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Integrating Community-Based and Smart Care Models: Strategies for Advancing China's Elderly Care Industry Amid Demographic Challenges

Aiyun Hua*

School of Public Administration, Nanjing Normal University, Nanjing 210023, China

**Corresponding author: Aiyun Hua, E-mail: wxhaytt@163.com.*

Abstract

China’s rapidly aging population presents significant challenges to its elderly care system. By 2021, 18.1% of the population was aged 65 years or above, with those over 80 years and exceeding 30 million. Traditional caregiving models, including family-based and institutional care, are increasingly inadequate due to urbanization, reduced family sizes, and economic constraints. This paper explores innovative solutions by examining the integration of community-based networks and smart care technologies. Drawing lessons from successful international models in Japan, Sweden, and Singapore, as well as advancements in smart care technologies in the United States, Germany, and South Korea, this study highlights strategies for developing sustainable and culturally adapted elderly care systems in China. These include building localized care hubs, enhancing independent living through smart home systems, fostering public–private partnerships to offset financial burdens, and aligning modern innovations with traditional caregiving practices to ensure acceptance. The findings emphasize the importance of balancing accessibility, affordability, and cultural relevance to meet the evolving needs of China’s aging society.

Keywords

Aging population, Community-based care, Smart care technologies, Cross-country comparative analysis

1. Introduction

Currently, China has an aging society, with 18.1% of its population aged 65 and above by the end of 2021—a figure that is expected to grow significantly in the coming decades. The number of elderly individuals over 80 has already surpassed 30 million and is projected to reach 50 million by 2035 (National Bureau of Statistics, 2021). By 2050, nearly 35% of China’s population will be over 65, according to UN predictions. These trends highlight the immense demographic challenges China faces, including the need for robust, innovative elderly care systems to support its aging population.

Traditional caregiving models, such as family-based care, are increasingly strained by urbanization, smaller family units, and shifting social dynamics. Moreover, institutional care remains limited in scale and affordability. To meet this growing demand, integrating community-based and smart care models offers a promising path forward. By combining localized support systems with advanced technology, China can

create a sustainable elderly care framework that addresses both the physical and emotional needs of its aging citizens. This paper examines the current state of China's elderly care industry, draws lessons from international models, and proposes strategies for the effective integration of these innovative approaches.

2. Current Landscape of China's Elderly Care Industry

The aging population in China stems from improved life expectancy and the long-term effects of the one-child policy (Xie & Fan, 2020). As of the end of 2021, 18.1% of the population was 65 years or older, with those over 80 years of age exceeding 30 million. This growing elderly demographic places economic pressure on younger generations, increasing the demand for professional care services. Families are finding it increasingly challenging to balance caregiving responsibilities with economic productivity, necessitating alternative care solutions. China's current elderly care system relies heavily on family-based and institutional care models.

2.1 Family-based Care Model

Family-based care, rooted in the long-standing ethical cultural tradition of filial piety (Xiao), remains the dominant model (Xie & Fan, 2020). Despite its cultural significance, modern socioeconomic shifts have significantly weakened its practicality. Urbanization has driven millions of young workers from rural areas to cities, leaving elderly parents behind with minimal support. According to statistics from civil affairs departments, there are more than 50 million left-behind elderly people in China's rural areas. In provinces such as Sichuan, Henan and Anhui, many rural areas have become "elderly villages", where left-behind elderly people can rely only on neighborhood mutual assistance or limited community services to meet their daily needs (Luo et al., 2022).

The one-child policy has further exacerbated this issue, as single children are now responsible for supporting two aging parents, sometimes even four grandparents, while managing their own families and careers. In major cities such as Beijing and Shanghai, it is common for elderly parents to move in with their children, yet many struggle with social isolation and lack independence due to lifestyle differences and space constraints in urban apartments. By 2021, approximately 23% of the elderly population in China lived alone, with some facing serious risks, such as delayed medical care in emergencies (National Bureau of Statistics, 2021). In high-profile cases, elderly individuals living alone have gone unnoticed for days after experiencing falls or sudden illnesses, highlighting the urgent need for alternative caregiving solutions.

