Intertwining Urban Shrinkage and Aging Challenges in the Yangtze River Delta Region, China

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ABSTRACT

This research examines the intertwined challenges of urban shrinkage and demographic aging in China's Yangtze River Delta (YRD) region, where nearly half of cities exhibit local shrinkage while elderly populations exceed national averages. Through regional analysis and interviews with officials in four cities, the study reveals systematic contradictions between demographic realities and policy implementation. Despite negative population growth, growth-oriented development models driven by GDP-centric evaluations pose hidden risks for future urban decline. Based on perspectives framing aging as an opportunity for societal restructuring, this research analyzes East Asian top-down planning strategies (Japan's networked compact cities, Singapore's age-friendly planning, and South Korea's smart aging initiatives) and identifies structural governance barriers in the YRD cities. The paper aims to provide insights for addressing these dual challenges, ultimately contributing to adaptive planning approaches for sustainable urban futures.

BIOGRAPHICAL SKETCH

Chengyu Wang, a second-year MRP student at Cornell University, developed his passion for urban shrinkage, aging, and zoning in different regions through his extensive experience including land use planning, urban renewal, age-friendly planning, and environmental planning. His interest lies in urban policies to create a more sustainable future city that successfully addresses aging and shrinking cities. Before coming to Cornell, he completed his undergraduate in human geography and urban-rural planning in China. He has planning skills, including GIS, data analysis, and design software like AutoCAD and Adobe Creative Suite. He is also proficient in video editing and filmmaking using Adobe Premiere Pro and Final Cut Pro.

Wang's professional experience spans multiple planning contexts across China. As an intern at the Zhejiang Urban and Rural Academy of Planning and Design, he contributed to urban design for a district renovation project, conducting resident surveys and analyzing data. At the Bureau of Natural Resources and Planning in Xinchang County, he worked on village planning and spatial planning projects, gaining practical experience in delineating various zones and protection areas using technical tools.

His academic research is across different fields. At Cornell's Just Places Lab, Wang serves as a graduate research assistant on community development projects, including the "Cornell Research to Action - Youth" initiative focusing on building deconstruction and adaptive reuse. He also participated in Tompkins County's Age-Friendly Planning project, analyzing delivery services and coverage for elderly residents. His undergraduate thesis on development strategies for a remote village with cultural resources earned him the Outstanding Graduate Thesis Award in Sichuan Province.

Wang's diverse project experiences demonstrate his versatility as a planner. He led a team that developed an ecological restoration security pattern for the Qingyi River-Dadu River Basin, using predictive modeling to assess future climate and water resource trends. He also worked on an innovative tourism planning project that resulted in a published paper on a real-time monitoring system for high-altitude skywalks in scenic areas. In 2024, he investigated the impact of mega-events on urban planning in Australia, collaborating with Dr. Jennifer Minner to explore sustainable development strategies for Olympic sites.

All these educational and professional experiences have given him valuable insights into Chinese governance and urban issues. Wang aims to enhance his skillset that combines technical proficiency with social research capabilities, enabling him to address complex planning challenges with both analytical rigor and community sensitivity in his future studies.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to my chair, Prof. Mildred E. Warner, who has always been patient and encouraging, providing me with refreshing insights and invaluable guidance throughout the whole process. During our discussions on aging and urban shrinkage issues, the collision of our perspectives and thoughts has consistently generated innovative ideas and approaches.

Additionally, I would like to thank Prof. Jennifer Minner. Through our three-semester collaboration and my work at the Just Places Lab, I have gained a deeper understanding of the importance and implementation of sustainability, which has provided significant direction for my exit project.

Furthermore, I sincerely thank the leaders and local officials from the Yangtze River Delta region who participated in the interview phase of this article, including officials from various city and county planning departments and statistical bureaus. I appreciate your willingness to take the time to communicate with me, exchange perspectives, and jointly explore strategies to address the dual challenges of aging and urban shrinkage.

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LIST OF ABBREVIATIONS

CPF - Central Provident Fund
DRC - Development and Reform Commission
FDI - Foreign Direct Investment
GDP - Gross Domestic Product
HDB - Housing Development Board (Singapore)
HMP - Health Monitoring Pod
IBD - International Business District
IoT - Internet of Things
LRT - Light Rail Transit
MLIT - Ministry of Land, Infrastructure, Transport and Tourism
MOH - Ministry of Health
MRT - Mass Rapid Transit
NDRC - National Development and Reform Commission
OECD - Organization for Economic Co-operation and Development
PLS-SEM - Partial Least Squares Structural Equation Modeling
TOD - Transit-Oriented Development
UN - United Nations
WHO - World Health Organization
YRD - Yangzi River Delta

LIST OF SYMBOLS

PREFACE

This research emerges from a deeply personal connection to China's rapidly transforming urban landscape. Having witnessed firsthand the paradoxical coexistence of ambitious urban expansion alongside increasingly evident demographic aging in my hometown within the Yangtze River Delta region, I became fascinated by this fundamental contradiction in contemporary Chinese urban development. The sight of newly constructed neighborhoods with few residents juxtaposed against aging communities lacking adequate services compelled me to investigate this phenomenon systematically. The Yangtze River Delta region, with its economic vitality and accelerated aging, presents an ideal laboratory for examining how cities respond to these intertwined challenges.

This work would not have been possible without the generous participation of local officials across four cities who candidly shared their experiences, challenges, and aspirations. Their insights into the practical realities of balancing growth imperatives with aging populations proved invaluable. I am particularly grateful to those who facilitated these conversations and to the scholars whose foundational research on urban shrinkage and aging laid the groundwork for this investigation.

Special thanks must go to Professor Mildred E. Warner, whose guidance and expertise in aging policies and urban governance shaped this research in profound ways. Her commitment to understanding how demographic change can be transformed from challenge to opportunity has deeply influenced my approach to this topic.

It is my sincere hope that this research contributes meaningfully to sustainable urban futures in rapidly aging societies for China and the whole world. By examining how different cities within a single region approach similar challenges of aging and urban shrinkage, I aim to provide valuable insights for creating an age-friendly urban environment and reducing the negative impact of urban decline.

March 2025

INTRODUCTION

Increased longevity, declining birth rates, and population aging are global trends (Warner et al., 2024), which are particularly pronounced in China due to its former one-child policy. Meanwhile, demographic change has always interacted with the growing and shrinking of regions. After half a century of population growth and urbanization, Chinese cities are on the edge of shifting the development model. The two reinforcing challenges - urban shrinkage and demographic aging, stem from China's growth-oriented policies and the lack of long-term development planning.

In the 21st century, these challenges in China's Yangtze River Delta (YRD) region—one of the country's most economically vibrant and culturally prosperous metropolitan clusters—present a unique case in the interplay between urban shrinkage and demographic aging. Despite the region's overall prosperity, exemplified by thriving metropolitan centers like Shanghai, Hangzhou, and Nanjing, a troubling pattern has emerged: half of the cities and counties in the YRD region show local shrinkage, with the population aged 60 and above accounting for 22.79%, exceeding the national average of 21.1%.

This demographic transformation manifests through two notable paradoxes in Chinese urban development. First, cities continue to expand their built-up areas while ignoring the actual utilization efficiency of the existing built city. Second, master plans consistently project future population growth, contradicting the reality of population loss and aging. These paradoxes indicate that city leaders in China fail to recognize the intertwined challenges of aging and shrinkage, as aging and decline will happen sooner than we think (Guillemot et al., 2024). While some cities have begun implementing targeted policies for aging populations, many localities continue prioritizing growth-oriented development, showing a disconnect between demographic realities and policy implementation.

The growth or shrinkage of urban areas is not only the result of the socioeconomic dynamics of cities themselves but is also affected by complex interactions with cities at various scales (Alama-Sabater et al., 2021; Mallach et al., 2017; Martinez-Fernandez et al., 2016). In the Yangtze River Delta Region, urbanization processes manifest as a zero-sum dynamic, where the growth of certain cities is predicated on the relative contraction of others. Through agglomeration economies and regional resource

reallocation, dominant metropolitan centers achieve growth and expansion at the expense of peripheral cities' decline (Deng et al., 2019; Li & Chen, 2023).

Under the combined influence of political, economic, spatial, cultural, and social factors, urban shrinkage and aging are twin phenomena (Jingwen, M., Shengchuan, Z., & Wu, L., 2022) that require integrated solutions. Due to the circular causality of the processes in shrinking cities, the effects of the aging process can in turn become drivers (Haase, Rink, Großmann, Bernt, & Mykhnenko, 2014). As demographic aging often accelerates urban shrinkage, while shrinking cities typically experience more rapid aging, it creates intertwined challenges that need comprehensive approaches to address both phenomena simultaneously and formulate mitigation strategies. Valuable lessons can be learned from Japan's networked compact city, Singapore's age-friendly planning, and South Korea's smart aging initiatives, which have faced, and are facing these challenges.

This study builds upon a perspective that frames aging as an opportunity to rethink the economy, society, and regions (Warner, Zhang & Guillemot, 2024) and China's emerging policies on "smart shrinkage" and "Right-Sizing (Aligning infrastructure and services with reduced populations)" (Han et al., 2024; Hartt, M. D., 2018). This research incorporates carefully designed interviews with urban leaders in the YRD region, aiming to investigate how local officials perceive the challenges between demographic realities and policy implementation, explore current policies implemented, and discuss future plans in response to the twin phenomena. Additionally, by examining strategies from other East Asian perspectives, this paper analyzes approaches, outcomes, and limitations in addressing the dual challenges in these regions. Through multi-angle qualitative and quantitative research, the work aims to develop adaptive strategies for the twin phenomena and plan for a more sustainable future.

In the next section, I will conduct an in-depth analysis of the definition and potential solutions for urban shrinkage and aging, as well as the relationship between urban shrinkage and aging, drawing on previous research, academic literature, and documents from international organizations such as the United Nations and the World Health Organization. This analysis combines global perspectives and Chinese contexts, examining the realities and complexities of aging and urban shrinkage challenges in China as well as three case studies of other Asian cities.

LITERATURE REVIEW

1. The relationship between urban shrinkage and aging

The concept of urban shrinkage was first proposed by German scholars in the context of post-industrial decline and population loss in Eastern Germany following reunification (Häussermann & Siebel, 1988; Rieniets, 2009), encompassing population loss (particularly working-age cohorts) and even spatial hollowing. This phenomenon is characterized by the deterioration of urban areas due to multiple factors including deindustrialization, suburbanization, aging, and political system transformation. Recent scholarship has expanded the definition of urban shrinkage to incorporate both demographic and economic indices, recognizing it as a multifaceted process that manifests through declining population metrics, spatial underutilization, and diminishing economic vitality (Martinez-Fernandez et al., 2016; Haase et al., 2014; Wiechmann & Pallagst, 2012).

Aging refers to the demographic phenomenon where there is an increasing proportion of older individuals within a population that is driven by declining birth rates, increased life expectancy, and changes in societal structure (United Nations, 2019). This demographic shift is often measured by indicators such as the aging index (the ratio of people aged 65 and over to those under 15) and the old-age dependency ratio (the proportion of elderly individuals relative to the working-age population) (World Bank, 2018). Since aging leads to transformation in the workforce, social service demands, and economic vitality (Bloom, D. E., Canning, D., & Fink, G., 2015), it has profound implications for urban development, economic sustainability, and social structures.

The relationship between urban shrinkage and aging manifests through a bidirectional causality pattern, where each phenomenon can both result from and contribute to the other. Urban shrinkage is not a linear or uniform process, but a multifaceted phenomenon shaped by interconnected economic, social, demographic, and policy-driven factors (Hartt, M. D., 2018). Research by Jingwen et al. (2022) identifies two distinct indirect influence paths by using the variance-based partial least squares method of Structural equation modeling (PLS-SEM). Based on empirical evidence from Chinese cities, this study examines how urban shrinkage indirectly accelerates demographic aging through economic, social, and spatial dimensions, while simultaneously analyzing how demographic aging facilitates further urban shrinkage through economic and social transformations. The bidirectional relationship operates through two distinct mechanisms: a socioeconomic pathway (shrinking cities → society

→ economy → aging process) and a spatial pathway (shrinking cities → space → aging process). Therefore, these intertwined challenges cannot be addressed in isolation.

According to Ma et al.'s (2022) research on Chinese cities, demographic aging often accelerates urban shrinkage, while shrinking cities typically experience more rapid aging due to youth outmigration. The relationship between shrinking and aging in the YRD region is evident in two ways. First, accelerated aging population reduces the proportion of the working-age population. This results in higher living and caregiving pressures on workers, increasing outmigration and declining birth rates. The loss of workforce and economic vitality further intensifies urban shrinkage. Second, aging societies contribute to negative natural population growth as caregiving burdens rise, reducing the desire and capacity to have children. Contemporary social phenomena such as delayed marriage and childbirth also accelerate the aging process in the YRD region. The resultant urban shrinkage leads to deteriorating economic and social conditions, further limiting the quality of life of the elderly. Under such circumstances, younger workers migrate from aging cities to other urban centers in search of enhanced opportunities and superior living environments. In the 2020s, numerous cities in southern Zhejiang and Jiangsu provinces recorded negative natural population growth, generating the risk of urban shrinkage and impeding substantial challenges for long-term sustainable development.

Research by Jarzebski et al. (2021) demonstrates that population decline may present opportunities for sustainable development through reduced environmental pressures and modified consumption patterns. While urban shrinkage presents opportunities for optimizing resource allocation and infrastructure efficiency, it concurrently generates challenges in sustaining public service delivery and economic dynamism in affected regions (Jarzebski et al., 2021). The imperative for comprehensive planning is evident in a study of Leipzig's (Germany) tripartite revitalization (Bontje, 2004), Detroit's adaptive resilience (Ligon, 2017 & Bottero et al., 2022), and Kitakyushu's (Japan) multidimensional aging governance (Haase et al., 2014). Additionally, Hollander et al. (2009) illustrate how Youngstown's 'smart decline' strategy—combining economic repositioning, social capital enhancement, and spatial right-sizing—provides a model for managing both demographic and spatial challenges. These successful planning practices across Germany, the United States, and Japan demonstrate the universality of integrated approaches in addressing urban shrinkage and aging. For China, these cases underscore the necessity of comprehensive planning frameworks (Bontje, 2004) that simultaneously tackle the twin phenomena by integrating economic, social, and spatial dimensions into cohesive strategies.

2. The definition and possible solutions of urban shrinkage and aging

The United Nations -Habitat has not provided a specific definition of urban shrinkage. Still, it does recognize shrinkage as a complex multi-dimensional process characterized by a combination of symptoms at the local scale: declining population (particularly working-age population), economic downturn, unplanned development, and social challenges that may include poverty, inequality, and public service reduction (UN-Habitat., 2016; United Nations Human Settlements Programme, 2016.).

The WHO defines people aged 60 years and older as older adults and demographic aging refers to the increasing number and proportion of people aged 60 years and above (WHO, 2025). Aging is occurring at an unprecedented pace and will accelerate in the coming decades. The aging population is projected to increase from 1 billion in 2019 to 1.4 billion by 2030, and further expand to 2.1 billion by 2050. Notably, 2020 marked a significant demographic milestone when the global population of adults aged 60 and above surpassed the number of children under age 5. This demographic transformation stems from declining birth rates and longer life expectancies. By 2050, 80% of older adults will reside in low- and middle-income countries (WHO, 2024). Aging poses a greater impact on developing countries, which lack the resources and funding to address demographic transitions, leading to further exacerbation of inequality (Rouzet et al., 2019; Pampel, 1998).

