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The Supply Path of Elderly Care Services and Its Optimization:A Dual Perspective Based on Multi-Actor Collaboration and Technology Enablement

Ying Meng*
Liaoning University of International Business and Economics, Dalian 116000, Liaoning, China

**Corresponding author: Ying Meng, 529359405@qq.com*

Abstract: With the accelerating process of population aging, the supply of elderly care services has become a critical issue concerning national welfare and people's livelihoods. This paper systematically analyzes the main pathways, practical challenges, and optimization strategies of current elderly care service supply from the dual perspectives of multi-agent collaboration and technology empowerment. The study finds that China has initially established multiple pathways, including a three-tier county-township-village networked supply system, integrated medical-care and wellness-preservation models, and technology-driven smart solutions. However, challenges such as uneven resource allocation, insufficient collaboration among stakeholders, and varying service quality persist. To address these issues, the supply system should be optimized through mechanisms such as institutional integration, technology empowerment, and multi-agent collaboration. This will facilitate a shift from a "fragmented" to a "holistic" governance approach in elderly care services, thereby achieving high-quality development.

Keywords: Elderly Care Services; Multi-Actor Collaboration; Technology Empowerment; Service Supply Optimization; Integrated Medical-Care Model

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1. Introduction

Population aging is a common challenge faced by many countries worldwide. Since entering an aging society at the end of the 20th century, China has experienced a continuous acceleration of its aging process[1]. By the end of 2024, China's population aged 60 and above had reached 310 million, accounting for 22% of the total population. It is projected that by 2035, the elderly population will exceed 400 million, representing over 30% of the population, marking the entry into a stage of severe aging[2-5]. Against this backdrop, issues such as insufficient supply, low quality, and suboptimal structure of elderly care services have become increasingly prominent, posing significant constraints to the implementation of the national strategy for actively responding to population aging. Particularly in rural areas, where the degree of aging is higher, the challenges of elderly care are more acute, urgently necessitating the construction of an elderly care service supply system with Chinese characteristics[6-9].

Currently, China's elderly care service supply is showing trends of diversification, networking, and intelligentization.

Practices from regions like Guangxi indicate the preliminary formation of a elderly care pattern based on "home care as the foundation, community support as the development, institutional care as the supplement, and integration of medical and elderly care[10]." However, due to historical deficits and unbalanced regional development, the supply of elderly care services still faces numerous challenges, such as the "fragmentation" problem observed in rural elderly sports services, including lagging ideologies, insufficient collaboration among multiple stakeholders, inequitable coverage of service targets, and singular service projects[11]. Therefore, systematically analyzing the pathways for elderly care service supply and exploring optimization strategies hold significant theoretical value and practical importance[12-15].

This paper, based on holistic governance theory and incorporating practical experiences from various regions, conducts research from three dimensions: supply path innovation, analysis of practical dilemmas, and construction of optimization mechanisms, aiming to provide theoretical reference and practical guidance for improving China's elderly care service supply system[16-20].

2. Core Pathways and Model Innovation in Elderly Care Service Supply

2.1. County-Township-Village Three-Tier Networked Supply Path

The three-tier linkage of county, township, and village is an important path to solve the fragmentation of rural elderly care services. This model forms an organically connected service network by strengthening the radiating role of county-level institutions, the hub function of township centers, and the coverage capacity of village-level facilities[13]. Practices in regions like Guangxi show that by the end of 2025, each county (city, district) will have at least one county-level institution for extremely impoverished individuals focusing on disability care, the service coverage rate of township regional elderly care service centers will reach 60%, and village (community) elderly care service facilities will be further improved[17].

In constructing this three-tier network, county-level institutions undertake functions such as professional care, training demonstration, and resource allocation; township centers play a connecting role, providing comprehensive services like day care, rehabilitation, and nursing; village-level facilities are community-based, offering basic services such as mutual aid elderly care, cultural, and recreational activities. Practices in regions like Henan, through building "silver-haired fitness circles," aim to have at least one elderly sports fitness activity site and no fewer than two fitness instructors in each administrative village (community), reflecting the trend of extending the service network to the grassroots level.

