHJ-31).

Some also like the newly built “community stage,” stating,

“During holidays, there are often organized activities like dance performances and Hanfu displays. It’s very lively” (GHJ-1).



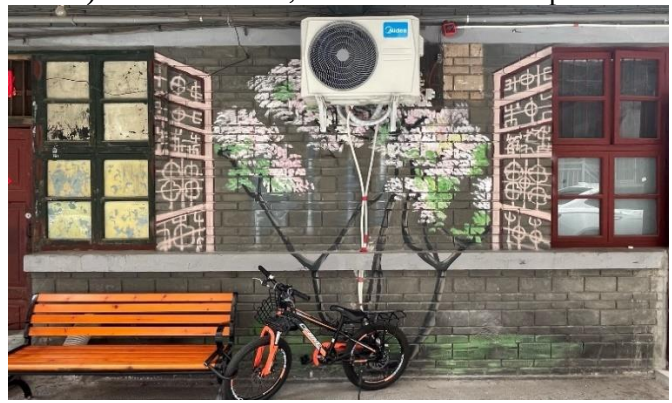
a) Renovated public leisure space



b) Renovated road, flower beds and tree pits



c) Holding events on the “Community Stage”



d) Murals on the walls

Figure 5.19 GHJ Community after the Renovation

(source: picture (c) from https://mp.weixin.qq.com/s/J_vn8TvLazPS8u_q0wSsrA; others by author)

(2) Aspects of Dissatisfaction

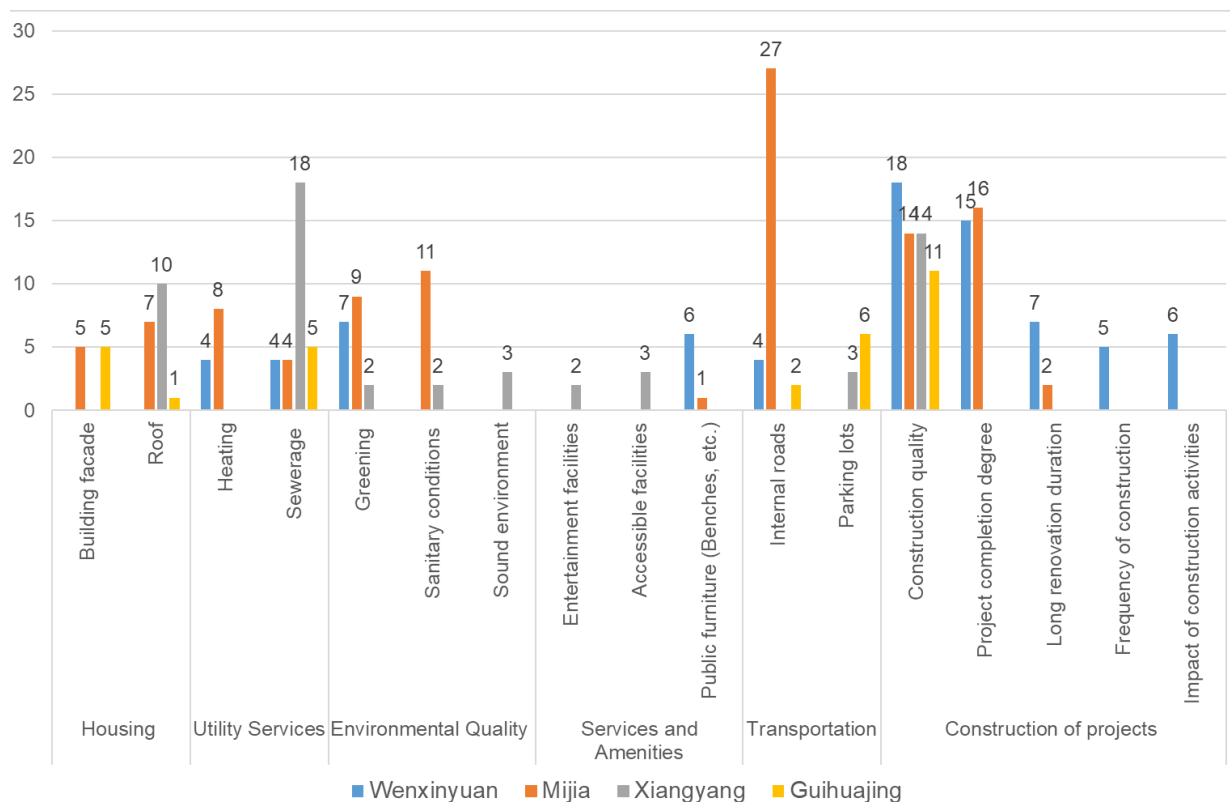


Figure 5.20 Unsatisfactory Aspects of the Renovation Projects

The survey also asked residents about aspects of the renovation they were dissatisfied with, as shown in Figure 5.20. Besides concerns about housing, utility services, environmental quality, and community roads, many residents expressed dissatisfaction with the construction process itself, citing issues such as frequent construction and poor completion quality. Overall, MJ (Fuxin) shows significant concerns in multiple areas, particularly roads and sanitary conditions. WXY (Fuxin) has moderate concerns across several areas. XY (Ziyang) and GHJ (Ziyang) have relatively fewer areas of dissatisfaction, mainly related to construction quality and drainage.

In WXY (Fuxin), residents expressed the most dissatisfaction with the quality and completeness of the construction work. Other concerns included the long construction periods, the frequency of construction, and the noise and inconvenience caused by these activities. Additionally, a few residents were unhappy with the public furniture in the small square, the green spaces, and the heating system. One resident commented,

“The construction is too frequent. There’s a new renovation project every year. Two years ago, it was the heating system, last year it was the water pipes, and this year it’s the gas pipes. They dig up the roads to replace the pipes and then fill them in, and dig them up again the next year for another pipe replacement. This has severely damaged the road surfaces, causing some sections to collapse during rain. Additionally, after the heating pipes were replaced, some houses have good heating while others still don’t, with buildings closer to the heating inlet having better results” (WXY-5).

Another respondent shared a similar sentiment:

“Every autumn, construction starts, rushing to fill in the roads before the pipes freeze in winter. The

newly paved roads are dug up and left in a mess” (WXY-7).

Adding to these concerns, a resident expressed dissatisfaction with the completion of the construction:

“The doors of the new water meter boxes in the stairwell still haven’t been installed” (WXY-26).

Additionally, another resident mentioned,

“There used to be a lot of seating and stone stools under the residential buildings where people could sit, chat, and sunbathe. After the renovation, the seats were removed and replaced with hard surfaces for parking. Now, we can only use the benches in the small square, but there aren’t enough. More should be added, especially since there are many elderly residents in our community” (WXY-10).



a) Road construction impacted residents’ travel



b) The doors for the newly replaced water meter boxes have not been installed.



c) Some road surfaces have not been fully restored.



d) The number of benches is insufficient.

Figure 5.21 Aspects of Dissatisfaction Among WXY Residents

In MJ (Fuxin), as many as 27 respondents expressed dissatisfaction with the condition of the roads. Other areas of concern included the completeness and quality of the construction work, sanitation, greening, heating, and roofing. One resident stated,

“When the pipes were being replaced, the roads were dug up and left in a mess. They were only roughly filled back in, but never restored to their original state. We’ve reported this to the government multiple times, and each time they promise to fix it in a few months, but it still hasn’t been repaired” (MJ-2).

Another respondent shared a similar experience:

“Last year, they replaced the heating and water pipes, but the roads were not properly restored afterward. There’s a lot of dirt, and on rainy days, it turns into mud pits, making it difficult for elderly residents to walk. I’ve heard that next year they’ll fix the roads. I hope they can do it. There’s also a

rumor that the construction crew hasn't been well paid, which might explain the poor quality of the work” (MJ-7).

Additionally, some residents reported issues with the roofing:

“After the waterproofing layer on the roof was redone, some buildings still experience leaks. When it rains heavily, water seeps into the stairwells and into the top-floor apartments. I feel the new roofing material isn't good. The construction was rushed, leading to poor quality” (MJ-18).

Several residents also complained about weeds and poor sanitation in the community:

“The weeds were cleared during the renovation, but they've grown back, and no one is taking care of them. Sometimes I cut the weeds myself around my building's entrance. Some people have even planted vegetables where the weeds used to be. The sanitation is also poor, with some construction debris left behind” (MJ-23).

Moreover, there were complaints about the heating system:

“After the renovation, some homes have good heating, but others, like mine, do not. We still have to use electric heaters” (MJ-41).



a) Some road surfaces have not been fully restored.



b) Unmanaged Weeds

Figure 5.22 Aspects of Dissatisfaction Among MJ Residents

In XY (Ziyang), many residents have expressed dissatisfaction with the drainage system and the quality of construction, particularly those living in the residential buildings south of the main square. Additionally, some residents are unhappy with the renovated roofs. One resident noted,

“The construction quality is not very good. After the renovation, the drainage system has actually worsened. Before the renovation, there weren't many blockages, but now that they raised the ground level of the square, rainwater floods our building. Every time it gets clogged, we have to hire someone to fix it ourselves. The roads are dirty, and we've incurred significant financial losses” (XY-3).

Another resident added,

“Before the renovation, the design and construction teams did not conduct proper measurements. The elevation of the city's sewage network is higher, while the pipes in our community are lower, preventing our sewage from draining into the city system. As a result, the drainage blockages have become frequent. The renovation policy is good, but the construction quality is not that good” (XY-4).

Additionally, a resident mentioned issues with the renovated roofs:

“The new roofs are not as well-insulated as the old ones, and there are also leaks” (XY-13).

Another resident expressed disappointment with the renovation project:

“Our community was supposed to be a model for renovation, but the results are less impressive than

the publicity suggested. Some of the construction work is subpar. They say a lot of money was spent on the renovation, but it's unclear where it all went—there's no transparency. Also, we can't freely use the new card rooms; they have time restrictions. On weekends, we can't use them because the community committee staff are off duty” (XY-22).

Moreover, some residents felt their needs were not fully considered during the renovation:

“The renovation removed our window guards and replaced them with uniformly designed windows. We are not allowed to reinstall the window guards, which means we no longer have a place to hang our clothes. It used to be convenient to hang clothes on the window guards, but now it's very inconvenient” (XY-42).



a) This is the gate on the south side of the main square. There is a height difference between the inside and outside of the gate, causing rainwater to flow towards the buildings on the inner side.



b) Frequently flooded road surface

Figure 5.23 Aspects of Dissatisfaction Among XY Residents

In GHJ (Ziyang), some residents have expressed concerns about the quality of construction. Additionally, a few residents have expressed dissatisfaction with the building facades, parking areas, and exposed pipes. One resident noted,

“The construction quality is not very good. The newly paved road has already started developing potholes after a short period. In a few years, the road will probably be in even worse condition” (GHJ-11).

Another resident expressed dissatisfaction with the building's exterior appearance,

“Only one floor of the building's exterior wall was repainted in gray, while the upper floors were left untouched, showing the original bricks and cement. It looks very inconsistent and unattractive” (GHJ-12).

Parking difficulties were also highlighted by a resident:

“The buildings in the community are too densely packed. The renovation should have included demolishing some old buildings to make room for parking. Now, there is no space for parking” (GHJ-34).

Additionally, another resident raised safety concerns:

“Some pipes are now exposed on the road surface, which is unsafe, especially for the elderly who might trip over them” (GHJ-26).



a) Damaged road surfaces



b) Inconsistent building facades



c) Overcrowded building layout



d) Exposed pipes

Figure 5.24 Aspects of Dissatisfaction Among GHJ Residents

5.3.3 Differences in Satisfaction with Community Renovation Projects

This study further analyzed residents' satisfaction with the renovation projects based on different social attributes. ANOVA (Analysis of Variance) was used to test the significance of differences between groups (Table 5.1). The findings indicate significant differences among residents with different lengths of residence, and types of homeownerships. However, no significant differences were found among residents of different ages, genders, education levels, marital statuses, household sizes, occupation, or incomes.

Regarding the length of residence, residents who had lived in the community for 1-3 years, 21-30 years, and 31-40 years had higher average satisfaction levels, whereas those who had lived there for 6-10 years had the lowest satisfaction levels. Among residents who have lived in the community for 1-3 years, many are likely new tenants who moved in because they were satisfied with the renovation results. Residents who have lived there for over 20 years are generally from Ziyang and thus show higher satisfaction levels. The lowest satisfaction among residents with 6-10 years of residence might be due to two factors: a) they haven't developed a strong attachment to the community and have lower engagement with the renovation project; and b) many residents in MJ fall within this range, which lowers the average satisfaction.

Regarding homeownership, residents in public rental housing had the highest average satisfaction, while private owners had the lowest, with personal renters falling in between. Public rental housing residents are typically low-income and benefit from government subsidies, leading to higher gratitude and satisfaction with the renovation. Personal renters, who often view the community as a temporary residence with a higher likelihood of moving in the future, have lower interest and demand for the community's renovation compared to private owners. Private owners generally have higher expectations for such projects and are

more likely to feel dissatisfied when these expectations are not met.

Table 5.1 The Results of ANOVA for Residents with Varying Socioeconomic Characteristics

Different Socioeconomic Characteristics		Overall Satisfaction with Community Renovation Projects
Age		
Mean $\pm$ Standard Deviation	36-40($n=1$)	4.00 $\pm$ null
	41-45($n=5$)	3.00 $\pm$ 1.41
	46-50($n=9$)	3.33 $\pm$ 1.00
	51-55($n=23$)	3.52 $\pm$ 1.20
	56-60($n=33$)	2.88 $\pm$ 0.99
	61-65($n=38$)	3.21 $\pm$ 1.17
	66-70($n=38$)	3.34 $\pm$ 1.32
	71-75($n=29$)	3.41 $\pm$ 1.05
	76-80($n=15$)	4.07 $\pm$ 1.03
	Over 80($n=22$)	3.59 $\pm$ 1.01
<i>F</i>		1.629
<i>p</i>		0.109
Gender		
Mean $\pm$ Standard Deviation	Female ($n=110$)	3.41 $\pm$ 1.19
	Male ($n=103$)	3.28 $\pm$ 1.11
<i>F</i>		0.653
<i>p</i>		0.420
Educational Level		
Mean $\pm$ Standard Deviation	Primary school and below ($n=49$)	3.39 $\pm$ 1.20
	Junior high school ($n=108$)	3.25 $\pm$ 1.18
	Senior high school or technical secondary school ($n=50$)	3.56 $\pm$ 0.99
	Junior college ($n=2$)	2.00 $\pm$ 1.41
	Bachelor's degree and above ($n=4$)	3.50 $\pm$ 1.00
<i>F</i>		1.349
<i>p</i>		0.253
Marital Status		
Mean $\pm$ Standard Deviation	Single ($n=1$)	5.00 $\pm$ null
	Married ($n=182$)	3.31 $\pm$ 1.14
	Divorced/Widowed ($n=30$)	3.50 $\pm$ 1.20
<i>F</i>		1.383
<i>p</i>		0.253
Household Size		
Mean $\pm$ Standard Deviation	1 ($n=30$)	3.60 $\pm$ 1.19
	2 ($n=130$)	3.28 $\pm$ 1.15
	3 ($n=42$)	3.40 $\pm$ 1.04
	4 ($n=10$)	3.10 $\pm$ 1.37
	5 ($n=1$)	5.00 $\pm$ null
<i>F</i>		1.145
<i>p</i>		0.336
Occupation		
Mean $\pm$ Standard Deviation	Self-Employed ($n=15$)	3.33 $\pm$ 0.90
	Enterprises and Institution Staff ($n=6$)	3.83 $\pm$ 0.75
	Business and Service Personnel ($n=8$)	3.88 $\pm$ 0.64
	Worker ($n=1$)	4.00 $\pm$ null
	Job Seeker ($n=2$)	3.00 $\pm$ 1.41
	Government Employee ($n=3$)	2.67 $\pm$ 2.08
	Unemployed ($n=7$)	2.57 $\pm$ 1.13
	Retired ($n=171$)	3.35 $\pm$ 1.18
<i>F</i>		1.075
<i>p</i>		0.381

Monthly Income Per Household Member (yuan)		
Mean ± Standard Deviation	Less than 1000 (n=6)	3.33±1.03
	1000-2000(n=50)	3.46±1.30
	2000-3000(n=85)	3.15±1.24
	3000-4000(n=71)	3.52±0.89
	4000-5000(n=1)	2.00±null
<i>F</i>		1.490
<i>p</i>		0.206
Length of Residence (Years)		
Mean ± Standard Deviation	1-3 (n=19)	3.84±0.96
	4-5 (n=9)	3.00±1.12
	6-10 (n=53)	2.68±1.01
	11-15 (n=15)	3.40±1.06
	16-20 (n=49)	3.35±1.23
	21-30 (n=7)	3.86±1.46
	31-40 (n=22)	3.86±0.83
	More than 40 (n=39)	3.69±1.06
<i>F</i>		5.127
<i>p</i>		0.000**
Property Ownership		
Mean ± Standard Deviation	Private Ownership (n=173)	3.16±1.09
	Personal Renting (n=23)	3.78±1.00
	Public Rental Housing (n=17)	4.65±1.00
<i>F</i>		16.985
<i>p</i>		0.000**

* $p < 0.05$ ** $p < 0.01$

5.4 The Impact of Community Renovation Projects on Community Livability

5.4.1 Overall Analysis of the Impact

From the previous section, it can be concluded that while most residents are satisfied with the renovation, many issues have also been raised. Therefore, it is necessary to further analyze whether such renovations actually enhance the livability. Using regression analysis, this study explores the impact of renovation projects on community livability. Considering the differences in project implementation across various cities and communities, regression analyses were conducted for the overall sample, the two cities, and the four communities separately. The results (Table 5.2) indicate that in all models, satisfaction with the renovation projects has a significant positive impact on the evaluation of community livability. When residents are satisfied with the renovation, they tend to have a higher evaluation of the livability. While this does not directly assert that the implementation of renovation projects is the cause of improved livability, it does provide some evidence that renovation projects can enhance community livability.

From the resident interviews in the previous section, it is clear that renovation projects have greatly improved the community's infrastructure and overall environmental quality. The reshaping of public spaces within the community has fostered more interaction among neighbors, helping to strengthen the sense of community belonging and safety. Although there have been some negative impacts on certain residents, particularly in the MJ Community, the overall positive effects outweigh the negative ones.

Table 5.2 Regression Analysis of the Impact of Renovation Projects on Community Livability

a) Analysis of Full Sample (n=213)

	Non-Standardized Coefficients		Standardized Coefficients	t	p	Collinearity Diagnostics	
	B	Std. Error	Beta			VIF	Tolerance
Constant	2.630	0.070	-	37.800	0.000**	-	-
Satisfaction with the community renovation projects	0.301	0.020	0.725	15.309	0.000**	1.000	1.000
R ²	0.526						
Adjusted R ²	0.524						
F	F (1,211)=234.358,p=0.000						
D-W value	1.564						

Dependent variable: Community livability

* $p < 0.05$ ** $p < 0.01$

b) Analysis of Two Case Study Cities

Fuxin City (n=107)	Non-Standardized Coefficients		Standardized Coefficients	t	p	Collinearity Diagnostics	
	B	Std. Error	Beta			VIF	Tolerance
Constant	2.626	0.098	-	26.880	0.000**	-	-
Satisfaction with the community renovation projects	0.266	0.032	0.634	8.404	0.000**	1.000	1.000
R ²	0.402						
Adjusted R ²	0.396						
F	F (1,105)=70.625, p=0.000						
D-W value	1.677						

Ziyang City (n=106)	Non-Standardized Coefficients		Standardized Coefficients	t	p	Collinearity Diagnostics	
	B	Std. Error	Beta			VIF	Tolerance
Constant	2.958	0.096	-	30.815	0.000**	-	-
Satisfaction with the community renovation projects	0.243	0.024	0.700	9.986	0.000**	1.000	1.000
R ²	0.490						
Adjusted R ²	0.485						
F	F (1,104)=99.730, p=0.000						
D-W value	1.669						

Dependent variable: Community livability

* $p < 0.05$ ** $p < 0.01$

c) Analysis of Four Case Study Communities

		Regression Coefficient	95% CI	VIF	Tolerance	R ²	Adjusted R ²	F-value
Fuxin-WXY (n=53)	Constant	2.763** (17.129)	2.446 ~ 3.079	-	-	0.372	0.360	<i>F</i> (1,51)=30.212, <i>p</i> =0.000
	Satisfaction with renovation projects	0.257** (5.497)	0.166 ~ 0.349	1.000	1.000			
Fuxin-MJ (n=54)	Constant	2.728** (24.552)	2.510 ~ 2.946	-	-	0.275	0.261	<i>F</i> (1,52)=19.765, <i>p</i> =0.000
	Satisfaction with renovation projects	0.185** (4.446)	0.103 ~ 0.266	1.000	1.000			
Ziyang-XY (n=52)	Constant	2.890** (22.942)	2.643 ~ 3.137	-	-	0.545	0.536	<i>F</i> (1,50)=59.879, <i>p</i> =0.000
	Satisfaction with renovation projects	0.265** (7.738)	0.198 ~ 0.332	1.000	1.000			
Ziyang-GHJ (n=54)	Constant	3.133** (17.967)	2.791 ~ 3.474	-	-	0.304	0.290	<i>F</i> (1,52)=22.682, <i>p</i> =0.000
	Satisfaction with renovation projects	0.198** (4.763)	0.117 ~ 0.280	1.000	1.000			

* $p < 0.05$ ** $p < 0.01$ (t-values in parentheses)

5.4.2 Differences in Impact Across Socioeconomic Groups

Due to the different compositions of residents in each community, understanding which demographic groups benefit most from renovation projects can help in formulating more targeted policies and allocating limited resources and funds more effectively. Therefore, a grouped regression analysis was conducted on residents with different socioeconomic attributes to determine in which groups the impact on livability is most significant. The analysis focused on several representative categories reflecting the diverse needs of residents, including age, income levels, and types of homeownerships.

As shown in Table 5.3(a), among residents of different ages, the renovation projects had a significant positive impact on livability for residents aged 51 and above, while the effect was not significant for the 36-50 age group. This may be because older adults are more dependent on their living environment compared to younger people, and the renovation projects might have significantly improved their living conditions, resulting in a more positive response from this group. In terms of income levels, as shown in Table 5.3(b), the impact was significant across all age groups, particularly for residents with lower monthly incomes, who showed higher regression coefficients. This likely because residents with lower incomes have a more pressing need for improvements in living conditions, and any positive changes brought by the renovation projects can significantly enhance their quality of life. Regarding different types of homeownerships, as shown in Table 5.3(c), the impact was significant across all groups, with the strongest effect observed among private homeowners, who had the highest regression coefficients. This may be because private homeowners have a stronger sense of ownership and responsibility towards their property. Renovation projects not only improve their living environment but may also increase property values, leading to a more positive response from this group.