2.2 Institutional Care Model

Institutional care, including nursing homes and eldercare facilities, provides professional services for elderly individuals, who require higher levels of support. By the end of 2023, China had approximately 41,000 registered elderly care institutions with approximately 8.2 million beds nationwide (Wang et al., 2024). However, these resources are concentrated in major cities such as Beijing, Shanghai, and Guangzhou, where private and high-end facilities cater to middle- and upper-income groups. In contrast, rural areas, such as parts of Gansu and Guizhou, suffer from a severe shortage of nursing homes, forcing many elderly individuals to remain at home without adequate care.

Cost remains another major barrier. In first-tier cities, private nursing homes can cost upwards of 10,000 RMB per month, far exceeding the average monthly pension of retirees, which hovers approximately 3,000 RMB. Even government-subsidized facilities, which charge lower fees, often have long waiting lists. For example, in Shanghai, some state-run nursing homes have waiting times of up to five years due to high demand. As a result, many families either take on caregiving responsibilities themselves or seek informal, unregulated care services, which may not meet proper safety and quality standards.

Beyond financial concerns, social stigma further limits the appeal of institutional care. Many elderly individuals perceive moving into a nursing home as the last choice, which is directly associated with abandonment by family members. Traditional beliefs that "raising children is for old age" still shape attitudes, making institutional care less accepted, particularly among older generations (Wang et al., 2024).

These deep-rooted cultural perceptions, combined with financial and accessibility challenges, have prevented institutional care from becoming a widely adopted solution in China.

3. Comparative Analysis of International Elderly Care Models

As countries face the challenges of aging populations, different approaches to elderly care have emerged, combining community-based services and smart technologies to improve quality of life. Many nations have prioritized community-based care, ensuring that seniors receive essential support while remaining in familiar environments. Countries such as Japan, Sweden, and Singapore have successfully implemented local care networks that integrate medical, social, and daily living assistance, enabling aging in place.

At the same time, advancements in smart care technologies have transformed elderly care, particularly in countries such as the United States, Germany, and South Korea. These nations have embraced AI-powered monitoring systems, wearable health devices, and telemedicine to increase caregiving efficiency and independence for seniors. By integrating technology into home and institutional care, they have addressed workforce shortages and rising healthcare costs.

The following sections explore how these global models—both community-based and technology-driven—offer valuable insights for improving elderly care systems.

3.1 Community-Based Care in Japan, Sweden, and Singapore

Japan's long-term care insurance (LTCI) system, introduced in 2000, provides comprehensive support for elderly individuals to age in place. This system funds a wide range of community-based services, including home care visits, daycare centers, and meal delivery programs, ensuring that seniors receive personalized care without leaving their communities. Municipal governments play a critical role in assessing the needs of elderly residents and coordinating service providers. The success of this model lies in its mandatory contributions from citizens over 40 years of age, ensuring sustainable funding and universal access (Tamiya et al., 2011).

Similarly, Sweden has developed an integrated approach that empowers local governments to deliver elderly care services tailored to community needs. Swedish municipalities are legally obligated to provide home care and assistance for seniors, including personal hygiene, meal preparation, and mobility support. These services are supplemented by community centers that offer social activities to combat isolation (Swedish Institute, n.d.). Sweden's model is notable for its emphasis on individualized care plans, created in consultation with seniors and their families, to maintain dignity and autonomy.

Singapore presents another successful example of community-based elderly care. The government has implemented programs such as "Community Networks for Seniors," which organizes local volunteers to provide social engagement, health monitoring, and light household tasks for elderly residents (Ministry of Health Singapore, 2018). Polyclinics and eldercare centers work together to ensure seamless transitions between medical care and daily support (Ministry of Health Singapore, 2021). This integrated model prioritizes community bonding and cost-effective solutions to meet the needs of an aging society.

While all three countries emphasize ageing-in-place and community-based care, there are notable differences in their approaches. Japan's LTCI system relies on a nationwide insurance scheme, ensuring financial sustainability through mandatory contributions, whereas Sweden places responsibility on local governments to directly provide services funded through taxation. Singapore, in contrast, adopts a more grassroots approach by leveraging community volunteers and integrating medical services with social care, making it a cost-effective model particularly suited for urban settings. These variations highlight the diverse strategies governments can adopt on the basis of their economic structure, social expectations, and available resources.