Table 1. Functional Positioning of the County-Township-Village Three-Tier Elderly Care Service Network

Tier	Main Functions	Facility Examples	Coverage Target
County Level	Professional Care, Training Demonstration, Resource Allocation	Disability Care Institutions, Comprehensive Service Platforms	At least one disability care institution per county/city
Township Level	Day Care, Rehabilitation Nursing, Referral Services	Regional Elderly Care Service Centers,gerocomium	Service coverage rate over 60%
Village Level	Mutual Aid Elderly Care, Cultural/ Recreational Activities, Basic Services	Elderly Activity Stations, Filial Piety Canteens, Fitness Parks	Elderly care service facilities in each village/community

2.2. Integrated Medical-Care and Wellness Development Path

The integration of medical care, elderly care, and wellness is an innovative model to enhance the quality of elderly care services. This path breaks down barriers between medical and elderly care resources, achieving a full-chain service of "prevention-treatment-rehabilitation-care." The provincial pilot of "Five-Bed Linkage" promoted in Linshu County, involving the coordinated linkage of medical beds, nursing beds, rehabilitation beds, elderly care beds, and family care beds, provides continuous health and elderly care services for the elderly.

The integration of medical care and elderly care is reflected not only in institutional cooperation but also in the

extension of services to the community and home-based levels. Some regions promote the adjacent construction of rural elderly care institutions and mutual aid service facilities with township health centers and village clinics to achieve resource sharing and efficiency gains. Meanwhile, the application of smart technology further deepens this integration. The popularize of health monitoring devices, emergency call systems, and other smart terminals enables the elderly to enjoy timely health management services.

2.3. Technology and Smartization Empowerment Path

Technological empowerment is a key marker of the modernization of elderly care service supply. Smart elderly care utilizes technological means such as artificial intelligence, big data, and the Internet of Things to enhance the precision, personalization, and intelligence of services. The 2025 Shenzhen International Smart Elderly Care Industry Expo, themed "Technology Empowerment, Igniting New Momentum for the Silver Economy," showcased innovative products like smart service robots and smart home systems, highlighting the trend of deep integration between technology and elderly care.

The joint initiative by the Ministry of Industry and Information Technology and the Ministry of Civil Affairs on pilot projects for collaborative research and application scenarios of smart elderly care service robots (2025-2027) focuses on application scenarios such as care for the disabled and cognitively impaired, emotional companionship, and health promotion. It aims to promote the application verification and iterative upgrading of products in scenarios like homes, communities, and elderly care institutions. This pilot seeks to address the shortage of human resources in elderly care while improving the quality of life for the elderly.

Practices in regions like Gansu indicate that support from financial technology is also crucial for the development of smart elderly care. By increasing financial support for elderly care, it helps boost the silver economy, providing funding for the R&D and application promotion of smart elderly care products.

3. Practical Dilemmas and Deep-Seated Contradictions in Elderly Care Service Supply

3.1. Unbalanced Resource Allocation and Incomplete Coverage

There are significant urban-rural disparities and regional imbalances in the allocation of elderly care service resources. Rural areas suffer from a severe shortage of elderly care service facilities and a lack of professional care resources, resulting in a considerable gap compared to urban areas. Surveys indicate that rural elderly sports services face challenges such as insufficient venues, a lack of instructors, and inadequate institutionalized funding guarantees. Although the coverage rate of senior sports association at the county level and above has reached 100%, facilities and management at the grassroots level, especially in rural areas, remain weak.

This imbalance is also reflected in the insufficient coverage of key populations. The service needs of special groups such as the disabled and semi-disabled elderly, empty-nesters, and left-behind elderly in rural areas often are not effectively met. Some regions exhibit "cream-skimming" in selecting service targets, favoring those in better health with relatively simpler needs, while marginalized groups like the very old and disabled elderly who need professional care are left behind.

3.2. Insufficient Multi-Stakeholder Coordination and Fragmented Governance

Insufficient coordination among stakeholders is a key factor restricting the efficiency of elderly care service supply. Currently, there remains a phenomenon of departmental silos between government agencies, and between the government, market, and society. In the field of rural elderly sports services, "the governance chain lacks coordination, and management authority faces institutional constraints, leading to a governance structure characterized by discreteness and fragmentation." This fragmentation is evident at multiple levels, including policy support, organizational management, service supply, and technology application.