Table 5.3 Impact Differences Among Residents with Different Socio-economic Attributes

(a) Impact Differences Across Age Groups

Age		Regression Coefficient	95% CI	VIF	Tolerance	R ²	Adjusted R ²	F-value
36-50 (n=15)	Constant	2.997** (8.496)	2.306 ~ 3.688	-	-	0.172	0.108	$F(1,13)=2.692$, $p=0.125$
	Satisfaction with renovation projects	0.168 (1.641)	-0.033 ~ 0.370	1.000	1.000			
51-65 (n=94)	Constant	2.494** (27.589)	2.317 ~ 2.671	-	-	0.605	0.601	$F(1,92)=141.159$, $p=0.000$
	Satisfaction with renovation projects	0.319** (11.881)	0.267 ~ 0.372	1.000	1.000			
66-80 (n=82)	Constant	2.784** (24.600)	2.563 ~ 3.006	-	-	0.505	0.499	$F(1,80)=81.562$, $p=0.000$
	Satisfaction with renovation projects	0.276** (9.031)	0.216 ~ 0.336	1.000	1.000			
Over 80 (n=22)	Constant	2.757** (10.561)	2.245 ~ 3.268	-	-	0.480	0.454	$F(1,20)=18.491$, $p=0.000$
	Satisfaction with renovation projects	0.301** (4.300)	0.164 ~ 0.439	1.000	1.000			

* $p<0.05$ ** $p<0.01$ (t-values in parentheses)

(b) Impact Differences Across Income Levels

Monthly Income (yuan)		Regression Coefficient	95% CI	VIF	Tolerance	R ²	Adjusted R ²	F-value
Less than 2000 (n=56)	Constant	2.562** (22.927)	2.343 ~ 2.781	-	-	0.640	0.633	$F(1,54)=96.057$, $p=0.000$
	Satisfaction with renovation projects	0.299** (9.801)	0.239 ~ 0.358	1.000	1.000			
2000-3000 (n=85)	Constant	2.571** (25.345)	2.372 ~ 2.769	-	-	0.554	0.549	$F(1,83)=103.217$, $p=0.000$
	Satisfaction with renovation projects	0.304** (10.160)	0.246 ~ 0.363	1.000	1.000			
3000-5000 (n=72)	Constant	2.862** (18.738)	2.563 ~ 3.162	-	-	0.365	0.365	$F(1,70)=40.281$, $p=0.000$
	Satisfaction with renovation projects	0.268** (6.347)	0.185 ~ 0.351	1.000	1.000			

* $p<0.05$ ** $p<0.01$ (t-values in parentheses)

(c) Impact Differences Across Different Types of Property Ownership

Property Ownership		Regression Coefficient	95% CI	VIF	Tolerance	R ²	Adjusted R ²	F-value
Private Ownership (n=173)	Constant	2.591** (31.614)	2.430 ~ 2.751	-	-	0.488	0.485	$F(1,171)=162.922$, $p=0.000$
	Satisfaction with renovation projects	0.313** (12.764)	0.265 ~ 0.361	1.000	1.000			
Personal Renting (n=23)	Constant	2.858** (17.790)	2.543 ~ 3.173	-	-	0.610	0.592	$F(1,21)=32.868$, $p=0.000$
	Satisfaction with renovation projects	0.236** (5.733)	0.155 ~ 0.316	1.000	1.000			
Public Rental Housing (n=17)	Constant	3.213** (11.674)	2.674 ~ 3.752	-	-	0.405	0.365	$F(1,15)=10.201$, $p=0.006$
	Satisfaction with renovation projects	0.185** (3.194)	0.072 ~ 0.299	1.000	1.000			

* $p<0.05$ ** $p<0.01$ (t-values in parentheses)

5.5 Factors Influencing the Implementation Effectiveness

5.5.1 Funding Sources of the Renovation Projects

(1) Impact of Government Financial Investments

Generally, the funding for renovation projects is shared reasonably between the government, residents, and social forces. The main categories are as follows: 1) Government Support: City and district governments primarily support basic renovation projects. 2) Beneficiary Contribution: For improvements that benefit specific residents, those residents are encouraged to contribute through donations, labor, or direct funding. Renovations such as earthquake reinforcement, installing elevators, and covering the costs of area expansion should be funded by the residents. 3) Social Participation: Enhancement projects encourage participation from social forces. Original property owners and public housing property units are encouraged to contribute financially. Professional operating units are guided to fulfill their social responsibilities by investing in upgrading related pipeline facilities. Social capital investment is also attracted for the design, renovation, and operation of various facilities, promoting new community services such as elderly care, childcare, and housekeeping.

In both case study cities, the principle of “shared funding” and “those who benefit contribute” is emphasized. Each district government, based on local circumstances, reasonably determines the cost-sharing rules and clarifies the residents’ financial responsibilities. For the renovation of supply and drainage systems, electricity, heating, gas, and telecommunications facilities, professional operating units bear the primary financial responsibility and organize the implementation. However, in the case study communities, the projects rarely required residents to contribute financially, so the costs were primarily borne by the government and various operating units.

In this context, the impact of local fiscal revenue and expenditure is significant. Table 5.4 presents the General Public Budget Revenue and Expenditure for the City Districts of two cities from 2019 to 2021, a period during which renovation projects were either initiated or underway. The results show that both the local general public budget revenue and expenditure in Fuxin are lower than those in Ziyang. Although specific investment amounts in renovation projects for the case study communities were not obtained, Ziyang has a stronger local fiscal capacity compared to Fuxin. Consequently, Ziyang likely has more investment in community renovation projects. Additionally, the previous overview of the renovation processes in both cities reveals that Fuxin relies more on subsidies from higher-level governments, while Ziyang has attracted some social funding for renovations. For instance, small community social enterprise has joined the “Happy Yanjing” community service project in XY Community (Ziyang).

Table 5.4 Comparison of General Public Budget Revenue and Expenditure of the City District

	General Public Budget Revenue (City District)		General Public Budget Expenditure (City District)	
	Fuxin City	Ziyang City	Fuxin City	Ziyang City
2021	3.19 billion yuan (462.32 million USD)	3.86 billion yuan (559.42 million USD)	7.50 billion yuan (1.09 billion USD)	10.19 billion yuan (1.48 billion USD)
2020	3.08 billion yuan (446.38 million USD)	3.56 billion yuan (515.95 million USD)	10.87 billion yuan (1.57 billion USD)	10.43 billion yuan (1.51 billion USD)
2019	2.96 billion yuan (428.99 million USD)	3.59 billion yuan (520.29 million USD)	9.70 billion yuan (1.41 billion USD)	10.62 billion yuan (1.54 billion USD)

(1 CNY = 0.1449 USD, exchange rate in 2020)

(2) Allocation of Resources Across Communities Within the City

The government's positioning of community renovation projects and the connection between the community committees and local government also influence the effectiveness of these projects. In Fuxin City, WXY Community is a model project for renovation, thus receiving more government attention and resources. Consequently, the renovation progress in WXY is more advanced compared to MJ Community, where the progress has been relatively slower. In Ziyang City, XY Community is also a model project for the renovation of old residential areas and is a primary focus for the government. Residents have reported that city government officials frequently visit the community to inspect the progress, and the community committee maintains active communication with the city government. As a result, the XY Community tends to receive more government resources compared to the GHJ Community. The renovation efforts in XY are more extensive, including the demolition of illegal constructions, the construction of small squares, and the development of comprehensive community service centers. These projects are more than those in GHJ Community.

However, government attention can sometimes lead to lower overall satisfaction with the renovation. In XY, satisfaction levels are lower compared to GHJ. This is partly due to the disruptions caused by sewer pipe renovations and partly because the government's emphasis on the area has raised residents' expectations that are difficult to meet. Additionally, renovation projects may sometimes prioritize fulfilling government assessment criteria while neglecting the actual needs of residents.

5.5.2 Contents of Renovation Projects

Based on the renovation projects carried out in the four communities, they can be classified into three levels (Table 5.5): Level 1: Improvement of Building Performance; Level 2: Enhancement of the Outdoor Environment; Level 3: Improvement of Social Infrastructure.

By comparing the renovation content of the four communities, it is evident that WXY Community (Fuxin) encompasses all three levels. The renovations include building performance improvements, infrastructure upgrades, road enhancements, and the reshaping of public activity spaces. In contrast, MJ Community (Fuxin) primarily focuses on building performance and infrastructure, with Level 3 renovations limited to the community canteen, lacking attention to public interaction spaces. In Ziyang City's XY and GHJ communities, renovations also span all three levels, with significant improvements in public activity spaces. Additionally, XY has undertaken extensive work in constructing comprehensive community service centers, such as community canteens, medicine clinics, and children's growth centers, providing day care for the elderly and children, as well as convenient services for residents. It is observed that communities with improved social infrastructure tend to have higher resident satisfaction. These spaces enhance social interactions, strengthen neighborhood ties, and foster a sense of community. A resident from WXY remarked,

“After the community activity center was built, the community committee organized cultural activities during festivals. We often go to the activity room to play cards, mahjong, and even play the erhu”
(WXY-9).

Table 5.5 Categories of Renovation Projects in Four Communities

Level	Items	WXY (Fuxin)	MJ (Fuxin)	XY (Ziyang)	GHJ (Ziyang)
Level 1 Improvement of Building Performance	• Roof waterproofing	√	√	√	√
	• Rainwater pipes	√	√	√	√
	• Stairwells	√	√		
	• Heating	√	√		
Level 2 Enhancement of the Outdoor Environment	• Painting the exterior walls	√	√	√	√
	• Road	√	√	√	√
	• Green space	√		√	√
	• Infrastructure: electrical wires, upper and lower water pipes	√	√	√	√
	• Lighting	√		√	√
Level 3 Improvement of Social Infrastructure	• Public Activity Space	√		√	√
	• Comprehensive community service centers	√		√	√

5.5.3 Resident Involvement in the Implementation Process

In the survey, residents were asked to rate the level of involvement in the renovation process using a 5-point Likert scale, where 1 indicates no involvement at all and 5 indicates active involvement. The results (Table 5.6) reveal that overall participation across the four communities is relatively low. The highest level of participation was observed in GHJ, with an average score of 2.54, followed by XY (2.42). In contrast, Fuxin's two communities had comparatively lower scores, with WXY scoring 2.13 and MJ scoring 2.09.

Table 5.6 Residents' Assessment of Involvement During the Renovation Process

	WXY (Fuxin)	MJ (Fuxin)	XY (Ziyang)	GHJ (Ziyang)
Community Engagement (Mean)	2.13	2.09	2.42	2.54

Through regression analysis, the relationship between residents' involvement and their satisfaction with the renovation projects was explored. The results (Table 5.7) show that greater resident involvement leads to higher satisfaction. Residents from GHJ Community shared their positive experiences:

"During the renovation, the staff of the community committee came to understand our renovation preferences, and a message board was placed at the community entrance where we could write down any concerns" (GHJ-13).

Respondents from XY Community noted,

"During the renovation, the secretary of the community committee consulted us for opinions on aspects we wanted to be renovated" (XY-11).

Additionally, staff from the XY Community committee stated,

"During the renovation, we held residents' meetings and conducted door-to-door surveys. Committee members visited various construction sites daily to inspect and promptly communicated any issues

raised by the residents to the construction team for resolution.”

In contrast, only some residents from WXY Community reported that,

“The community committee sought our opinions during the renovation” (WXY-27).

In MJ Community, most residents expressed minimal involvement, stating,

“The renovation did not seek residents’ opinions; it was entirely government-funded, and the government decided everything” (MJ-41).

Table 5.7 Linear Regression Analysis of Community Engagement and Satisfaction with Community Renovation Projects (n=213)

	Non-Standardized Coefficients		Standardized Coefficients	t	p	Collinearity Diagnostics	
	B	Std. Error	Beta			VIF	Tolerance
Constant	1.629	0.221	-	7.365	0.000**	-	-
Satisfaction with the renovation	0.749	0.092	0.491	8.178	0.000**	1.000	1.000
R ²	0.241						
Adjusted R ²	0.237						
F	F (1,211)=66.884,p=0.000						
D-W value	1.278						

Dependent variable: Overall satisfaction with the community renovation projects; * $p < 0.05$ ** $p < 0.01$

5.5.4 Post-Renovation Management

Interviews revealed that the post-renovation management also impact residents’ satisfaction. Figure 5.25 summarizes the management models of the four case study communities.

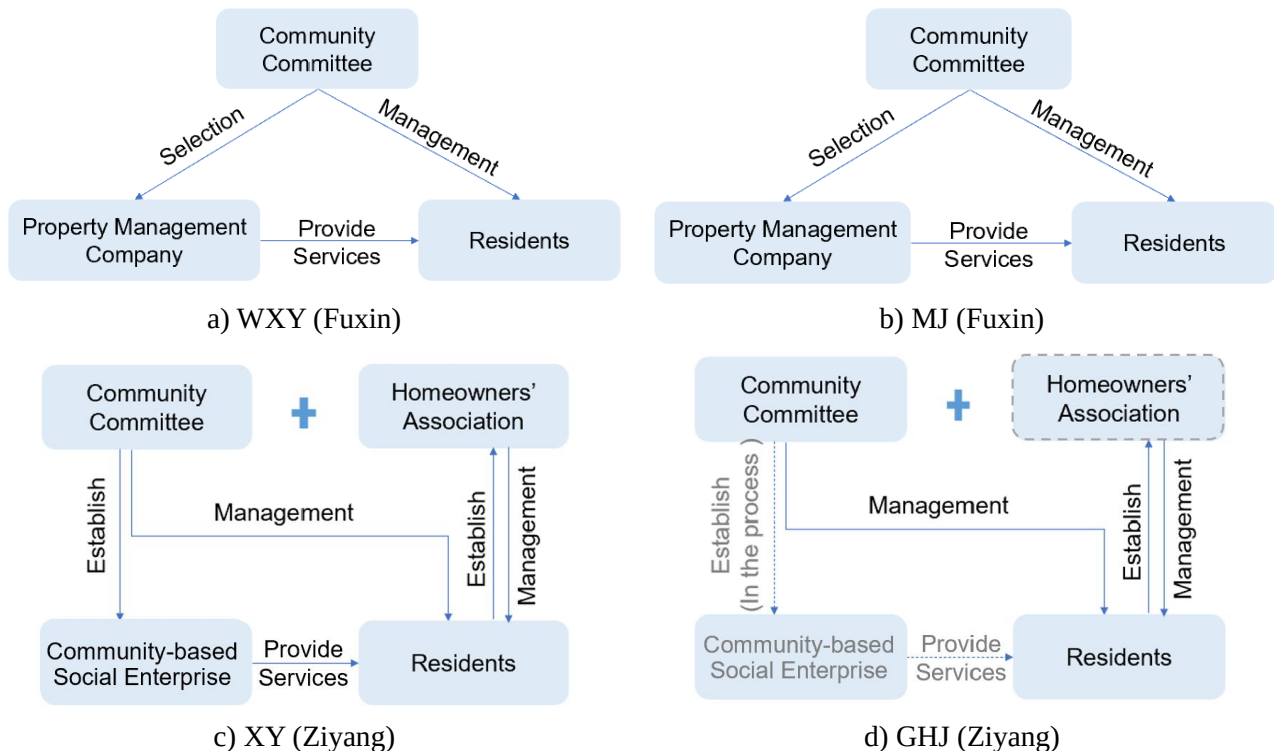


Figure 5.25 Community Management Models of Four Communities

In the two communities in Fuxin, community affairs are mainly managed by the community committee. The committee divides the community buildings into sections called “grids,” each overseen by a grid manager. Information about the grid managers and their service responsibilities is publicly available, and these managers are directly responsible for collecting and coordinating residents’ requests, encouraging residents to participate as well. Additionally, the community committee selects a property management company to provide basic services to the residents and mediates conflicts between residents and the property management company. Despite having the same management model, the effectiveness of property management varies significantly between the two communities. In WXY, residents have a relatively positive view of the property management company. One resident mentioned,

“When we report issues to the property management, they are quite effective, such as fixing broken hallway lights or dealing with leaks” (WXY-15).

Another resident noted,

“When we reported sanitation issues in the community, they arranged for cleaning staff” (WXY-19).

However, in MJ, the feedback on the property management company is mostly negative. One resident stated,

“We’ve reported issues to the property management many times, like broken hallway lights, piled-up garbage, and blocked sewer, but nothing gets resolved. Eventually, people stopped paying the property fees” (MJ-2).

Some residents mentioned,

“For those who pay the property fees, the property management will handle issues like replacing hallway lights and unclogging sewers. Naturally, they don’t help those who don’t pay the fees” (MJ-12).

Interviews indicated that most respondents in MJ do not pay the property fees, leading to financial difficulties for the property management company and a subsequent decline in service quality, creating a vicious cycle.

Compared to the entirely top-down management approach in Fuxin, the communities in Ziyang demonstrate stronger resident involvement and have experimented with resident self-governance. In XY, the community committee is the main management body. In 2022, the committee spearheaded the establishment of a small community-based social enterprise, Xiangyang Community Happiness Property Management Co., Ltd., wholly owned by the community committee. This enterprise provides various services, including a community canteen, day care for the elderly, a childcare center, and a community clinic. Unlike commercial property management companies, the cleaning, facility maintenance, and other services in XY primarily undertaken by committee staff, enthusiastic residents, and residents facing employment difficulties. Notably, in XY, residents of three residential buildings have formed their own homeowners’ association to manage daily affairs. This association generates revenue by managing the parking for electric and regular vehicles and collects a small fee from residents (lower than commercial property management fees) to cover daily expenses such as cleaning and sewer repairs (XY-4). This homeowners’ association has achieved a degree of self-governance, with residents expressing satisfaction with their work.

GHJ in Ziyang is also primarily managed by the community committee. Additionally, in April 2023, a homeowners’ association was established based on self-nomination and recommendations, comprising 1-2

members from each building. These members participate in community management and protect the legal rights of the homeowners. As the homeowners' association is newly established, its primary role has been to give residents a voice, and it has not yet achieved the level of self-governance seen in XY. GHJ Community has not considered bringing in a commercial property management company. Community sanitation is currently managed by the city's sanitation department. One resident remarked,

"We had considered a commercial property management company before, but it would require residents to pay fees. Many residents here live in public rental housing and are low-income, so they wouldn't pay. We calculated that a property management company would lose over 100,000 yuan a year, so they didn't enter the community" (GHJ-5).

However, in 2024, the community committee began exploring the possibility of establishing a community-based social enterprise to provide services to residents, similar to the XY Community.

Currently, top-down management faces challenges of funding and low resident participation. A community committee staff member from GHJ commented,

"The biggest challenge in community management is funding; without money, many issues cannot be resolved. We have to seek sponsorships for events. Additionally, there's a lack of resident participation—only a few Communist Party members are active. Most general residents do not participate; younger ones are busy with work, and older ones are not interested. If there's no money involved, they basically don't participate. Moreover, the sub-district office frequently has assessment tasks that we need to handle. We want to do practical things for the residents, but we also need to meet government expectations to access resources. However, sometimes the government's assessment goals are disconnected from the actual needs of the residents."

5.6 Discussion and Conclusion

1) Impact of Government-Led Renovation Projects on Community Livability

Both cities' community renovation projects are government-led, with district governments organizing and supervising the project progress throughout. The housing and urban-rural development bureaus of each city play a crucial role in the implementation. Regarding funding sources, despite emphasizing multi-source financing, both cities primarily rely on government investment. Fuxin relies more on higher-level government allocations, while Ziyang has attracted some social funding. The renovation projects are categorized into basic, improvement, and enhancement types, selected based on the local community's needs and available funds. MJ Community has the fewest renovation projects, while XY and GHJ Communities have more extensive renovations, with significant investments in social infrastructure such as public squares, leading to higher resident satisfaction.

Studies show that respondents in Ziyang are more satisfied with the renovation projects than those in Fuxin, with GHJ (Ziyang) having the highest satisfaction and MJ (Fuxin) having the lowest satisfaction. Residents are primarily satisfied with aspects like utility services, environment, roads, and the redevelopment of public activity spaces. However, unsatisfactory aspects mainly concern the construction process, including construction quality, long renovation periods, and high renovation frequency.

Although residents have varying levels of satisfaction with the renovation projects, overall, these community renovation efforts have played a positive role in enhancing livability. Additionally, the

renovation projects have a more substantial impact on elderly residents, low-to-middle-income residents, and individual property owners.

2) Factors Influencing the Effectiveness of Community Renovation Projects

Four factors influence the implementation of renovation projects: funding sources, project contents, resident involvement, and post-management.

Projects with robust local financial support and the ability to attract additional funding from social or private sectors tend to achieve better outcomes. It is important to broaden fundraising channels for renovation projects in shrinking cities, as these cities often face greater financial pressures, leading to limited funds available for such initiatives. With the government, homeowners, and private sectors as the main participants, efforts should be made to promote private sector investment, encourage homeowner contributions, and alleviate the financial burden on the government (Zhuo & Li, 2022). Funding plans should be tailored according to the specific conditions of each community. For communities in mildly shrinking cities that are located in prime areas, there is potential to attract developers, allowing for reduced government investment. Conversely, for communities in severely shrinking cities, especially those in peripheral locations, an increase in government investment may be necessary.

Projects focusing on social infrastructure tend to result in higher resident satisfaction. Klinenberg (2018) highlights the significance of social infrastructure, noting that when it is robust, it fosters contact, mutual support, and collaboration among friends and neighbors. Conversely, when social infrastructure is degraded, it inhibits social activity, leaving families and individuals to fend for themselves. Close-knit neighborhood relationships are even more crucial in shrinking cities, as they can help counteract the sense of isolation that may accompany population decline.

Higher resident involvement during the renovation process leads to greater satisfaction. Liao et al. (2020) discussed that public participation is a crucial pathway for achieving the micro-renewal of old communities. In recent years, the government has also recognized the importance of resident participation in community renovations. For instance, renovation plans in Fuxin and Ziyang have emphasized the need to respect residents' wishes and enhance their involvement. However, in practice, the level of involvement remains limited. Firstly, residents currently have a low willingness to participate. Due to China's previous work unit system, residents developed a mindset of relying on work units and the government to solve problems. Although the role of work units has diminished and been replaced by community committees, the government's leading role remains strong. As a result, most residents still rely on the government and do not see participation in community renovation as their right and responsibility (Zhang, Wen, Zhu, & Zhao, 2021). Additionally, the procedures and pathways for resident participation are unclear. In Ziyang, residents participate more actively than those in Fuxin because community committee staff conducted surveys to gather residents' opinions. Zhang et al. (2021) also shows that unclear channels for resident participation hinder enthusiasm, particularly in terms of poor information dissemination and ineffective participation pathways. Therefore, it is evident that beyond raising awareness of the importance of resident participation, establishing clear procedures to ensure effective participation is also necessary.

Effective post-renovation management involving multiple parties also leads to higher satisfaction. In Ziyang, two communities have attempted to establish homeowners' association, initiating preliminary

community self-governance. In comparison, the level of resident self-governance in Fuxin is weaker, and there is less initiative in maintaining the post-renovation community environment and facilities. Currently, homeowners' associations are playing an increasingly important role in community governance. These associations first emerged in the 1990s and rapidly developed after the enactment of the Property Law in 2007, driven by numerous rights protection movements. Their development can be divided into two stages: from "rights protection" to "self-governance" (Chen, 2013). Now, the role of homeowners' associations extends beyond protecting residents' rights and supervising property management; they also participate in community governance, helping to shift leadership back to the residents. Additionally, in the renovation of old residential communities in some cities, homeowners' associations have played a significant role. For instance, Zhegongxincun community in Hangzhou City undertook a resident-led renewal project, where residents funded, led, and supervised the construction process, achieving excellent results. The Beijing government issued the "Reform Plan for the Renovation of Old Residential Communities in Beijing" in 2022, emphasizing the continued promotion of homeowners' associations (or property management committees) in old communities, guiding them to play a full role in governance, renovation, and post-renovation management.

In addition to homeowners' associations, community-based social enterprises also play an important role in community governance and expanding community services. For example, in Ziyang's XY Community, a community-based social enterprise was established and achieved positive results. Community-based social enterprises first emerged in Chengdu City and are defined as "a new type of community economic organization initiated and led by the community residents' committee, and focused on revitalizing community resources, aiming to serve the public interest and meet the needs of community residents" (Chengdu's 14th Five-Year Plan for Urban and Rural Community Development and Governance). According to Yin (2024), under the leadership of the community residents' committee, community-based social enterprises operate through market mechanisms, revitalizing community spaces and resources to maximize their value. This approach enhances community finances, allowing them to provide services that better meet the specific needs of residents. Moreover, these enterprises encourage resident participation in their operations through forums such as residents' councils, creating a new platform for residents to engage in community affairs. Additionally, they help address issues like employment for vulnerable groups, elderly care, and childcare (Yin, 2024). Zhang (2020) also shows that community-based social enterprises, as a new form of organized community structure, empower residents, guide their involvement in community affairs, promote mutual assistance, and create a new model for delivering community services.