China has one of the fastest-growing aging populations in the world. The population of people over 60 years old in China is projected to reach 28% by 2040. This huge demographic shift presents new challenges and opportunities for public health and socioeconomic development while also requiring adaptations to the way societies are structured across all sectors - to create “Age-friendly Cities”. An age-friendly city encourages active aging by optimizing opportunities for health, participation, and security in order to enhance the quality of life as people age. In practical terms, an age-friendly city adapts its structures and services to be accessible to and inclusive of older people with varying needs and capacities (WHO, 2007). When a city uses its resources to enhance citizens' quality of life while curtailing unnecessary expansion, it simultaneously achieves two objectives: creating an age-friendly environment where older residents can thrive and continue contributing to society while achieving smart shrinkage (Han et al., 2024).

These are the universal strategies advocated by international organizations such as the WHO and the UN to transform the dual challenges into opportunities for development.

However, these institutions and strategies may not be universally applicable, as their effectiveness depends on their origins, intentions, and alignment with local realities (Evans, 2004). While international frameworks provide valuable insights into addressing urban shrinkage and aging, their applicability to specific regions demands careful contextualization. In the next part, I am going to elaborate on Chinese shrinkage-aging dynamics.

3. Chinese context

In the Chinese context, empirical research based on national census data from the Fifth Population Census (2000), the Sixth Population Census (2010), and the Seventh Population Census (2020), China has 180 shrinking cities. Research led by Professor Wu Kang has developed a comprehensive index incorporating registered population, resident population, and employment metrics, revealing that approximately half of the cities and counties in the YRD region exhibit signs of local shrinkage. Shockingly, the Yangtze River Economic Belt, a region of national strategic importance characterized by rich natural resources, strong agriculture, a prosperous economy, and technological foundations, is facing intensifying twin challenges. The population aged 60 and above accounted for 22.79%, exceeding the Chinese national average (21.1%). The Yangtze River Delta "gets old" earlier than the whole country, but also faster than other regions.

A distinct future of the twin phenomena in China is the paradoxical relationship between demographic downsizing and urban expansion. This pattern is particularly pronounced in the cities of the YRD region, where stringent GDP performance requirements further intensify this contradiction. While the population is increasingly aging, new urban construction and land development continue unchecked, leading to increasing operational costs and inefficient use of some urban facilities.

Overshadowed by the large cities' fast growth, medium and small cities are understudied, despite the fact that more of them have been identified as shrinking cities (Long and Wu, 2016) nationwide. Therefore, this study conducts interviews with urban leaders and analyzes the practical situations, challenges, and opportunities across a strategically selected sample of cities in the YRD region, including one large city, one medium-sized city, and two small cities. In the next part, I profile three countries with top-down planning and innovative approaches to the dual challenges as short case studies. These examinations of Japan, Singapore, and South Korea will provide comparative frameworks for understanding policy adaptation in similar cultural contexts.

4. Case studies in Japan, Singapore, and South Korea

This section systematically analyzes demographic aging and urban shrinkage management in three East Asian contexts: Japan, Singapore, and South Korea. A comprehensive literature review explores how these countries, with cultural backgrounds and top-down administrative structures similar to China, addressed their respective twin challenges. The comparative framework examines policy approaches, implementation strategies, and institutional responses in different Asian regions to provide insights for the Yangtze River Delta region.

I. Japan: A Pioneer in Asia

Since 1970, Japan has entered an aging era with an aging rate of 7.1%. In 1995, the aging rate exceeded 14%, entering an aging society. In 2000, it became the first country in the world with an aging rate of more than 20% (City·People·Work Creation Headquarters., 2017). The country's demographic landscape is defined by a super-aged society (28.7% aged 65+ in 2023) and sustained population decline, projected to reduce the national population by 30% by 2060 (National Institute of Population and Social Security Research, 2023). Regional cities such as Toyama (population: 413,938 in 2024) and Utsunomiya (population: 513,584 in 2024) exemplify the spatial and socioeconomic consequences of this dual crisis, including vacant housing (13% in Toyama's periphery), shrinking tax bases, and fragmented public services (MLIT, 2021). Both cities have adopted networked compact city models to reconcile urban shrinkage with aging needs, guided by national policies like the Compact City Promotion Law (2014) and the Regional Revitalization Strategy (Cabinet Office, 2015).

Therefore, Japan is a pioneer in addressing urban shrinkage and aging challenges through its networked compact city planning, exemplified by cities like Toyama and Utsunomiya (Luan, & Luan, 2019). Toyama City adopted the "dumpling and skewer" model, which reduced urban sprawl while enhancing accessibility for aging populations (Luan, & Luan, 2019). Similarly, Utsunomiya City has executed a "hub-based" strategy for concentrating urban functions, complemented by a "networked" (Zhili, L., & Zhixian, L., 2019) sophisticated public transportation system that supports its compact development objectives. These cases offer valuable lessons.

Acceptance of Fading

Japanese authorities have demonstrated the courage to acknowledge their decline as an inevitable reality rather than a temporary condition. Whether in terms of total population, age structure, or urban built-up areas, Japan had been aware of the crisis and actively taking initiatives. The 1968 *City Planning Act* marked a paradigm shift in

Japanese urban planning, transitioning from growth-centric models to control-oriented frameworks. Post-1968, many cities shifted focus from unstructured expansion to controlling urban scale and optimizing resources. In the late twentieth century, Japan's demographic dividend disappeared, with severe challenges of low fertility and aging, deteriorating local fiscal conditions, and lessons from the real estate bubble forcing the government to reconsider the unsustainability of the expansion model (Matanle & Rausch, 2011). In the twenty-first century, Japanese academia introduced Germany's "Smart Shrinkage" concept, emphasizing proactive planning rather than passive responses to aging and shrinkage (Wiechmann & Pallagst, 2012). The key turning point is the carrying out of the Compact Cities Promotion Act (コンパクトシティ推進法) in 2014, which marked that Japan officially promoted urban shrinkage and functional concentration in the form of national legislation.

A. Toyama's "Dumpling and Skewer" Model

- **Integrated Public Transport and Land Use**

  Toyama's strategy addresses aging and shrinkage through transit-oriented development and functional concentration, focusing on revitalizing its Portram light rail transit (LRT) system to create a linear corridor ("skewer") connecting high-density hubs ("dumplings") such as Toyama Station and Kureha Hills. The "hub-and-spoke" model aligns with the OECD's Compact City Policy in Japan (2020), which consolidates urban functions around key transportation nodes, with 80% of municipal healthcare facilities, senior centers, and retail concentrated within 500-meter pedestrian zones, reducing elderly travel times by 40% (Toyama City Government, 2018). Subsidized by the National Green Mobility Promotion Fund, the LRT system achieved a 25% increase in senior ridership by 2022 (OECD, 2020), effectively promoting accessibility for older adults while simultaneously reducing infrastructure costs (Suzuki & Cervero, 2020). Moreover, the LRT system reduced elderly car dependency from 75% to 53% (Suzuki & Cervero, 2020), while Utsunomiya's sub-centers increased social interaction rates by 35% (Utsunomiya City, 2020).

- **Vacant Land Reuse**

  Vacant lots and abandoned buildings were strategically repurposed to address both physical decline and social needs in aging communities. The adaptive reuse of underutilized spaces transformed them into community centers and green spaces that foster social cohesion and neighborhood vitality (Matanle & Rausch, 2011). A notable example is the conversion of a former elementary school into a

multipurpose community welfare center that now provides essential services including daycare, physiotherapy programs, and diverse social activities for elderly residents (Nakamura & Ono, 2019). This approach not only reclaims deteriorating urban spaces but also creates centralized service hubs that create age-friendly communities while reducing maintenance costs.

- **Fiscal Prioritization**

  The city's shift toward a shrinkage-oriented approach is also reflected in fund. allocation. In its 2021 development plan, Toyama reallocated 60% of its infrastructure budget from urban expansions—including road construction, real estate development, and new infrastructure projects—to Light Rail Transit (LRT) maintenance and pedestrianization initiatives (MLIT, 2021). This strategy cut annual maintenance costs by ¥1.2 billion (MLIT, 2021) and enabled more efficient utilization of urban resources. In this case, top-down economic planning drove the city to proactively pursue shrinkage as a strategic response to demographic changes.

B. Utsunomiya's Multi-Polar Network Compact City

- **Decentralized Service Hubs**:

  Aiming at integrating aging-friendly amenities into neighborhood hubs citywide, Utsunomiya designated 12 **sub-centers** anchored through railway stations, each providing "15-minute life circles" with clinics, pharmacies, and green spaces. The *Community-Based Integrated Care System* ensures that 90% of elderly residents access healthcare within 10 minutes (Utsunomiya City, 2017). The city adopted a polycentric structure to decentralize services while maintaining connectivity.

- **Smart Shrinkage via Population Forecasts**:

  Using 30-year demographic projections, the city phased out underused infrastructure. For instance, the closed Minami Elementary School was transformed into a shared community hub housing a co-working space, elderly recreation center, and childcare facility, reducing per capita infrastructure costs by 18% (Uchida & Nelson, 2020).

- **Green Network Integration**:

  A 50-km greenway system connects all sub-centers, promoting walkability and improving the living enrolment. This aligns with the national *Green Infrastructure*

Policy (2020), which prioritizes aging-friendly urban ecosystems (MLIT, 2020). This initiative has been highly praised by the residents and visitors of the city, which is evidence of Utsunomiya's successful planning approach.

Challenges and Limitations

Japan's practices serve as a model for other Asian countries, offering lessons in adaptive governance and spatial efficiency. Toyama's LRT system has improved urban accessibility for aging populations (Suzuki & Cervero, 2020), while Utsunomiya's sub-centers increased social interaction rates by 35% (Utsunomiya City, 2020). Both cities achieved 15–20% reductions in per capita infrastructure costs through spatial concentration, demonstrating fiscally sustainable shrinkage management (OECD, 2020). Toyama's TOD model prioritizes spatial efficiency, while Utsunomiya's polycentric approach balances decentralization with connectivity.

However, challenges persist. Cultural preferences pose a substantial barrier, with 40% of Toyama residents opposing high-density redevelopment due to privacy concerns (Fielding, 2018), while deeply rooted traditional land ownership norms impede the consolidation of fragmented plots necessary for efficient hub development (Matanle & Rausch, 2011). These cultural factors are compounded by fiscal sustainability risks, particularly for public transportation infrastructure like Toyama's Light Rail Transit system, which requires a minimum threshold of 5,000 daily users to remain economically viable—a requirement increasingly difficult to meet amid projected population declines (Sorensen, 2021). Additionally, spatial disparities is a significant challenge, with urban cores receiving the majority of revitalization investments while suburban areas remain neglected due to fiscal constraints, resulting in vacancy rates exceeding 20% in Utsunomiya's periphery (MLIT, 2021). Sorensen (2021) also critiques Utsunomiya's reliance on top-down planning, noting local residents were minimally involved in the planning process. Lastly, municipal planning departments face staff shortages, with 30% of employees aged 55 or older, limiting their ability to implement innovative policies (Japan Productivity Center, 2021).

II. Singapore: Technology-Driven Age-Friendly Urbanism

As a compact, multiethnic city-state, Singapore combines self-reliance policies with technology integration to create inclusive environments for its rapidly aging population (Feng & Straughan, 2017). Singapore's population over 65 is projected to reach 25% by 2030, while one-person households are growing rapidly. The government's approach avoids direct welfare subsidies, instead emphasizing individual savings, family obligations, and community resilience (Feng & Straughan, 2017; Malhotra et al.,

2019), supported by targeted technological interventions (Kwan & Asher, 2022; Yuen, 2019). Additionally, a significant strategy of aging management is supporting elderly re-employment (Thang, 2011).

The WHO (2007) framework for age-friendly cities underscores the necessity of aligning economic accessibility (e.g., older employment), social inclusion (e.g., intergenerational activities), and spatial accessibility (e.g., age-appropriate transportation), which is exemplified by Singapore's policy integration: Economic subsidies + community center development + pedestrian-first design. Learning Singapore's position and extensive experience in managing the challenges and maximizing the potential of aging can contribute to the international aging literature (Malhotra et al., 2019).

Smart Aging Technologies

First, IoT-Enabled Public Housing is a creative response to an aging society in Singapore. The Housing Development Board (HDB) retrofitted 85% of public housing blocks with Health Monitoring Pods (HMPs), sensor-equipped communal spaces tracking elderly health metrics (e.g., blood pressure, glucose levels) and transmitting real-time data to community clinics. These pilot projects reduced 22% in emergency hospitalizations (Ministry of Health, 2022). Secondly, the HealthHub platform (https://www.healthhub.sg), which is integrated with all public polyclinics in Singapore, facilitated remote consultations for nearly 500,000 seniors in 2022, reducing in-person visits for chronic disease management by 35% (Ministry of Health Singapore, 2023; GovTech Singapore, 2022). Such digital health technologies significantly reduce the time and cost of accessing health data, simplifying healthcare data management processes. Additionally, digital citizen preparation empowers individuals to effectively utilize digital health tools, access reliable health information, and engage in shared decision-making with healthcare providers (Wong, Voon, & Law, 2025). Thirdly, the government subsidizes 50% of the costs for care robots (e.g., PARO seals, and meal-delivery robots) in households with seniors living alone. By 2023, 18% of elderly Singaporeans will utilize such devices (Agency for Integrated Care, 2023).

Notably, the government empowers older residents to exercise their voice as active stakeholders in urban development. For instance, they can document policy implementation and solutions by photographing their built environment using smartphones (a photovoice), enabling direct citizen participation in monitoring urban initiatives (Moogoor et al., 2022; Yuen, 2019). However, due to digital literacy barriers,

less than 28% of seniors can use telemedicine and robot assistants, and they are also reluctant to learn and try these new technologies as well (Leong et al., 2024).

Vertical Community Design and Intergenerational Integration

The “Silver Housing” project integrates elderly-friendly units with childcare centers and hawker markets to foster intergenerational interaction (Tan & Tan, 2019). Vertical community design not only alleviates the issue of urban land scarcity but also ensures a high-quality living environment within the apartments, equipped with features such as green open space, physical exercise areas, voice-activated lighting, and fall-prevention flooring. Such high-density housing is uncommon in Western contexts but aligns with East Asian cultural norms. Surveys indicate that 65% of elderly residents engage daily with young families, significantly reducing social isolation (Housing and Development Board [HDB], 2021).

Moreover, 15-minute walking "Silver Zones" are created particularly for older adults to improve their accessibility and safety in the city. These zones, which are mandated within 1 km of Mass Rapid Transit [MRT] stations, feature tactile pavements, shaded rest areas, and priority seating. Traffic calming will be achieved to improve the quality of life of citizens while ensuring accessibility to public transport (Chng et al., 2022).

Self-Reliance, Familial Duty, and Institutional Coercion

Singapore’s aging policy is anchored in a "self-reliance" ethos, prioritizing individual responsibility, familial support, and community collaboration over direct welfare subsidies (Malhotra et al., 2019). This approach aligns with the nation’s socio-cultural values and fiscal conservatism, institutionalized through two key mechanisms:

- **Central Provident Fund (CPF):**

  A mandatory savings scheme requiring citizens to allocate up to 37% of monthly. wages (employer and employee contributions) into retirement, healthcare, and housing accounts. By 2023, 80% of retirees met basic living standards through CPF’s inflation-adjusted monthly payouts (CPF Board, 2022).