At the policy level, the elderly care service policy system remains scattered, often nested within comprehensive policies, lacking a systematic institutional arrangement. At the organizational management level, the structure is predominantly based on traditional bureaucratic, single-government management, with inadequate coordination mechanisms among

multiple stakeholders. This fragmented governance leads to resource waste, low efficiency, and the coexistence of service duplication and gaps.

3.3. Inconsistent Service Quality and Shortage of Professional Talent

The fall behind construction of service quality is a bottleneck factor restricting the optimization of supply. On one hand, service content is singular, lacking personalized and professional service items. Rural elderly sports services suffer from "singular service projects and unreasonable structure," making it difficult to meet the diverse needs of the elderly. On the other hand, there is a severe shortage of professional talent, particularly in areas like rehabilitation nursing and psychological comfort, which affects the improvement of service quality.

The main reasons for the talent shortage include low salaries in the elderly care industry, low social recognition, and unclear career paths. This leads to high staff turnover and difficulties in ensuring professionalism. Although some regions have strengthened the construction of elderly care forces through measures like setting up rural aiding the elderly public welfare positions, overall, the institutional guarantee for building a professional talent team remains imperfect.

4. Optimization Paths and Innovation Mechanisms for Elderly Care Service Supply

4.1. Institutional Integration and Policy Coordination Mechanism

Constructing a holistic governance institutional framework is the foundation for optimizing elderly care service supply. First, top-level design should be strengthened to establish cross-departmental and cross-level coordination mechanisms. Guangxi's approach of having 15 departments jointly issue the "Notice on Further Strengthening Rural Elderly Care Services," forming a work pattern of shared responsibility, is worth emulating. Such inter-departmental linkage mechanisms can break down policy barriers and achieve resource integration.

Second, the legal and regulatory system needs improvement to clarify the rights and responsibilities of various stakeholders. Enacting an Elderly Care Service Promotion Law and improving relevant supporting policies can provide legal guarantees for the participation of multiple stakeholders. Simultaneously, performance evaluation mechanisms should be sane, incorporating the construction of the elderly care service system into local government performance appraisal indicators to strengthen the rigid constraints on policy implementation.

Finally, innovate financial support methods and establish a diversified investment mechanism. On one hand, increase government investment and include elderly care funding in fiscal budgets. On the other hand, use policy tools like tax incentives and subsidies to guide social capital into the elderly care industry. Henan's regulation that no less than 8% of sports lottery public welfare funds used for publid fitness funding be allocated to elderly sports provides a stable funding guarantee for elderly care services.

4.2. Technology Empowerment and Smart Integration Mechanism

Digital transformation is a key path to enhancing the efficiency of elderly care service supply. First, accelerate the construction of smart elderly care platforms to promote information sharing and resource integration. County-level comprehensive elderly care service management platforms can uniformly guide and manage county-wide elderly care affairs, achieving precise matching of supply and demand. Simultaneously, promote the R&D and application of smart elderly care products, such as smart wearable devices and remote medical systems, to enhance the accessibility and convenience of services.

Second, strengthen digital skills training for the elderly to bridge the "digital divide." Through community training and intergenerational learning, improve the ability of the elderly to use smart technologies. Some regions have added features like voice prompts and one-click calls in age-friendly renovations to help the elderly better enjoy smart elderly care services.

Furthermore, promoting data standardization and interoperability is crucial. Establishing unified data standards for elderly care services can break down information silos, enabling the shared application of information from healthcare, social security, and elderly care, thus providing data support for personalized services.

4.3. Multi-Stakeholder Coordination and Market-Driven Mechanism

Building a supply pattern coordinated by multiple stakeholders is the direction for optimizing elderly care services. First, clarify the positioning and relationships between the government, market, society, and family, forming a complementary cooperation mechanism. The government should play a leading role, focusing on setting rules, regulating services, and providing a safety net; market entities provide diversified services through specialization and economies of scale; social organizations leverage their flexibility and proximity to the people to meet personalized needs; and the family continues to play its fundamental role in elderly care.