Compared to Fuxin, Ziyang has been more proactive in the development of homeowners' associations and community-based social enterprises, and this is partly related to its location. Neighboring Chengdu City has seen a boom in the establishment of homeowners' associations and community-based social enterprises in recent years, and this approach to community development has also influenced Ziyang. For instance, staff from the GHJ community committee mentioned in interviews that they regularly visit well-developed communities in Chengdu for on-site learning. On the other hand, Fuxin has been less influenced by the surrounding cities. This shows that while Ziyang, being close to mega cities, has lost some population and resources due to the attraction and siphoning effects, it has also gained new information and development models that benefit its urban growth.

3) Current Challenges and Recommendations

Currently, community renovation projects in shrinking cities face two main challenges: funding issues and low resident participation in community management. First, renovation funding relies entirely on local finances. As urban shrinkage intensifies, local financial pressure increases, reducing community investment. In this context, actively seeking social funding is crucial. The community-based social enterprise in XY, controlled by the community committee, is a successful attempt. It provides comprehensive community services, generates profit to sustain operations, and offers employment opportunities to some residents.

Second, community management requires not only a top-down approach but also bottom-up resident self-governance. Renovation projects are not only construction projects but also community governance initiatives (Sun et al., 2023). Resident participation is needed at all stages, including initial planning and design, mid-construction supervision to ensure design completion, and post-renovation self-management. Homeowners' association or self-managed property management are worth exploring. These platforms can help build cohesive communities and accumulate social capital. As the study by Zhang, Yu and Tian (2023) shows, community owners and business committees have become key leaders and enablers of community renewal. They have established a robust governance framework for community renewal through the development of an institutionalized owner participation mechanism.

References

- Chen, P. (2013). Research on homeowners' associations from the perspective of the state-market-society triad: A case study of commodity housing communities in City B. *Journal of Public Administration*, 10(3), 75-89. [陈鹏. (2013). 国家-市场-社会三维视野下的业委会研究——以 B 市商品房社区为例. *公共管理学报*, 10(3), 75-89.]
- Klinenberg, E. (2018). *Palaces for the people: How social infrastructure can help fight inequality, polarization, and the decline of civic life*. Crown.
- Liao, J., Liu, Y., & Feng, X. (2020). Approaches to Public Participation in Micro-renewal of Old Communities: A Case Study of Lane 580 Community, Zhengli Road, Yangpu Chuangzhi District in Shanghai. *Landscape Architecture*, 27(10), 92-98. [廖菁菁, 刘悦来, & 冯潇. (2020). 公众参与老旧社区微更新的实现途径探索——以上海杨浦创智片区政立路 580 弄社区为例. *风景园林*, 27(10), 92-98.]
- Sun, Y., Xiao, D., & Huang, L. (2023). Exploration of the renovation of old communities in the historical districts of Guangzhou under the concept of complete communities. *South Architecture/Nanfang Jianzhu*, (9). [孙乙菁, 肖大威, & 黄璐. (2023). 完整社区理念下的广州历史城区老旧小区改造探索. *南方建筑*, (9).]
- Yin, J. (2024). Research on the integration of social enterprises into community development and governance: A case study based on practices in Chengdu. *Journal of the Leshan Municipal Party School of the CPC*, (1), 75-85. [殷婕. (2024). 社会企业嵌入社区发展治理研究——基于成都市的实践考察. *中共乐山市委党校学报* (01), 75-85.]
- Zhuo, X., & Li, H. (2022). A study on cost allocation in renovation of old urban residential communities. *Sustainability*, 14(11), 6929.
- Zhang, J., Wen, B., Zhu, D., & Zhao, Y. (2021). Factors influencing community residents' enthusiasm for

participating in the renovation of old residential communities: An empirical study based on the renovation of old communities in Taocheng District, Hengshui City. *Urban Development Studies*, 28(10), 29-33. [张佳丽, 温标, 朱东剑, & 赵宇. (2021). 社区居民参与老旧小区改造积极性的影响因素研究——基于衡水市桃城区老旧小区改造的实证观察. *城市发展研究*, 28(10), 29-33.]

Zhang, W. (2020). Social enterprises and the reconstruction of neighborhood relations: A case study of four social enterprises. *Zhejiang Social Sciences*, (4), 64-78. [张维维. (2020). 社会企业与社区邻里关系的重建——以四个社会企业为例. *浙江社会科学*, (4), 64-78.]

Zhang, Z., Yu, J., & Tian, J. (2023). Owner-Led Urban Community Renewal Model——A Case Study of the Renewal of Old Communities, Xi'An, China. Xi'An, China.

Chapter 6

6. Residents' Willingness to Relocate and the Impact of Community Livability on It

This chapter explores the relocation willingness of residents in the case study communities and the factors influencing their decisions. Firstly, a questionnaire survey is used to understand residents' relocation intentions (stay in the current community, move to another community within the same city, or move to another city). In-depth interviews are then conducted to further analyze the reasons behind residents' desires to move or stay. Secondly, regression analysis and interviews are utilized to understand how residents perceived urban shrinkage impact their willingness to relocate. Thirdly, regression analysis and interviews are employed to examine how residents' evaluations of community livability and community renovation projects influence their willingness to relocate. Additionally, the variations in this influence among residents with different social attributes are explored.

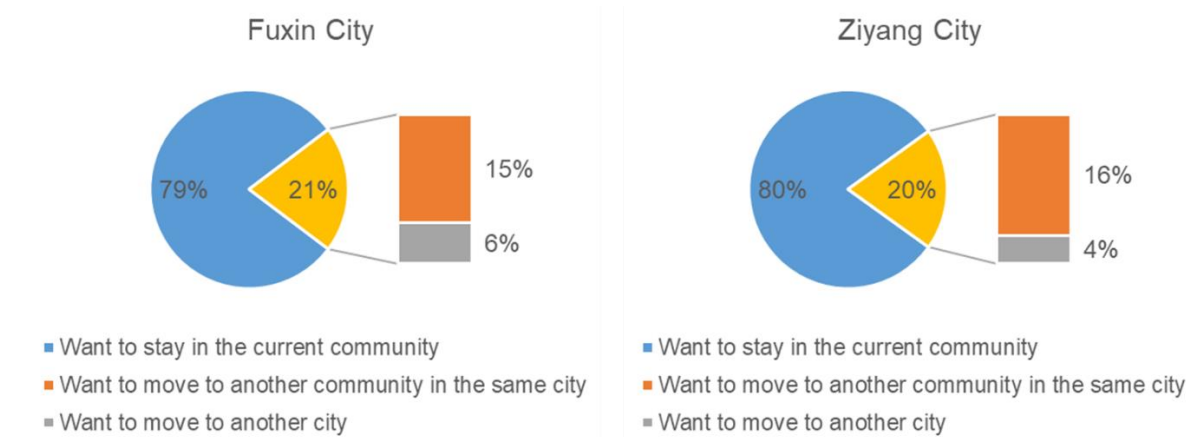
6.1 Methodology

Through a questionnaire survey, data on residents' future relocation intentions were collected. The survey options included: (1) willingness to stay in the current community, (2) desire to relocate to another community within the same city, and (3) desire to relocate to another city. Additionally, respondents were asked to provide reasons for their preferences regarding staying or relocating.

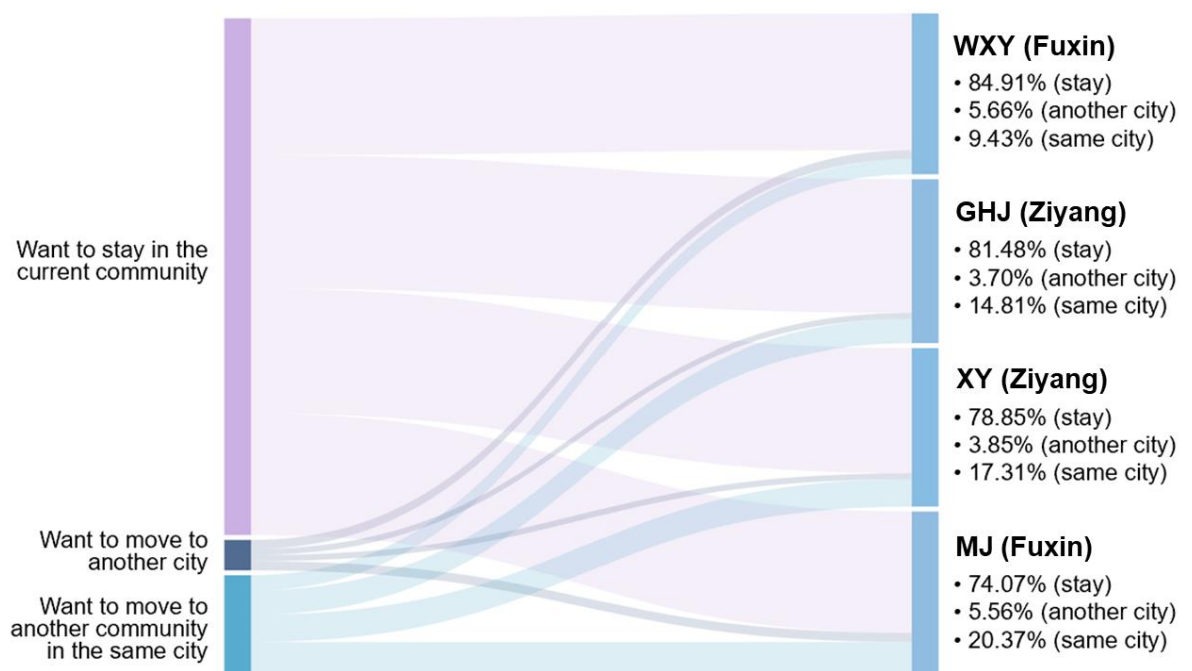
Subsequently, regression analysis was employed to investigate whether residents' perceptions of urban shrinkage and their assessments of community livability influence their relocation intentions. Given that relocation intentions are ordinal categorical variables, an Ordered Logit Regression Analysis was utilized because it can analyze the preferences across different levels of choice and their relationship with the independent variables. In this model, relocation intentions were coded as dummy variables: staying in the current community was assigned a value of 0, relocating within the same city was assigned a value of 1, and relocating to another city was assigned a value of 2. The perceptions of urban shrinkage and evaluations of community livability were treated as independent variables, while relocation intentions served as the dependent variable. Separate regression analyses were conducted for each independent variable to assess their impact on residents' relocation intentions.

6.2 Residents' Relocation Intentions

6.2.1 Statistics on Residents' Intentions to Settle or Relocate



a) Residents in Two Cities



b) Residents in Four Communities

Figure 6.1 Residents' Intentions to Settle or Relocate

Figure 6.1 (a) presents survey results regarding residents' living preferences in two cities. It is evident that residents in both cities show a similar trend in their living preferences, with the vast majority preferring to stay in their current community (Fuxin: 79%, Ziyang: 80%). In Fuxin, 21% of residents want to move to another community within the same city, while in Ziyang, 20% have this preference, showing a very close percentage. In addition, 6% of residents in Fuxin want to move to another city, compared to 4% in Ziyang. The proportion of residents wanting to move to another city is relatively low, but it is slightly higher in Fuxin than in Ziyang.

Figure 6.1 (b) illustrates the living preferences of residents in four communities. The majority of residents in all four communities prefer to stay in their current community. WXY (Fuxin) has the highest percentage of residents wanting to stay (84.91%), followed by GHJ (Ziyang) at 81.48%, XY (Ziyang) at 78.85%, and MJ (Fuxin) at 74.07%. The desire to move within the same city varies more significantly. MJ (Fuxin) has the highest percentage of residents wanting to move within the same city (20.37%), followed by XY (Ziyang) at 17.31%, GHJ (Ziyang) at 14.81%, and WXY (Fuxin) at 9.43%. Additionally, a relatively small percentage of residents in all communities express a desire to move to another city. The percentages are close across the communities, with WXY (Fuxin) at 5.66%, MJ (Fuxin) at 5.56%, XY (Ziyang) at 3.85%, and GHJ (Ziyang) at 3.70%. It suggests that WXY (Fuxin) and GHJ (Ziyang) have the highest satisfaction with their current community, with more than 80% of residents wanting to stay. MJ (Fuxin) has the highest percentage of residents wanting to move within the same city, indicating a possible interest in better local housing options or amenities. The overall desire to move to another city is low across all communities, suggesting a general contentment with the cities themselves but varying satisfaction with specific communities.

6.2.2 Differences Across Socioeconomic Groups

Using chi-square analysis to examine whether there are significant differences in relocation intentions among residents with different socioeconomic attributes. As shown in Table 6.1, residents of different ages, education levels, occupations, lengths of residence, and property ownership statuses exhibit significantly different relocation intentions.

For residents of different ages, there is a trend that as age increases, the intention to settle in the current community significantly rises, while the desire to move decreases. The highest percentages of those wishing to stay are observed in the age groups 71-75 (96.55%), 76-80 (93.33%), and over 80 (95.45%). Moving within the same city is more common among younger respondents, particularly those aged 36-45. The intention to move to another city is highest in the age group 41-45 (40.00%) but is negligible or non-existent in older age groups. Younger age groups (36-50) have a higher tendency to move within the same city or to another city, possibly due to job opportunities, a desire for better education for children, and a desire for better housing or amenities. In contrast, older age groups (51 and above) show a strong preference for settling in their current location, reflecting increased attachment to their current community, established social networks, and a desire for stability and familiarity as they age.

For residents of different education levels, higher education correlates with greater mobility, while lower education correlates with a stronger preference for stability. Residents with higher education levels (Bachelor and above) exhibit a strong preference for moving, since they might have better career opportunities and the financial means to consider relocating. However, residents with lower education levels (Primary school and below, Junior high school) show a strong preference for settling in their current community, possibly due to fewer opportunities for relocation, financial constraints, or a greater social attachment to their current location.

For residents of different occupations, job seekers and workers exhibit high migration intent, likely driven by the search for better job opportunities. Respondents who are self-employed and government employees

also show a higher tendency to move, which may be due to their better financial conditions. In contrast, the unemployed and retired individuals show low migration intent, with the unemployed preferring to settle (100.00%) and the retired largely preferring to settle (85.96%). This low migration intent is likely due to financial constraints, the need for stability, and strong community ties.

For residents with different lengths of residence, short-term residents are more likely to move within the city, while long-term residents show a strong preference for settling. Residents who have lived in the community for over 40 years show the highest preference for settling (97.44%), likely due to their age, deep community roots, and stable social networks. In contrast, those who have lived for 1-5 years show a lower preference for settling. Moving within the same city is most common among those who have lived for 1-3 years (36.84%) and least common among those who have lived for over 40 years (0.00%). Moving to another city is generally low across all groups, with slight increases among those who have lived for 4-5 years (11.11%) and 31-40 years (9.09%).

For residents with different types of property ownership, those in public rental housing show the highest preference for settling (100.00%), likely because these are low-cost welfare houses provided by the government, and residents may lack the financial means to move to another neighborhood. Individuals with private ownership also show a high preference for settling (81.50%), with a smaller portion considering moving within the same city (13.29%) or to another city (5.20%). This is because homeowners are more likely to develop relationships with neighbors, participate in community activities, and face costs associated with selling a home and purchasing a new one. Personal renters have the lowest preference for settling (52.17%) and the highest tendency to move within the same city (43.48%), possibly due to the temporary nature of renting and the potential need to move if the landlord decides to sell the property.

For residents with different income levels, although the differences between income groups are not statistically significant, it is evident that as income levels increase, the proportion of residents willing to relocate also rises. Residents with lower incomes (less than 2000 yuan) have the highest preference for settling (89.29%), while higher-income residents (over 3000 yuan) have the lowest preference for settling (70.83%) and the highest tendency to move within the same city (22.22%) and to another city (6.94%). This suggests that financial constraints are a significant factor limiting residents' ability to relocate.

Table 6.1 The Results of Chi-square Analysis for Residents with Varying Socioeconomic Characteristics

Age		36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	Over 80	Total	χ^2	<i>p</i>
Settlement Intentions	Settle	0.00%	0.00%	33.33%	73.91%	60.61%	84.21%	92.11%	96.55%	93.33%	95.45%	79.81%	69.428	0.000**
	Move within the same city	100.00%	60.00%	55.56%	26.09%	27.27%	7.89%	7.89%	3.45%	6.67%	4.55%	15.49%		
	Move to another city	0.00%	40.00%	11.11%	0.00%	12.12%	7.89%	0.00%	0.00%	0.00%	0.00%	4.69%		
Total		1	5	9	23	33	38	38	29	15	22	213		

* $p < 0.05$ ** $p < 0.01$

Education		Primary school and below	Junior high school	Senior high school	Junior college	Bachelor and above	Total	χ^2	p
Settlement Intentions	Settle	89.80%	83.33%	70.00%	50.00%	0.00%	79.81%	38.114	0.000**
	Move within the same city	8.16%	12.96%	22.00%	0.00%	100.00%	15.49%		
	Move to another city	2.04%	3.70%	8.00%	50.00%	0.00%	4.69%		
Total		49	108	50	2	4	213		

* p<0.05 ** p<0.01

Occupation		Self-Employed	Enterprises and Institution Staff	Business and Service Personnel	Worker	Job Seeker	Government Employee	Unemployed	Retired	Total	χ^2	p
Settlement Intentions	Settle	40.00%	66.67%	62.50%	0.00%	0.00%	33.33%	100.00%	85.96%	79.81%	50.234	0.000**
	Move within the same city	53.33%	33.33%	25.00%	100.00%	50.00%	33.33%	0.00%	10.53%	15.49%		
	Move to another city	6.67%	0.00%	12.50%	0.00%	50.00%	33.33%	0.00%	3.51%	4.69%		
Total		15	6	8	1	2	3	7	171	213		

* p<0.05 ** p<0.01

Length of Residence (Year)		1-3	4-5	6-10	11-15	16-20	21-30	31-40	Over 40	Total	χ^2	p
Settlement Intentions	Settle	63.16%	55.56%	77.36%	66.67%	85.71%	71.43%	77.27%	97.44%	79.81%	24.420	0.041*
	Move within the same city	36.84%	33.33%	15.09%	26.67%	12.24%	28.57%	13.64%	0.00%	15.49%		
	Move to another city	0.00%	11.11%	7.55%	6.67%	2.04%	0.00%	9.09%	2.56%	4.69%		
Total		19	9	53	15	49	7	22	39	213		

* p<0.05 ** p<0.01

Property Ownership		Private Ownership	Personal Renting	Public Rental Housing	Total	χ^2	p
Settlement Intentions	Settle	81.50%	52.17%	100.00%	79.81%	18.830	0.001**
	Move within the same city	13.29%	43.48%	0.00%	15.49%		
	Move to another city	5.20%	4.35%	0.00%	4.69%		
Total		173	23	17	213		

* p<0.05 ** p<0.01

Monthly Income Per Household Member (yuan)		Less than 2000	2000-3000	Over 3000	Total	χ^2	p
Settlement Intentions	Settle	89.29%	81.18%	70.83%	79.81%	6.928	0.140
	Move within the same city	8.93%	14.12%	22.22%	15.49%		
	Move to another city	1.79%	4.71%	6.94%	4.69%		
Total		56	85	72	213		

* p<0.05 ** p<0.01

6.2.3 Reasons for Wanting to Settle or Relocate

(1) Reasons for Wanting to Settle

Figure 6.2 displays reasons for staying in the current community across four communities. Overall, the reasons for staying show both similarities and differences across the four communities. All communities have a notable number of residents who prefer to avoid the hassle of moving due to older age. However, WXY (Fuxin) and MJ (Fuxin) residents are particularly concerned about higher housing prices in other areas, while XY (Ziyang) residents also value good neighbor relationships. GHJ (Ziyang) stands out with a strong preference for convenient shopping facilities and transportation. Other reasons include proximity to family members, convenience of commuting to work, enjoying the community environment, and convenience of living on a lower floor.

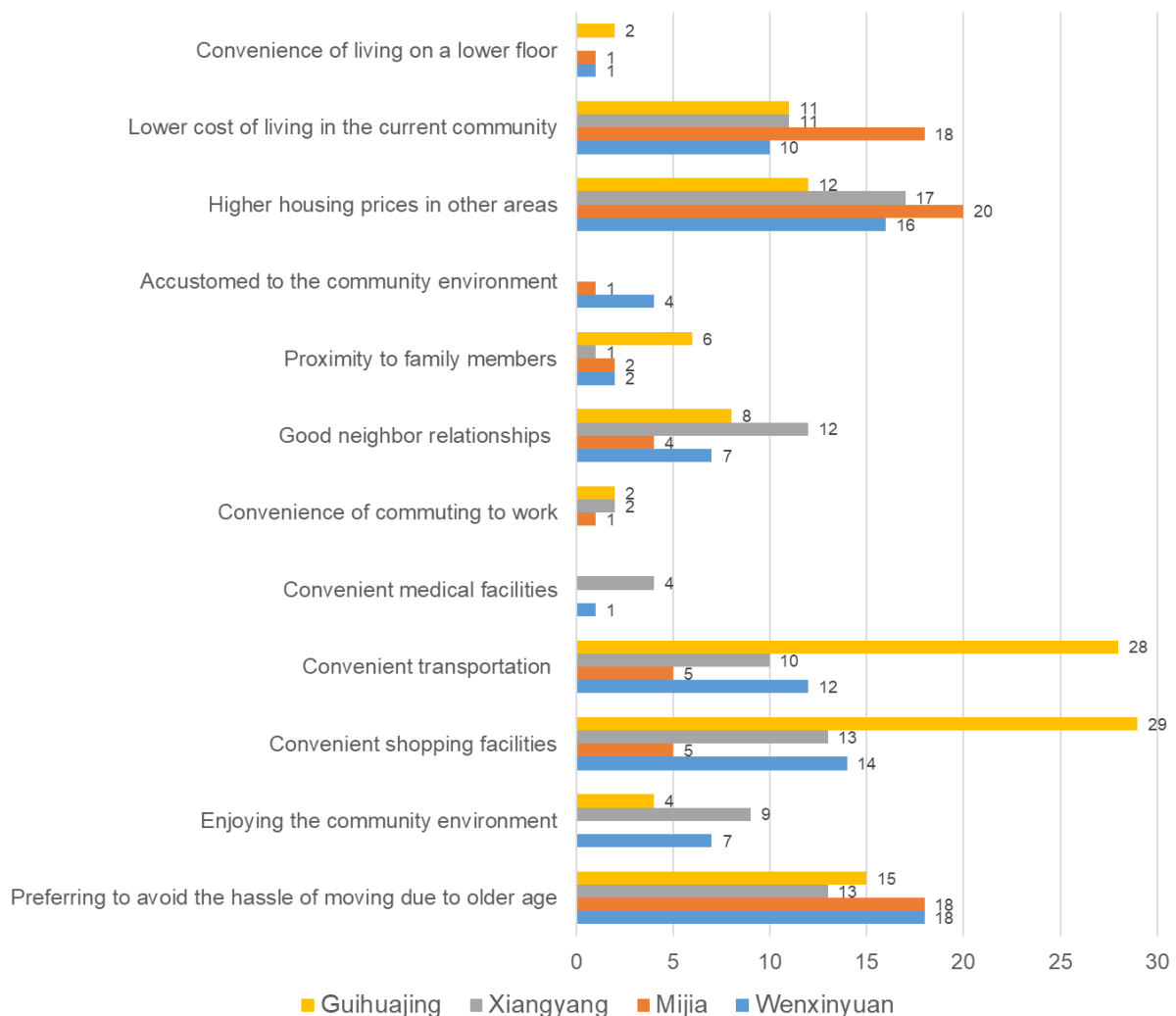


Figure 6.2 Reasons for Wanting to Settle

In WXY, the leading reason for staying is “preferring to avoid the hassle of moving due to older age” (18 residents), along with “higher housing prices in other areas” (16 residents) and “convenient shopping facilities” (14 residents). One resident mentioned, *“I don’t want to move; I’m too old to deal with the hassle. I’m used to living here, and it’s convenient for shopping and transportation”* (WXY-1). This sentiment is echoed by another resident who stated, *“I don’t want to move; I’m quite satisfied with*

everything here. The community is convenient and clean, and I've gotten used to living here" (WXY-4). A resident reluctant to move due to financial issues said, *"I can't afford to buy a house elsewhere. I can barely manage to cover food; I can't even pay for medical expenses"* (WXY-2). Another resident highlighted the social aspect of their community, saying, *"I don't want to move. All my neighbors here are old friends. We chat, exercise, and help each other out. If I move, I won't know anyone, and it won't be as good as it is now"* (WXY-39).