  In addition, the Matched Retirement Savings Scheme supplements low-income seniors by matching voluntary contributions up to SGD 1,200 annually, thereby enhancing retirement provisions for vulnerable groups (Ministry of Finance, 2023).

- **Maintenance of Parents Act:**

> Singapore's laws enforce filial duty on children, who must provide certain. financial support to their elderly parents unless the courts exempt them. This policy reduced state welfare expenditure by SGD 200 million in 2022, while reinforcing Confucian familial ethics (Ministry of Social and Family Development, 2023).

Singapore's multi-faceted approach to elderly care orchestrates collaboration among businesses, voluntary organizations, and communities in creating an age-friendly society. This approach extends across three key sectors: housing, where 80% of Singaporeans reside in public housing (HDB) mandated to include elderly-friendly retrofits such as ramps, voice-activated elevators, and fitness equipment (HDB, 2021); healthcare, delivered through state-run polyclinics and subsidized telemedicine platforms (HealthHub) that provide affordable services like chronic disease consultations for as low as SGD 10 (MOH, 2023); and employment initiatives through the Re-Employment Act, which has generated 68,000 senior-friendly positions by 2023 through partnerships with private firms, supported by wage subsidies and tax incentives. Employers receive up to SGD 8,000 annually per senior worker (aged 65–70) through the Senior Employment Credit scheme, boosting elderly workforce participation to 68% (Ministry of Manpower, 2023).

Challenges and Limitations

While the relatively successful Aging Policy Framework achieves fiscal sustainability, its reliance on unpaid familial labor and migrant labor underscores contradictions in its "self-reliance" narrative. Moreover, the state's strategic emphasis on cultural norms such as filial piety effectively masks structural inequities, particularly for women and low-income families. Research demonstrates pronounced gender disparities. 42.6% of female caregivers exit the workforce due to eldercare duties, exacerbating income inequality and retirement insecurity (Ang et al., 2023). The system also reveals a strong dependence on migrant labor, as evidenced by 49.15% of households with elderly members relying on foreign domestic workers for caregiving, which highlights substantial gaps in public support mechanisms (Ministry of Manpower, 2022). This burden on families is further exacerbated when less than 10 percent of organizations offer paid family care leave, shifting emotional and financial stress onto families.

Significant technological adoption barriers persist in Singapore. According to MOH (2023), only 10.5% of seniors utilize devices for functional health purposes, indicating low intrinsic motivation. Research reveals that older adults express strong preferences for human interaction, with 72% prioritizing face-to-face consultations over telehealth

options due to greater trust in physicians' expertise and discomfort with impersonal technological interfaces (Leong et al., 2024). Further barriers include distrust in automated systems, with participants expressing sentiments such as "I'd rather see a doctor in person," alongside cybersecurity concerns reflected in statements like "Phishing risks make me avoid health apps" (Qualitative Study, 2024). Digital literacy deficits complicated these challenges, with 85% of seniors relying on family members or community "digital ambassadors" for technical assistance, and many expressing they need "step-by-step, one-on-one guidance" to navigate digital health platforms (Leong et al., 2024). Improving digital literacy so that more older people can enjoy the benefits of emerging technologies is what Singapore needs to do in future age-friendly planning.

III. Incheon, South Korea: Powerful intervention of top-down planning

As a post-industrial metropolis undergoing rapid demographic and economic transitions, Incheon, South Korea, integrates smart city innovations with industrial regeneration to address the dual challenges of population aging and urban shrinkage (UN-Habitat, 2019). By 2022, Incheon's total fertility rate plummeted to 0.84 births per woman, which is far below the replacement level of 2.1, while over 20% of its population is aged 65 or older, a figure projected to rise to 35% by 2040 (Statistics Korea, 2023; Incheon Metropolitan City Government, 2022). Meanwhile, the city has experienced significant population loss, with a 15% decline in residents aged 20-39 over the past decade due to youth outmigration to Seoul and other economic hubs, compounded by post-industrial stagnation in traditional manufacturing sectors (Kim & Choi, 2021). To counter these crises, Incheon prioritizes "smart decline" strategies, repurposing vacant industrial zones into tech-driven hubs, while deploying IoT-enabled healthcare and mobility systems to support aging communities (Lee & Park, 2020). Unlike welfare-centric models, Incheon's policies emphasize multi-generational housing incentives, elderly re-employment programs, and community-led regeneration in shrinking neighborhoods (Ha & Kim, 2018; Incheon Urban Regeneration Center, 2020). This review analyzes Incheon's hybrid approaches and planning priorities to these intertwined crises, scrutinizing their strengths and limitations.

Integration of Smart City Technologies and Industrial Regeneration

Incheon's approach combines smart city innovations with industrial regeneration to address aging and shrinkage simultaneously. Lee and Park (2020) highlight how Incheon's "Smart Aging City Initiative" leverages technology to enhance elderly care. For instance, the Incheon Health Cloud platform connects hospitals and households, enabling remote monitoring of chronic diseases for over 65,000 seniors. Smart traffic systems optimize bus routes and provide real-time updates via mobile apps, reducing

waiting times by 30% in pilot areas (Lee & Park, 2020). However, the study notes a digital divide: only 42% of low-income elders use these services, compared to 78% of high-income groups, reflecting unequal access to technology.

Simultaneously, Incheon is repurposing industrial zones to attract younger populations. Kim and Choi (2021) analyze the Songdo International Business District (IBD), a former industrial hub now transforming into global tech firms and green spaces. This project created 25,000 jobs, slowing youth outmigration and boosting the economy. Yet, the gentrification risks can't be ignored: rising housing prices displaced 15% of original residents in adjacent neighborhoods, exacerbating socio-spatial inequality (Kim & Choi, 2021).

"Smart Decline" Strategies

Incheon adopted smart decline principles to manage shrinkage efficiently. By closing the underused bus lines and reinvesting in core metro networks, not only did the transit efficiency improve by 22%, but the operational funds of the city were saved. The city also established a Land Bank to acquire vacant properties and convert them into community gardens or temporary green spaces, which reduced urban blight in Bupyeong District by 18% (Incheon Urban Regeneration Center, 2020).

Multi-generational housing incentives further support "smart decline" by addressing housing oversupply and affordability (Jeon, Y., & Kim, S., 2020). Through tax rebates and renovation subsidies, the local authority encourages families to cohabitate in expanded or retrofitted homes, reducing demand for new housing units. For example, households adopting multi-generational living arrangements receive up to 30% property tax reductions, leading to a 12% decrease in housing vacancy in aging neighborhoods (Incheon Metropolitan Government, 2022; Incheon Development Institute, 2023). This strategy not only alleviates downward pressure on housing prices—median rents in targeted areas dropped by 8% between 2018 and 2022 (OECD, 2019)—but also mitigates social isolation among seniors.

While successful smart decline and redevelopment plans are concentrated in urban cores, peripheral regions such as Juan District, where aging populations exceed 28%, received only 10% of redevelopment funds, underscoring spatial bias in resource allocation (Incheon Metropolitan Government, 2022).

Aging-Specific Policies

Incheon's aging policies prioritize healthcare and economic participation. The Incheon 2030 Comprehensive Plan (2022) mandates the construction of three geriatric hospitals and expands home-based care coverage to 80% of seniors by 2025. Meanwhile, as noted by the Ministry of Health and Welfare in 2021, the "Community Care Center" program (Cho, J. H., & Choi, J. S., 2014) provides integrated services, including daycare, rehabilitation, and education, for people of all ages in 45 neighborhoods.

Employment programs have shown notable success through aging-specific policies. Incheon's Silver Job Initiative collaborated with local businesses to create roles tailored to elderly skills, such as community tour guides and library assistants (Ha & Kim, 2018). By 2021, the city's elderly employment rate reached 34%, surpassing the national average of 28% (Ministry of Health and Welfare, 2021).

Equity Challenges and Limitations

Despite progress, Incheon's strategies face criticism for privileging affluent groups and exhibiting spatial inequities. The OECD (2019) compares Incheon to Leipzig and Sapporo, stating that high-tech projects like Songdo IBD primarily benefit skilled workers and foreign investors, while aging communities in declining areas like Juan District rely on underfunded local initiatives. Similarly, Martinez-Fernandez et al. (2016) contrast Incheon's globalized regeneration with Japan's Kitakyushu, which prioritizes grassroots environmental projects over capital-driven models. Incheon's top-down planning risks excluding vulnerable populations: only 5% of public housing in redeveloped zones is allocated to low-income seniors, perpetuating spatial segregation (Incheon Urban Regeneration Center, 2020). Despite tax incentives promoting multigenerational housing, significant equity disparities persist. Only 12% of renovated units are accessible to low-income households; these incentives predominantly benefit middle-class families, and merely 5% of subsidized units are allocated to this demographic (Ha & Kim, 2018). While the UN-Habitat (2019) report praises Incheon's 15-minute neighborhood model in Juan District—clustering healthcare, retail, and leisure facilities within a 15-minute walking distance—this strategy didn't work in rural hinterlands (OECD, 2019). These limitations underscore institutional biases in resource allocation and policy design, putting marginalized groups in a more vulnerable position in the face of the dual challenges.

The analysis and findings of these case studies are summarized in Table 1 below.

Indicators/ Cities	Japan (Toyama & Utsunomiya)	Singapore	South Korea (Incheon)
Scale	medium-sized cities with medium population density	A city-state with extremely high population density	The third largest city in South Korea, relatively high population density
Primary Approach	Networked compact city model with transit-oriented development	Technology-driven age-friendly urbanism with self-reliance emphasis	Smart city innovations with industrial regeneration
Cultural Context	Acceptance of decline as reality rather than temporary condition	Confucian values emphasizing filial piety and family responsibility	Transition from industrial to knowledge economy
Planning Strategy	• Toyama: "Dumpling and Skewer" model (high-density hubs connected by transit corridors) • Utsunomiya: Multi-polar network with decentralized service hubs	• Vertical community design • 15-minute walking "Silver Zones" • Integration of services in public housing	• Smart decline strategies • 15-minute neighborhood model • Repurposing industrial zones
Transportation Focus	• Light Rail Transit (LRT) systems • Pedestrianization • Transit-oriented development	• Age-friendly modifications to Mass Rapid Transit (MRT) • Pedestrian-friendly "Silver Zones"	• Smart traffic systems • Optimized bus routes • Real-time transit updates via mobile apps
Housing Innovation	• Vacant land reuse for community centers • Adaptive reuse of abandoned buildings • Concentration of urban functions	• "Silver Housing" with elderly-friendly features • Intergenerational housing • Smart home technologies	• Multi-generational housing incentives • Tax rebates for cohabitation • Renovation subsidies
Technology Integration	• Limited focus on technology • Emphasis on physical infrastructure and spatial planning	• IoT-enabled public housing • Health Monitoring Pods • Telemedicine (HealthHub) • Care robots	• Incheon Health Cloud platform • Remote health monitoring • Smart traffic systems • IoT-enabled healthcare
Policy Framework	• Compact City Promotion Law (2014) • Regional Revitalization Strategy • "Smart Shrinkage" concept	• Self-reliance ethos • Central Provident Fund (CPF) • Maintenance of Parents Act	• Incheon 2030 Comprehensive Plan • Silver Job Initiative • Community Care Center program

Resource Allocation	• 60% of infrastructure budget reallocated to LRT and pedestrianization • Strategic prioritization of core urban areas	• Balanced investment across housing, healthcare, and employment	• Focus on high-tech projects and urban cores • Limited investment in peripheral regions
Achievements	• 25% increase in senior transit ridership • 15-20% reduction in per capita infrastructure costs • Reduced elderly car dependency (75% to 53%)	• 80% of retirees meeting basic standards through CPF • 68% elderly workforce participation • 65% of elderly residents engaging daily with young families	• 34% elderly employment rate • 30% reduction in transit waiting times • 18% reduction in urban blight
Challenges	• Cultural resistance to high-density living environment (40% opposition) • Fiscal sustainability of transit systems • Spatial disparities in investment	• Digital literacy barriers (only 28% of seniors using telemedicine) • Gender disparities in work opportunities • Dependence on migrant labor to maintain the population • Limited organizational support	• Digital divide • Gentrification and displacement (15% of original residents) • Spatial inequity (only 10% of funds to peripheral regions) • Limited accessibility for low-income seniors

Table 1. Comparison among the three case studies

To ground global perspectives in the YRD region's unique socio-economic dynamics, including rapid urbanization, fiscal decentralization, and local governance structures, this study employs a two-phase methodology. In the next section, I present my research methodology for analyzing the Yangtze River Delta, the most special urban agglomeration in China, combining quantitative regional analysis with qualitative interviews of local officials from four selected cities. This approach allows for both macro-level understanding of demographic patterns and micro-level insights into policy implementation, creating a comprehensive foundation for developing context-specific recommendations for the YRD region.

METHODOLOGY

After examining international and Chinese perspectives on the complexity and relationship between shrinkage and aging, three Asian case studies offer valuable comparative insights into addressing the twin challenges. This chapter now turns to the Yangtze River Delta, the most special urban agglomeration in China. This study employs a multi-scale analytical framework to uncover the characteristics of aging and shrinkage in the YRD region, connecting empirical observations with local dynamics. The integration of quantitative regional analysis, qualitative interview data, and international case studies provides a foundation for developing tailored policy recommendations specific to the YRD region's circumstances. By examining how the twin phenomena interact at both provincial and municipal levels, this approach provides a comprehensive understanding of the heterogeneity of aging and shrinkage across different administrative scales. The specific research methods are as follows:

At the macro level, this research employs quantitative methods to analyze cross-provincial patterns in aging, migration, and urbanization rates. It emphasizes overall regional conditions and disparities in aging and labor mobility between provinces. At the micro level, in-depth interviews with municipal leadership in strategically selected cities—Shanghai, Lishui, Tiantai, and Xinchang—reveal the nuanced manifestations of aging-shrinkage phenomena at the local scale, including governance responses, challenges, and planning initiatives developed to address the twin challenges.

1. Regional Analysis

This part is a systematic analysis of demographic and spatial dynamics in the whole Yangzi River Delta region from a macro-regional perspective. This approach synthesizes and builds upon the empirical foundation established by previous studies to characterize distinctive regional attributes. It examines demographic indicators and urban expansion patterns derived from national census data and provincial statistical yearbooks over the past twenty years to summarize the relationship and interaction of the aging and urbanization processes. This provides a theoretical foundation and regional background for the qualitative research of the four case cities in the following part.

Research Area: The Yangtze River Delta (YRD) Region

Figure 1. The Map of the Yangzi River Delta Region

1. Definition and Scope

The YRD encompasses 41 cities across four provincial-level jurisdictions: Shanghai, Jiangsu, Zhejiang, and Anhui. It covers an area of 358,000 km² (National Development and Reform Commission, 2021). Its core economic zones include the Shanghai metropolitan area, Nanjing (Jiangsu province), Hangzhou (Zhejiang province), and Hefei (Anhui province).

2. Significance and Uniqueness

The YRD region is an economic powerhouse, contributing 24% of China's GDP in 2023. It is also a cornerstone of the global economy, accounting for 6.5% of international trade volumes (World Bank, 2023). With a per capita GDP 1.8 times the national average (National Bureau of Statistics, 2023), it hosts 40% of China's Fortune 500 headquarters (Shanghai Municipal Government, 2023) and serves as a critical node in global supply chains. For instance, Shanghai's financial markets rank among the world's top five, rivaling New York and London (Global Financial Centers Index, 2023). Moreover, the region facilitates 30% of China's foreign direct investment (FDI) inflows and outflows (UNCTAD, 2023).