3.2 Smart Care Technologies in the Global Stage

In the United States, smart care technologies have become a key component of elderly care. Telemedicine platforms enable remote consultations, reducing the need for frequent hospital visits, particularly in rural

areas (Rural Health Information Hub, n.d.). Wearable devices, such as smartwatches, monitor vital signs such as heart rate and blood pressure, and send real-time data to caregivers and healthcare providers. For example, companies such as Apple and Fitbit have introduced fall-detection features, providing immediate alerts in emergencies.

Germany has integrated advanced technologies such as AI-powered monitoring systems into institutional and home care settings. These systems include automated medication dispensers, virtual assistants for scheduling and reminders, and motion sensors to detect unusual movements. Additionally, “smart homes” equipped with IoT devices allow elderly residents to control lighting, heating, and security through voice commands, increasing their independence (European Commission, 2017). Government-supported initiatives, such as the "Digital Healthcare Act," have further encouraged the adoption of these technologies by subsidizing their costs for care providers and families (Federal Ministry of Health, n.d.).

South Korea has also made significant advancements in smart care technologies, driven by its “Smart Silver Town” initiative. These developments include robotic caregivers that assist with mobility and daily tasks and AI-powered platforms that provide health assessments through voice or text-based communication (Kim & Shin, 2018). South Korea's focus on integrating these technologies into affordable housing ensures that even low-income elderly individuals benefit from these innovations, making it a leader in equitable access to smart care solutions (Cho, 2024).

Despite their common emphasis on leveraging technology to improve elderly care, these countries differ in their implementation strategies. The U.S. focuses primarily on consumer-driven solutions, with companies developing smart wearables and telemedicine services that individuals and healthcare providers can adopt independently. Germany, on the other hand, takes a more institutional approach, embedding smart care technologies into government-supported elderly care facilities and home care programs. South Korea stands out for integrating technology into affordable housing developments, ensuring that even lower-income seniors benefit from innovations such as robotic caregivers. These differences reflect each country’s priorities---whether they are market-driven adoption, government-backed implementation, or large-scale integration into social infrastructure.

Overall, these international examples highlight how community-based services and smart technologies can complement each other, creating adaptable and effective care systems that prioritize both accessibility and personalization.

4. Lessons for China

4.1 Expanding Accessible Community Networks

One key lesson for China is the importance of strengthening accessible community networks to support aging in place. Japan’s LTCI system demonstrates how localized care hubs can effectively provide services such as daycare, meal delivery, and basic medical support. China has already taken steps in this direction. For example, Shanghai has established over 200 community-based senior service stations offering meal delivery, rehabilitation, and short-term care for elderly residents (Shanghai Municipal Government, 2019). However, these services remain concentrated in urban areas, leaving rural elderly populations underserved.

In rural regions, a promising approach could be the expansion of mobile healthcare units. In Guizhou, a government-supported program deploys medical vans equipped with diagnostic tools and staffed by doctors and nurses to remote villages, providing basic health check-ups and medication delivery (Guizhou Provincial Development and Reform Commission, 2022). Expanding such initiatives nationwide could help bridge the service gap for elderly individuals in isolated areas. Additionally, Zhejiang Province has experiment with a “mutual aid care model”, where healthier seniors assist their frailer neighbors in exchange for future care benefits, reducing reliance on formal caregiving institutions. Scaling up such grassroots initiatives could provide a cost-effective solution for rural aging populations.

4.2 Building Smart Home Systems for Independent Living

In addition, developing smart home systems can significantly improve the safety and independence of elderly individuals. In cities such as Shenzhen and Hangzhou, high-end residential complexes have integrated AI-powered fall detection systems, voice-activated emergency alerts, and smart medication dispensers. However, such technology remains unaffordable for many seniors.

To address this, some local governments have started subsidizing smart home upgrades for low-income elderly residents. In Guangzhou, a pilot program provides free installation of smart monitoring devices for seniors living alone, allowing caregivers to track movement patterns and receive alerts in emergencies. In Beijing's Chaoyang District, a government initiative offers older adults wearable health monitors that continuously transmit real-time data to local community health centers. Expanding these initiatives nationwide, particularly in public housing projects, could make smart home technologies more accessible to lower-income seniors.