For MJ residents, the primary reason for staying is "higher housing prices in other areas," with 20 residents citing this. One resident explained, *"I don't plan to move. Our financial situation is not good, and we can't afford to buy a house elsewhere. The houses here don't sell for much either. This community is suitable for low-income people"* (MJ-1). Another resident mentioned, *"There's no money left to move. It's hard to find a job in Fuxin now, and my child's salary is too low, so my retirement pension has to support my child"* (MJ-26). The second most cited reason is "lower cost of living in the current community" (18 residents). A recent mover shared, *"I don't plan to move again. I just moved to this community last year. It's cheap to buy things here, and the cost of living is low"* (MJ-8). Another main reason is "preferring to avoid the hassle of moving due to older age" (18 residents). An elderly resident said, *"I don't want to move; I'm too old to deal with the hassle. I'm used to living here, and it's lively with all the old neighbors around"* (MJ-9). Another resident noted, *"I don't want to move; life here is still convenient, and I'm already content"* (MJ-13).

In XY, "higher housing prices in other areas" is the top reason for staying, mentioned by 17 residents. One resident explained, *"I don't plan to move. Buying a house elsewhere would cost money, and I can't afford that"* (XY-4). Other frequently cited reasons are "convenient shopping facilities" (13 residents) and "preferring to avoid the hassle of moving due to older age" (13 residents). Residents shared, *"I don't plan to move. It's convenient to live here; transportation is easy, and I'm satisfied with everything. Plus, my sister lives nearby"* (XY-2). Another added, *"I don't want to move; my workplace is nearby, which is convenient"* (XY-5). Additionally, "good neighbor relationships" (12 residents) is also a significant reason for staying in XY. One resident remarked, *"I'm not moving. I'm very satisfied with my current living situation. My friends all live nearby, and we can play cards together every day. It's also easy to buy groceries, and living on the ground floor means no need to go up and down stairs"* (XY-13).

In GHJ, the main reason for residents choosing to stay is "convenient shopping facilities," cited by 29 residents, followed by "convenient transportation" (28 residents). Residents expressed their satisfaction with their current living conditions. One resident stated, *"Living here is pretty good. It's clean, shopping is convenient, and I live on the ground floor, so I don't need to use the stairs"* (GHJ-2). Other frequently cited reasons include "preferring to avoid the hassle of moving due to older age," "high cost of living in other areas," and "good relationships with neighbors." One mentioned, *"I don't want to move. I'm used to living here, and besides, I'm getting old and don't want to bother with the hassle"* (GHJ-1). Another resident highlighted the importance of social connections, saying, *"I don't plan to move in the future. I've been with my neighbors and friends for many years. We see each other and chat every day. Moving away would be too lonely. Many of us think this way, especially elderly people living alone. They don't want to bother their children and instead rely on friends and neighbors for help"* (GHJ-3). Additionally, another resident pointed out financial and satisfaction reasons: *"I've never thought about moving. First, I don't have the money, and second, I'm quite satisfied living here"* (GHJ-4).

(2) Reasons for Wanting to Relocate

Figure 6.3 displays reasons why residents want to relocate to other areas across four communities. Overall, the desire for improved community environment, enhanced living facilities, and better housing quality are the most common reasons across all locations. Closer proximity to family and greater development potential of the location also play significant roles in the decision-making process for moving.

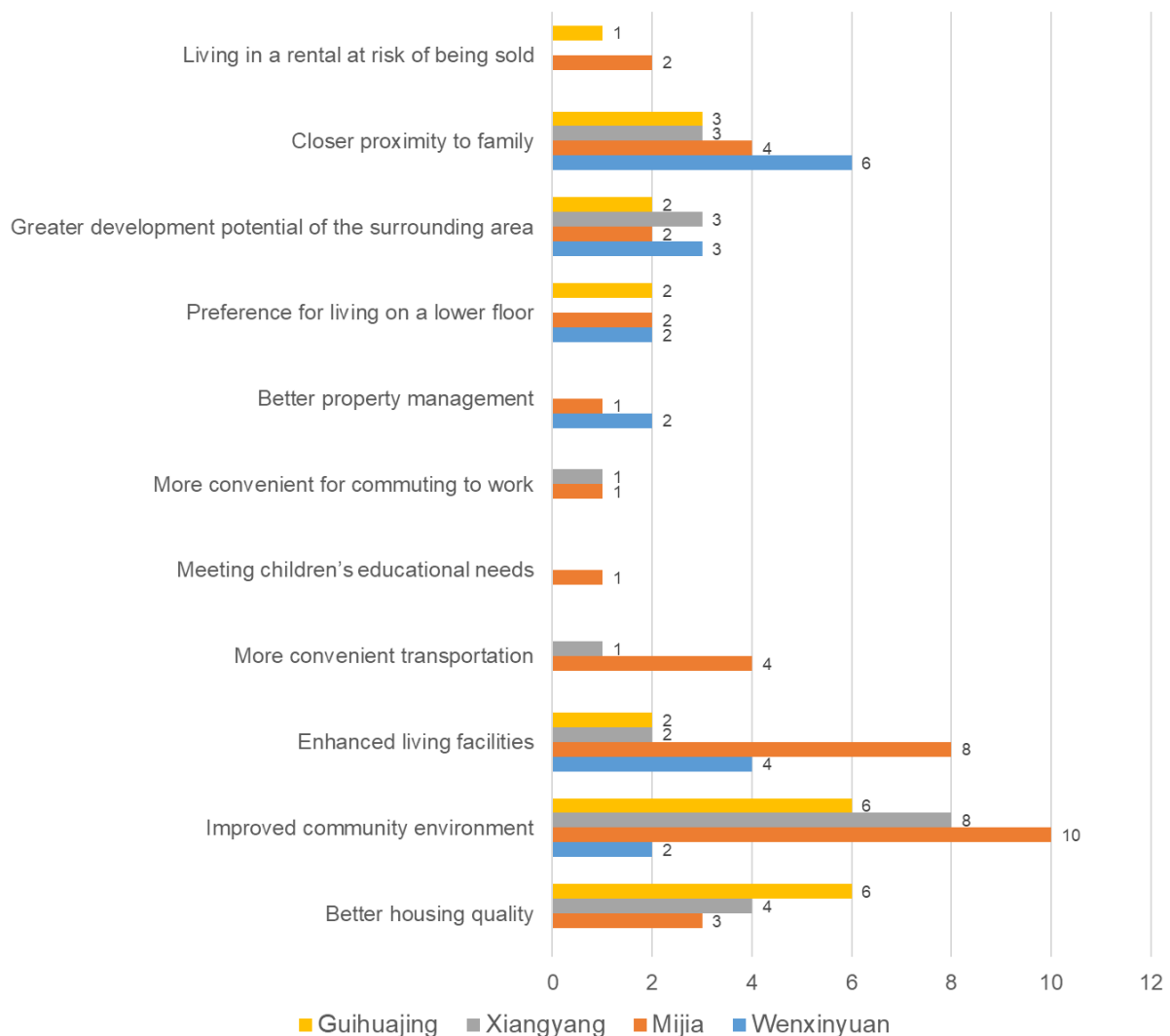


Figure 6.3 Reasons for Wanting to Relocate

Residents in WXY are primarily motivated to move closer to family, as cited by 6 residents. Better housing quality is also a key reason, noted by 4 residents. Other motivations include an improved community environment and greater development potential. According to interviews, one resident mentioned the possibility of moving to the city where their child works: *“My child works in Shenyang City, and I might move there to be closer”* (WXY-5). Another resident expressed the desire to move near their child’s residence in the northern part of the city: *“I want to move to a neighborhood near my child’s place for convenience in taking care of me. Also, I want to switch to a lower floor because I am getting older and can’t climb stairs anymore”* (WXY-15). A third resident showed a preference for areas with better facilities and property management: *“I will move to a place with better facilities, a better location, and good property management”* (WXY-6).

In MJ, 10 residents want to move due to the desire for an improved community environment, while 8 residents are seeking enhanced living facilities. One interviewee complained about the poor environment: *“This environment is too bad. I want to move to a place in the city with a better environment and complete facilities”* (MJ-2). Closer proximity to family is also a significant factor. A resident mentioned the possibility of moving to their daughter’s home in the city: *“Depending on the situation, I might move to my daughter’s place. We can take care of each other, and I can help with my grandson”* (MJ-4). Another resident considered moving to Ningbo, a city located in southeastern China, where his daughter works: *“My daughter works in Ningbo. I might move there as the southern climate is better and more suitable for retirement”* (MJ-7). Additionally, some tenants are influenced by their landlords: *“I am renting here, and the landlord might sell the property. If that happens, I will have to find another place to rent”* (MJ-6).

Residents of XY are mainly motivated to move due to the desire for an improved community environment, cited by 8 residents, and better housing quality, noted by 4 residents. Additional reasons include greater development potential and closer proximity to family. One resident wanted to move to the new district: *“I want to move to the new district where development is better. Many new residential buildings have been constructed, and the community environment is also good”* (XY-3). Another resident wanted to relocate for business purposes: *“I am thinking of moving. I run a small shop nearby and currently live in a rented house. I might move to the new district to continue my business there, since that area has attracted many people now”* (XY-1). A third resident highlighted the importance of being close to family: *“I want to move to the new district where my son lives, and I plan to move to the same community as him”* (XY-6).

The primary reasons residents want to move from GHJ are better housing quality and an improved community environment, each cited by 6 residents. Other notable reasons include closer proximity to family and greater development potential of the surrounding area, similar to residents in the XY. One resident said: *“I want to move to the new district where the community environment is better, the housing quality is higher, and the property management services are also better than in the old district”* (GHJ-16).

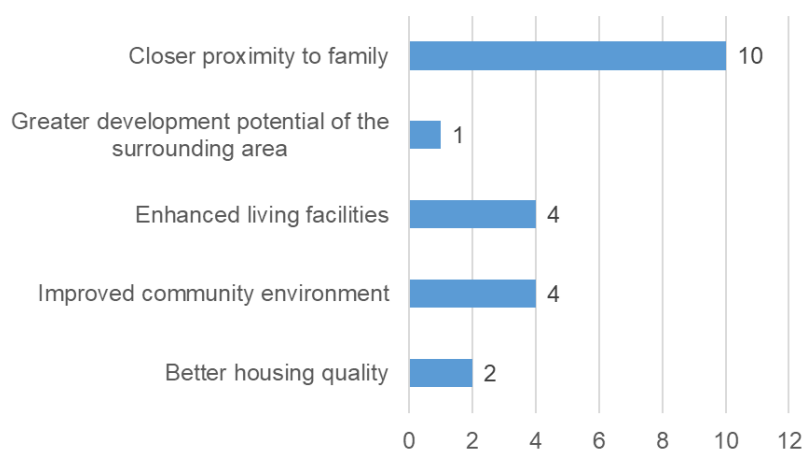


Figure 6.4 Reasons for Wanting to Relocate to Another City

However, among the residents who want to relocate, most still prefer to stay in their original city. Further analysis (Figure 6.4) reveals that the primary reason for wanting to move to other cities is to be closer to family, particularly the city where their children live, rather than seeking better job opportunities like younger people do.

6.3 Impact of Perceived Urban Shrinkage on Relocation Intentions

Using residents' perceptions of urban shrinkage (including population change and economic change) as independent variables and their relocation intentions as the dependent variable, an Ordered Logit Regression Analysis was conducted. In the regression analysis, the independent variables were converted to numerical values: population/economic decline was coded as 1, population/economic stability was coded as 2, and population/economic growth was coded as 3. The dependent variable was transformed into an ordinal categorical variable with the following coding: staying was assigned a value of 0, relocating within the same city was assigned a value of 1, and relocating to another city was assigned a value of 2. Considering the different degrees of urban shrinkage in the two cities, regression analyses were conducted separately for each city. The results are shown in Table 6.2.

In Fuxin, residents' perceptions of urban shrinkage did not affect their relocation intentions. However, in Ziyang, both perceptions of population decline and economic recession significantly influenced residents' relocation intentions. Residents who believed in population (economic) growth were more likely to stay, while those who perceived population (economic) decline were more inclined to move to other cities.

The differences between the two cities can likely be attributed to varying degrees of urban shrinkage, the duration of the shrinkage period, and residents' income levels. Compared to Ziyang, Fuxin is experiencing a higher degree of urban shrinkage, which started earlier and has lasted longer. When shrinkage becomes a common experience, residents gradually become accustomed to this environment. Skilled or economically better-off residents have already left Fuxin, resulting in a higher proportion of low-income residents remaining. Even if they perceive significant decline, their economic constraints limit their ability to move. In contrast, although Ziyang has experienced a population decline for many years, economic recession is a more recent issue. Additionally, the overall fiscal condition of the city and residents' income levels are better than those in Fuxin. Therefore, when people begin to perceive shrinkage, they might take proactive steps to relocate, and their financial capacity also allows them to relocate.

Table 6.2 Results of Ordered Logit Regression Analysis (Impact of Perceived Urban Shrinkage)

a) Analysis of Fuxin City

Changes in Urban Population	Variable	Regression Coefficient
	Perception of Urban Population Changes	0.026 (0.077)
	Likelihood Ratio Test	$\chi^2(1)=0.006, p=0.939$
	McFadden R-squared	0.000
Changes in Urban Economy	Variable	Regression Coefficient
	Perception of Urban Economic Changes	0.249 (0.762)
	Likelihood Ratio Test	$\chi^2(1)=0.592, p=0.442$
	McFadden R-squared	0.004
Dependent Variable: Residents' Settlement Intentions		

Sample Size: 107

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

b) Analysis of Ziyang City

Changes in Urban Population	Variable	Regression Coefficient
	Perception of Urban Population Changes	-1.170** (-3.033)
	Likelihood Ratio Test	$\chi^2(1)=10.616, p=0.001$
	McFadden R-squared	0.084
Changes in Urban Economy	Variable	Regression Coefficient
	Perception of Urban Economic Changes	-0.789* (-2.256)
	Likelihood Ratio Test	$\chi^2(1)=5.675, p=0.017$
	McFadden R-squared	0.045
Dependent Variable: Residents' Settlement Intentions		

Sample Size: 106

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

6.4 Impact of Community Livability on Relocation Intentions

6.4.1 Overall Analysis of the Impact of Community Livability on Relocation Intentions

An Ordered Logit Regression was used to analyze the relationship between residents' evaluations of community livability and their relocation intentions. In the regression analysis, the independent variables were community livability ratings, represented by numbers 1-5, indicating a range from very dissatisfied to very satisfied. The dependent variable was transformed into an ordinal categorical variable with the following coding: staying was assigned a value of 0, relocating within the same city was assigned a value of 1, and relocating to another city was assigned a value of 2. Considering the contextual differences of various communities, regression analyses were conducted separately for the two cities and four communities. The results are shown in Table 6.3.

In Fuxin and its two communities, residents' evaluations of community livability did not significantly influence their relocation intentions. However, in Ziyang and its two communities, residents' evaluations of community livability significantly affected their relocation intentions. In Ziyang's two communities, there was a significant inverse relationship between community livability evaluations and relocation intentions, indicating that residents who rated their community's livability highly were more likely to stay, while those with lower evaluations were more inclined to move. This to some extent demonstrates that improving community livability is crucial for retaining the population in shrinking cities.

The reasons for this difference may also be related to the degree of urban shrinkage and residents' income levels. Fuxin is experiencing a severe and prolonged degree of urban shrinkage. Over time, residents may have become accustomed to living in a declining environment. Additionally, for most residents, income is a significant factor that restricts their ability to leave, even if they are dissatisfied with the livability. For those who want to leave Fuxin, being close to family or seeking employment opportunities are more important considerations. Therefore, even if community livability improves, it is unlikely to be sufficient to influence their decision to stay. In contrast, Ziyang is experiencing a milder degree of urban shrinkage and only recently encountered economic recession. As a result, residents are more sensitive to any changes in

their community environment, making their evaluations of livability a critical factor in their relocation decisions. When they perceive high livability, they choose to stay, and if they perceive low livability, they are financially capable of relocating to a better environment.

Table 6.3 Results of Ordered Logit Regression Analysis

a) Analysis of Fuxin City

Variable	Regression Coefficient
Community Livability	-1.145 (-1.947)
Likelihood Ratio Test	$\chi^2(1)=4.311, p=0.038$
Mcfadden R-squared	0.032
Dependent Variable: Residents' Settlement Intentions	

Sample Size: 107

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

b) Analysis of Ziyang City

Variable	Regression Coefficient
Community Livability	-2.439** (-2.903)
Likelihood Ratio Test	$\chi^2(1)=9.603, p=0.002$
Mcfadden R-squared	0.076
Dependent Variable: Residents' Settlement Intentions	

Sample Size: 106

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

c) Analysis of Four Case Study Communities

Fuxin - WXY (N=53)	Variable	Regression Coefficient
	Community Livability	-1.083 (-1.380)
	Likelihood Ratio Test	$\chi^2(1)=2.187, p=0.139$
	Mcfadden R-squared	0.039
Fuxin - MJ (N=54)	Variable	Regression Coefficient
	Community Livability	-0.892 (-0.840)
	Likelihood Ratio Test	$\chi^2(1)=0.737, p=0.391$
	Mcfadden R-squared	0.010
Ziyang - XY (N=52)	Variable	Regression Coefficient
	Community Livability	-2.166* (-2.007)
	Likelihood Ratio Test	$\chi^2(1)=4.841, p=0.028$
	Mcfadden R-squared	0.076
Ziyang - GHJ (N=54)	Variable	Regression Coefficient
	Community Livability	-3.576* (-2.116)
	Likelihood Ratio Test	$\chi^2(1)=5.565, p=0.018$
	Mcfadden R-squared	0.090

Dependent Variable: Residents' Settlement Intentions

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

6.4.2 Differences in Impact Across Socioeconomic Groups

Since community livability affects relocation intentions in Ziyang, a further comparison analysis was conducted among Ziyang's respondents to understand whether the impact of livability on relocation intentions varies across different socio-economic groups. Previous analyses of differences in relocation intentions across socioeconomic groups revealed significant differences among residents of different ages, education levels, occupations, lengths of residence, and property ownership statuses. Additionally, interview data indicated that income is a crucial factor restricting relocation. Therefore, this section explores the differential impact of livability on relocation intentions based on these significantly different groups. Given that 76.4% of Ziyang's respondents are retirees and that the sample sizes for other occupational categories are too small to yield accurate analysis, this section focuses exclusively on residents of different ages, incomes, education levels, lengths of residence, and property ownership statuses.

When analyzing different age groups, considering the potential lack of statistical power due to small sample sizes within certain age ranges, the age groups were divided based on the retirement age in China, creating two categories: those under 60 and those 60 and above. Additionally, because the number of respondents choosing to relocate to other cities was very small, the dependent variable, relocation intention, was reclassified into two categories: no intention to relocate (coded as 0) and intention to relocate (coded as 1). A binary logit regression was then conducted with community livability as the independent variable. The results show that improving community livability has limited appeal for younger and middle-aged residents but significantly influences the settlement intentions of older residents. As shown in Table 6.4, among residents under 60, the impact of community livability is not significant. This indicates that other factors, such as job opportunities, educational resources, and economic constraints, play a more crucial role in their decision-making. In contrast, for residents aged 60 and above, community livability has a significant negative impact on relocation intentions. This means that higher livability is associated with lower relocation intentions, highlighting that community livability is a crucial factor for the elderly population.

Table 6.4 Impact Differences Across Age Group (Results of the Binary Logit Regression Analysis)

Age		
Less than 60 (n=34)	Variable	Regression Coefficient
	Community Livability	-1.372 (-1.111)
	Intercept	4.916 (1.057)
	Likelihood Ratio Test	$\chi^2 (1)=1.300, p=0.254$
	Hosmer-Lemeshow Test	$\chi^2 (8)=15.406, p=0.052$
	McFadden R-squared: 0.028	
	Cox & Snell R squared: 0.038	
	Nagelkerke R squared: 0.050	
More than 60 (n=72)	Variable	Regression Coefficient
	Community Livability	-3.298* (-2.010)
	Intercept	10.147 (1.671)
	Likelihood Ratio Test	$\chi^2 (1)=5.098, p=0.024$

	Hosmer-Lemeshow Test	$\chi^2 (7)=5.157, p=0.641$
	McFadden R-squared: 0.123	
	Cox & Snell R squared: 0.068	
	Nagelkerke R squared: 0.157	

Dependent Variable: Residents' Settlement Intentions

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

When analyzing residents with different income levels, it was found that the number of residents with relocation intentions in the income range of 1000-2000 yuan (RMB) was too small for a meaningful analysis. Therefore, income levels were categorized into two groups: below 3000 (low income) and above 3000 (non-low income). The results, as shown in Table 6.5, indicate that for non-low-income residents, improving community livability reduces relocation intentions. For residents with an income below 3000, community livability did not significantly influence relocation intentions. This suggests that for low-income groups, other factors such as housing prices and living costs have a greater impact on their decision to relocate. In contrast, for residents with an income above 3000, community livability had a significant impact. The lower the evaluation of community livability, the higher the proportion of residents with relocation intentions. This indicates that once residents have a certain level of economic capability, they become more concerned with the livability of their community.

Table 6.5 Impact Differences Across Income Levels (Results of the Binary Logit Regression Analysis)

Monthly Income (yuan)		
Less than 3000 (n=55)	Variable	Regression Coefficient
	Community Livability	-2.680 (-1.747)
	Intercept	7.442 (1.347)
	Likelihood Ratio Test	$\chi^2 (1)=3.558, p=0.059$
	Hosmer-Lemeshow Test	$\chi^2 (8)=7.306, p=0.504$
	McFadden R-squared: 0.124	
	Cox & Snell R squared: 0.063	
	Nagelkerke R squared: 0.154	
More than 3000 (n=51)	Variable	Regression Coefficient
	Community Livability	-4.326** (-2.719)
	Intercept	15.876** (2.626)
	Likelihood Ratio Test	$\chi^2 (1)=10.302, p=0.001$
	Hosmer-Lemeshow Test	$\chi^2 (7)=11.817, p=0.107$
	McFadden R-squared: 0.159	
	Cox & Snell R squared: 0.183	
	Nagelkerke R squared: 0.254	

Dependent Variable: Residents' Settlement Intentions

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

When analyzing residents with different education levels (Table 6.6), it was found that the impact of community livability on relocation intentions reached a significant level among those with a junior high school education. In this group, higher evaluations of community livability were associated with a greater

tendency to settle. However, the impact was not significant among residents with primary school education or below, and those with senior high school education and above. The possible reason is that education levels are closely related to employment and income. Residents with lower education levels may face economic constraints that limit their ability to move, regardless of livability. Meanwhile, individuals with higher education levels may prioritize other factors, such as the development potential of the location, over community livability, making them less influenced by this factor in their relocation decisions.