The region hosts 16% of China's population, and its aging rates (over 25%) exceed national averages, offering a testing ground for developing new policies. Characterized

by high-quality urbanization, the YRD exhibits smaller urban-rural disparities compared to other Chinese regions. With an urbanization rate of 76% (2023)—surpassing the national average of 65%—the region demonstrates balanced development through integrated public services, such as near-universal healthcare coverage and equitable educational resources. For example, rural residents in Zhejiang Province enjoy 83% of urban income levels (Zhejiang Statistical Yearbook, 2023), reflecting a high level of equity.

As a national strategic priority under the "YRD Integrated Development Plan", the region serves as a model for regional coordination, smart urbanization, and sustainable development. The plan prioritizes cross-provincial infrastructure (e.g., the Yangtze River Delta Ecological Green Integration Demonstration Zone), unified regulatory frameworks for aging policies, and green technology adoption (e.g., carbon-neutral industrial parks in Suzhou). By innovative policies such as the "10-minute community life circle" and digital governance platforms, the region sets precedents for nationwide reforms. Its hybrid governance model—blending central mandates with local innovation—empowers localities to secure economic growth while developing approaches to deal with the twin phenomena.

The YRD's experiments in smart shrinkage and aging-friendly planning are closely monitored by international institutions, as its challenges mirror those of aging economies worldwide. For instance, Shanghai's "whole-life-cycle community" initiative, which integrates elderly care with mixed-use development that empowers communities to meet all needs and services for people of all ages, has inspired similar programs in Tokyo and Singapore (OECD, 2023). This dual role, both China's most important economic, cultural and technological innovation region and a global reference point, underscores the region's significance in shaping 21st-century urban development paradigms.

3. Representativeness

(1) Spatial Diversity: The YRD combines megacities (Shanghai), industrial hubs (Suzhou, Ningbo), and rural-urban transition zones (Lishui, Tiantai), reflecting the full spectrum of China's urbanization—from hyper-dense cores to aging society. This diversity enables cross-contextual analysis of aging-shrinkage dynamics as well as ensures that different institutions and strategies are established and applied to various types of areas.

(2) Economic Vitality and Innovation: As China's most economically dynamic and innovative region, the YRD's advanced digital infrastructure (e.g., Hangzhou's "City Brain"), thriving entrepreneurship ecosystems (e.g., Shanghai's Pudong New Area), and cross-border economic integration (e.g., Yangtze River Economic Belt) position it as an experimentation hub for policy optimization and reform to turn aging and shrinkage challenges into opportunities.

(3) Institutional Complexity: The region operates under a hybrid governance model blending central mandates (e.g., aging-friendly cities, smart cities) and local fiscal autonomy (e.g., land finance-driven expansion). This inherent tension between top-down control and grassroots innovation reflects broader national challenges in balancing centralized authority with regional flexibility. Furthermore, the YRD holds China's highest degree of regional autonomy and policy-making authority, positioning it as the most viable arena for piloting institutional reforms and adaptive policy adjustments. If successful, these localized innovations could provide blueprints for national-level institutional reforms and policy optimization, demonstrating the practical strategies for addressing the twin challenges.

2. Local leadership Interviews

Carefully designed interviews with local government leaders across four strategically selected cities will provide a micro, qualitative perspective on local authorities' responses to aging and the prevention of urban shrinkage. These responses can represent how cities of different scales, economic conditions, development orientations, and levels of local administrative autonomy within the Yangtze River Delta region are addressing the challenges, as well as identifying the limitations in their approaches.

(1) Shanghai, with a population exceeding 24 million, serves as China's economic center and global financial hub, representing first-tier cities in the YRD region. What it is going through in managing demographic aging within a complex metropolitan context offers valuable insights for other major cities. In the context of moderating economic growth, continuous influx of young migrant workers, persistent urban expansion, and accelerating demographic aging, Shanghai's experience in managing demographic aging within a complex metropolitan context offers valuable insights for this research.

(2) Lishui, a medium-sized city in Zhejiang Province, occupies a relatively disadvantaged position within the YRD region in terms of both geographical location

and economic conditions, and is currently experiencing significant demographic transition while facing potential risks of urban shrinkage.

(3) Tiantai County and (4) Xinchang County, both economically prosperous small cities in Zhejiang Province, have gained recognition for their successful age-friendly planning initiatives despite facing serious aging challenges.

These four cities share common challenges of demographic aging and urban shrinkage, yet differ significantly in their economic foundations, geographic positioning, and development policies. Their selection for this study was based on several factors: Shanghai's indisputable importance as the region's core city demonstrates how mega-cities try to address the twin challenges within complex urban systems. Taintai and Xinchang Counties represent relatively successful examples of age-friendly planning implementation at a smaller urban scale, particularly noteworthy given their context of consecutive years of negative population growth. While Lishui represents a medium-sized city facing relatively challenging conditions across multiple dimensions, coupled with insufficient awareness of potential risks associated with aging and shrinkage. Their geographic distribution across the YRD region - from coastal metropolitan center to inland medium and small cities - provides a comprehensive view of regional variation when facing the twin challenges.

In the interviews, participants were carefully selected based on their direct involvement in planning and policymaking process:
• Shanghai: A chief urban planner from Tongji University who is deeply involved in Shanghai's age-friendly community planning and employed as an urban planning consultant for several cities in Zhejiang province.
• Lishui: A leader from the Audit Bureau.
• Tiantai County: A civil servant from the Planning Bureau specifically involved in age-friendly planning initiatives.
• Xinchang County: A senior official from the Urban-Rural Planning Bureau.

Aiming to identify the unique challenges and potential solutions of cities of different sizes from a policy-making perspective, the interviews investigate local government leaders' perceptions and plans for demographic change and urban shrinkage, their current responses to the twin challenges, their future policy implementation strategies, and their self-assessment of their cities' successes and shortcomings in addressing the twin challenges.

ANALYSIS

1. Regional Analysis

In this section, I analyze the complex relationship between shrinkage and aging in the Yangtze River Delta region. The most important catalyst is the developed transportation network and talent introduction and settlement systems in the metropolitan areas, which further drive the out-migration of the young labor force from small and medium-sized cities to core urban centers, exacerbating aging issues in smaller cities. The loss of the young population leads to aging, which foreshadows future urban shrinkage and leads to deterioration of economic and social conditions, further limiting the quality of life for elderly residents. As the economic core of China, cities of all sizes in this region maintain expansion-oriented approaches, with Growth-Oriented Development serving as the dominant regional paradigm. The contradictions between reality and planning, as well as between present conditions and future challenges, have created latent risks throughout the region.

Demographic Paradox of Growth-Oriented Development

The Yangtze River Delta (YRD), contributing 24.1% of China's GDP (National Bureau of Statistics, 2022), exhibits a distinctive contradiction between urban expansion and population hollowing. Census data reveals that between 2010-2020, most YRD cities experienced urban built-up area growth of an average of 4.2% annually, the working-age population declined by 0.8% annually, and the proportion of people aged 65 and over increased by 5.1% (China's 6th and 7th Population Census). This "expansion-shrinkage duality" (Long & Wu, 2016) manifests acutely in third-tier cities like Zhenjiang and Yangzhou, where elderly dependency ratios surpassed 28.3% in 2022, exceeding Shanghai's 24.0% (Shanghai Municipal Statistics Bureau, 2023).

The population is declining, while the urban construction area is continuing to expand both vertically and horizontally. Blindly pursuing GDP growth and splendid economic data, some localities never realized the underlying crisis that such expansion is disconnected from the demographic trends. One of the conspicuous features of cities forced to contract and decline is the concurrence of population loss and urbanization (Jingwen, M., Shengchuan, Z., & Wu, L., 2022). This exemplifies the inherent contradiction between growth-oriented development and contemporary demographic realities. Long and Wu's (2016) findings contextualize the region's "growth-shrinkage duality" – while GDP and built-up areas expand, 37% of YRD's county-level cities face simultaneous population decline and aging (elderly dependency ratio >25%). And the planning system's institutional bias of growth patterns leads to leads to continued land

expansion at an annual rate of 4.2% in the Yangtze River Delta region, despite population decline in 23% of its counties and districts.

Inter-city cooperation and the Siphon Effect

The operational mileage of railways in the YRD region exceeds 15,000 kilometers, including over 7,700 kilometers of high-speed rail. The high-quality rapid transit network is becoming increasingly dense, significantly enhancing the accessibility and convenience of communication between cities (Yangtze River Delta Railways Set New Record for Passenger Volume Last Year, Hefei Daily, 2025). However, the high-speed public transportation network is designed to strengthen connectivity (Cao et al., 2013), but it functions as an unexpected demographic siphon. Gravity model analysis demonstrates that every 10% increase in intercity rail accessibility correlates with 2.1-3.5% youth population outflow in small and medium-sized cities (The elastic coefficient of HSR accessibility to population outflow ranges from -0.25 to -0.42, $p<0.01$.) (Li & Chen, 2023; Guo, Li & Han, 2020). This infrastructure-driven centralization contradicts the polycentric development goals outlined in the Yangzi River Delta Regional Integration Plan 2021-2025.

The study by Li and Wu (2018) describes how Shanghai and Kunshan established cooperative relationships over many years. Because Shanghai chose to leverage its vast suburban advantages to attract manufacturing investment and population influx, the two cities engaged in fierce competition in areas including land supply, government subsidies, tax relief, and preferential labor policies. This exemplifies a common phenomenon that core cities,

Although developed metropolitan areas maintain economic stability and urban expansion through the continuous influx of new talent, other cities face increasingly severe aging due to the outflow of young workers.

The siphoning effect is further intensified through cooperation between regional cities, such as the city cluster around Shanghai and the Hangzhou metropolitan area. Based on the regional cooperation practices in the Yangtze River Delta from 2008 to 2016, Li and Wu (2018) propose the concept of "Administrative State-Led Regionalism" with Chinese characteristics. Through the analysis of 487 intergovernmental agreements and interviews with 37 officials, their research reveals a hierarchical structure in cooperation domains: economic agreements account for 82% (e.g., industrial park co-development), while social agreements constitute only 12% (including elderly care and healthcare services). The study highlights a significant power asymmetry, with Shanghai, Nanjing, and Hangzhou dominating 73% of the regional agenda-setting, marginalizing the elderly care demands of smaller cities. Furthermore, 42% of the agreements remain at the level of "joint declarations," lacking concrete implementation mechanisms, such as mutual recognition of elderly care standards. Notably, local governments treat regional cooperation as a tool for "political tournaments," prioritizing economic collaborations that boost GDP growth while neglecting the long-term benefits of social policy coordination (Luo, X., & Shen, J., 2009).

Imbalances between plans and reality

He and Wu's (2009) theory of neoliberal urbanism in China provides an important perspective for studying the paradoxical dynamics of aging and urbanization in the Yangtze River Delta (YRD). Their analysis reveals how municipal governments, driven by fiscal pressures and the growing demand for elderly care services, prioritize land-finance strategies—such as developing new districts and urban renewal projects in old cores—to generate revenue for healthcare services and aging infrastructure. However, this neoliberal logic creates spatial contradictions. While senior services are funded through land-driven fiscal mechanisms, it accelerates the fragmentation of senior communities through gentrification, particularly in historic neighborhoods with concentrated senior populations, such as Suzhou's ancient districts. Notably, the actual utilization efficiency of redeveloped urban parcels remains empirically unverified.

Long and Wu's (2016) groundbreaking study systematically identifies and maps urban shrinkage patterns across China, revealing multiple shrinkage epicenters within the YRD. The research highlights the “administrative urbanization paradox,” whereby the conversion of rural towns into urban districts artificially inflates urbanization rates

while obscuring localized contraction. For instance, Shanghai's administrative expansion through the incorporation of Chongming Island produces statistical "growth" that masks underlying demographic decline.

The interplay between neoliberal land commodification, urban shrinkage, and population aging manifests uniquely in the YRD context. These phenomena collectively emerge as institutional byproducts of growth-oriented development models, wherein spatial expansion and fiscal strategies designed to sustain aging services paradoxically exacerbate imbalances between plans and reality.

Conclusion

Previous studies have revealed a phased positive transition in regional cooperation within the Yangtze River Delta, shifting from purely "economic priority" frameworks in the 2000s toward more integrated "limited social policy coordination" during the 2010s. Despite this positive progression, these collaborative efforts have proven insufficient to address the region's accelerating demographic challenges. The YRD region currently sustains its economic dynamism primarily through inter-provincial migration, creating a temporary demographic buffer that masks underlying structural vulnerabilities; it’s not the ultimate solution. Without rethinking regional planning frameworks to address the institutional mismatch between growth-oriented land policies and demographic realities, the region faces the risk of entering a deteriorating cycle of economic inefficiency and social inequity. Proactive transition is urgent for the YRD region before the window for adaptation closes.

2. Qualitative Interviews

Next, I conducted in-depth interviews with local leaders from Xinchang County, Tiantai County, Lishui, and Shanghai. These semi-structured interviews focused on current policy implementation, future planning strategies, and officials' assessments of their cities' successes and limitations in addressing these demographic challenges. In the interviews across four specific cities, “city” means urban districts and affiliated rural areas. The statistical data reflect the entire administrative region of the selected cities, including all subordinate townships. Figure 2 shows the geographical locations of the four case cities, and Table 2 provides an overview of the city profiles and interview results below.