South Korea's "smart silver town" model provides another useful example. In government-funded senior housing, AI-powered systems monitor daily routines and send alerts if irregularities are detected. A similar approach could be applied in China's rapidly expanding eldercare housing sector, ensuring that new developments incorporate smart monitoring as a standard feature rather than a luxury add-on.

4.3 Fostering Public–Private Partnerships for Sustainable Development

Given the financial burden of building both community networks and smart home systems, fostering innovation through public–private partnerships is essential. China's major tech companies have already started investing in elderly care solutions. For example, Alibaba's "Smart Elderly Care" program provides cloud-based health tracking services in partnership with local governments, whereas Tencent has developed AI-powered eldercare robots to assist with basic tasks such as medication reminders and emotional companionship (AIbase, 2024). However, these projects are largely experimental and lack widespread implementation.

A successful example of public–private collaboration can be seen in Germany, where the government offers subsidies for nursing homes and home care providers to adopt digital health solutions. China could adopt a similar strategy by providing financial incentives for private companies that develop cost-effective eldercare technologies. Additionally, insurance companies could be encouraged to introduce long-term care insurance policies that cover smart home modifications, similar to Japan's LTCI system.

Another promising model comes from the United States, where Medicare and Medicaid reimburse telemedicine services for elderly patients. China has already launched similar policies, such as the integration of telemedicine into the national healthcare system. In some cities, such as Hangzhou and Wuhan, elderly patients can now receive virtual consultations and chronic disease management via public health insurance. Expanding this coverage to include home monitoring devices and digital caregiving platforms could further reduce the financial burden on families.

4.4 Aligning Modern Care Solutions with Cultural Values

Finally, adapting international models to fit China's cultural and demographic context is crucial. Resistance to nontraditional caregiving remains strong in China, where family involvement in elderly care is deeply valued. Smart care systems and community services could be designed to complement, rather than replace, family caregiving.

To address these concerns, cities such as Chengdu and Nanjing have piloted "family-integrated eldercare" models, where professional caregivers visit elderly individuals at home rather than relocating them to institutions (Nanjing Municipal People's Congress, 2021). These services include daily assistance, medical check-ups, and rehabilitation therapy, allowing seniors to remain in a familiar environment. The government could expand this model nationwide, particularly in communities with a high proportion of elderly residents living alone.

Another culturally sensitive initiative is Shanghai's "Time Bank", where young volunteers earn credit by assisting elderly residents with tasks such as grocery shopping, household chores, and companionship. These credits can later be redeemed for their own eldercare services in the future (Hu, 2023). This system has not only provided much-needed support to seniors but also encouraged intergenerational engagement, reinforcing traditional values of respect and care for elderly individuals. Expanding the time bank model across China could help ease the caregiving burden while maintaining family involvement.

Additionally, the rise of telemedicine and family health monitoring apps provides an opportunity to involve family members in caregiving without requiring them to be physically present. Platforms such as Ping An Good Doctor and JD Health have already begun offering services that allow family members to monitor their elderly relatives' health remotely. Encouraging the integration of such digital solutions with community healthcare services could further align modern eldercare innovations with traditional family values.

5. Conclusion

China's rapidly aging population presents both significant challenges and opportunities for its elderly care industry. Traditional models, while deeply rooted in cultural values, are no longer sufficient to meet the increasing demand and evolving needs of elderly citizens. The integration of community-based care networks and smart home technologies presents an encouraging direction for the future, providing a blend of localized support and advanced innovations to increase both the accessibility and quality of care. However, these approaches face financial and logistical challenges, emphasizing the importance of fostering public–private partnerships to share costs and drive innovation.

Moreover, any strategy must be carefully adapted to align with China's cultural and demographic realities. Solutions that complement traditional family caregiving rather than replace it will gain greater acceptance and ensure a smoother transition to modernized care systems. In the future, China should prioritize the equitable expansion of elderly care infrastructure, particularly in rural areas, and continue leveraging digital and AI-driven technologies to personalize care delivery. Establishing pilot programs for innovative models and scaling successful ones can further accelerate progress.

By learning from international practices and adapting these lessons to its unique context, China has the potential to create a sustainable and inclusive elderly care framework. This effort is not just about addressing an immediate demographic shift but also about laying the foundation for a society that values and supports its aging population with dignity and compassion.

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