Table 6.6 Impact Differences Across Education Levels (Results of the Binary Logit Regression Analysis)

Education Levels		
Primary school and below (n=24)	Variable	Regression Coefficient
	Community Livability	-1.171 (-0.430)
	Intercept	2.046 (0.199)
	Likelihood Ratio Test	$\chi^2 (1)=0.187, p=0.666$
	Hosmer-Lemeshow Test	$\chi^2 (7)=13.256, p=0.066$
	McFadden R-squared: 0.014	
	Cox & Snell R squared: 0.008	
	Nagelkerke R squared: 0.018	
Junior high school (n=51)	Variable	Regression Coefficient
	Community Livability	-3.152* (-2.349)
	Intercept	10.069* (2.042)
	Likelihood Ratio Test	$\chi^2 (1)=7.461, p=0.006$
	Hosmer-Lemeshow Test	$\chi^2 (8)=4.115, p=0.847$
	McFadden R-squared: 0.183	
	Cox & Snell R squared: 0.136	
	Nagelkerke R squared: 0.247	
Senior high school and above (n=31)	Variable	Regression Coefficient
	Community Livability	-2.913 (-1.678)
	Intercept	10.672 (1.610)
	Likelihood Ratio Test	$\chi^2 (1)=3.140, p=0.076$
	Hosmer-Lemeshow Test	$\chi^2 (8)=18.877, p=0.016$
	McFadden R-squared: 0.076	
	Cox & Snell R squared: 0.096	
	Nagelkerke R squared: 0.131	

Dependent Variable: Residents' Settlement Intentions

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

When analyzing residents with different lengths of residence, the sample size for some groups was too small. Therefore, the lengths of residence were divided into three groups: 1-10 years, 11-30 years, and over 30 years. The results, as shown in Table 6.7, indicate that community livability significantly influences relocation intentions among residents who have lived in their community for over 30 years. In contrast, the impact is not significant in the other two groups. Residents who have lived in a community for over 30 years are likely to have a stronger attachment to their local environment and deeper social ties. And they

are also more likely to have invested financially in their property and community. Thus, improvements in livability are more meaningful to them, making them more inclined to stay.

Table 6.7 Impact Differences Across Length of Residence (Results of the Binary Logit Regression Analysis)

Length of Residence (Years)		
1-10 (n=20)	Variable	Regression Coefficient
	Community Livability	0.454 (0.252)
	Intercept	-2.339 (-0.342)
	Likelihood Ratio Test	χ^2 (1)=0.064, $p=0.800$
	Hosmer-Lemeshow Test	χ^2 (8)=14.675, $p=0.066$
	McFadden R-squared: 0.002	
	Cox & Snell R squared: 0.003	
	Nagelkerke R squared: 0.004	
11-30 (n=25)	Variable	Regression Coefficient
	Community Livability	-1.979 (-1.288)
	Intercept	6.699 (1.160)
	Likelihood Ratio Test	χ^2 (1)=1.830, $p=0.176$
	Hosmer-Lemeshow Test	χ^2 (7)=14.540, $p=0.042$
	McFadden R-squared: 0.058	
	Cox & Snell R squared: 0.071	
	Nagelkerke R squared: 0.099	
Over 30 (n=61)	Variable	Regression Coefficient
	Community Livability	-4.818* (-2.542)
	Intercept	15.900* (2.306)
	Likelihood Ratio Test	χ^2 (1)=9.624, $p=0.002$
	Hosmer-Lemeshow Test	χ^2 (8)=6.636, $p=0.576$
	McFadden R-squared: 0.245	
	Cox & Snell R squared: 0.146	
	Nagelkerke R squared: 0.308	

Dependent Variable: Residents' Settlement Intentions

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

In the analysis of residents with different property ownership statuses, it was found that none of the residents in public rental housing had relocation intentions. Therefore, the comparison focused only on residents with private property ownership and those renting privately. The results (Table 6.8) indicate that community livability has significant impact among residents with private property ownership, whereas it does not significantly impact renters. Renters may be more focused on short-term needs and considerations, unlike property owners who are more concerned with the long-term livability of their community. Additionally, property owners often have more stable socioeconomic status and greater resources, allowing them to improve or choose living environments that meet their standards of livability. In contrast, renters might face economic limitations and restricted choices, making them less sensitive to community livability.

Table 6.8 Impact Differences Across Different Types of Property Ownership (Results of the Binary Logit Regression Analysis)

Property Ownership		
Private Ownership (n=72)	Variable	Regression Coefficient
	Community Livability	-3.227** (-2.807)
	Intercept	10.519* (2.504)
	Likelihood Ratio Test	$\chi^2(1)=10.547, p=0.001$
	Hosmer-Lemeshow Test	$\chi^2(7)=2.866, p=0.897$
	McFadden R-squared: 0.155	
	Cox & Snell R squared: 0.136	
	Nagelkerke R squared: 0.223	
Personal Renting (n=17)	Variable	Regression Coefficient
	Community Livability	1.139 (0.395)
	Intercept	-4.519 (-0.405)
	Likelihood Ratio Test	$\chi^2(1)=0.158, p=0.691$
	Hosmer-Lemeshow Test	$\chi^2(7)=12.832, p=0.076$
	McFadden R-squared: 0.007	
	Cox & Snell R squared: 0.009	
	Nagelkerke R squared: 0.012	

Dependent Variable: Residents' Settlement Intentions

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

6.4.3 The Mediating Role of Community Livability in the Impact of Community Renovation Projects

In the previous chapter, it was showed that government-led community renovation projects can improve community livability to some extent. This section further explores whether residents' positive or negative evaluations of such community actions affect their relocation intentions. An Ordered Logit Regression Analysis was used for this investigation. Given the significant differences in residents' satisfaction with community renovation projects between the two cities, separate regression analyses were conducted for each city. The results, as shown in Table 6.9, indicate that in both cities, the impact of renovation projects on relocation intentions did not reach a significant level.

Table 6.9 Ordered Logit Regression Analysis of the Impact of Community Renovation Projects on Relocation Intentions

a) Analysis of Fuxin City

Variable	Regression Coefficient
Satisfaction with Community Renovation Projects	-0.386 (-1.654)
Likelihood Ratio Test	$\chi^2(1)=2.856, p=0.091$
McFadden R-squared	0.021
Dependent Variable: Residents' Settlement Intentions	

Sample Size: 107

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

b) Analysis of Ziyang City

Variable	Regression Coefficient
Satisfaction with Community Renovation Projects	-0.383 (-1.586)
Likelihood Ratio Test	$\chi^2(1)=2.486, p=0.115$
McFadden R-squared	0.020
Dependent Variable: Residents' Settlement Intentions	

Sample Size: 106

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are z-values)

Since community livability significantly affects relocation intentions in Ziyang, and renovation projects significantly impact community livability, it is worth exploring whether renovation projects indirectly influence relocation intentions. To investigate this, a mediation analysis was conducted with satisfaction with renovation projects as the independent variable, relocation intentions as the dependent variable (with values of 0 for no relocation, 1 for relocation within the city, and 2 for relocation to another city), and community livability as the mediating variable. The results (Table 6.10) indicate that the direct and indirect effects of satisfaction with renovation projects on relocation intentions are not statistically significant. However, the mediating effect of community livability is significant. This suggests that in Ziyang, while renovation projects enhance community livability, these improvements alone do not substantially impact relocation intentions. Instead, community livability itself plays a crucial role in their decision to stay.

Table 6.10 Results of the Mediation Analysis

a) Mediation Effect Model Testing

	Relocation Intentions	Community Livability	Relocation Intentions
Constant	0.550** (2.815)	2.958** (30.815)	1.860** (3.049)
Satisfaction with Renovation Projects	-0.082 (-1.661)	0.243** (9.986)	0.025 (0.372)
Community Livability			-0.443* (-2.262)
Sample Size	106	106	106
R^2	0.026	0.490	0.072
Adjusted R^2	0.016	0.485	0.054
F value	$F(1,104)=2.759, p=0.100$	$F(1,104)=99.730, p=0.000$	$F(2,103)=3.992, p=0.021$

* $p < 0.05$ ** $p < 0.01$ (Values in parentheses are t-values)

b) Summary of Mediation Effect Test Results

Item	c (Total Effect)	a	b	a*b (Indirect Effect)	a*b (Boot SE)	a*b (z-value)	a*b (p-value)	a*b (95% Boot CI)	c' (Direct Effect)	Test Conclusion
Satisfaction with Renovation Projects => Community Livability => Relocation Intentions	-0.082	0.243**	-0.443*	-0.108	0.069	-1.566	0.117	-0.351 ~ -0.084	0.025	Complete Mediation

* $p < 0.05$ ** $p < 0.01$

Bootstrap type: Percentile bootstrap method

Note:

Total Effect (c): The total effect of “Satisfaction with Renovation Projects” on “Relocation Intentions”.

a and b: The coefficients representing the paths from “Satisfaction with Renovation Projects” to “Community Livability” (a) and from “Community Livability” to “Relocation Intentions” (b).

Indirect Effect (a*b): The product of a and b, representing the mediation effect.

Direct Effect (c’): The direct effect of “Satisfaction with Renovation Projects” on “Relocation Intentions” after accounting for “Community Livability”.

6.5 Discussion and Conclusion

1) Impact of Perceived Shrinkage on Residents’ Willingness to Relocate

Overall, the proportion of respondents in both cities who express a desire to relocate is similar. Most residents prefer to stay in their current community, and among those who do wish to move, the majority prefer to relocate to another community within the same city. Only a few respondents want to move to a different city. This indicates that despite the challenges of shrinking environments, some cities losing inhabitants may still retain appeal. As Hollander (2011) found, people living in some shrinking cities report happiness and satisfaction due to the high level of heterogeneity among these cities in terms of perceptions of neighborhood quality.

Analyzing the impact of residents perceived urban shrinkage on their willingness to relocate reveals that in Ziyang City, residents with a stronger perception of urban shrinkage are more likely to want to relocate. In contrast, in Fuxin, residents’ perceptions of shrinkage do not significantly influence their willingness to move. This discrepancy may be because, in the early or middle stages of urban shrinkage, residents might be more sensitive to these changes and, if they have the economic ability, may take proactive measures such as relocating. However, in cities experiencing long-term shrinkage, residents may have adapted to or become satisfied with their current environment. Additionally, many residents with the intention to relocate might have already left during the early stages of shrinkage, leaving behind older residents, those with lower economic levels, or those lacking employment skills for other cities. These conditions limit their ability to relocate. Thus, in the early stages of urban shrinkage, negative perceptions of shrinkage may drive relocation, but as shrinkage becomes severe, other factors such as satisfaction with the status quo or income levels may become more influential. This result complements the study by Guimarães et al. (2016), which suggests that although residents acknowledge the “shrinking atmosphere,” such as the presence of abandoned buildings, these are not the most relevant factors influencing their decisions to leave. In particular, the “shrinking atmosphere” is significantly less valued by lower-income residents.

2) Impact of Community Livability on Residents’ Willingness to Relocate

The research results indicate that in the two communities in Fuxin, residents’ evaluations of community livability do not significantly influence their intention to relocate. This may be due to factors such as income and age influencing the willingness to relocate. However, in the two communities in Ziyang, residents’ evaluations of community livability have a noticeable impact on their relocation intentions. Residents with higher evaluations of community livability are more inclined to stay in their current community. This effect is particularly significant among residents over 60 years old, those with a monthly income of over 3000 yuan, and those with personal property ownership. Convenient shopping facilities and transportation are major reasons residents wish to stay in their current community. On the other hand, the

pursuit of better amenities, higher-quality community environments, more promising locations, and the desire to be closer to family members are significant factors driving residents to leave. This indicates that improving community livability to a certain extent is crucial for retaining the population in shrinking cities. This finding aligns with the conclusions of other scholars. For example, Robe and Taylor (2010) found that neighborhood quality affects couples' decisions to move, after controlling for life course events and housing characteristics. Lower levels of residential satisfaction led to an increased intention to leave the city (Barreira et al., 2019; Fu et al., 2022). Compared to previous studies, this research further demonstrates the varying impact of community livability assessments in shrinking cities with different degrees and types of urban shrinkage. Additionally, while government-led renovation projects have a significant positive impact on community livability, they do not directly influence residents' relocation intentions.

3) Impact of Residents' Socioeconomic Attributes on Relocation Intentions

Analyzing the differences in relocation intentions among residents with different socioeconomic attributes reveals that income, age, education level, length of residence, and property ownership status also influence residents' relocation intentions. Income is a major constraint for many residents considering relocation. This is especially important in shrinking cities, where there may be a higher proportion of low-income residents. Many low-income residents cannot afford the high housing prices and living costs in other areas, so even if they are dissatisfied with community livability, they lack the resources to leave. While studies have shown that economic activity are crucial for retaining residents and can lead to potential departure when better job opportunities arise elsewhere (Guimarães et al., 2016), this study emphasizes the constraints that low economic levels on the willingness to relocate.

Additionally, regarding different age groups, as residents age, their willingness to settle in their current community increases significantly, while their desire to relocate decreases. This is partly because moving can be too exhausting for older residents and partly due to their stronger attachment to the community. Research has shown that the higher the degree of community attachment, the lower the willingness to relocate (Clark & Coulter, 2015). Furthermore, residents with higher education levels tend to be more mobile and have higher relocation intentions, whereas those with lower education levels tend to be more stable. This could be because higher education levels often correlate with better job opportunities and higher income levels. Residents with shorter residence durations are more inclined to relocate, while long-term residents tend to stay in their original community due to their deep emotional bonds and strong neighborhood relationships. This finding aligns with Guimarães et al. (2016), who highlighted the relevance of social ties and place attachment to inhabitants' intentions to continue living in their city of residence. Among residents with different types of property, those with private ownership are more likely to stay in their original community compared to renters.

References

- Barreira, A. P., Nunes, L. C., Guimarães, M. H., & Panagopoulos, T. (2019). Satisfied but thinking about leaving: The reasons behind residential satisfaction and residential attractiveness in shrinking Portuguese cities. *International Journal of Urban Sciences*, 23(1), 67-87.
- Clark, W. A., & Coulter, R. (2015). Who wants to move? The role of neighbourhood change. *Environment and Planning A*, 47(12), 2683-2709.

- Fu, H., Zhou, G., Sun, H., & Liu, Y. (2022). Life satisfaction and migration intention of residents in shrinking cities: Case of Yichun City in China. *Journal of Urban Planning and Development*, 148(1), 05021062.
- Guimarães, M. H., Nunes, L. C., Barreira, A. P., & Panagopoulos, T. (2016). What makes people stay in or leave shrinking cities? An empirical study from Portugal. *European Planning Studies*, 24(9), 1684-1708.
- Hollander, J. B. (2011). Can a city successfully shrink? Evidence from survey data on neighborhood quality. *Urban Affairs Review*, 47(1), 129-141.
- Rabe, B., & Taylor, M. (2010). Residential mobility, quality of neighbourhood and life course events. *Journal of the Royal Statistical Society Series A: Statistics in Society*, 173(3), 531-555.

Chapter 7

7. Conclusions and Recommendations

This chapter provides a comprehensive summary of the research conclusions, covering four main aspects: the overall situation of shrinking cities in mainland China, residents' perceptions of shrinkage and evaluation of community livability, the effectiveness of community renovation projects on enhancing community livability, and the impact of community livability evaluation on residents' willingness to relocate. It elucidates the relationships among perceived shrinkage, community livability, satisfaction with renovation projects, and willingness to relocate. Based on the research conclusions, this chapter offers recommendations for improving community livability through renovation projects in the context of urban shrinkage, including general principles, implementation framework for renovation projects, and strategies for various community types. Finally, this chapter points out the contributions and limitations of the study, and suggests directions for future research.

7.1 Key Findings

Figure 7.1 summarizes the influential relationships among the variables in this study: perceptions of shrinkage, community livability assessment, satisfaction with renovation projects, and willingness to relocate. Figure 7.2 provides a summary of the key findings, addressing and refining the research framework proposed in Chapter 1. It highlights the impact of urban shrinkage on community livability and the role of community renovation projects in addressing these challenges. The study reveals that perceptions of urban shrinkage significantly affect residents' evaluations of community livability in severely shrinking cities. Additionally, economic decline notably impacts community livability, influencing factors such as housing quality, environmental quality, services and facilities, and economic stability. Community renovation projects are identified as crucial strategies to mitigate these effects and enhance community livability, although their implementation effectiveness varies and faces challenges. Furthermore, in mildly shrinking cities, improving community livability helps reduce residents' willingness to relocate and retain the population.

The main findings of the study are detailed below from four perspectives: the overall situation of shrinking cities in China, residents' perceptions of shrinkage and evaluations of community livability, the effectiveness of community renovation projects in enhancing community livability, and the impact of community livability evaluations on residents' willingness to relocate.

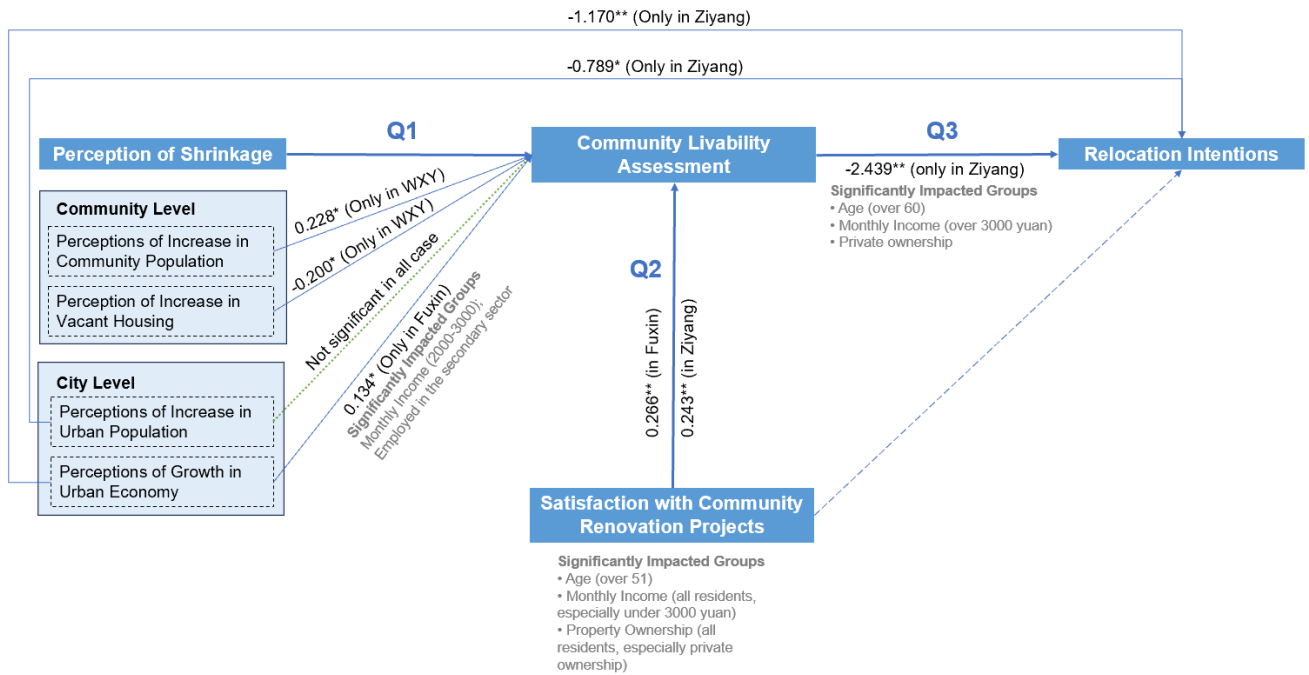


Figure 7.1 Summary of the Influential Relationships Among the Variables

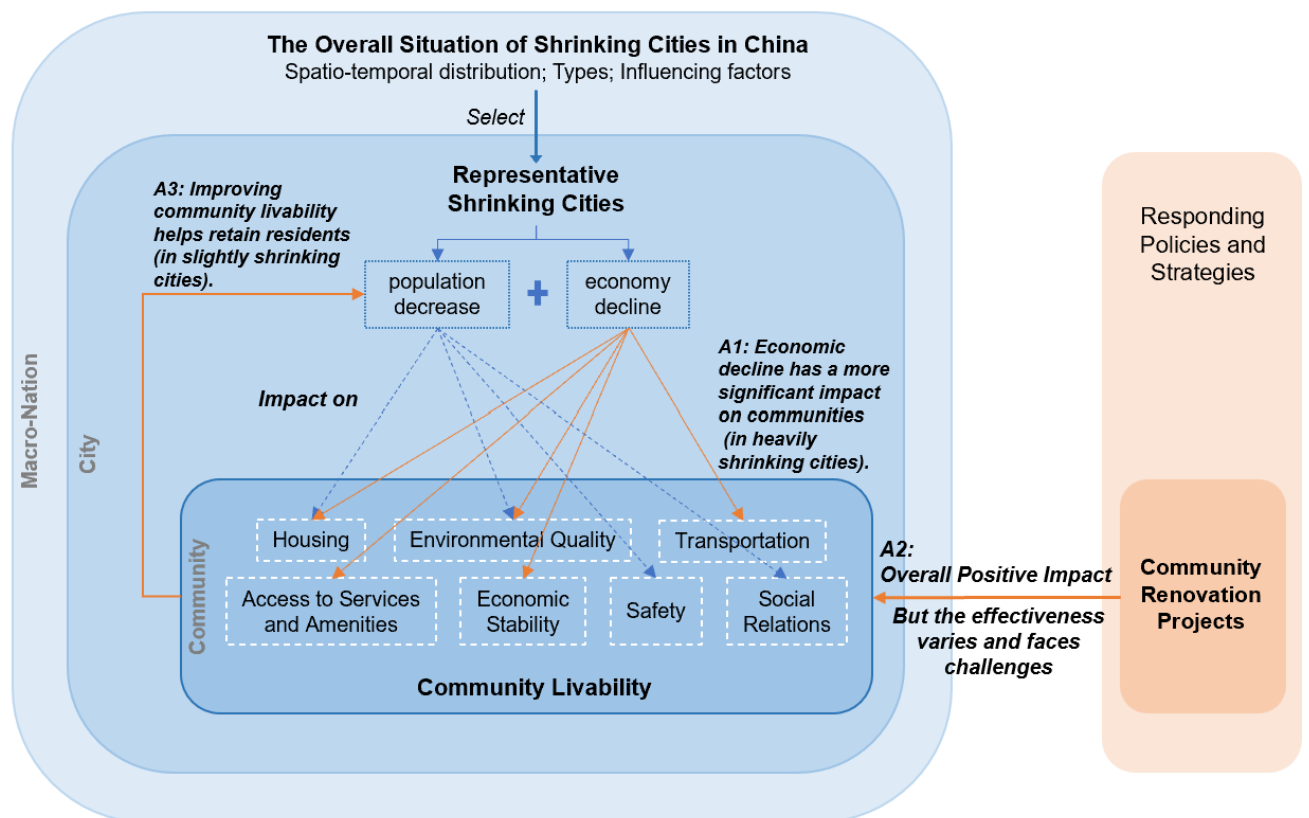


Figure 7.2 Summary of the Key Findings

7.1.1 Shrinking Cities in Mainland China

Since 2000, China has experienced a phenomenon of population shrinkage. Over the past 20 years, the number of cities with shrinking populations has increased from less than one-fifth to more than half. The distribution of these cities has expanded from the central and southwestern provinces to most provinces, with severe population shrinkage observed in Northeast China, Inner Mongolia Autonomous Region, and Shaanxi and Sichuan Provinces. Compared to cities with population shrinkage, cities with economic shrinkage emerged later, starting to appear around 2015, primarily in the northeastern regions. The development of shrinking cities is dynamic: from 2000 to 2010, the number of shrinking cities increased; from 2010 to 2015, the number decreased; and after 2015, the number of shrinking cities increased again.