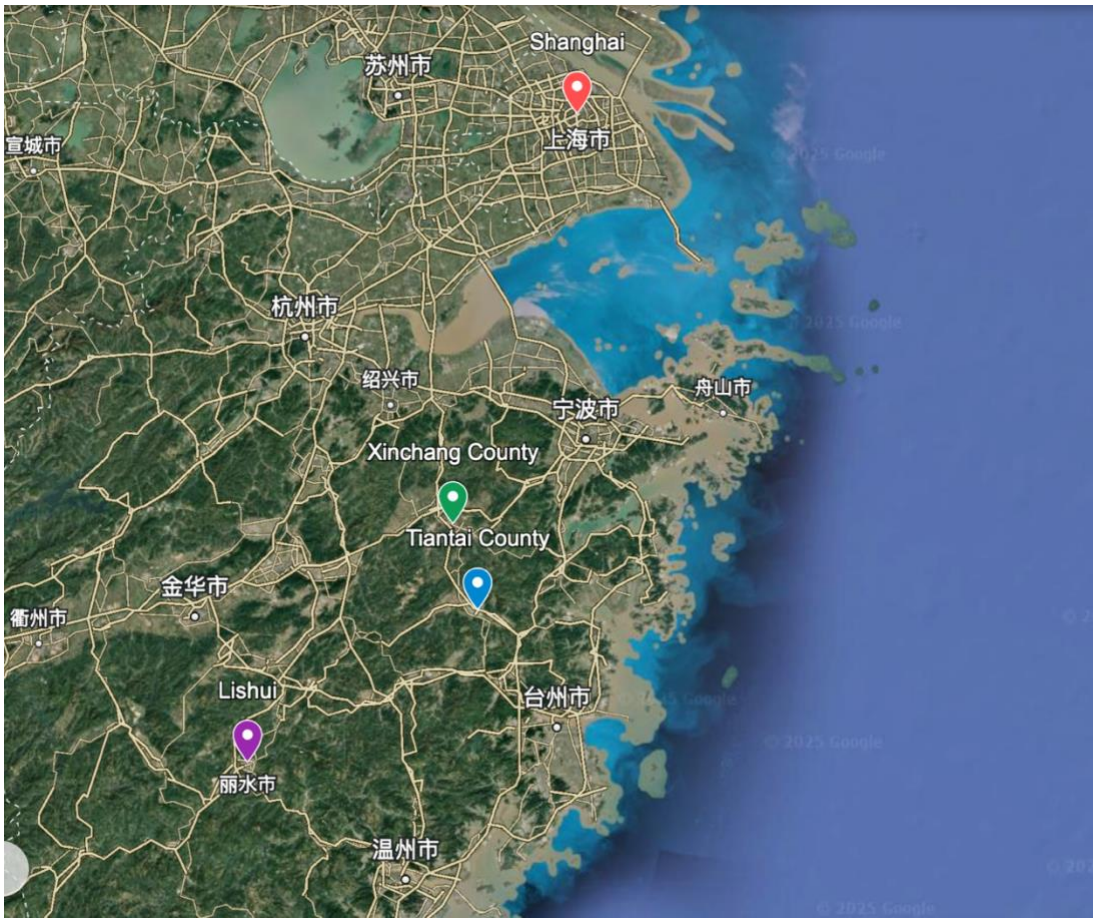

Figure 2. The Four Case Cities in the YRD Region

Indicators/ Cities	Shanghai	Lishui	Tiantai County	Xinchang County
Scale	Mege City	Medium-sized City	Small City	Small City
Population and Aging	• Total population: 24.87 million (2024) • 65+ population: 36% • Exhibits "dual growth of aging and total population" • Continuous spatial expansion	• Total population: 2.532 million (2024) • Aging rate: 23.57% (highest in Zhejiang Province) • Natural population growth: -1.7‰ (2024)	• Total population: 476,000 (2023) • Aging rate: 23.57% • 38 consecutive months of negative natural population growth • Severe rural hollowing, some townships exceeding 70% aging rate	• Total population: 411,700 (2024) • Aging rate: over 29% • Five consecutive years of negative natural population growth • Projected aging rate of 37.97% by 2030

Urban Development Model	• Polycentric development strategy • Intensive land use transition • Attraction of high-quality talent	• GDP-oriented expansion • Urban area tripled since 2020 • Reliance on low-value industries	• Balanced dual-track strategy • Controlled urban expansion • Tourism and industrial	• Growth-oriented development • Land finance-driven • GDP-centric performance m2etrics
Aging Policy Responses	• "9073" elderly care model (90% home-based, 7% community-based, 3% institutional) Community-based services • "Future Community" initiatives	• Incremental upgrading of medical facilities in urban centers • Selective expansion of recreational spaces for the elderly •Enhancement of accessibility in public spaces • Lack of targeted aging-adaptive policies	• Increased investments in healthcare system and quality of life improvements • Elderly education ("Cloud-based Elderly University") • Compact planning prioritizing urban center regeneration	• Five-minute community (walkable services) • Pension system upgrades ("Love Cards") • Low-cost and free community-based care facilities • Increased financial allocations for age-friendly planning
Urban-Rural Disparities	• Resources prioritized for central areas • Differentiated service models by density	• Severe disparities in healthcare access • 10% of resources for 81.5% elderly in rural areas	• Urban concentration of advanced services • Limited rural support except in tourism areas	• Minimal attention to rural areas despite highest aging rates • Basic village clinic system

Resource Allocation	• Priority on economic development objectives • Strategic investment in economic infrastructure to maintain fiscal health • Phased implementation of elderly care improvements • Regional integration and coordinated development	• Significantly constrained resources • Primary allocation to urban expansion and industrial development • Elderly-related interventions are limited to generic measures due to resource constraints • No systematic strategies for addressing shrinkage	• Increased financial investments in healthcare system and quality of life • 97 new village/community elderly care centers planned by 2035 • Public-private partnerships through open tenders with professional eldercare enterprises	• Increased fiscal commitments to universally accessible infrastructure • Year-on-year growth in aging-related budgetary expenditures • Decreased provincial government contributions, increased county-level allocations • Uneven resource distribution with urban bias
Challenges	• National policy constraints • "Gravitational pull" effect on region • Limited elderly satisfaction assessment	• Bureaucratic rigidity • Fragile economic base • Political risk in strategy adjustment	• Service distribution inequity • Excessive urban concentration • Integration framework lacking	• Mismatch between new infrastructure development and elderly needs • Strict GDP-oriented performance evaluations • Limited administrative autonomy
Future Outlook	• Increased technical investments • Youth attraction incentives • Enhanced regional integration	• Likely first to experience urban shrinkage • Compact development for resource efficiency • Rural service prioritization • Need for enhanced regional collaboration	• Continuation of balanced approach • Smart eldercare advancement • Service standardization	• Current strategy unsustainable • Needs development reconfiguration • Smart shrinkage potential

Table 2. Comparative Analysis: Four Cities in the Yangtze River Delta Region

Xinchang County: Expansion-Oriented Development Amid Severe Aging[1]

1. Demographic and Urban Development Context

Xinchang County, located in the Yangtze River Delta (YRD) region, is facing a dual challenge of rapid aging and urban expansion. Despite the natural population growth rate has remained negative for the past five consecutive years (-5.17‰ in 2024, -3.71‰ in 2023, and -2.59‰ in 2022), the total population (411,700 in 2024) shows slight annual increases due to in-migration from other regions primarily driven by economic opportunities in low-skilled and service industries. In 2024, Xinchang's aging rate (exceeding 29%) is significantly higher than both the national average (21.1%) and the Yangtze River Delta regional mean (22.8%). The proportion of the elderly population is projected to reach 37.97% by 2030. This demographic shift is exacerbated by progressively increasing life expectancy, outmigration of the youth, and steadily declining birth rates.

Xinchang continues to pursue growth-oriented development, with new urban districts and commercial centers under construction. This growth is driven by GDP-centric performance metrics and the need to generate land revenue to offset fiscal deficits. Considering Xinchang's consistent annual population growth, there is a rational basis for emphasizing physical expansion rather than adaptive policies for future shrinkage carries a degree of empirical justification.

2. Policy Responses

Five-Minute Community

The county focuses on community-based care and age-friendly infrastructure. This initiative ensures that elderly residents can access essential services and infrastructure (e.g., healthcare, groceries, and parks) within a 5-minute walking distance. While most cities implement 10-minute or 15-minute life circle designs (Zhou, 2019), Xinchang County opted for a 5-minute living circle model due to its smaller urban area and the higher community and population density within its urban districts. Although innovative, implementation remains uneven, with rural areas lagging significantly behind urban centers.

Pension System Upgrades

The county has introduced significant improvements to elderly support systems: (1) Implementation of "Love Cards," vouchers that can be used at any merchant within the county for elderly subsidies. (2) Development of low-cost and free community-based care facilities including clinics, screening centers, and nursing homes. (3) Expansion of

[1] Insights gleaned from the interviews and quantitative research

basic healthcare services oriented toward elderly needs. These measures are reactive rather than proactive, addressing immediate needs without long-term planning. As the elderly population continues to expand, these welfare programs will impose an increasingly significant fiscal burden on local government resources.

Increased financial allocations for age-friendly planning

Since 2020, Xinchang County has significantly increased its fiscal commitments to universally accessible infrastructure, senior recreational and fitness facilities, and healthcare service provisions. The proportion of budgetary expenditures dedicated to aging-related initiatives has demonstrated a consistent annual growth trend, reflecting the local government's proactive approach to addressing aging challenges. Notably, fiscal allocations for age-friendly planning in 2024 doubled those of 2023 and tripled those of 2022.[2]

The funding structure reveals a strategic shift in fiscal autonomy. Provincial government contributions decreased from 71% of total age-friendly planning investments in 2022 to 38% in 2024, while county-level allocations correspondingly increased to 62%. This evolving fiscal pattern demonstrates Xinchang's reduced dependence on provincial subsidies, enhancing its administrative autonomy and service delivery capacity in elderly care programs. Recent developments include two public nursing homes (each exceeding 500 beds) equipped with advanced medical facilities and therapeutic landscapes, which have received widespread public acclaim. The facilities exemplify how localized fiscal empowerment enables tailored solutions to aging challenges, particularly through integrated healthcare-recreation environments that address both physical and psychosocial needs of seniors.

3. Challenges

The county's urban expansion coexists with accelerated aging, creating low land and resource utilization efficiency. New infrastructure developments (e.g., underground parking and shopping malls) cater to anticipated growth, while elderly-focused facilities (e.g., accessible housing) receive insufficient attention. This reflects a broader mismatch between demographic trends and urban planning priorities, like other cities in the YRD region.

Rural areas in Xinchang County, where aging rates are most severe, receive minimal policy attention and resource allocation. Healthcare in these areas is typically limited

[2] Due to the confidentiality of the data, the specific data given to me by the interviewees cannot be presented. Therefore, the fiscal allocations for age-friendly planning in Xinchang County can only be reflected by the multiplier

to periodic village clinics, while elderly care facilities are often underfunded or repurposed (e.g., cultural halls used as temporary care centers). Despite the enhanced financial status of rural residents, serious rural hollowing has led to significantly compromised service accessibility and quality. The outmigration of working-age populations, coupled with fragmented infrastructure networks, exacerbates service delivery challenges in depopulating villages. Although there are pharmacies and clinics within each town, systemic disadvantages for aging populations in accessing healthcare, social support, and recreational resources cannot be ignored.

More significant challenges arise from structural governance constraints. Limited administrative autonomy, combined with performance evaluation metrics that prioritize growth indicators, creates systemic barriers to balancing aging-responsive planning with urban expansion. Local officials have recognized the potential need for future adaptive policies that reconcile sprawl with age-friendly development. However, as one official noted during the interview, "We We cannot actively shrink the city—GDP determines our political performance."

4. Future Outlook and Policy Implications

Xinchang's current expansion-driven growth strategy demonstrates long-term unsustainability. Although sustained inflows of migrant populations have offset natural population decline, the natural growth rate has deteriorated from -2.59‰ in 2021 to -5.17‰ in 2024, while migrant inflows remain stagnant. Against the backdrop of China’s declining total population and diminishing demographic dividend, Xinchang risks approaching a tipping point where urban shrinkage becomes inevitable. Moving ahead to a transition phase to adapt to future changes will require reconfigurations of development priorities and resource allocation frameworks.

To address these emerging challenges, Xinchang should adopt proactive strategies such as smart shrinkage and compact urban planning while maintaining reactive measures like expanding elderly care facilities. This strategic reorientation necessitates both localized innovations and policy support from higher-level governments, yet substantial challenges remain on the path to implementation.

5. Conclusion

Xinchang County exemplifies the challenges faced by small cities in the Yangtze River Delta region as they confront accelerated aging amid endless expansion pressures. While current policies address immediate aging-related needs, they lack the foresight

and integrated plans to prepare for potential future shrinkage scenarios. The county's experience reveals a broader structural tension in Chinese urban governance between economic development imperatives and demographic realities, particularly in small urban centers lacking economic diversification and attractiveness. As aging accelerates across the region, Xinchang's trajectory helps us understand the limitations of existing approaches and the potential pathways to a more sustainable model of development.

Lishui City: Growth-Driven Policy in a Resource-Constrained Setting[3]

1. Demographic and Urban Development Context

Lishui, a medium-sized city in the south mountain areas of Zhejiang Province, faces severe aging (23.57% elderly population in 2023) but persists in urban expansion. Despite a declining natural population growth rate, the total population did not decline significantly in recent years due to in-migration of low-skilled workers from other provinces.

Lishui exhibits the highest aging rate in Zhejiang Province at 23.11% (2023), with a total resident population of 2.532 million in 2024. Projections indicate the aging rate will escalate to 30% by 2030, accompanied by a negative natural population growth of -1.7‰ in 2024. The city has a stable influx of people every year, which is 4,000 in 2024 (Bulletin of Main Population Data of Lishui City, 2024). Urbanization trends reveal 1.67 million urban residents (66.0% urbanization rate) and 862,000 rural residents, marking a 1.4 percentage-point increase in urbanization compared to 2023 (Bulletin of Main Population Data of Lishui City, 2024). The increasing proportion of urban areas each year reflects the continuous expansion development mode. A critical demographic challenge lies in the divergence between Lishui's registered population (2.689 million) and resident population (2.532 million) (红黑人口库，2024), indicating significant outmigration. This trend, primarily driven by the outflow of young labor forces, exacerbates the region's aging crisis and undermines its long-term socioeconomic sustainability.

Peripheral counties and towns within the administrative division of Lishui City are affected most by the dual challenges of aging and urban shrinkage. Suichang County exemplifies this trend, with over 25% elderly residents (2023), significantly higher than the provincial average of 15.41% (Zhejiang Statistical Yearbook, 2023). This demographic imbalance is exacerbated by persistent youth outmigration to core cities (Hangzhou and Ningbo) in the same province, where economic opportunities and urban

[3] A quote from the interviewee

amenities are more concentrated. Between 2023 and 2024, Suichang experienced a net population loss of 8,200 residents, primarily working-age individuals aged 20–39 (Lishui Municipal Bureau of Statistics, 2024). Despite the influx of in-migrant workers, these low-skilled laborers primarily engage in agricultural and manufacturing work, while Lishui City lacks high-value-added industries and technology-oriented talent.

Currently, Lishui has tripled its urban physical footprint since 2020 (quote from the interview), propelled by GDP-centric performance evaluations and fiscal reliance on land sales. However, this rapid spatial expansion starkly contrasts with its sluggish economic growth, attributable to a constrained industrial base (primarily metal processing), scarce natural resources, and deficiencies in skilled labor and advanced technologies. The county's limited capacity to attract and retain skilled migrants exacerbates this demographic-economic imbalance, creating a self-reinforcing cycle of stagnation. Consequently, Lishui now faces the most acute aging and shrinkage challenges with unsustainable urban sprawl in Zhejiang Province.

2. Policy Responses

Lishui operates under significant fiscal constraints that limit its capacity to implement comprehensive aging-focused policies. The city primarily allocates resources to urban expansion and industrial development, restricting aging-related interventions to more generic measures:

- Incremental upgrading of medical facilities in urban centers
- Selective expansion of recreational spaces for elderly residents
- Basic enhancement of accessibility features in public spaces
- Limited development of elderly care facilities, primarily in central areas

While localized efforts aim to enhance social security benefits (primarily funded by municipal revenues) and extend rural healthcare access, these initiatives lack systemic integration with demographic realities. No tailored aging-adaptive policies exist, reflecting resource limitations and policy priorities emphasize growth metrics over sustainable governance. Regarding the potential risks of urban shrinkage, the authorities have yet to formulate any responsive policies or planning frameworks, while new land development and urbanization initiatives continue to be aggressively pursued.

A local official expressed frustration: 'It's not that we lack the will to implement more rational policies addressing the dual challenges of aging and urban shrinkage. However, as a relatively underdeveloped region in Zhejiang Province, resource constraints and

fiscal pressures compel us to prioritize meeting economic development targets above all else (*In-depth interview, January 2024*).

3. Challenges:

Lishui faces significant challenges in adapting development strategies to demographic realities. Local officials acknowledge the severity of aging issues but cite bureaucratic constraints that limit policy innovation. As one official in Lishui City Statistics Bureau noted during the interview: "Adjusting development strategies is politically risky without top-down mandates." This institutional environment perpetuates expansion-oriented development despite mounting evidence of demographic transitions that may ultimately necessitate alternative approaches. This institutional environment makes it difficult to change the expansion-oriented development model in the short term.

