

Impact of Smart Technology Use on Social Participation Among Older Adults in Urban and Rural China

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ABSTRACT

The aging population in China continues to deepen. By the end of 2024, the population aged 60 and above had reached 310.31 million, accounting for 22.0% of the total population; among them, the population aged 65 and above was 220.23 million, accounting for 15.6% (National Bureau of Statistics, 2025). The proliferation of smart technologies has created new pathways for social participation among older adults, but the urban-rural digital divide and skill disparities persist. According to CNNIC (2025), the internet penetration rate in rural areas is 65.6%, while the overall usage rate among the older adult population is only 52.0%. Although this has improved, it remains below the national average. Intergenerational support plays a key role herein, as help from children and younger generations can significantly enhance technology adoption and social participation levels among older adults. This paper reviews domestic and international research, combines data on urban-rural disparities in China, focuses on analyzing the stratified impact of smart technology use on social participation, and explores the moderating mechanism of intergenerational support. The study finds that smart technologies can expand the social connections and public affairs participation of older adults, with intergenerational support playing a particularly decisive role in rural areas. This paper innovatively proposes the "stratified pathway of technology use" and the "urban-rural disparity — intergenerational support interaction framework" to provide references for smart aging policies and intergenerational collaboration.

KEYWORDS

Smart technology; Social participation; Intergenerational support; Urban-rural disparities; Population aging

1 Introduction

Chinese society is undergoing a process of deep aging. By the end of 2024, the national population aged 60 and above reached 310.31 million, an increase of 13.34 million from the previous year, accounting for 22.0%; among them, the population aged 65 and above was 220.23 million, accounting for 15.6% (National Bureau of Statistics, 2025). This demographic shift not only brings pressure on healthcare and pensions but also makes enhancing the social participation of older adults an important task. The World Health Organization proposed as early as 2002 that social participation is a key dimension of "active aging," effectively delaying health decline and enhancing well-being. In a digital society, smart technologies provide new paths for older adults to participate in society. Smartphones, wearable devices, health management platforms, and smart home systems not only improve the quality of life for older adults but also expand their possibilities for interaction with society. However, urban-rural disparities remain a constraining factor. CNNIC (2025) data shows that the internet penetration rate in rural areas is 65.6%, significantly lower than in urban areas; while the internet usage rate among the older adult population is 52.0%, still below the national average. The urban-rural digital divide is evident not only at the access level but also in the depth and quality of use. Family intergenerational support is regarded as an important bridge for integrating older adults into the digital society. Foreign studies indicate that companionship and explanations from family members can significantly alleviate technology anxiety among older adults (Demiris & Hensel, 2008); domestic research also finds that help from children and grandchildren can directly improve the technology use level of older adults. This paper intends to explore: How does smart technology affect the social participation of older adults? What role do urban-rural disparities play? How does intergenerational support exert a moderating effect?

2 Literature Review

2.1 Domestic Research

Domestic research mostly focuses on the digital divide, mental health, and aging policy. Jiang Xiaohui (2024) points out that artificial intelligence can improve efficiency in elderly care services but requires age-friendly design. Wei Jieru (2023) emphasizes that urban-rural digital gaps limit the social support available to older adults. Zhang Yueyun et al. (2023), using CFPS data, found that internet use reduces depression levels and increases social participation among older adults.

2.2 Foreign Research

Faiola et al. (2019) proposed the mHealth framework, emphasizing the role of digital health in promoting health and social interaction. Demiris and Hensel (2008) found that family members are important intermediaries for the adoption of smart home technologies by older adults. Freeman et al. (2020) pointed out that intergenerational support can enhance social connections and reduce loneliness among older adults.

2.3 Japanese Experience

Japan has rich experience in smart aging. The e-VITA project provides health and social support for older adults through a virtual coach platform (Bevilacqua et al., 2018). Brucksch and Schultz (2018) argue that Japanese policy emphasizes technology "complementing" human resources rather than "replacing" them, focusing on collaboration between family and community.

2.4 Research Gaps

Existing research has shortcomings:

- (1) Domestic studies often focus on mental health, paying less attention to social participation;
- (2) Foreign research lacks verification within the context of China's urban-rural disparities;
- (3) There is insufficient research on the moderating role of intergenerational support;
- (4) The integration of Japanese experience with Chinese practice is not systematic enough.

3 Argumentative Analysis

3.1 Stratified Pathways of Smart Technology Use

Technology use among older adults shows stratified characteristics:

(1) Basic Level: Primarily for communication and entertainment, such as video calls and short videos. A 2024 survey shows that over 70% of older adults mainly use WeChat to maintain contact with relatives. This level primarily maintains social networks and alleviates loneliness.

(2) Functional Level: Involves health monitoring, appointment registration, bill payment, and online shopping. Over 65% of older adults in Beijing use online registration systems, compared to less than 30% in rural Hunan. A survey in Sichuan showed that only 25% of rural older adults are proficient in using payment apps, far lower than the 78% in Shanghai.

(3) Participatory Level: Participation in volunteer services, community governance, and interest groups through digital platforms. 2024 data from "Volunteer Hub" shows that the number of volunteers aged 60 and above increased by 18%, with over half registering via mobile phones. This level enhances the sense of social value and public participation among older adults.

This stratified pathway reveals the progressive relationship between smart technology and social participation: from maintaining connections, to improving life, to actively participating in society.