Regarding the types of shrinking cities, currently, most are characterized by population shrinkage alone. However, there is a notable shift from early population-only shrinkage to dual-dimension shrinkage, encompassing both population and economy, especially since 2015. Analyzing the periods of shrinkage, the four types of cities—continuous shrinkage, recent shrinkage, periodic shrinkage, and discontinued shrinkage—show that continuous shrinkage cities make up the largest proportion. These are primarily located in the northeastern regions, Shanxi and Shaanxi Provinces in the central region, Gansu Province in the northwest, and some areas in the south. Recent shrinkage cities are mainly found in North China and Yunnan Province in the south. Periodic shrinkage cities are mainly distributed in South China. Additionally, the proportion of shrinking cities varies by city size and whether they are resource-based cities, with higher shrinkage rates in small and medium-sized cities and resource-based cities.

Regarding the factors influencing urban shrinkage, population factors such as migration and aging have become significant causes of urban shrinkage nationwide. Economically, industrial transformation and local government fiscal revenues have a considerable impact on urban shrinkage. These factors vary across regions and change over time. In most regions, the impact of population migration and aging is increasing. In the southwestern inland cities of China, large-scale migration of labor to developed coastal cities and rising aging rates are major causes of urban shrinkage. Deindustrialization and industrial restructuring, leading to structural unemployment and capital outflow, are the main reasons for the decline of most resource-based industrial cities in northern China. Conversely, industrial upgrading has benefited southern cities. Additionally, local public fiscal revenue has the most significant positive impact on shrinking cities in the northeastern regions.

7.1.2 Residents' Perceptions of Shrinkage and Community Livability Evaluation

Due to Fuxin's earlier and more severe economic shrinkage compared to Ziyang, residents of Fuxin have a stronger perception of population decline and economic recession. Additionally, Fuxin's respondents generally perceive community decline more intensely than those in Ziyang. Within each city, residents' perceptions of community shrinkage vary by neighborhood. This variation is influenced by geographic location and nearby facilities. Residents in centrally located communities with well-developed facilities have a weaker perception of community shrinkage, whereas those in relatively peripheral areas feel the shrinkage more strongly. Notably, MJ Community (Fuxin) in the suburbs, which has attracted many rural migrants due to lower housing prices, shows a weaker perception of community shrinkage.

When evaluating community livability, Ziyang's communities score higher than Fuxin's in terms of facilities (such as schools, kindergartens, elder care, entertainment, medical services, and shops) and public transportation. This may be because Ziyang's better economic conditions allow for more investment in public infrastructure, leading to higher community livability ratings among its residents. Within cities, communities with better geographic locations tend to have higher livability scores. The differences are mainly reflected in environmental quality, accessibility to services and amenities, and safety and security.

Research indicates that perceptions of urban shrinkage can influence community livability evaluations to some extent. Economic recession has a greater impact than population decline. In Fuxin, residents' perceptions of economic recession negatively affect their community livability evaluations, while perceptions of population decline have no significant impact. This is because economic recession affects residents' personal economic stability and local government finances, influencing the provision and maintenance of essential utilities and public transportation. In Ziyang, perceptions of urban shrinkage do not significantly affect community livability evaluations, suggesting that mild shrinkage does not noticeably impact community livability. The deterioration of community environment, functions, and social relationships only becomes apparent when urban shrinkage reaches a certain level.

Moreover, residents' perceptions of community population shrinkage or increased vacant housing do not significantly impact community livability, except in Fuxin's WXY Community. Currently, the vacant housing in these communities mainly consists of multi-story buildings, which do not have as severe an impact on the community environment as single-family homes. Furthermore, the population decline has not yet significantly affected neighborhood interactions since the communities still maintain a substantial population. However, in WXY, the increase in vacant housing has affected heating efficiency and housing prices, which is noteworthy. Although the direct impacts of population decline and housing vacancies are not yet evident, potential issues related to infrastructure, the housing market, and community interaction are beginning to emerge.

7.1.3 The Effectiveness of Community Renovation Projects on Enhancing Community Livability

The effectiveness of renovation projects varies across different communities. Survey respondents in Ziyang report higher satisfaction with renovation projects compared to those in Fuxin, with the highest satisfaction found in GHJ Community (Ziyang) and the lowest in MJ Community (Fuxin). These projects primarily improve public facilities, environment, roads, and public activity spaces. However, some residents expressed dissatisfaction with the construction process, citing issues such as poor construction quality, lengthy renovation periods, and high renovation frequency.

Four factors influence the implementation effectiveness of renovation projects: funding sources, project content, resident participation, and post-renovation management. Communities with more funding and those designated as key renovation projects by the government are more likely to secure resources. Projects that focus on enhancing social infrastructure tend to have higher resident satisfaction. Additionally, the more involved residents are in the renovation process, the higher their satisfaction. Effective post-renovation management also contributes to higher satisfaction levels.

Despite the varying effectiveness of renovation projects across communities, they generally result in improvements to community livability. This demonstrates that implementing renovation projects is an effective strategy for enhancing community livability and promoting positive community development. However, the implementation of these projects faces challenges. First, funding is a significant issue. Compared to growing cities, shrinking cities attract less social and private investment for renovations, making them more reliant on government funding. Given the context of urban decline, local government finances are also under pressure. Second, residents' willingness to participate in community management is relatively low. Current management is too reliant on top-down government control, lacking resident self-governance. The establishment of homeowners' association and community-based social enterprises to provide living services in XY Community (Ziyang) is a good attempt.

7.1.4 The Impact of Community Livability Evaluation on Residents' Willingness to Relocate

In case studies cities, most residents tend to stay in their current communities. Among those who wish to relocate, the majority prefer to move to another community within the same city, with only a few respondents expressing a desire to move to other cities. Further analysis of how residents' perceptions of urban shrinkage influence their willingness to relocate reveals that in Ziyang, residents who perceive urban shrinkage more strongly are more inclined to move. In contrast, in Fuxin, residents' perceptions of urban shrinkage do not significantly affect their willingness to relocate. This indicates that during the early stages of urban shrinkage, residents are more sensitive to the phenomenon, and negative views on urban shrinkage may drive them to relocate. However, when a city experiences long-term shrinkage, perceptions of shrinkage are no longer a significant factor in relocation decisions, especially for low-income residents.

Regarding the impact of community livability on relocation willingness, there is no significant effect in Fuxin's communities; factors such as income and age have a greater influence on relocation willingness. However, in Ziyang's two communities, residents with higher evaluations of community livability are less likely to want to move. Convenient shopping facilities and transportation are the main reasons residents prefer to stay in their current communities. This suggests that improving community livability to a certain extent is crucial for retaining the population in shrinking cities. Additionally, community livability acts as a mediator in the impact of renovation projects on relocation willingness. Renovation projects do not directly influence residents' willingness to relocate.

Furthermore, low income is a major constraint for many residents considering relocation. Shrinking cities tend to have a higher prevalence of low-income populations who cannot afford the higher housing prices and living costs in other areas. Consequently, even if they perceive shrinkage or are dissatisfied with community livability, they lack the means to move. Additionally, elderly residents have lower relocation willingness due to their stronger attachment to the community and the physical burden of moving. Similarly, residents who have lived in a neighborhood for a long time and homeowners are more inclined to stay in their original community due to their strong attachment to the area.

7.2 Recommendations

7.2.1 General Principles

Based on the above research findings, considering the current challenges faced by shrinking cities and the ongoing trend of population decline, this study proposes that community renovation projects in shrinking cities needs to improve in the following areas: Promote Multi-Stakeholder Participation, Enhance Focus on Social Infrastructure, and Strengthen Post-Renovation Management.

(1) Promote Multi-Stakeholder Participation

a) Government Leadership:

Although the government continues to play a leading role in initiating and overseeing renovation projects, the financial limitations in shrinking cities necessitate more diverse stakeholders. The government should focus on leveraging available resources efficiently and setting clear priorities that align with broader urban development goals.

b) Market Involvement:

In shrinking cities where government funding is limited, it is crucial to encourage private sector participation through public-private partnerships. Offering incentives such as tax breaks or subsidies can attract investment from businesses and developers, who can provide much-needed financial support and innovation for renovation projects. Although some studies suggest that the correlation between investment network centrality and urban population changes is positively significant (Wu & Yao, 2021), there is also a case study of a shrinking mining city in Turkey that demonstrates how adopting policies focused on ecology, industrial heritage, quality of life, and livability, along with the reframing and deployment of conventional practices, can make a shrinking city attractive for investment (Özatağan & Eraydin, 2021). Therefore, in some shrinking cities, particularly those experiencing mild or early stages of shrinkage, it is possible to attract private investment with appropriate urban policies.

c) Social Organization Engagement:

Engaging community-based organizations is necessary in the context of urban shrinkage. These organizations can bring in additional resources, helping to bridge the gap left by constrained government budgets. A case study from Japan highlights how social enterprises, which possess both nonprofit and for-profit characteristics, have played a significant role in revitalizing shrinking industrial areas through multi-source fundraising and the planning and execution of both profit and nonprofit activities (Liu, Zhang, & Mao, 2023). In China, social organizations are also beginning to participate in community governance, with cities like Beijing already making some attempts. Zeng and Liu (2022) explored how two social organizations in Beijing actively engaged in community governance. One organization became a government partner by focusing on vulnerable groups within the community, while the other was contracted by the government to provide community services. Both demonstrated the important role that social organizations can play in reflecting residents' needs and alleviating social tensions due to their nonprofit, voluntary, and public service nature. As discussed in Chapter 5, cities like Chengdu are also promoting community-based social enterprises, and Ziyang's case community has made some attempts with positive results. Therefore, it is necessary to promote the involvement of community organizations in other shrinking cities in the future.

d) Resident Involvement:

Active resident participation becomes even more critical when government capacity is limited. Factors influencing resident participation include internal factors such as interest-driven motivations and social capital, as well as external factors like relevant policies and the level of community governance (Zhang et al., 2021). In growing cities, residents are more likely to be motivated to participate in renovation projects due to potential benefits, such as increased property values after the renovations. However, in shrinking cities, where such benefits are less apparent, the interest-driven motivation is weaker. Therefore, it is even more essential to establish comprehensive institutional procedures and provide residents with convenient channels for participation. Establish regular forums for community feedback, ensuring transparency and open communication to build trust and foster a sense of ownership among residents. Empower residents to actively participate in decision-making and oversee the project's implementation.

(2) Enhance Focus on Social Infrastructure

In shrinking cities, despite financial constraints, it is crucial to prioritize the improvement of essential social infrastructure, such as public activity spaces, community centers, healthcare facilities, and small parks. These elements have a direct impact on the quality of life and community satisfaction, making them key areas for investment. Improving social infrastructure not only provides residents with places to gather and engage in recreational activities but also fosters social interaction and community cohesion. Public activity spaces and community centers become hubs for community events, cultural activities, and social gatherings, encouraging residents to build relationships and support networks. Enhanced social interactions and community activities help form strong community bonds, which are essential for creating resilient and supportive communities.

These improvements can also help retain residents and attract new ones, contributing to the stabilization and potential revitalization of shrinking cities. Building community relationships and fostering community cohesion is particularly important in these contexts. As populations decline, the remaining residents often face increased isolation and reduced social interaction. Strong community ties can mitigate these effects by providing social support and a sense of security. When residents feel connected and supported, they are more likely to stay in their communities, participate in local activities, and contribute to community development.

3) Strengthen Post-Renovation Management

a) Establish Homeowners' Associations and Encourage Resident Self-Governance

In the context of limited government capacity, encouraging resident self-governance is essential. It ensures that communities remain vibrant and well-maintained even with limited government oversight and empowers residents to actively shape and sustain their communities.

The formation of homeowners' associations is one way to promote resident self-governance. Unlike community residents' committees, which are semi-administrative and focus on social and political stability, homeowners' associations prioritize residents' interests. Empowering these bodies to make decisions, manage funds, and ensure the sustainability of improvements can significantly reduce the burden on government resources.

Homeowners' associations can take on responsibilities such as overseeing property management companies, managing the revenue generated from common areas and its use, renovating and updating shared facilities and equipment, organizing community events, and addressing residents' concerns. Moreover, these organizations can foster greater community engagement by involving residents directly in decision-making processes. It ensures that the specific needs and preferences of the community are met, enhancing the overall quality of life for residents. In addition to managing daily operations, homeowners' associations can play an important role in long-term planning and development. They can work collaboratively with local governments, private investors, and other stakeholders to secure funding and support for community projects.

As discussed in Chapter 5, many cities are promoting the establishment of homeowners' associations, which are transitioning from a focus on "rights protection" to "self-governance." In the rights protection phase, homeowners' associations represent residents in negotiations with developers and property management companies to secure their rights. As they develop into the self-governance phase, they take on responsibility for the daily management of the community and for mediating conflicts between residents and the association, as well as conflicts among residents themselves (Zhang, 2020). In first- and second-tier cities like Beijing and Shanghai, homeowners' associations were established earlier and have developed rapidly, with many communities now having mature associations. However, in shrinking cities, many homeowners' associations are still in the early stages of development, particularly in older communities.

Recently, shrinking cities have begun to recognize the importance of homeowners' associations in community renovation projects and daily management. For example, community renovation plans in Fuxin and Ziyang both mention the need to establish resident self-governance organizations, such as homeowners' associations, in renovated communities. Additionally, another policy has been driving the formation of homeowners' associations. As many older residential communities reach the point where significant repairs are needed, government regulations require that the special maintenance funds pre-paid by homeowners can only be accessed if approved by a homeowners' assembly vote. The homeowners' association must then submit an application to the relevant authorities for approval, and finally, the members of the association must sign off on the use of the funds (Zhang, 2020). As a result, the presence of a homeowners' association directly impacts a community's ability to utilize these maintenance funds, making it increasingly likely for more communities in shrinking cities to establish such associations.

b) Establish Community-based Social Enterprises in Capable Communities

Community-based social enterprises, led by the community residents' committee, combine both commercial and public service functions. These enterprises can effectively utilize community resources, such as vacant land and unused buildings, to generate income while providing valuable services to residents, such as childcare centers, elder care, and recreational facilities. Unlike commercial property management companies that require higher management fees, community social enterprises typically generate less profit, resulting in a lower financial burden on residents. Additionally, they can create employment opportunities by hiring residents. However, it requires some support from private investment, and there are potential challenges, such as the risk of excessive power concentration within the residents' committee leading to monopolistic practices, as well as concerns about the long-term sustainability of these enterprises (Yin, 2024). Despite these challenges, establishing community-based social enterprises

can be a viable strategy for communities that lack commercial property management companies.

c) Sustainable Management Practices and Ongoing Self-Monitoring and Feedback

Implementing sustainable maintenance practices is crucial in shrinking cities, where maintaining existing infrastructure is a priority. This includes regular inspections, prompt repairs, and community-driven initiatives to keep public spaces clean and well-maintained. To ensure the effectiveness of these practices, Community residents' committees or homeowners' associations should establish systems for continuous self-monitoring and evaluation of renovated areas. Regularly collect feedback from residents to identify issues early and make necessary adjustments. Regular inspections can prevent larger problems by addressing minor issues promptly, saving costs in the long run. Community-driven initiatives, such as volunteer clean-up days, reduce the strain on limited government resources and enhance community cohesion.

7.2.2 Specific Implementation Framework for the Renovation Project

Based on the aforementioned principles, this study proposes a framework for implementing community renovation projects in shrinking cities (Figure 7.3). This framework outlines the processes from initiation to post-management. It emphasizes the involvement of multiple stakeholders beyond the government, highlights the importance of resident participation, and strengthens process supervision, quality control, and resident satisfaction surveys. Furthermore, it enhances post-renovation management through resident self-governance. In the context of shrinking cities where the government faces financial and management pressures, this framework helps diversify funding sources, enhance residents' self-governance capabilities, and implement projects that better meet residents' needs and expectations.

1) Project Initiation

The project initiation phase begins with gathering residents' opinions (Step 1). Resident self-governing organizations collect feedback from residents on renovation needs and preferences, which is essential in urban shrinkage contexts where resources should be allocated effectively. This feedback is used to create initial renovation and funding plans, which are then submitted as formal applications to district or municipal governments (Step 2). Before making a formal decision on the renovation project, the government needs to collaborate with resident self-governing organizations, experts, NGOs, community planners, and private investment representatives to discuss the renovation plans and determine specific actions based on local policies and conditions (Step 3). Collaboration is key in this step: resident self-governing organizations work closely with local authorities; experts, NGOs, and community planners provide technical support to ensure feasibility. At the same time, the government, residents, and private investors agree on a funding plan (Step 4). This plan leverages private investment to supplement limited government funding, with community businesses or other private entities providing financial support and participating in planning to align financial resources with renovation goals. Additionally, residents determine a certain contribution ratio based on the content of the renovation.

2) Project Construction

In the project construction phase, the government takes the lead in selecting construction contractors in consultation with resident self-governing organizations and private investors (Step 5). Once selected, the contractors carry out the renovation work (Step 6) under the supervision of both governments and resident

self-governing organizations to ensure construction quality (Step 7). Additionally, resident self-governing organizations coordinate between the contractors and residents to address any issues that arise during the construction process.

3) Project Inspection and Acceptance

The project inspection and acceptance phase involves thorough quality checks and evaluations. District/municipal governments conduct comprehensive quality inspections (Step 8) to ensure all work meets safety and regulatory standards. Concurrently, resident self-governing organizations perform satisfaction surveys to gather feedback from community residents about the completed renovations. Based on the results of government inspections and resident surveys, necessary modifications are made to ensure the renovations effectively meet community needs and expectations.

4) Project Handover and Post-Management

The final phase, project handover and post-management, involves transitioning the completed project to community management. This phase includes ongoing monitoring and feedback mechanisms (Step 9) to ensure the sustainability of renovations. Community committees, which are semi-administrative bodies, and homeowners' associations, which are based on property ownership, are responsible for effective community management. These two organizations have distinct roles. Community committees operate under the jurisdiction of the government's "subdistrict office" and are funded by government allocations. Their focus is on social and political stability, including public education, social welfare, security, cultural and health services, mediation of resident disputes, and employment. Homeowners' associations, on the other hand, manage funding independently. They can generate revenue by utilizing communal properties and public areas, such as managing parking. If public revenue is insufficient, they collect funds from homeowners. Their focus is on the interests of the residents, including public health, landscaping, traffic and vehicle management, maintenance of public facilities and equipment, and maintenance of environmental cleanliness. They pay attention to collecting residents' opinions and addressing them accordingly.

In some communities, community committees and homeowners' associations may delegate management to specialized property management companies. These companies are responsible for housing repairs, maintenance and management of public facilities, environmental management (cleaning and landscaping), and providing convenience services. Residents pay fees to the property management companies, while the community committees and homeowners' associations supervise the companies and mediate any conflicts with residents. In low-income communities where commercial property management companies are not present, community committees may establish community-based social enterprises, employing local residents to provide services at lower profits. Alternatively, homeowners' associations may provide services directly, encouraging volunteerism among residents.

Project Phases

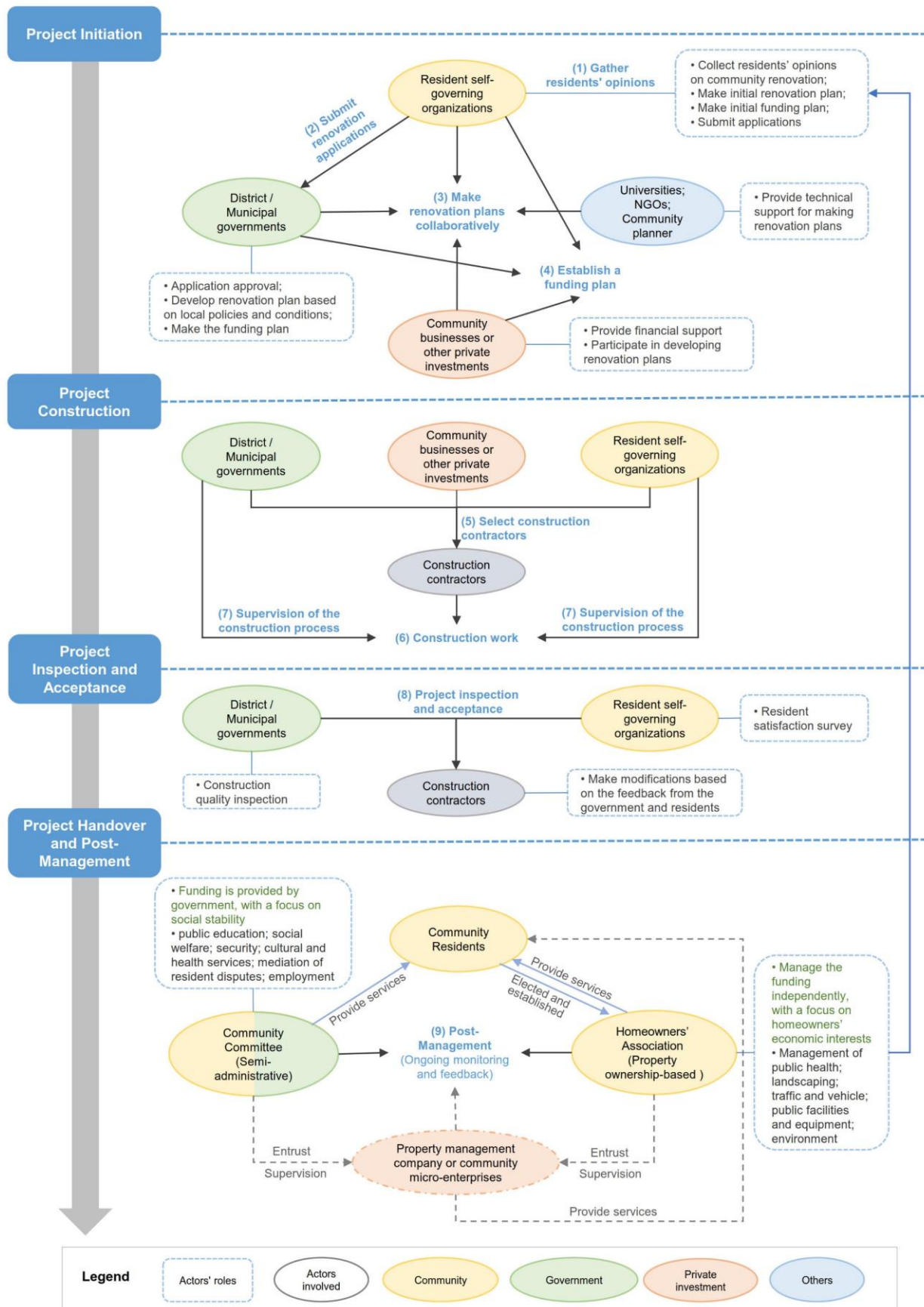


Figure 7.3 Implementation Framework for Community Renovation Projects in Shrinking Cities

7.2.3 Strategies for Various Community Types

Due to the varying degrees of urban shrinkage and the different locations and facilities of communities within shrinking cities, the development issues they face differ. Therefore, it is necessary to classify communities within shrinking cities and provide corresponding recommendations.

The four communities in the case study represent four different types, as shown in Table 7.1(a). These classifications are based on the extent of urban shrinkage and the community's basic conditions (location and surrounding facilities).

- 1) Type I: Represented by GHJ (Ziyang), is in a mildly shrinking city and located in the city's core area with densely distributed facilities.
- 2) Type II: Represented by XY (Ziyang), is also in a mildly shrinking city but located in the secondary core area with evenly distributed facilities that meet basic needs.
- 3) Type III: Represented by WXY (Fuxin), is in a severely shrinking city and located in the secondary core area with evenly distributed facilities that meet basic needs.
- 4) Type IV: Represented by MJ (Fuxin), is in a severely shrinking city and located in the outskirts or suburban areas, with relatively poor facilities.