The accessibility disparity between urban and rural elderly care services represents a critical challenge for Lishui's aging population. Rural residents typically lack access to healthcare beyond village clinics and pharmacies and face significant barriers to more comprehensive services that are concentrated in urban areas. In the rural regions of Suichang County, Lishui City, 81.5% of residents are elderly, but only 10% of medical resources are allocated to these villages. This spatial mismatch between service distribution and demographic need creates substantial inequities in care access and quality. The local government tries to relocate rural populations to urban centers through incentive-based migration programs and expand municipal boundaries to absorb peri-urban villages into formal urban jurisdictions. In this way, rural hukou holders will be transformed into urban residency status, enabling relocated populations to access better service facilities and infrastructure.

Moreover, overreliance on low-value industries and migrant labor creates a fragile economic base that is particularly susceptible to broader demographic shifts. As China's demographic dividend diminishes, Lishui's growth model appears increasingly unsustainable. In the future, fiscal challenges will get worse when aging-related service demands are accelerating.

4. Future Outlook and Policy Implications

Lishui is projected to be the fastest region in Zhejiang Province to enter the urban shrinkage phase. Rather than passively responding, the city would benefit from a proactive, gradual, and planned shift from expansion to compact urban planning. Future strategies should direct limited resources toward prioritizing functional hubs and rural healthcare networks to maximize impact given fiscal constraints. Both local and higher-

level governments need to recognize that improving the quality of life for current residents should take precedence over expansion aimed at attracting more migrants.

Key policy priorities should focus on enabling localized aging-responsive governance frameworks and fostering regional collaboration through strategic integration with major cities such as Hangzhou. This integration would facilitate the sharing of healthcare and elderly care resources to address service gaps, while also promoting talent and technology exchanges to tackle challenges posed by urban shrinkage and mono-industrial economic structures. Such collaborative mechanisms could partially offset resource constraints while advancing age-inclusive urban planning initiatives.

5. Conclusion

Lishui, a resource-constrained and geographically peripheral city in the YRD region, exemplifies the risks of growth-centric urbanism. Its development strategy, driven by GDP-centric performance metrics and reliance on low-skilled migrant labor, masks a looming crisis. Despite its reliance on migrant labor to sustain population stability, city leaders ignore the impending dual crisis of urban shrinkage and intensify through the expansion-oriented growth model. Lishui's overreliance on low-value industries and land-driven growth appears increasingly vulnerable. To avoid more severe future disruptions, the transition toward adaptive planning models that prioritize long-term resilience is imperative. This reorientation will require both local innovation and higher-level policy support to overcome institutional barriers and reconsider the current focus on expansion-oriented development.

Tiantai County: Aging Without Shrinkage, A Balance Between Urban Expansion and Age-friendly Planning[4]

1. Demographic and Urban Development Context

Tiantai, a small city in Zhejiang, exemplifies aging without economic contraction and urban shrinkage. Its economy grows through industrial upgrades (e.g., digital economy parks) and tourism. What is valuable is that the city has not taken the road of massive expansion. Although the total population has increased year by year, the urban expansion rate is relatively slow.

[4] Insights from the interviews

Tiantai's elderly population represents 23.57% of its total population, exceeding the national average by 2.47 percentage points. The region has officially entered a deeply aging society phase. Since 2018, the elderly population has increased at an average annual rate of 0.63 percentage points, which is 0.2 percentage points faster than the provincial average. Notably, rural hollowing-out is particularly pronounced—according to the 2023 Rural Revitalization Survey Report, in rural areas, the aging rate is over 70% with a total population of 236,500. Such as Shiliang Town (total population 8,500) and Nanping Town (total population 7,200) has exceeded 70.3%. This creates a structural counterbalance with the county's 182,000 migrant workers (accounting for 41.7% of the working-age population). In terms of natural population change, Tian-tai County has experienced 38 consecutive months of natural population decline (average birth rate of 5.2‰ vs. death rate of 7.8‰ from 2020 to 2023). Despite natural demographic decline trends, Tiantai's total population grew by 0.87% in 2023, reaching 476,000 residents. This demographic reversal primarily stems from cross-provincial labor migration attracted by the region's digital economy industrial park, temporarily masking underlying demographic risks.

Tiantai pursues a dual-track development strategy: moderately expanding urban areas (e.g., new commercial centers and the industrial regions) while improving elderly services and infrastructure. Unlike many comparable jurisdictions, Tiantai has maintained effective control over its urban expansion rate, creating a more sustainable development pattern that may prove advantageous when facing future demographic shifts.

2. Policy Responses

- Integrated Elderly Care
  The Lao You Kang Yang project integrates medical and elderly care, with smart technologies (like IoT health monitoring) piloted in accessible urban centers. Many medical care services are offered to order adults for free.
- Increased Funding Allocation
  Tiantai County has increased financial investments in the health care system and quality of life improvements. Government allocations for elderly care, infrastructure enhancement, and social service optimization have seen year-on-year increases. The local administration also has the autonomous authority to formulate age-friendly policies.
- Education for older adults
  Through strategic resource integration, Tiantai County has revitalized education programs for the elderly and guided investments in building and renovating

educational facilities for seniors. The county has successfully attracted more than 20,000 elderly residents to participate in educational programs, enhancing their life skills and digital literacy. Additionally, the implementation of a "Cloud-based Elderly University" initiative aims to bridge the digital divide among older adults, facilitating their adaptation to smart devices and emerging technologies.

- Spatial Optimization

  Tiantai has implemented a compact planning approach that prioritizes the. regeneration of city centers rather than urban sprawl. This strategy includes: (1) Focused development within existing urban footprints. (2) Adaptive reuse of underutilized properties for elderly-oriented services. (3) Integration of age-friendly design elements in urban renewal projects. (4) Conservation of agricultural land through controlled expansion.

  However, spatial optimization initiatives remain underdeveloped in rural areas. In some townships of Tiantai County, continuous decline, population loss, and diminishing economic vitality have led to increasingly severe rural shrinkage. Only townships with cultural or tourism value have received spatial planning and fiscal support.

3. Challenges

Despite innovative policy approaches, Tiantai faces significant challenges in ensuring equitable service distribution across its territory. Urban elderly residents enjoy relatively advanced services, including smart nursing homes[5] (Shafei, I., Khadka, J., & Balasubramanian, M., 2024) and comprehensive healthcare facilities at low prices, while rural residents primarily rely on outdated communal healthcare facilities and infrastructure. The smart homes use innovative technologies for older adult care, such as virtual support groups, video-conferencing, and electronic health records; assistive technologies that can safely maintain independence and assist with daily living such as sensors, wearables, telehealth, smart home technologies as well as interactive robotic technologies for mobility and cognitive support such as humanoid robots, rehabilitation robots, service/companion robots. These are the privileges of urban dwellers that are difficult to access for the rural population. Additionally, rural clinics face chronic staffing shortages that compromise care quality and accessibility.

[5] Smart nursing homes in China means nursing homes equipped with advanced technology, more efficient operation, and better service quality, and all elderly people can enjoy services. It is not like smart nursing homes in the United States are only provided to the disabled.

Tiantai has implemented multiple aging-related initiatives inducing smart nursing homes[6], community-embedded elderly care[7], and IoT health monitoring centers[8], but these often lack coordination. An excessive number of elderly care institutions have been built in urban areas, leading to an overly high density of services that functionally overlap with each other. Therefore, the absence of a comprehensive integration framework undermines the potential synergies between complementary programs and may compromise long-term sustainability as duplicated efforts and resource inefficiencies.

4. Future Outlook and Policy Implications

Tiantai County has developed a forward-looking approach to addressing demographic challenges through systematic planning and targeted investments. The county's "Elderly Care Service Facilities Layout Special Plan (2021-2035)" projects added 97 village/community elderly care centers by 2035, demonstrating a commitment to addressing demographic shifts through systematic infrastructure development.

The county emphasizes community-embedded eldercare through innovative "He He · Elderly · Home" complexes in urban communities and town centers, leveraging vacant public buildings, village facilities, and dedicated spaces in new residential developments. To ensure quality and sustainability, Tiantai implements public-private partnerships through open tenders with professional eldercare enterprises, establishing a "one town equipped with one service center; one community equipped with one care center" network.

Tiantai's development approach has balanced targeted expansion with intensive development. The county has strengthened industrial transformation, digital economy

[6] Smart nursing homes integrate advanced technologies such as automated care systems, digital health monitoring platforms, and intelligent living environments to enhance eldercare quality while optimizing staff efficiency. These facilities typically feature sensor-equipped living quarters that track residents' vital signs and movement patterns, voice-activated assistance systems that respond to residents' needs, and digital care management platforms that coordinate services across multiple departments.

[7] Community-embedded elderly care refers to decentralized service models that integrate eldercare functions within existing residential neighborhoods, allowing seniors to age in familiar environments. These systems typically include neighborhood-based day care centers, community health stations providing regular check-ups and medication management, volunteer networks offering companionship and basic assistance, and coordinated home visit services from healthcare professionals.

[8] IoT health monitoring centers utilize Internet of Things technologies to remotely track elderly health metrics and activity patterns, enabling early intervention for potential health issues. These systems deploy networked devices throughout seniors' homes, nursing homes, and residential facilities to collect real-time health data, implement artificial intelligence algorithms to analyze behavioral patterns and detect anomalies, establish centralized monitoring stations where healthcare professionals review aggregated data, and feature emergency response when concerning health indicators are detected.

development, and tourism growth while adhering to land- and resource-saving principles in urban construction.

Looking forward, Tiantai will likely maintain this balanced development mode while adapting to aging trends through:

- Optimizing eldercare networks through increased age-friendly renovations and integrated medical-eldercare services;
- Advancing smart eldercare technologies through intelligent service systems that enhance accessibility while addressing staffing limitations;
- Refining eldercare service systems through standardized protocols and comprehensive service guarantees across urban and rural areas.

5. Conclusion

Tiantai stands as a paradigmatic example of sustainable development practices within the Yangtze River Delta region, particularly in its exemplary management of demographic aging. The city demonstrates exceptional competence in policy implementation, fiscal allocation, and public service improvements. Meanwhile, local government leaders exhibit comprehensive awareness of the twin challenges of future demographic shifting and urban shrinkage. This policy adaptability can be attributed to the city's advantageous geographical location, abundant natural resources, and foundation in high-value-added industries, which enable greater autonomy in fiscal management and policy formulation. These advantages help the city more effectively transform the challenges of aging and urban shrinkage into opportunities.

Tiantai’s uniqueness lies in its systematic planning perspective, exemplified by its comprehensive 15-year elderly care development plan. This forward-looking positioning enables Tiantai to anticipate and adapt to demographic changes rather than merely react to immediate pressures. Compared to jurisdictions pursuing aggressive expansion, the county’s balanced strategy—combining selective growth with intensive utilization of existing resources—creates favorable conditions for adapting to future challenges of demographic shifts and urban shrinkage.

Tiantai’s experience offers valuable lessons for other small and medium-sized cities in China undergoing similar demographic transitions. By integrating elderly care into broader development strategies, emphasizing specialized service delivery, and promoting balanced urban growth, its practices demonstrate resilience and sustainability.

Shanghai: The heart of Chinese Economy and Culture is Aging[9]

1. Demographic and Urban Development Context

Shanghai, the economic and cultural nucleus of the Yangtze River Delta (YRD) and the largest city in China, confronts accelerated aging while the city and population scale continue sprawling. Shanghai consists of 16 administrative districts that form a polycentric spatial structure, with an overall development trend characterized by eastward expansion (Pudong), westward extension (Hongqiao), southward movement (Lingang), and northern optimization (Baoshan). Between 2000 and 2010, the city expanded at an average rate of 82.3 km² annually, which decreased to 45.6 km² after 2010 due to intensive land use policies. As of 2024, the city's population aged 65 and above accounts for 36% of its 24.87 million total residents, exceeding the national average (21.1%). Shanghai is the city with the highest aging rate in the country. Still, unlike other cities, Shanghai presents a two-way growth trend of " both increasing elderly population and total population." The increase of total population coincides with ongoing spatial expansion, exemplified by the development of new urban zones such as the Lingang Special Area.

The formation of a deeply aging society is largely attributable to the young labor force that migrated to the city during the Reform and Opening-up period (1978) and the development of the Pudong New Area (1992), who have now entered their elderly years. These individuals, who constitute a significant portion of Shanghai's original residents, have directly contributed to the city's substantial aging demographic profile. However, the mismatch between physical urban expansion and the infrastructure needs associated with aging has become increasingly apparent, exposing deficiencies in resource allocation and service delivery. For complex political and economic reasons, Shanghai's urban sprawl is prioritized over age-friendly construction.

The transformation of Shanghai's age structure since 2000 is illustrated in the following figures.

[9] 新华全媒+丨感受上海脉动 “秒懂”中国，2023，新华社.
https://baijiahao.baidu.com/s?id=1760508849826430059&wfr=spider&for=pc