Second, innovate development models and promote the integration of "elderly care +" formats. Shaanxi's Silver Economy Industry Catalog encompasses "seven major areas, twenty-three categories," including basic industries like elderly care finance, age-friendly homes, and elderly meal assistance, as well as emerging fields like rehabilitation nursing and smart wearables. New models such as "elderly care + tourism," "elderly care + culture," and "elderly care + fitness" enrich the content of elderly care services and enhance industrial value.

Finally, stimulate social participation vitality by developing mutual aid elderly care and volunteer services. Encourage healthy, younger seniors to participate in services for the elderly, establishing a "time bank" system to achieve intergenerational transfer of service resources. Guangxi's encouragement for young volunteers and healthy, low-age seniors to provide diverse volunteer services to needy,Elderly people in their vicinity demonstrates the potential of mutual aid elderly care.

4.4. Quality Improvement and Talent Cultivation Mechanism

Enhancing the professional level of elderly care services is the core of optimizing supply. First, establish and improve a service quality standard system covering facility construction, service content, and management processes. Standardization promotes service normalize and professionalism while accommodating personalized needs. Guangxi proposes strengthening the quality construction of elderly care services and promoting the application of AI in rural elderly care to improve the precision, personalization, and intelligence of services.

Second, strengthen the construction of a professional talent team and improve training mechanisms. On one hand, support universities and vocational colleges in offering majors related to elderly care services to expand the scale of talent cultivation. On the other hand, establish a vocational training system combining pre-job training, on-the-job training, and continuing education to enhance the professional capabilities of practitioners. The "Three Members" (instructors, coaches, referees) training system established in Henan, training over 20,000 backbone annually, provides talent support for elderly care services.

Finally, improve incentive and guarantee mechanisms to enhance career attractiveness. Attract and retain excellent talent for elderly care work by increasing salaries, clearing career development channels, and enhancing social recognition. Particularly for rural elderly care service personnel, policies such as post subsidies and incline in professional title evaluation should be used to stabilize the grassroots service team.

Table2. Multiple Pathways and Expected Outcomes for Optimizing Elderly Care Service Supply

Optimization Dimension	Main Measures	Expected Outcomes	Typical Cases
Institutional Integration	Cross-department coordination, planning guidance, financial guarantees	Solve fragmentation, form policy synergy	Guangxi's 15-department linkage mechanism
Technology Empowerment	Smart platform construction, smart product application, digital training	Enhance precise, personalized service levels	Smart elderly care service robot pilot
Multi-Stakeholder Coordination	Clarify stakeholder roles, develop integrated formats, stimulate social participation	Expand supply scale, enrich service content	Shaanxi Silver Economy Industry Catalog
Quality Improvement	Standard system construction, professional talent cultivation, incentive mechanisms	Improve service professionalism, satisfaction	Henan's "Three Members" training system

5. Conclusion and Outlook

Optimizing the pathways for elderly care service supply is a systematic project requiring coordinated advancement from multiple dimensions including institutional design, resource allocation, stakeholder coordination, and technological innovation. Currently, China's elderly care service supply is evolving from singularization and decentralization towards diversification and networking, with innovative practices such as the county-township-village three-tier service network, integrated medical-care and wellness models, and technology empowerment paths continuously emerging. However, problems like unbalanced resource allocation, insufficient stakeholder coordination, and low service quality remain prominent and urgently need to be addressed through holistic governance.

In the future, the optimization of elderly care service supply should focus on the following aspects: First, strengthen holistic governance to break down departmental barriers and hierarchical obstacles, forming policy synergy. Second, promote digital transformation, using technological means to enhance service efficiency and quality. Third, facilitate multi-stakeholder coordination to achieve complementarity among the government, market, society, and family. Fourth, enhance professionalization construction to improve the quality and capability of service personnel.

Ultimately, the goal of optimizing elderly care service supply is to build a multi-level elderly care service system that covers the entire population, balances urban and rural areas, has clear rights and responsibilities, provides moderate guarantees, and is sustainable, allowing all elderly people to enjoy a happy and fulfilling later life. With the deepening implementation of the national strategy for actively responding to population aging, China's elderly care service supply system will continuously improve, providing Chinese solutions and wisdom for global population aging governance.

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