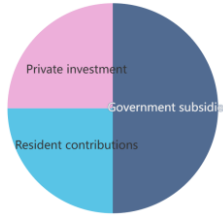
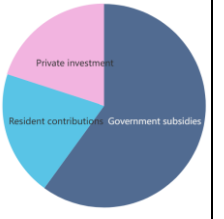
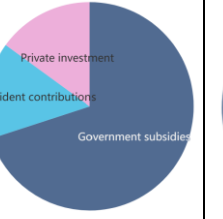
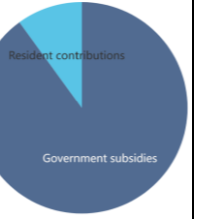
Based on the characteristics of these four types of communities, this study proposes targeted strategies in three areas: Funding Sources for Renovation, Key Renovation Points, and Community Management, as shown in Table 7.1(b).

Table 7.1 Strategies for Various Community Types in Shrinking Cities

a) Classification of Communities in Shrinking Cities

Classification of Communities in Shrinking Cities	Mild urban shrinkage	Severe urban shrinkage
Located in city's core area with densely distributed facilities	Type I (e.g., GHJ)	
Located in the secondary core area with evenly distributed facilities that meet basic needs	Type II (e.g., XY)	Type III (e.g., WXY)
Located in the outskirts or suburban areas, with relatively poor facilities		Type IV (e.g., MJ)

b) Renovation Funding, Renovation Points, and Community Management for Different Community Types

		Type I	Type II	Type III	Type IV
Funding Sources for Renovation					
		■ Government subsidies ■ Private investment ■ Resident contributions			
		approximately half is provided by the government, with more coming from resident contributions and private investment	government subsidies account for about 60%, with the remainder coming from resident contributions and the private investment	government subsidies account for approximately two-thirds, with a small portion from resident contributions and private investment	primarily funded by government subsidies
Key Renovation Points	Develop public activity spaces, community activity centers, pocket parks, etc.	√	√	√	
	Establish community-based social enterprise (e.g. childcare, senior care)	√	√	√	
	Maintain a clean community environment				√
	Ensure robust infrastructure		√	√	√
	Maintain building structures, roads, etc.				√
	Employment skills training for residents			√	√
Community Management	Community Committee	√	√	√	√
	Homeowners' Association	√	√	√	√
	Property Management Company or Community-based Social Enterprise	√	√	√	○

1) Funding Sources

For Type I communities, situated in good locations within mildly shrinking cities, renovation projects can stimulate neighborhood vitality and attract private investment. Residents here also tend to have better economic conditions, so the funding can be divided approximately equally, with the government covering about half of the costs and the remaining half shared between private investments and residents. Type II communities, with relatively poorer locations and facilities, may attract less private investment compared to Type I, and residents' income levels are slightly lower. Thus, government funding will be allocated more heavily in Type II communities than in Type I within mildly shrinking cities. In severely shrinking cities, Type III and Type IV communities face reduced external investment. Type III communities, with average basic conditions, can still attract some private investment and resident contributions, but will rely heavily on government funding. Type IV communities, with mostly low-income residents, will depend almost entirely on government funding, except for minimal community enterprise investment.

2) Key Renovation Points

For Type I communities, with relatively complete infrastructure and facilities, the focus should be on enhancing social infrastructure and overall neighborhood vitality. This includes developing community pocket parks, public activity spaces, cultural facilities, commercial facilities, childcare facilities, and senior facilities. Additionally, consider leveraging local resources to establish community-based social enterprises, thereby increasing employment opportunities and enhancing community vitality. For Type II communities, while ensuring that infrastructure and service facilities are adequate, prioritize creating public activity spaces and community activity centers to enhance interaction and cohesion within the community. Increasing green spaces is also essential to improve the overall environmental quality. For Type III communities, similar to Type II, prioritize creating public activity spaces and community activity centers while ensuring infrastructure and service facilities are adequate. Considering the severe urban shrinkage impacts on residents' employment and economic conditions, the community committee should implement skills training programs, such as in catering, nursing, housekeeping, childcare, and other professional skills, to boost employment opportunities and improve the employment environment. For Type IV communities, with poor infrastructure and facilities, the initial focus should be on ensuring comprehensive infrastructure, including maintaining building structures with potential safety hazards and improving community roads and sanitation conditions. Enhance public safety facilities by improving street lighting and surveillance systems. Additionally, similar to Type III, the community committee should offer skills training programs to increase employment opportunities and improve residents' economic stability.

3) Community Management

In Type I, Type II, and Type III communities, management should be a collaborative effort between the community committee, homeowners' association, and either a property management company or a community-based social enterprise. For Type I and Type II communities, given the mild urban shrinkage, some investment might be attracted. In such cases, consider establishing community-based social enterprises (e.g., clinics, cafeterias, childcare centers, senior care) to provide services to residents. In Type IV communities, due to the low-income levels of residents, it may not be feasible to bring in commercial property management companies. If investment or support from social organizations can be secured, establishing a community-based social enterprise could be an option. If not, management should be handled by the community committee and homeowners' association, with the homeowners' association maintaining community facilities and the environment using the revenue generated from public spaces and

residents contributes.

7.3 Research Contributions, Limitations, and Future Prospects

7.3.1 Research Contributions

1) A Macro Understanding of the Development of Shrinking Cities in China

This study focuses on the phenomenon of urban shrinkage, which is often mentioned in developed countries such as the United States, the UK, Germany, and Japan, and applies it to China, where many cities are still undergoing urbanization. This study contributes to the international discussion on “urban shrinkage.” The research traces the changes in population and economy in shrinking cities in China over the past two decades (2000-2020), identifies the distribution of shrinking cities in mainland China, classifies different types of shrinking cities, and explores the factors influencing urban shrinkage in various regions. Moreover, the findings indicate that nearly half of the cities have experienced population decline, providing a reminder for future urban planning and development transformation. Particularly in 2022, China recorded its first population decline, with a continuously decreasing birth rate, signaling that China has entered a stage of population reduction. Additionally, the economic impact of the pandemic has further exacerbated urban shrinkage, suggesting that the number of shrinking cities will continue to increase, and the degree of shrinkage will intensify in the long term. In this context, it is essential to rethink urban transformation, reconsider urban development goals, and adjust growth-oriented planning methods to adapt to long-term shrinkage.

2) Understanding Community Development in the Context of Urban Shrinkage

Unlike other studies that focus more on the overall city or regional level, this research emphasizes small-scale community development within cities. It highlights the importance of community livability as a development goal and conducts the study from the residents’ perspective. The research explores how residents’ perceptions of urban shrinkage affect their evaluations of community livability and their future relocation intentions. It delves into the impact of shrinkage on local communities and residents’ lives.

3) Exploring the Role of Community Renovation Projects in Enhancing Livability in Shrinking Cities

Most studies on the renovation of old residential areas in China focus on growing cities, with less attention given to how this nationwide policy is implemented and its effectiveness in shrinking cities. This study addresses this gap by discussing the implementation and effects of renovation projects in shrinking cities. The findings underscore the necessity of such renovation projects and their positive impact on local communities.

4) Actionable Recommendations for Community Renovation in Shrinking Cities

In the implementation of renovation projects and subsequent community management, this study offers recommendations based on the context of urban shrinkage, including general principles, a specific implementation framework for renovation projects, and strategic priorities for different types of communities. Considering the financial and managerial challenges faced by local governments in shrinking cities, the recommendations emphasize the importance of multi-stakeholder participation and resident self-governance.

7.3.2 Research Limitations

This study has several limitations that should be acknowledged:

First, the selected communities are all located in older urban areas, excluding more upscale residential areas in newer parts of the cities. This focus on older communities may not fully capture the perceptions of residents in more modern and higher-end communities, which could have different dynamics and challenges related to urban shrinkage and community livability.

Second, due to the high proportion of elderly respondents in case study sites, the study does not adequately include the perspectives of younger residents. Younger people are crucial for the future of shrinking cities. They bring different priorities and perceptions regarding urban shrinkage and community livability. Moreover, their mobility and decisions about staying or relocating can significantly influence the demographic and economic trends in shrinking cities.

Third, due to limitations in accessing government data, the research does not include the government's perspective, encompassing their views on urban shrinkage, current urban planning, implementation strategies for community renovation projects, and future urban plans.

Fourth, this study selected two representative cities from Northeast and Southwest China for analysis. While the findings are applicable to cities with similar urban development backgrounds, they not fully represent the conditions of shrinking cities in other regions of China.

7.3.3 Future Prospects

Future research should aim to include a more diverse range of residential areas, including newer and higher-end neighborhoods, to provide a more comprehensive understanding of urban shrinkage and community livability across different socio-economic settings. Emphasizing the perspectives of younger residents is also essential, as this demographic is more likely to be mobile and may have different expectations and responses to urban shrinkage and community livability initiatives. Additionally, incorporating the government's perspective is crucial for understanding the policy implementation process and the challenges faced by the local government. Moreover, expanding the scope to include a more diverse range of cities across China will further enhance the applicability of the findings, contributing to more effective development strategies.

References

- Liu, J., Zhang, Y., & Mao, J. (2023). Social Enterprises and Their Role in Revitalizing Shrinking Cities—A Case Study on Shimizusawa of Japan. *Land*, 12(12), 2146.
- Özatağan, G., & Eraydin, A. (2021). Emerging policy responses in shrinking cities: Shifting policy agendas to align with growth machine politics. *Environment and planning a: economy and space*, 53(5), 1096-1114.
- Wu, K., & Yao, C. (2021). Exploring the association between shrinking cities and the loss of external

investment: An intercity network analysis. *Cities*, 119, 103351.

- Yin, J. (2024). Research on the integration of social enterprises into community development and governance: A case study based on practices in Chengdu. *Journal of the Leshan Municipal Party School of the CPC*, (1), 75-85. [殷婕. (2024). 社会企业嵌入社区发展治理研究——基于成都市的实践考察. 中共乐山市委党校学报 (01), 75-85.]
- Zhang, J., Wen, B., Zhu, D., & Zhao, Y. (2021). Factors influencing community residents' enthusiasm for participating in the renovation of old residential communities: An empirical study based on the renovation of old communities in Taocheng District, Hengshui City. *Urban Development Studies*, 28(10), 29-33. [张佳丽, 温标, 朱东剑, & 赵宇. (2021). 社区居民参与老旧小区改造积极性的影响因素研究——基于衡水市桃城区老旧小区改造的实证观察. 城市发展研究, 28(10), 29-33.]
- Zeng, L., & Liu, C. (2022). An analysis of the formal institutional embeddedness of social organizations in urban community governance. *Urban Development Studies*, 29(3), 124-132. [曾丽敏, & 刘春湘. (2022). 社会组织参与城市社区治理的正式制度嵌入性分析. 城市发展研究, 29(3), 124-132.]
- Zhang, W. (2020). Social enterprises and the reconstruction of neighborhood relations: A case study of four social enterprises. *Zhejiang Social Sciences*, (4), 64-78. [张维维. (2020). 社会企业与社区邻里关系的重建——以四个社会企业为例. 浙江社会科学, (4), 64-78.]

Appendices

Appendix 1: Questionnaire Survey Form

Appendix 2: Interview Summaries

Appendix 1: Questionnaire Survey Form

(Translated from Chinese)

Survey on Residents' Perception of Urban Shrinkage, Evaluation of Community Livability, Satisfaction with Community Renovation Projects, and Relocation Intentions

Dear Resident,

I am a doctoral student at Kyoto University, Japan. I sincerely appreciate your valuable time and participation in this survey. The purpose of this questionnaire is to gather your insights on urban shrinkage, evaluate the livability of your current community, assess your satisfaction with community renovation projects, and understand your future relocation intentions. The findings from this survey will contribute to the sustainable development of communities. All responses will be used for my research, and participant confidentiality is assured. Thank you once again for your support!

Section 1: Basic Information

1. Gender:

☐ Male ☐ Female

2. Age:

☐ Less than 18 ☐ 18-35 ☐ 36-40 ☐ 41-45 ☐ 46-50 ☐ 51-55 ☐ 56-60 ☐ 61-65 ☐ 66-70 ☐ 71-75
☐ 76-80 ☐ Over 80

3. Educational Level:

☐ Primary school and below ☐ Junior high school ☐ Senior high school ☐ Junior college
☐ Bachelor's degree and above

4. Marital Status:

☐ Single ☐ Married ☐ Divorced/Widowed

5. Occupation:

☐ Worker ☐ Business and Service Personnel ☐ Government Employee ☐ Self-Employed
☐ Professional and Technical Personnel ☐ Enterprises and Institution Staff ☐ Student ☐ Retired
☐ Job Seeker ☐ Unemployed ☐ Other_____

6. Industry of Employment:

☐ Agriculture ☐ Manufacturing ☐ Coal Industry ☐ Electricity/Gas/Water Production and Supply
☐ Construction ☐ Transportation ☐ Information Transmission/Computer Services and Software
☐ Wholesale and Retail ☐ Accommodation and Catering ☐ Financial Industry ☐ Real Estate
☐ Scientific Research and Technical Services ☐ Public Facility Management ☐ Residential Services
☐ Education ☐ Health/Social Welfare ☐ Culture, Sports, and Entertainment ☐ Other_____

7. Monthly Income Per Household Member (yuan):

☐ Less than 1000 ☐ 1000-2000 ☐ 2000-3000 ☐ 3000-4000 ☐ 4000-5000 ☐ More than 5000

8. Property Ownership:

☐ Private Ownership ☐ Public Rental Housing ☐ Personal Renting ☐ Mixed Ownership

9. When did you move into this community?

10. Household Size:

11. Where do your spouse and children live and work?

12. Housing Area:

13. Why did you choose to live in this community?

☐ Collective Relocation led by the government ☐ Employer-Provided Housing ☐ Personal Purchase

If you purchased the property yourself, what were your reasons? (You may select multiple options)

☐ Affordable Housing Prices ☐ Proximity to Workplace ☐ Convenient Public Transportation

☐ Convenient Shopping ☐ Many Acquaintances in the Area ☐ Proximity to Schools

☐ Low Cost of Living ☐ Other _____

Section 2: Perception of Community Changes

1. How do you think the population of the community has changed over the past few years?

☐ Decreased ☐ Remained Stable ☐ Increased

2. How do you think the number of vacant housing units in the community has changed over the past few years?

☐ Decreased ☐ Remained Stable ☐ Increased

3. How do these vacant housing affect your life?

☐ Affect Property Prices ☐ Affect Community Environment ☐ Feel Unsafe ☐ Affect Health

☐ Reduce Neighbor Interactions ☐ Other _____ ☐ No Impact

Section 3: Perception of Urban Development Changes

1. How do you think the city's population has changed over the past few years?

☐ Decreased ☐ Remained Stable ☐ Increased

2. How do you think the city's economy has changed over the past few years?

☐ Declined ☐ Remained Stable ☐ Grown

3. How do you think the city's population will develop in the future?

☐ Decrease ☐ Remain Stable ☐ Increase

4. How do you think the city's economy will develop in the future?

☐ Decline ☐ Remain Stable ☐ Grow

Section 4: Evaluation of Community Livability (Please mark "√")

	1	2	3	4	5
	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Quality of Buildings					
Essential Utility Services					
Green Spaces					
Sanitary Conditions					
Sound Environment					

Primary and Secondary Schools					
Kindergartens					
Elderly Care Facilities					
Entertainment Facilities					
Healthcare					
Financial Facilities					
Shops					
Restaurants					
Sports Facilities					
Public Transportation					
Parking Lots					
Income					
Price Level					
Housing Affordability					
Employment Opportunities					
Community Engagement					
Neighborhood Relationships					
Sense of Place					
Feeling of Safety					

Section 5: Satisfaction with Community Renovation Projects

1. What is your overall satisfaction with the community renovation project?

☐ 1 Very Dissatisfied ☐ 2 Dissatisfied ☐ 3 Neutral ☐ 4 Satisfied ☐ 5 Very Satisfied

2. What aspects of the renovation are you most satisfied with?

3. What aspects of the renovation are you most dissatisfied with?

4. How would you rate resident participation in the renovation project?

☐ 1 No Participation ☐ 2 Low Participation ☐ 3 Neutral ☐ 4 Partial Participation
☐ 5 Active Participation

Section 6: Relocation Intentions

1. Do you have plans to relocate within the next 5 years?

If so, what are the reasons?

If not, what are the reasons?

2. If you plan to move, where would you like to move to?

☐ Another House within the Same Community ☐ Another Community in the Same City ☐ Another City

Appendix 2: Interview Summaries

Selected Summaries of Interviews with Representative Community Residents and Community Committee Staff (Translated from Chinese)

Interview with WXY Community

Interviewee: WXY-5¹ (Community Resident)

Basic Information: Male, 60 years old, former coal miner, now retired

Interview Date: October 6, 2023

Interview Location: Public space below Building 44, WXY Community

1. Perception of Population Changes in the Community

Question: How do you think the population of the community has changed over the past few years?

Answer: I feel like the population hasn't changed much. Many of the old neighbors who used to live here have moved to the northern part of the city where many new residential complexes have been built. However, in recent years, many people from outside have moved in because the housing here is cheap, and the environment is decent. Many people from nearby rural areas have bought houses here.

2. Perception of Vacant Housing Changes

Question: How do you think the number of vacant housing units in the community has changed over the past few years? Have these vacant housing affected your life?

Answer: The number of vacant housing units has possibly increased slightly. The lower floors are mostly fully occupied, with no vacant housing, but the top floors have quite a few vacant units because most residents here are elderly and don't want to climb stairs. I haven't felt much impact from the vacant housing.

3. Perception of Urban Population Changes

Question: How do you think the city's population has changed over the past few years? Are you optimistic about the future population growth?

Answer: I feel that many young people have left Fuxin for jobs in other places, so the population has probably decreased. Maintaining the current population level in the future would be good enough because there are fewer young people.

4. Perception of Urban Economic Changes

Question: How do you think the city's economy has changed over the past few years? Are you optimistic about the future economic development of the city?

Answer: The economy has been struggling since the coal mines closed, and there hasn't been much improvement in recent years. It has remained stable, but I feel the future will be about the same as now.

5. Satisfaction with Community Renovation Projects

Question: Do you think the community has improved in various aspects after the renovation project?

Answer: After the renovation, the overall environment of the community has improved. The roads have been repaved, and the squares, flowerbeds, and fitness equipment are all newly installed. People come out every day to exercise and chat in the square, which is very nice.

Question: What are you dissatisfied with about the renovation project?

¹ WXY-5 means that the interviewee is the respondent of the fifth valid questionnaire.

Answer: The construction is too frequent. There's a new renovation project every year. Two years ago, it was the heating system, last year it was the water pipes, and this year it's the gas pipes. They dig up the roads to replace the pipes and then fill them in, and dig them up again the next year for another pipe replacement. This has severely damaged the road surfaces, causing some sections to collapse during rain. Additionally, after the heating pipes were replaced, some houses have good heating while others still don't, with buildings closer to the heating inlet having better results.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I might move in the future. My child works and has settled in Shenyang City. I might move there to be closer to them and make it easier to take care of each other.

Interview with WXY Community

Interviewee: WXY-10 (Community Resident)

Basic Information: Male, 80 years old, former coal miner, now retired

Interview Date: October 7, 2023

Interview Location: Public space below Building 52, WXY Community

1. Perception of Population Changes in the Community

Question: How do you think the population of the community has changed over the past few years?

Answer: Overall, I feel the population has decreased. Many people have moved away, and some elderly residents passed away during the pandemic.

2. Perception of Vacant Housing Changes

Question: How do you think the number of vacant housing units in the community has changed over the past few years? Have these vacant housing affected your life?

Answer: The number of vacant housing units has increased. Many people have posted ads to sell their homes. The prices aren't high, but the higher floors are hard to sell. I haven't felt that these vacant housing have affected my life.

3. Perception of Urban Population Changes

Question: How do you think the city's population has changed over the past few years? Are you optimistic about the future population growth?

Answer: The city's population seems to have decreased because young people can't stay here due to the lack of job opportunities. Only middle-aged and elderly people remain. The future population will probably stay stable, but many young people are also reluctant to have children because raising them is too expensive.

4. Perception of Urban Economic Changes

Question: How do you think the city's economy has changed over the past few years? Are you optimistic about the future economic development of the city?

Answer: The economy has been developing quite well in recent years, with the construction of the high-speed rail station and the urban development in the northern part of the city progressing nicely. The future economy should continue to improve, if with more national support and investment.

5. Satisfaction with Community Renovation Projects

Question: Do you think the community has improved in various aspects after the renovation project?

Answer: The overall renovation outcome is quite good. The roads are now smooth, and the main road in the community has been upgraded from a cement road to an asphalt road. There is no more mud, and it doesn't get waterlogged on rainy days, making it more convenient to go out. Another significant improvement is the heating. It has become much better, and it's no longer cold indoors during winter. Previously, some homes couldn't even reach 15°C.

Question: What are you dissatisfied with about the renovation project? Why?

Answer: The number of public seats has decreased after the renovation, which is not enough for us elderly

residents. There used to be many seats and stone stools under the residential buildings where people could sit, chat, and sunbathe. After the renovation, the seats were removed and replaced with hard surfaces for parking. Now, we can only use the benches in the small square, but there aren't enough. More should be added, especially since there are many elderly residents in our community.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I won't move. At my age, I don't want to deal with the hassle. I've gotten used to living here, the living environment is good, and it's convenient for shopping.

Interview with WXY Community

Interviewee: WXY-26 (Community Resident)

Basic Information: Female, 45 years old, works at a state-owned enterprise

Interview Date: October 8, 2023

Interview Location: Public space below Building 45, WXY Community

1. Perception of Population Changes in the Community

Question: How do you think the population of the community has changed over the past few years?

Answer: I feel the population has decreased due to many elderly people passing away, especially after the pandemic. Additionally, many people have moved to commercial housing communities in the city, as the conditions there are better than in this shantytown relocation community.

2. Perception of Vacant Housing Changes

Question: How do you think the number of vacant housing units in the community has changed over the past few years? Have these vacant housing affected your life?

Answer: There seem to be more vacant housing units than a few years ago. However, the vacant housing hasn't affected me much, as there are still many people living in our building.

3. Perception of Urban Population Changes

Question: How do you think the city's population has changed over the past few years? Are you optimistic about the future population growth?

Answer: The city's population seems to have decreased. Many people are working in other places, and fewer young people are having children now. If the economic development doesn't improve, the population will likely continue to decline in the future.

4. Perception of Urban Economic Changes

Question: How do you think the city's economy has changed over the past few years? Are you optimistic about the future economic development of the city?

Answer: The economy has not been developing well. There are no major industries to support it, jobs are hard to find, and wages are low. The city's economy ranks among the lowest in the province. The future economic outlook is also not very optimistic because the city lacks resources and transitioning is very difficult.

5. Satisfaction with Community Renovation Projects

Question: Do you think the community has improved in various aspects after the renovation project?

Answer: Overall, the renovation is quite good. The heating has improved significantly, the community is cleaner, and the roads are easier to walk on.

Question: What are you dissatisfied with about the renovation project? Why?

Answer: The work wasn't done carefully, and there are still some finishing touches that haven't been completed. For example, the doors of the new water meter boxes in the stairwell still haven't been installed.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I'll see where my child works after graduation. I might move to a place closer to them.

Interview with WXY Community

Interviewee: WXY-C (Community Committee Staff)

Basic Information: Female, 47 years old

Interview Date: October 9, 2023

Interview Location: WXY Community Committee Office

1. Current Population and Elderly Proportion

Question: How many residents are there in the community now? What is the proportion of elderly residents?

Answer: Our community currently has over 5,000 residents. There are 21 community grid members, each responsible for managing three buildings, which is about 100-150 households. A significant portion of our community is elderly, with seniors making up about half of the population.

2. Community Activities

Question: Does the community committee generally organize community activities?

Answer: We sometimes organize clean-up activities, such as cleaning the stairwells together, sometimes in cooperation with the property management and some resident volunteers. We also organize cultural events during holidays where residents come together to perform songs and dances. The most popular activities among residents are the free medical check-ups for the elderly. Doctors come to measure blood pressure and provide health knowledge talks for seniors. We collaborate with local supermarkets to distribute eggs, milk, meat, daily necessities, and discounted products to attract elderly participation, and sometimes there are free clinics as well.