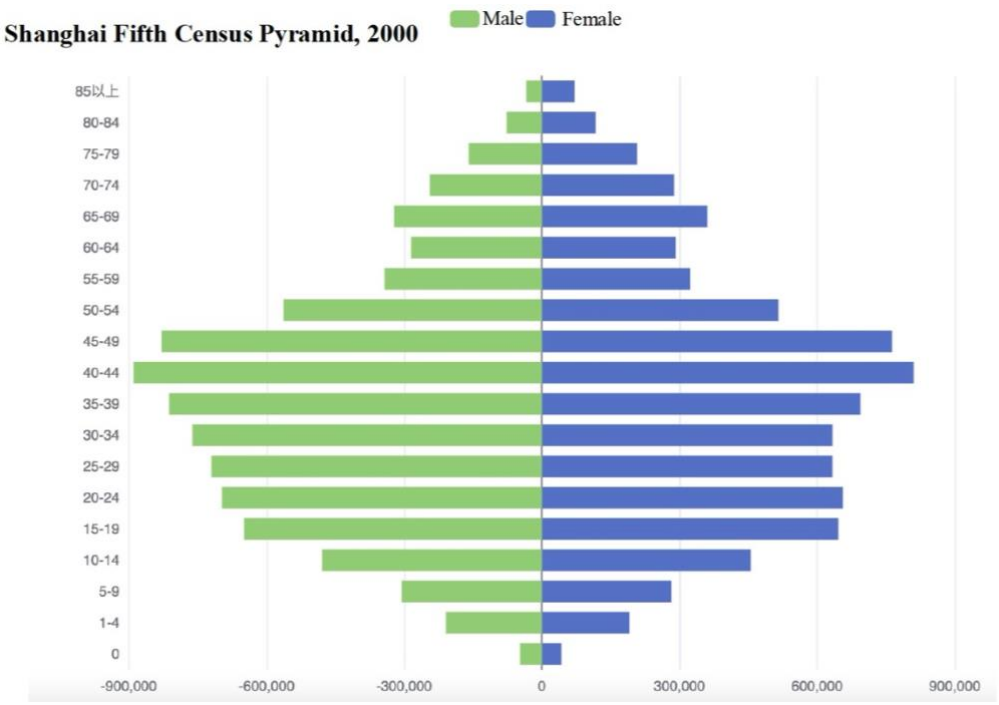

Figure 3. Shanghai's Population Pyramid in 2000

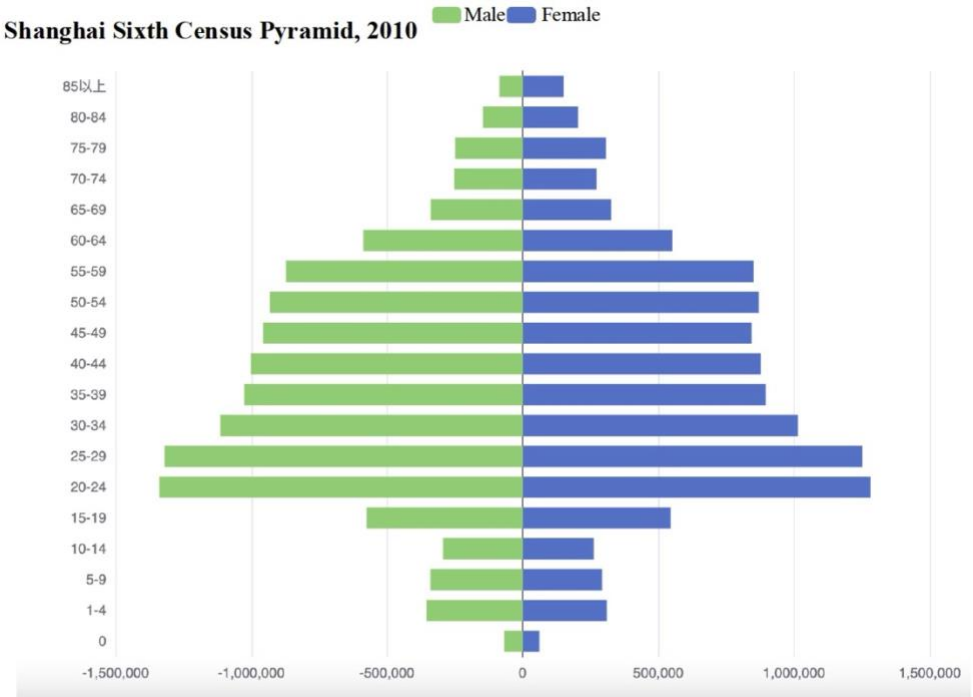

Figure 4. Shanghai's Population Pyramid in 2010

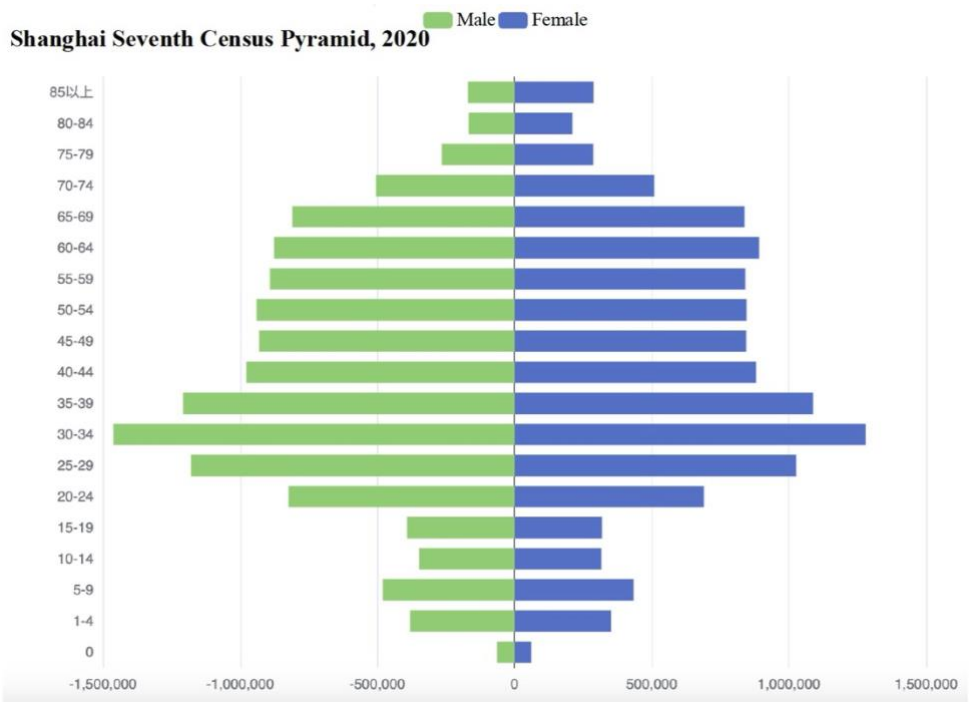

Figure 5. Shanghai's Population Pyramid in 2020

2. Policy Responses

Polycentric Development Strategy

This strategy aims to create multiple functional centers with comprehensive service facilities, reducing travel distances for elderly residents while optimizing land use efficiency. The "10-minute community life circle" planning concept introduced five years ago exemplifies this approach, although disparities exist between the central and peripheral districts. In central urban areas (Huangpu District, Xuhui District, Changning District, Jing 'an District, Putuo District, Hongkou District, Yangpu District, and Pudong New Area), higher density of service facilities within 5-10 minute walking radiuses, capitalizing on higher population densities to maximize service efficiency. In other areas, more dispersed service networks with recognition of service gaps due to lower population densities and resulting economic inefficiencies.

Intensive Land Use Transition

After rapid expansion in the past decades, Shanghai has slowed down its physical growth rate and controlled the level of urbanization and immigration. This transition reflects a policy shift toward intensive land utilization, prioritizing the redevelopment of old urban areas and optimizing the existing land. The "National Spatial Planning"

framework has been instrumental in establishing constraints on further urban sprawl, directing attention toward optimization of existing urban spaces.

Community-Based Care Systems

A significant policy is the development of community-based care systems that maintain the "9073" eldercare model (90% home-based care, 7% community care, 3% institutional care) while enhancing service quality. Key initiatives include:

- Establishment of comprehensive day care centers in residential communities
- Development of community canteens specifically for elderly residents
- Creation of senior activity centers offering social engagement opportunities
- Implementation of "Future Community" initiatives that provide whole-lifecycle services for residents within community boundaries

Age-Friendly Infrastructure Development

Shanghai initiated programs for retrofitting existing infrastructure to better accommodate elderly needs, including the development of additional urban green public spaces, installation of elevators in older residential buildings, improvement of lighting systems in public and semi-public spaces, addition of resting facilities and weather shelters in public areas, enhancement of barrier-free facilities and accessible pathways, as well as strategic placement of elderly-oriented facilities near transit nodes to enhance accessibility across the metropolitan region.

Resource Allocation Prioritization

Facing fiscal constraints, Shanghai has adopted a pragmatic approach to resource allocation that prioritizes central areas with a higher concentration of elderly populations. This approach acknowledges economic realities while seeking to maximize the utilization of limited resources:

- Concentration of specialized elderly services, including Medical and Healthcare Services, Daily Support Centers, Clinics, and Social Engagement Facilities, in areas with higher elderly population densities;
- Standardization of service offerings to achieve economies of scale and prioritization of essential services over personalized care options;
- Differential service models are implemented across urban and suburban contexts based on population density and efficiency considerations: central areas feature High-Density Integrated Service Networks with facility-based care systems, while

suburban regions utilize Dispersed Service Networks emphasizing home-based care approaches.

Population Management Approaches

The interview indicates an implicit approach focused on optimizing Shanghai's population structure through multiple mechanisms. The government actively attracts non-local high-productivity talent through preferential policies (assisting with housing and household registration in Shanghai) and economic incentives to maintain the city's economic dynamism, while simultaneously implementing regulatory measures that gradually phase out non-local low-productivity segments of the population. This selective approach is complemented by sophisticated systems for strategic management of population inflows and outflows designed to balance demographic pressures across different districts and mitigate aging trends. In summary, these coordinated approaches enable Shanghai to cultivate a population profile that aligns with its economic development objectives while addressing the challenges posed by accelerated aging.

3. Challenges and Limitations

Shanghai's policy approaches must conform to broader national directives. As China's economic hub, Shanghai's primary mandate remains economic development, and it is obliged to support other regions through fiscal transfers. Despite its prosperity, Shanghai cannot prioritize age-friendly initiatives over urban expansion that generates economic value. This approach reflects broader fiscal priorities: balancing local eldercare needs against national revenue-sharing obligations, strategically investing in economic infrastructure to sustain fiscal health, and implementing eldercare improvements in phases according to economic capacity.

While Shanghai's financial investment in eldercare planning significantly exceeds that of other Yangtze River Delta regions, and the municipal government reports impressive eldercare achievements, empirical assessment of outcomes remains limited. Research on elderly satisfaction in Shanghai is notably scarce, with the most comprehensive study dating back to 2010 (Jin, 2010) indicating a slight annual decline in elderly life satisfaction. In recent years, elderly satisfaction metrics have not been publicly released, creating a significant gap in understanding the effectiveness of Shanghai's age-friendly planning practices.

Shanghai pursues a policy of regional integration, linking the city with neighboring regions, exemplified by Suzhou and Jiaxing, through transport infrastructure (especially high-speed rail) and economic coordination. These initiatives enhance economic interactions across the wider metropolitan region, facilitate workforce mobility to support Shanghai's economic functions, create integrated service delivery systems that transcend administrative boundaries, and establish complementary development patterns that distribute both economic and social infrastructure regionally. However, the integration has created a pronounced gravitational pull effect, with Shanghai exerting a significant demographic vacuum on surrounding regions as young skilled workers migrate to the metropolis for superior employment opportunities and urban amenities. Although Shanghai's development theoretically provides spillover benefits that should eventually nurture surrounding areas through knowledge transfer, investment flows, and expanded market access, the current reality reflects a substantial imbalance, with neighboring communities experiencing notable workforce depletion that challenges their demographic sustainability and economic vitality. This asymmetrical relationship continues to reshape the regional population structure, concentrating productive labor in Shanghai while potentially accelerating aging in peripheral areas.

4. Future Outlook and Policy Implications

To further mitigate demographic pressures, Shanghai will pursue a dual strategy in the coming years. The city will increase financial and technical investments in age-friendly planning initiatives while simultaneously implementing policies and economic incentives to attract the younger, thereby diluting the proportion of elderly residents. As Shanghai continues to absorb regional vitality, the gravitational pull effect on surrounding cities is inevitable.

Shanghai's pursuit of economic efficiency manifests in exclusionary practices that highlight social inequities: individuals without Shanghai household registration who make limited contributions to the urban economy face systematic replacement, as the city selectively welcomes only those who generate more value. Through this approach, Shanghai aims to delay population aging while maintaining high-quality human capital and elevated per capita GDP output. Under this development strategy, the policy orientation is always urban expansion.

5. Conclusion

Shanghai's responses to aging within the context of continued urban expansion reflect a pragmatic approach that balances economic imperatives with social needs. While the city has implemented innovative planning concepts and service delivery mechanisms, significant challenges remain in addressing spatial disparities and ensuring equitable access to age-friendly infrastructure and services. The case illuminates broader tensions in Chinese urban governance between economic growth objectives and social welfare considerations, particularly as demographic aging accelerates throughout the nation.

DISCUSSION

1. Attitudes and Perceptions of Government Leaders in the YRD Region

Government leaders in the Yangtze River Delta (YRD) region exhibit a dualistic approach to addressing urban shrinkage and aging. On one hand, cities like Shanghai and Tiantai demonstrate proactive efforts to integrate aging-responsive policies with urban development. Shanghai's polycentric planning, intensive land use transitions, and community-based care systems reflect a pragmatic balance between economic imperatives and social welfare. Similarly, Tiantai's compact urban design and investments in elderly education highlight localized innovations tailored to demographic realities. On the other hand, Xinchang County and Lishui City exhibit insufficient awareness of the urban shrinkage challenges underlying aging. They have not adopted sustainable development models to curb urban expansion, even maintaining overly optimistic assumptions that future shrinkage will not occur.

However, structural biases persist. The primary driver lies in growth-oriented metrics dominating regional and municipal performance evaluations, creating contradictions between demographic realities and policy implementation. For instance, despite negative natural population growth and stable total populations (combining native residents and migrant inflows), Xinchang and Lishui prioritize urban expansion under the pressures of land-finance dependency and political mandates to meet GDP targets. Interviews reveal a disconnect between awareness and action: officials in shrinking cities acknowledge aging risks but lack incentives to shift from expansion to adaptive planning. Urban-rural disparities further exacerbate inequities. Peripheral areas like Suichang County in Lishui face severe aging yet receive minimal resource allocation, underscoring systemic neglect of marginalized regions.

2. Impact of China's Administrative System on Addressing Twin Challenges

China's administrative framework for urban governance—comprising the Development and Reform Commission (DRC) and Urban-Rural Planning Bureau—operates as a hybrid system resembling the Planning Department of European and American contexts. It can be understood that the planning departments of Western governments simultaneously undertake the functions of China's Urban-Rural Planning Bureau and DRC. However, China's unique planning system exhibits distinct hierarchical rigidity and is closely tied to financial departments. China's urban planning follows a top-down governance structure. Government leadership establishes policy directives, which the National Development and Reform Commission transforms into specific strategies. After central approval, the Planning Bureau implements these

policies through projects executed by commissioned experts from universities and design institutes. While planning staff engage in limited public consultation during implementation, higher-level decision-making entities lack mechanisms for direct citizen engagement, creating a significant disconnect between policy formation and community needs. This structure creates systemic barriers to addressing localized challenges like aging and urban shrinkage.

Figure 6. China's Government Administrative Structure

The administrative process follows a top-down cascade:

- Policy Direction: Central leadership (mayors and Shuji[10]) sets national priorities (e.g., growth-oriented development, aging-friendly planning).
- Strategy Translation: The DRC converts these directives into regional plans (e.g., the Yangtze River Delta Intercity Cooperation Projects), which provincial governments review and ratify.

[10] In the political system of China, the position of "Shuji" (书记), commonly translated as "Party Secretary", holds a pivotal role in municipal governance. The Party Secretary is the highest-ranking official of the Chinese Communist Party (CCP) within a city, serving as the head of the municipal Party committee. This role embodies the CCP's principle of "the Party leads everything", underscoring the Party's overarching authority in political, economic, and social affairs.

- Project Operationalization: Relying on technical experts from universities and design institutes, the Urban-Rural Planning Bureau cooperates with these urban planning experts and monitors their work to ensure that the output results meet the criteria of the policy direction and ultimately translate the strategy into concrete projects. For instance, Shanghai's "10-minute community life circles" exemplify rapid spatial optimization under this model.

Under this governance system, many problems are exposed. While Planning Bureaus oversee project execution, they lack autonomy in funding allocation. Municipal finance departments prioritize GDP-driven initiatives (e.g., industrial parks, transportation hubs) over aging-specific infrastructure and services because of the top leadership and NDRC directives. Additionally, public participation is relegated to post hoc formalities, with insufficient engagement during the pre-planning and planning phases. In Chinese cities, public notices are typically issued only after plans and policies have been finalized, merely informing residents rather than involving them in the process. Planners within the Planning Bureau act as intermediaries rather than facilitators of community engagement. Planners outside the government system serve as technical experts, lacking roles as communicative planners and responsible planners (Zhang, Lu, Shi, & Liao, 2024). Under this institutional framework, planners struggle to act as bridges connecting the public with policymakers. For example, in Tiantai, despite planners advocating for balanced rural healthcare development, the demands of rural residents for elderly care centers were deferred and inadequately addressed.