3.2 The Mechanism of Intergenerational Support

The mechanism of intergenerational support is mainly manifested in:

(1) Instrumental Help: Children help older adults purchase devices and install applications. Surveys show that about 70% of urban older adults consult their children when encountering problems, rising to 80% in rural areas.

(2) Emotional Encouragement: Family group chats and video calls make older adults more willing to try technology. Foreign research also indicates that family companionship is an important factor in alleviating digital anxiety (Demiris & Hensel, 2008).

(3) Knowledge Transfer: Communities conduct "intergenerational co-learning" activities where grandchildren and volunteers teach digital skills to older adults. In Shanghai's "Smart Aid for the Elderly" classes, over 90% of older adults stated that "help from grandchildren is the motivation for learning."

(4) Reverse Support: In some rural families, older adults take on the responsibility of caring for grandchildren and, in return, receive technical guidance. This "skill exchange" model becomes a new form of intergenerational interaction.

(5) Quasi-Intergenerational Support: Some community volunteers and neighborly relationships function as "substitutes for children," providing technical assistance to older adults living alone or empty-nesters. Volunteer projects in Shanghai and Guangzhou, where university students regularly visit older adults' homes to solve smartphone problems, have achieved good results.

Intergenerational support has both direct and moderating effects. In rural areas, it determines whether older adults can reach the functional and participatory levels; in urban areas, it plays more of a supplementary role.

3.3 The Compound Effect of Urban-Rural Disparities

Urban-rural disparities are evident not only in infrastructure but also in social participation:

Urban Older Adults: Can enhance participation through community classes and cultural platforms. In 2024, the participation rate in online community activities among older adults in Beijing reached 45%, and 48% in Shanghai.

Rural Older Adults: Rely more on guidance from children. A survey in rural Hunan found that 60% of older adults still primarily rely on cash. Older adults in mountainous areas of Sichuan stated that "they only have the opportunity to learn when their children return home."

Regional Disparities: The gap between eastern coastal areas and central-western regions is significant. Internet usage among rural older adults in Jiangsu is close to 60%, while in parts of Guizhou and Gansu, it is less than 30%.

The urban-rural context determines the marginal effect of intergenerational support: in cities, it plays a supplementary role; in rural areas, it is almost a decisive condition.

3.4 Multidimensional Analysis of Social Participation

Social participation of older adults is not limited to social interaction but also includes political, economic, and cultural aspects:

(1) **Political Participation:** Some urban communities have implemented online voting and questionnaires, allowing older adults to express their opinions via mobile phones. 2024 online voting data from a community in Shanghai showed a participation rate of 35% among those aged 60 and above.

(2) **Economic Participation:** Some older adults sell agricultural products or engage in part-time work through e-commerce platforms. In the "Silver Hair E-commerce" cooperative in rural Shandong, over 300 older adults rely on their children's help to complete online transactions.

(3) **Cultural Participation:** Online communication within interest groups is increasingly active. In 2024, "calligraphy groups" and "choir groups" for older adults in Nanjing, Jiangsu, organized offline activities through WeChat, with participation growing year by year.

Smart technologies significantly expand the breadth and levels of social participation for older adults.

3.5 Research Innovations and Limitations**

Innovations:

(1) Proposing the "stratified pathway of smart technology use," revealing the differential effects of the basic, functional, and participatory levels on social participation.

(2) Constructing the "urban-rural disparity — intergenerational support interaction framework," emphasizing the criticality of intergenerational support in rural areas.

(3) Introducing the concepts of "reverse support" and "quasi-intergenerational support," expanding the connotation of intergenerational support.

(4) Emphasizing the political, economic, and cultural dimensions of social participation, moving beyond a singular social interaction perspective.

(5) Proposing the "community — family — technology three-dimensional linkage model," emphasizing multi-agent collaboration.

Limitations:

(1) Data primarily relies on secondary statistics, lacking large-scale empirical investigation;

(2) Insufficient analysis of individual-level differences (e.g., gender, education);

(3) The integration of international experience needs to be more deeply combined with China's policy system.

3.6 Policy Recommendations

(1) **Stratified Training:** Set up basic, functional, and participatory level courses according to the technical proficiency of older adults.

(2) **Institutionalize Intergenerational Interaction:** Promote family "digital assistance," teaching by grandchildren, and community volunteer services.

(3) **Narrow the Urban-Rural Gap:** Increase rural broadband infrastructure construction and device subsidies, establish "digital stations."

(4) Multidimensional Participation Support: Encourage older adults to participate in political decision-making, economic activities, and cultural exchange.

(5) Learn from International Experience: Learn from Japan's concept of "technology complementing human resources," promoting tripartite collaboration among community, family, and technology.

4 Conclusion

Smart technologies provide important opportunities for social participation among older adults, but urban-rural disparities and the digital divide still constrain their effectiveness. Intergenerational support plays a decisive role, especially in rural areas, where help from children and grandchildren is the main way for older adults to overcome digital barriers. Through stratified pathway analysis, urban-rural comparison, and multidimensional analysis, this paper reveals the complex interaction between "technology — urban/rural — intergenerational" factors and proposes policy recommendations. Future research could combine large-scale samples and longitudinal data to further verify the differential impacts of various intergenerational support models on social participation.

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