3. Community Renovation Project

Question: What aspects were addressed in the renovation project? Were residents' opinions sought during the renovation process?

Answer: The renovation project primarily focused on replacing pipelines, including water supply, heating, and gas pipes. The community roads were also repaved. Additionally, weeds, shrubs, and trees were trimmed and converted into small hard-surface squares. Subsequent efforts involved minor repairs and constructions. Residents can report any issues to the community grid members, then we coordinate with the government.

4. Community Management

Question: Does the community currently have a property management company, and how are responsibilities divided between the committee and the property company?

Answer: The property management company is appointed by the government, and residents pay property fees for services like garbage collection. We are responsible for mediating conflicts between residents and between residents and the property management company. The community committee has the authority to dismiss the property management company, but the cooperation has been good so far.

Interview with MJ Community

Interviewee: MJ-2 (Community Resident)

Basic Information: Male, 64 years old, former coal miner, now retired

Interview Date: October 15, 2023

Interview Location: Public space below Building 76, MJ Community

1. Perception of Population Changes in the Community

Question: How do you think the population of the community has changed over the past few years?

Answer: I feel the population has increased over the past few years. Many people have moved here from nearby rural areas and counties because the housing here is cheap. While the environment isn't great, it's definitely better than rural houses.

2. Perception of Vacant Housing Changes

Question: How do you think the number of vacant housing units in the community has changed over the past few years? Have these vacant housing affected your life?

Answer: There are fewer vacant housing units now. Many have been sold or rented out. The vacant housing units haven't affected me at all.

3. Perception of Urban Population Changes

Question: How do you think the city's population has changed over the past few years? Are you optimistic about the future population growth?

Answer: I think the population has probably increased since many rural people have moved to the city, like those from Xinqiu. However, the future is uncertain because young people are not coming back, leaving mostly the elderly.

4. Perception of Urban Economic Changes

Question: How do you think the city's economy has changed over the past few years? Are you optimistic about the future economic development of the city?

Answer: The economy hasn't changed much in recent years and remains as sluggish as before. Without resources, it's hard to develop new industries. Maintaining the current economic level would already be good.

5. Satisfaction with Community Renovation Projects

Question: Do you think the community has improved in various aspects after the renovation project?

Answer: Last year, they renovated the heating pipes, water pipes in the stairwells, and the roofs. After the renovation, the indoor temperature during winter has increased. The municipal department now checks to ensure the indoor temperature is above 16°C, and it has met this standard.

Question: What are you dissatisfied with about the renovation project?

Answer: The most disappointing part is the road surface, as you can see. When the pipes were being replaced, the roads were dug up and left in a mess. They were only roughly filled back in and never restored to their original state. We've reported this to the government multiple times, and each time they promise to fix it in a few months, but it still hasn't been repaired. I've also heard that some residents living

on the sixth floor have experienced roof leaks after the renovation.

6. Overall Satisfaction with Current Living Situation

Question: What aspects of living in this community are you most satisfied with?

Answer: I'm used to living here, and the people in the community all know each other. Most of the residents are either former workers from Dongliang Mine or long-time residents of the Mijia area. We have been neighbors for years, so the neighborhood relationships are quite good. It's lively with everyone chatting together.

7. Satisfaction with Property Management

Question: Are you satisfied with the management by the property company?

Answer: The property company doesn't take care of anything and charges high fees, almost as much as those in commercial housing communities in the city. We've reported issues to the property management many times, like broken hallway lights, piled-up garbage, and blocked sewers, but nothing gets resolved. Eventually, people stopped paying the property fees.

8. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: Yes, the environment here is too poor. I want to move to a place in the city with a better environment and complete facilities.

Interview with MJ Community

Interviewee: MJ-23 (Community Resident)

Basic Information: Female, 56 years old, former self-employed, now retired

Interview Date: October 17, 2023

Interview Location: Public space below Building 55, MJ Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: The population in our community has increased quite a bit. We are close to the county, and the housing prices here are very low—actually, the lowest in the entire city. As a result, many people from the county have been buying homes here.

2. Perception of Vacant Housing Changes

Question: How do you feel the number of vacant housing units has changed over the past few years? Have these vacant housing units affected your life?

Answer: There are fewer vacant housing units than before. Most of the lower floors have been sold, though some higher floors remain empty. These vacant housing units haven't really affected us much.

3. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: The city's population seems to have decreased. There's not much work here in Fuxin, and the wages are low, so it's hard to keep young people around—they all go out to find work elsewhere. Additionally, young people aren't having many children. If the economy remains as it is now, it will be very difficult to retain young people. As we older folks gradually pass away, the population will continue to decrease.

4. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: The economy has been poor ever since the coal mines shut down. Many companies have gone bankrupt, there are many laid-off workers, and no new industries have been established. Our local economy is the poorest. I don't see much hope for future development.

5. Overall Satisfaction with Current Living Situation

Question: Are you satisfied with living here?

Answer: The environment in the community is very poor. The roads are all dirt, and there are weeds everywhere. The weeds were cleared during the renovation, but they've grown back, and no one is taking care of them. Sometimes I cut the weeds myself around my building's entrance. Some people have even planted vegetables where the weeds used to be. The sanitation is also poor, with some construction debris left behind.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: No, I don't plan to move. We can't afford to move since housing elsewhere is too expensive. Things are cheap here, which suits us well. This place is suitable for people with low-income.

Interview with MJ Community

Interviewee: MJ-41 (Community Resident)

Basic Information: Female, 68 years old, former farmer

Interview Date: October 20, 2023

Interview Location: Public space below Building 73, MJ Community

1. Moving into the Community

Question: When did you move into this community, and why did you choose to live here?

Answer: I bought my house here in 2016. I used to live in a nearby rural area. The housing prices in MJ are affordable, and many of my acquaintances have moved here, so I decided to buy a house here as well.

2. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: There have been people moving in and out. Many elderly folks have moved out to help their children with their grandchildren elsewhere. However, it seems that more people are moving in, mainly because the housing price is cheap here.

3. Perception of Vacant Housing Changes

Question: How do you feel the number of vacant housing units has changed over the past few years? Have these vacant housing units affected your life?

Answer: There seem to be fewer vacant housing units than when I first moved in. The vacant housing units do affect heating—if the units above or below you are empty, they don't have heating, which means your unit isn't as warm in the winter. Other than that, there's no major impact.

4. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: The population has definitely decreased. After finishing college, very few young people return; they prefer to work elsewhere. The wages here are too low, and jobs are hard to find.

5. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: The economy is terrible. We are among the poorest in the country. We used to rely on coal mines and power plants, but they have been shut down for many years. I don't see how the economy will improve in the future.

6. Satisfaction with Community Renovation Projects

Question: How do you feel about the community renovation project?

Answer: After the renovation, some homes have good heating, but others, like mine, do not. We still have to use electric heaters. Some households have issues with water leaks on their walls. The roads are also in poor condition—uneven and muddy, making it difficult to go out on rainy days.

Question: Were residents' opinions sought during the renovation process by the community committee or government departments?

Answer: The renovation did not seek residents' opinions; it was entirely government-funded, and the government decided everything.

7. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: No, I don't plan to move. Even if I wanted to, I don't have the money to do so, and at my age, it's not feasible. I'll make do here. Besides, it's convenient for shopping and going to the morning market.

Interview with MJ Community

Interviewee: MJ-C (Community Committee Staff)

Basic Information: Female, 50 years old

Interview Date: October 16, 2023

Interview Location: MJ Community Committee Office

1. Current Population and Elderly Proportion

Question: How many residents are there in the community now? What is the proportion of elderly residents?

Answer: Our community is quite large—it is the largest shantytown resettlement community in the city, with 131 buildings and over 8,000 households. The community is divided into three sub-communities (xiaoqu): Jiacheng, Shengcheng, and Mijia. The proportion of elderly and low-income residents is very high.

2. Community Activities

Question: Does the community committee generally organize community activities?

Answer: Yes, we do. We typically organize health check-up events, such as the large-scale health clinic we held in collaboration with Fuxin Mining General Hospital. We also organize resident volunteer services, like cleaning up the public spaces. During holidays, we hold more activities, such as making dumplings with elderly residents during Chinese New Year and performing the yangko dance during the Lantern Festival. However, resident participation is limited, as many are not very enthusiastic about these activities.

3. Community Renovation Project

Question: What does the renovation project mainly include? Are residents' opinions sought during the renovation process?

Answer: The renovation project mainly includes repairing roofs, adding waterproof layers, replacing heating and water supply pipelines, and repainting building exteriors. Some residents do raise issues, and we coordinate with various parties to address them as much as possible. However, some requests are beyond our capacity to handle.

4. Community Management

Question: Does the community currently have a property management company, and how are responsibilities divided between the committee and the property company?

Answer: Yes, there is a property management company responsible for the daily maintenance of the community environment. However, many residents do not pay property fees, which makes it challenging for the company. For those who do pay, the company tries to resolve their issues. Our community committee assigns a grid member to manage several buildings, responsible for collecting basic household information, employment, minimum living guarantees, healthcare, collecting resident opinions, and mediating disputes.

Interview with XY Community

Interviewee: XY-4 (Member of Homeowners' Association)

Basic Information: Female, 70 years old, former self-employed, now retired

Interview Date: November 6, 2023

Interview Location: Public space below Building 10 (Jixiangyuan), XY Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: The community's population is decreasing, leaving mostly elderly people. Besides, many older residents who live on higher floors have also moved away. Those with better financial conditions have moved to new districts where the environment in commercial housing communities is better.

2. Perception of Vacant Housing Changes

Question: How do you feel the number of vacant housing units has changed over the past few years? Have these vacant housing units affected your life?

Answer: The number of vacant housing units has increased somewhat. Lower floors are still okay, but there are more vacant housing units on higher floors, although many of them have been rented out.

3. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: I feel the city's population has increased because many rural people have moved to the city in recent years. I expect this trend to continue, with more rural residents moving into the city.

4. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: I think the economy has been quite good in recent years. The construction in the High-tech Zone, Tuodong District, and around the high-speed rail station has been progressing well. Especially with the metro connection to Chengdu opening in a couple of years, the development should improve even more.

5. Satisfaction with Community Renovation Projects

Question: Are you satisfied with the renovation project?

Answer: After the renovation, the overall environment is cleaner. The dilapidated houses were demolished and turned into public activity spaces, which is nice for activities like playing cards and walking. However, there are issues with the drainage system. It often gets clogged during rainy days, and we have to find someone ourselves to fix it. Before the renovation, the design and construction teams did not conduct proper measurements. The elevation of the city's sewage network is higher, while the pipes in our community are lower, preventing our sewage from draining into the city system. As a result, the drainage blockages have become frequent. The renovation policy is good, but the construction quality is not that good.

6. Community Management

Question: Does the community currently have a property management company?

Answer: Since this is an old community, there is no property management company. The residents of our three buildings formed a homeowners' association. When we encounter issues like drainage blockages, we contact maintenance personnel ourselves. Our income mainly comes from car parking fees, electric bicycle parking fees, and sometimes we raise funds from residents, which is cheaper than regular property fees.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I don't plan to move. Buying a house elsewhere would cost money, and I can't afford that. Besides, I'm used to living here, and it's convenient for shopping and transportation.

Interview with XY Community

Interviewee: XY-13 (Community Resident)

Basic Information: Female, 79 years old, former employee at a food company, now retired

Interview Date: November 8, 2023

Interview Location: Public space below Building New 2 (Jixiangyuan), XY Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: It feels like there are fewer people than before. Many of my old neighbors have moved away, although some new residents have moved in. This place is close to schools, so parents often rent here for their children's education. However, overall, there seem to be fewer people than before.

2. Perception of Vacant Housing Changes

Question: How do you feel the number of vacant housing units has changed over the past few years? Have these vacant housing units affected your life?

Answer: The number of vacant housing units has increased. In our building, for example, the top floor has several empty units. Some elderly residents have moved to nursing homes, leaving only a few of us on the first and second floors. The vacant housing units haven't really affected us much.

3. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth? Why?

Answer: The population doesn't seem to have changed much. Some young people have gone to work in Chengdu, Chongqing, or other big cities, while many rural residents have moved here. The future will probably be similar to the present.

4. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: The economy has been stable over the past few years. Wages have stayed the same, and prices haven't changed much either. The future economy will likely remain at this level.

5. Satisfaction with Community Renovation Projects

Question: Have there been improvements in the community since the renovation project?

Answer: The old, dilapidated houses were torn down and replaced with small squares. There are now many fitness equipment and benches, which are great for us elderly folks to exercise, chat, and play cards. I now go out to play cards every day. The community is also well-lit at night, which makes it safer.

Question: What are you dissatisfied with the renovation project?

Answer: The new roofs are not as well-insulated as the old ones, and there are also leaks. The renovated roof panels are thinner and lack insulation, which impacts residents on the top floor the most, though it's not as bad for us on the lower floors.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I'm not moving. I'm very satisfied with my current living situation. My friends all live nearby, and we can play cards together every day. It's also easy to buy groceries, and living on the ground floor means no need to go up and down stairs.

Interview with XY Community

Interviewee: XY-21 (Community Resident)

Basic Information: Male, 70 years old, former railway employee, now retired

Interview Date: November 10, 2023

Interview Location: Public space in the main entrance of XY Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: The population has increased. Many former railway employees have moved away, but now there are quite a few people renting here because the housing is cheap and the environment is nice.

2. Perception of Vacant Housing Changes

Question: How do you feel the number of vacant housing units has changed over the past few years? Have these vacant housing units affected your life?

Answer: There don't seem to be many vacant housing units. Most have been sold or rented out. These vacant housing units haven't really affected us much.

3. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: The population seems to have decreased. Young people have moved to bigger cities like Chengdu and Chongqing for work, leaving mostly older people here. I expect the population to continue decreasing because this is still a small city with low wages, and young people nowadays are reluctant to have children.

4. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: The economy hasn't been very good. Ziyang is poor, there are no big companies, employment is difficult, and tourism hasn't developed. Relying on agricultural products doesn't bring in much money. Future development depends on national investment. If there is investment, things might improve.

5. Satisfaction with Community Renovation Projects

Question: Are you satisfied with the community renovation project?

Answer: Previously, people had built unauthorized small houses on the ground floor, making the walkways narrow and crowded, and reducing the natural light in the buildings. These structures were demolished during the renovation. The space has opened up, and the rooms now get more sunlight. Additionally, the drainage system has improved, the roads are easier to walk on, and the square is well-lit at night, allowing children to play basketball and badminton. The community center has also opened a canteen and a game room, providing a place to play cards indoors during bad weather. However, the game room has limited hours and is closed on weekends. It would be better if it were open all the time.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I don't plan to move. I'm familiar with living here and enjoy playing cards with my friends every day. The cost of living is low, and it's convenient to shop. It's better to stay here.

Interview with XY Community

Interviewee: XY-C (Community Committee Staff)

Basic Information: Female, 46 years old

Interview Date: November 13, 2023

Interview Location: XY Community Committee Office

1. Current Population and Elderly Proportion

Question: How many residents are there in the community now? What is the proportion of elderly residents?

Answer: Our jurisdiction has over 5,300 residents, spread across 21 neighborhoods. These are all old communities with a high proportion, around half, of elderly residents.

2. Community Renovation Projects

Question: What renovation projects have been carried out in the community? What role did the committee play in these projects?

Answer: The exteriors of the residential buildings have been renovated, including cleaning and adding decorative elements. Our community is near the train station and serves as the railway staff housing area, so we added a train locomotive emblem to each balcony. We also built a new square with a light show in the evenings. The community's drainage pipes and power lines were also redone. Additionally, we created a cultural wall to showcase the community's heritage, featuring old, nostalgic photos on the square's walls. Our specific responsibilities included coordination and logistical support, as well as mediating between residents and the construction teams.

3. Operation of the Community Activity Center

Question: I noticed that the community activity center has a canteen, a children's growth center, a clinic, and a supermarket. How are these facilities operated?

Answer: We aim to partner with community businesses to create a comprehensive community service platform that integrates public services, elderly care, childcare, medical rehabilitation, and convenient commerce. The canteen and children's activity center were established under the leadership of our community committee, with staff comprising both community residents and externally hired employees. The clinic is operated in collaboration with Ziyang Traditional Chinese Medicine Hospital, and the community supermarket is managed by an external private team. These projects are currently in the early stages of operation.

Interview with GHJ Community

Interviewee: GHJ-3 (Community Resident)

Basic Information: Male, 64 years old, former construction company employee, now retired

Interview Date: November 17, 2023

Interview Location: Public space below Building 4 (Shuixiangzi), GHJ Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: It seems there hasn't been much change. The community is almost fully occupied with very few vacant housing units. Our location is excellent, with schools and hospitals nearby. When people move out, others move in to rent. Rent is also cheap, so the population in the community has remained stable.

2. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: The city's population seems to have decreased. Young people prefer to live in big cities where there are more job opportunities and better amenities. My children also live elsewhere. I expect the population to continue decreasing because the elderly population is growing, and fewer young people are having children.

3. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: Economic development hasn't been great in recent years. Previously well-known factories, including the major automobile manufacturer, haven't been doing as well, and overall wage levels are low. I am not optimistic about the future economy because Ziyang lacks resources.

4. Satisfaction with Community Renovation Projects

Question: How do you feel about the community renovation project?

Answer: Before the renovation, this area was a dark alley with a dirty and messy environment. After the renovation, the environment has greatly improved. The community landscape is really nice now. Flower beds and tree pits have been added in front of the residential buildings, with benches designed around the flower beds where you can sit, look at the flowers, and chat. The sanitation has also improved, with cleaning staff coming regularly to maintain it.

5. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I don't plan to move in the future. I've been with my neighbors and friends for many years. We see each other and chat every day. Moving away would be too lonely. Many of us think this way, especially elderly people living alone. They don't want to bother their children and instead rely on friends and neighbors for help.

Interview with GHJ Community

Interviewee: GHJ-5 (Community Resident)

Basic Information: Female, 53 years old, former government employee, now retired

Interview Date: November 17, 2023

Interview Location: Public space below Building 7, GHJ Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: There hasn't been much change. Although many old residents have moved to new areas, the good location, convenient transportation, and proximity to schools have kept the area attractive. Almost all the houses are rented out, maintaining the original population level.

2. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: The city's population seems to have decreased. There are fewer young people in the city now, as many have moved to Chengdu, Chongqing, or southern cities for work. Ziyang's proximity to Chengdu makes it convenient for young people to work there and return home easily. The city's aging population is increasing, and as elderly residents pass away, the population will likely decline further.

3. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: The city's economic development has not been good in recent years. For example, the big companies, such as Nanjun automobile factory hasn't been doing as well as before. However, with improved transportation to Chengdu, there might be opportunities to attract investment in the future.

4. Satisfaction with Community Renovation Project

Question: How do you feel about the community renovation project?

Answer: The drainage has improved significantly. Previously, our community's drainage pipes were old and not connected to the city's system, so the sewage was discharged untreated. Now, it's all integrated into the city's network. The roads have also been repaved, making them easier to walk on. However, the small square has too few fitness equipment pieces, and more should be added.

5. Community Management

Question: Is the property management company responsible for the community's environment management?

Answer: We don't have a property management company. The sanitation is handled by the environmental sanitation department. We had considered hiring a commercial property management company before, but it would require residents to pay fees. Many residents here live in public rental housing and are low-income, so they wouldn't pay. We calculated that a property management company would lose over 100,000 yuan a year, so they didn't enter the community.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I don't plan to move. Living here is very convenient. It's in the old city center, making shopping easy, and there are places for exercise. Transportation is also convenient, making it easy to get anywhere.

Interview with GHJ Community

Interviewee: GHJ-11 (Community Resident)

Basic Information: Male, 73 years old, former self-employed, now retired

Interview Date: November 18, 2023

Interview Location: Beside the Neighborhood Stage, GHJ Community

1. Perception of Population Changes in the Community

Question: How do you feel the population of the community has changed over the past few years?

Answer: The community's population seems to have decreased somewhat. Many people with better economic conditions have moved to new areas, and some elderly residents passed away during the pandemic.

2. Perception of Vacant Housing Changes

Question: How do you feel the number of vacant housing units has changed over the past few years? Have these vacant housing units affected your life?

Answer: The number of vacant housing units appears to have increased slightly, but overall, there aren't too many, and most have been rented out. These vacant housing units haven't really affected my lives much.

3. Perception of Urban Population Changes

Question: How do you feel the population of the city has changed over the past few years? Are you optimistic about future population growth?

Answer: The population has remained relatively stable. While many young people have moved to big cities, a lot of rural residents have moved into the city. I believe this trend will continue, with more rural people moving in.

4. Perception of Urban Economic Changes

Question: How do you feel the city's economy has changed over the past few years? Are you optimistic about future economic development?

Answer: The economy has remained stable. The government has developed new projects, such as the construction of Linkong Airport Economic Zone and the new metro line to Chengdu. Future economic development depends on government investment. The provincial government doesn't pay much attention to Ziyang. If the provincial government could have better policies and investments, Ziyang could develop better.

5. Satisfaction with Community Renovation Projects

Question: Are you satisfied with the renovation project?

Answer: The environment has improved after the renovation. The roads have been repaved, the building exteriors repainted, and the electrical wiring reorganized. Murals were also added to the walls. However, the construction quality is not very good. The newly paved road has already started developing potholes after a short period. In a few years, the road will probably be in even worse condition.

6. Plans to Move in the Future

Question: Do you plan to move in the next few years? Why?

Answer: I don't plan to move. Overall, I am satisfied living here. I've been here for a long time, and all my friends are here. It's also convenient for transportation and shopping.

Interview with GHJ Community

Interviewee: GHJ-C (Community Committee Staff)

Basic Information: Female, 57 years old

Interview Date: November 13, 2023

Interview Location: GHJ Community Committee Office

1. Current Population

Question: How many residents are there in the community, and what is the population structure like?

Answer: Our community has over 5,000 residents. More than half are elderly, with few young people left. Those with better income have moved away, leaving mostly elderly residents behind. There are also many low-rent housing units in our community, which are occupied by the low-income and other vulnerable groups.

2. Community Renovation Projects

Question: Could you please introduce the community renovation projects? Were residents' opinions considered during the renovation?

Answer: The first step in the renovation was to update the drainage system. Previously, each building had its own drainage setup, but now everything is connected to the municipal system and undergoes centralized sewage treatment. We also repaired the roads, fixing any potholes. Additionally, we repaired the damaged facades of buildings below the first floor, making them look almost new. Electrical wiring was also redone. Our community committee funded exterior wall murals.

The specifics of the renovation were mostly decided by the Housing and Urban-Rural Development Bureau. However, we helped mediate conflicts between the bureau and the residents. For example, we suggested changing the color of the wall tiles to gray, giving the community a vintage feel that matches the historical character of GHJ Community.

3. Community Activities

Question: Does the community committee generally organize community activities?

Answer: Yes, we usually organize activities during holidays. For instance, during the Dragon Boat Festival, we host Hanfu shows and dance performances. Since our Guihuajing area has an ancient theme, the cultural wall depicts historical scenes. Recently, we also hung traditional lanterns in Shuixiangzi.

4. Challenges in Community Management

Question: What challenges do you currently face in community management?

Answer: The biggest challenge is funding; without money, many issues cannot be resolved. We have to seek sponsorships for events. Additionally, there's a lack of resident participation—only a few party members are active. Most general residents do not participate; younger ones are busy with work, and older ones are not interested. If there's no money involved, they basically don't participate. Moreover, the sub-district office frequently has assessment tasks that we need to handle. We want to do practical things for the residents, but we also need to meet government expectations to access resources. However, sometimes the government's assessment goals are disconnected from the actual needs of the residents.