3. Japan, South Korea, and Singapore's Lessons

Based on what I found from the interviews and the literature review, Japan, South Korea, and Singapore demonstrate that state-led development models and compressed economic growth (Jeon, Y., & Kim, S., 2020) can address aging and shrinkage challenges when coupled with adaptive governance. Key takeaways include:

(1) Japan's networked compact cities: Toyama's "dumpling and skewer" model and Utsunomiya's decentralized hubs emphasize spatial efficiency and elderly accessibility. These strategies align with the YRD's need to optimize existing infrastructure rather than expand indiscriminately.

(2) Singapore's technology-driven integration: IoT-enabled housing and vertical communities offer scalable solutions for high-density aging populations in Shanghai and Hangzhou. However, digital literacy programs and elderly education must accompany tech adoption to bridge generational gaps.

(3) South Korea’s smart shrinkage: Incheon’s land banks and multi-generational housing incentives provide frameworks for repurposing vacant spaces in shrinking cities like Lishui.

4. Systemic Challenges and Comparative Insights

Growth-Oriented Institutional Bias: Performance evaluations prioritize GDP and urbanization rates, incentivizing sprawl over adaptive reuse. Lishui City allocated 73% of its 2023 infrastructure budget to industrial expansion while aging villages like Suichang County received only 5% for healthcare upgrades.

Land-Finance Dependency: Municipalities rely on land sales for revenue, perpetuating expansionist agendas even in shrinking cities. As one Lishui official noted, “Adjusting strategies is politically risky without provincial approval.”

Rigid Hierarchical Governance: While East Asian models like Japan’s Compact City Promotion Law and Singapore’s Central Provident Fund emphasize state-led top-down planning, they integrate adaptive public participation mechanisms (e.g., Toyama’s resident-driven transit redesign, and Singapore’s "Silver Zone" consultations). China’s system, however, lacks formal channels for grassroots co-design with the public, transforming policies into technocratic exercises.

The role of planners & the voice of the people: 99% of planners in China serve the government, functioning solely as technical experts.[11] The decision-making authority for urban development resides exclusively with government officials. China's urban planning emphasizes technical aspects while urban development is heavily influenced by "human factors" (policymaker decisions). This dynamic severely constrains opportunities for planning experts and scholars to contribute substantive policy recommendations, making it difficult for the academic community to meaningfully guide policy formation. Consequently, there are virtually no communicative planners in China currently (Zhang et, al., 2025). Plan implementation rarely incorporates public will and ordinary citizens' voices remain unheard because individuals lack channels to express their opinions. The only formal mechanism for public input on urban development and planning projects is through People's Congress and Chinese People's Political Consultative Conference meetings. However, even these forums are not fully representative of the general public, as they include carefully selected delegates, businesspeople, and entrepreneurs chosen by government authorities.

[11] Quotes from interviews

POLICY RECOMMENDATION

1. Enhance Participatory Governance Mechanisms

China's Urban and Rural Planning Law stipulates the legal procedures for public participation, requiring draft plans to be publicized to the public and solicit comments. However, the study of Yang Bin et al. (2019) pointed out that such statutory public participation is often reflected in the "informing-feedback" mode rather than the true "consultation-participation" mode, with obvious procedural characteristics. According to Wu Fulong et al. (2021), public participation in urban planning in China has the problem of "insufficient breadth and limited depth". In particular, the participation of the elderly is often lower than that of other age groups due to the limitations of information acquisition ability and participation channel cognition.

As a result, the *Urban and Rural Planning Law*[12] should be revised to mandate citizen councils in all planning phases, replacing the current model with a new "consultation-participation" framework. Elderly advisory boards could prioritize age-friendly infrastructure in rural-urban transition zones. This approach should be supported by hybrid engagement tools that combine mobile apps for elderly input with community workshops and in-person engagement in decision-making to promote public participation.

2. Reform GDP-Centric Performance Evaluation Systems

GDP-centric metrics should be replaced with composite sustainability indices measuring aging service coverage, rural-urban equity, compact development rates, and resource efficiency indicators. This shift would align urban governance with sustainable development principles while addressing demographic challenges (Li et al., 2024). Fiscal incentives should reward municipalities achieving "smart shrinkage" through central transfers or tax rebates, encouraging innovative approaches to address the dual challenge, which will help cities overcome institutional resistance to acknowledging shrinkage potential and promoting resource-efficient development models.

3. Plan for Urban Sustainability

Proactively planning for urban contraction rather than continuing unsustainable expansion represents a fundamental shift toward sustainable development (Han, et al.,2024). By acknowledging demographic realities and implementing strategic downsizing where appropriate, cities can avoid the environmental and fiscal burdens of maintaining oversized infrastructure networks. Focusing more on optimizing and transforming existing urban built-up areas rather than disorderly expansion is more

[12] “城乡规划法”is the supreme law governing urban and regional planning in China.

important. This approach aligns with sustainability principles by reducing resource consumption and optimizing service delivery that meets the needs of current populations without compromising future generations' well-being.

Strategic spatial retrofitting should prioritize the adaptive reuse of underutilized assets and vacant buildings while limiting urban growth boundaries to curtail sprawl. Cities should implement selective demolition programs for vacant structures that cannot be feasibly repurposed (Heisel & Hebel, 2022; Shami, 2006), turning these spaces into green infrastructure or public spaces that enhance ecological resilience and provides recreational spaces for aging populations. A greater proportion of land sale revenues should be allocated to urban renewal, adaptive reuse projects, and age-friendly infrastructure optimization, including rural healthcare networks, barrier-free transportation systems, and services that address the more personalized needs of elderly residents.

This sustainable approach to spatial planning would create more compact, resource-efficient urban forms that simultaneously reduce infrastructure maintenance costs, decrease carbon emissions through reduced transportation needs, and create more accessible environments for all populations. By embracing the principles of circular economy in urban development (Alexander & Reno, 2012), cities can recycle building materials from demolition and reduce waste, embody sustainability principles in physical urban transformation (Bertino et al., 2021).

x

4. High-Quality Intercity Cooperation

A YRD Aging-Shrinkage Task Force would facilitate cross-jurisdictional resource sharing, enabling cities to exchange experiences and solutions for addressing the dual challenges of aging and urban shrinkage. This regional body could pilot adaptive policies inspired by international sustainable urban models such as Japan's networked compact city approach, creating an integrated urban network that efficiently utilizes infrastructure and shares eldercare services across multiple cities.

Furthermore, first-tier cities like Shanghai and Hangzhou, which have created negative spillover effects on surrounding areas through their gravitational pull on regional resources and talent, should increase compensatory measures and support for peripheral cities. These metropolitan centers should provide technical expertise and talent support to neighboring municipalities, helping to mitigate the demographic and economic imbalances created by regional migration patterns.

5. Shift From Building Things to Building the Quality of Life, A Better Future

China's current development phase presents a unique opportunity to reorient urban governance priorities from GDP-driven metrics toward comprehensive livability frameworks. The WHO Age-friendly Cities Framework provides a blueprint for creating an inclusive environment that support residents of all ages across their lifecycles, enhancing citizens' quality of life by focusing on eight interconnected domains (outdoor spaces and buildings, transportation, housing, social participation, respect and social inclusion, civic participation and employment, communication and information, and community support and health services) (WHO, 2007).

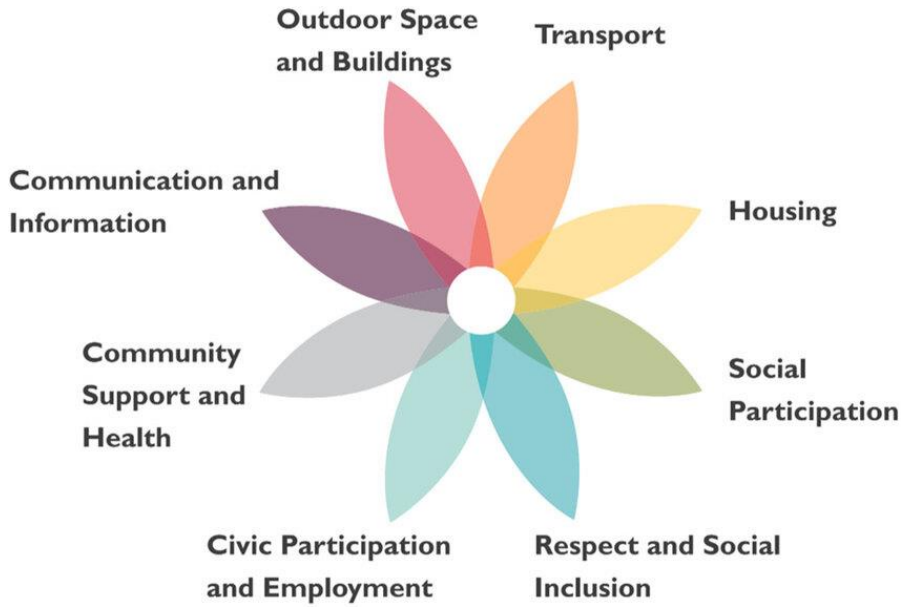

Figure 7. WHO's age-friendly flower framework

The International Making Cities Livable Conference emphasizes that "it is not about building things, it's about building the quality of life." The purpose of this movement is to enhance the physical and social health and well-being of all inhabitants, strengthen community, and increase civic engagement by sustainably reshaping the built environment of cities, suburbs, towns, and villages IMCL, n.d.. This approach promotes "True Urbanism" – time-tested principles of appropriate human-scale architecture, mixed-use shop/houses, and a compact urban fabric of blocks, streets, and squares that create vibrant public places (International Making Cities Livable Conference, 2025).

As Guillemot and Warner (2023) emphasize, comprehensive urban planning should integrate care-focused economic policies that connect informal family support networks with formal care systems. This approach addresses the WHO model's limitations by recognizing the critical intersection between infrastructure, economic priorities, and social networks. By adopting these internationally recognized

frameworks, the YRD region could pioneer a transformative approach to urban development that places human well-being at its center in China. This livability-centered transition represents not merely an adaptation to demographic realities but an affirmative vision for China's urban future—one where cities may become more compact in scale but simultaneously more vibrant, inclusive, and sustainable in quality.

LIMITATIONS

A significant limitation of this study concerns the availability of detailed financial data regarding elderly care initiatives and urban expansion projects across the four case cities. While aggregate annual expenditure data and proportional allocations for elderly care planning (as percentages of total government expenditure) were accessible, information detailing specific investment distributions across individual elderly care programs remained unobtainable. This data limitation constrains the ability to conduct more nuanced analyses of resource allocation priorities within age-friendly planning initiatives.

Similarly, calculating financial investments precisely in urban expansion is challenging due to urban development's complex, multi-sectoral nature. Real estate development projects, investment attraction initiatives, and transportation infrastructure construction—all integral components of urban expansion planning—operate through diverse funding mechanisms, many of which involve both public and private capital. Furthermore, the limited public accessibility of detailed financial allocation plans for these initiatives restricts comprehensive financial analysis.

These data constraints introduce critical uncertainties into my analysis of how the Yangtze River Delta region navigates the intertwined challenges of aging populations and urban shrinkage. The inability to trace precise funding allocations limits the understanding of whether fiscal strategies proactively counteract shrinkage (e.g., through adaptive reuse of vacant housing for elderly communities) or inadvertently exacerbate it (e.g., by prioritizing sprawl-driven real estate over compact, age-friendly urban planning). Furthermore, the region’s reliance on mixed public-private funding models for urban projects complicates efforts to assess the equity of resource distribution between aging-related programs and growth-oriented development.

These financial data limitations underscore a broader systemic issue: the absence of transparent and disaggregated financial reporting may lead policymakers to rely on flawed research and recommendations formulated by planning experts and technocrats. Without access to detailed fiscal insights, these professionals risk misjudging the trade-offs between sustaining urban competitiveness and addressing population aging. Consequently, their analyses may fail to account for local governments’ ambiguous funding priorities—elderly care initiatives, new urban area development, or urban containment strategies favoring inner-city renewal. Therefore, this knowledge gap

hinders the study's policy recommendations for the developing spatially and fiscally integrated solutions to the intertwined crises of aging and urban shrinkage.

Beyond finance, the lack of public participation obscures elderly residents' lived needs and preferences. Existing research in the U.S. has shown that the participation of older adults is key to planning for their needs (Warner and Zhang 2022). Yet such participatory mechanisms remain nascent in China. The responsible community planner experiment in Beijing may serve as an example of how China can begin to engage the voices of older adults in planning for their needs (Zhang, Lu, and Liao, 2024). These gaps highlight the need for future research to advocate for data transparency and systematic participatory frameworks in urban governance.

FUTURE STUDIES

Digital Technologies and Smart Aging

Future research should explore how digital technologies can address aging and urban shrinkage challenges in resource-constrained environments like Lishui. Studies should investigate how digital platforms can bridge service gaps in areas with dispersed elderly populations, what adaptations can overcome digital literacy barriers, and how emerging technologies might reshape spatial planning for aging communities. Research should also examine governance frameworks that support technology-enabled aging while protecting privacy, and how digital tools might increase elderly participation in urban planning and policymaking.

Rural-Urban Interface in Aging Management

The distinctive challenges of rural aging within the Yangtze River Delta warrant dedicated investigation. Research should examine service delivery models that function effectively across the urban-rural continuum, particularly in transitional zones where administrative boundaries create service gaps. Studies should analyze the relationship between rural hollowing and urban aging patterns, and evaluate policy mechanisms addressing spatial inequities in healthcare access for elderly populations in peri-urban and rural communities experiencing rapid demographic transitions.

Governance Innovation Diffusion

Future studies could focus on why certain jurisdictions within the YRD region demonstrate greater policy innovation despite operating under the same national administrative framework. Research should examine whether these innovations could be implemented in other regions facing similar demographic challenges. The relationship between local fiscal autonomy and aging-related policy innovation deserves particular attention, as preliminary findings suggest that administrative flexibility may enable more adaptive governance. Understanding conditions that facilitate policy experimentation could help scale successful approaches across diverse contexts.

CONCLUSION

Transitioning from passive expansion to proactive adaptation requires breaking growth-centered institutional lock-ins. Moving from inequitable rural-urban resource allocation toward balanced development requires innovative policy reform and fund allocation model upgrade. Within the Yangtze River Delta region, cities face distinct yet similar challenges—some are pioneering innovators while others struggle with limited resources. Strengthening regional cooperation represents a critical pathway for collectively addressing aging and urban shrinkage challenges.

As China confronts the inevitable demographic transition that will reshape its urban landscapes, the opportunity exists to reimagine what constitutes successful urban development. Rather than viewing population aging and potential urban shrinkage as threats to prosperity, these phenomena could catalyze a fundamental reorientation toward quality over quantity in urban development. The diminishing demographic dividend need not result in declining urban vitality if cities can successfully pivot toward creating environments of exceptional livability.

This vision of the future of Chinese cities will reach a new stage, where cities contract in physical footprint and population while simultaneously increasing in livability, sustainability, and human flourishing. By integrating East Asian experiences with local innovations and international frameworks for livability, the Yangtze River Delta has the opportunity to implement more rational regional performance evaluation metrics, citizen-participatory collaborative design, and fiscal flexibility.

As China's most innovative region, the Yangtze River Delta has the potential to demonstrate that a city's success lies not in its expansion but in its capacity to foster human wellbeing across diverse demographic profiles. By embracing this perspective, the region could establish not only a blueprint for China's urban future but a globally relevant model for navigating demographic transition with creativity and vision.

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