Exploring the 'Holistic Governance' Mechanism of Digital Technology Empowering the Smart Elderly Care Industry Through a Case Study of Beijing

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Abstract. Against the backdrop of an 'aging before becoming wealthy' population and mismatched supply and demand, China's elderly care service system, though transitioning toward a universal model, still faces significant challenges from institutional fragmentation at the implementation level. Taking Beijing as a case study and adopting a holistic governance perspective, this paper explores the optimization mechanisms of the smart elderly care industry empowered by digital technology. The study finds that the dual governance by the health and civil affairs systems is the root cause of 'information silos' and the 'business model paradox,' and that merely piling on technology cannot overcome administrative barriers. The conclusion points out that the key to breaking this deadlock lies in moving from 'technological connection' to 'institutional integration.' This paper proposes recommendations such as establishing cross-departmental data governance mechanisms, using long-term care insurance to build a closed-loop payment system, and adhering to age-appropriate technology design principles, in order to achieve holistic governance and precise provision of elderly care resources in megacities.

Keywords: Smart elderly care; holistic governance; social elderly care service system.

1. Introduction

The evolution of China's elderly care service system is essentially a passive adaptation and response to the characteristic of an aging population that 'ages before it becomes wealthy.' With the solidification of the '4-2-1' family structure and the increase in population mobility, the traditional family function of elder care is gradually weakening; At the same time, the institutional elderly care system, as an important supplement, has not effectively absorbed the overflow of service demand. In practice, it shows a structural contradiction with public institutions facing a shortage of beds while private institutions have a high vacancy rate. This mismatch between supply and demand indicates that a single household or institutional model can no longer meet the growing and multi-level social elderly care needs. Facing this structural dilemma, the national elderly care service policy direction has undergone institutional changes and path reconstruction. The introduction of the "14th Five-Year Plan for the Development of the Elderly Industry and Elderly Care Service System" marks a formal shift in governance logic from the early "gap-filling" assistance to the construction of a universal "inclusive" system, which also signifies that China's elderly care services have entered a new stage focused on high-quality development. This transformation no longer focuses on simply increasing the total volume of services, but aims to address issues such as the lack of care for the disabled and the poor integration of medical and nursing services through precise stratification, attempting to build a solid institutional safeguard for an aging society at the level of top-level design [1].

When macro policies are implemented at the micro level, they encounter practical obstacles within the existing system and mechanisms. Through a systematic review of representative academic literature over the past decade on elderly care service systems, the integration of medical care and elder care, and smart elderly care, the deep logic behind this obstacle has been clarified. Existing research generally indicates that although top-level design is increasingly improved, implementation is still heavily hindered by segmented administrative structures. Especially the dual governance by the health and civil affairs systems has led to severe institutional fragmentation, restricting the optimal allocation of elderly care resources and continuous collaboration among stakeholders [2]. This

systemic flaw has also affected the smart elderly care industry and has become an issue of concern in the current academic community. Although academia and industry generally believe that technology is the key to solving service challenges, in the absence of unified data standards and cross-department coordination mechanisms, the smart elderly care industry faces a dual paradox: first is the information silo paradox, where hastily implemented elderly care information systems in various regions often operate independently, with departments treating data as private property and data not being shared, causing technological empowerment to remain superficial [3]. Second is the paradox of the business model. Due to the imperfections in the payment system, companies find it difficult to achieve sustainable profits through low-frequency services, resulting in the industry not yet having a mature business model. Existing literature mostly focuses on calls for macro-level policies or discussions on individual technical frameworks, with few studies delving into how megacities can overcome the above administrative barriers through specific digital governance platforms.

In this context, digital technology is not merely a tool for improving efficiency but is also seen as a key variable for driving changes in governance models and breaking through fragmentation. Beijing has conducted pioneering explorations in implementing national strategies and addressing the aforementioned governance challenges. Its 2023 'Comprehensive Elderly Service Platform Construction Work Plan' explicitly proposes to 'break down system barriers and connect data islands,' aiming to address long-standing issues in departmental collaboration by building a unified citywide smart elderly care management hub. The interactivity, platform-based approach, and precision characteristics of the digital era align with the modern city's governance and public service supply needs for value addition and efficiency improvement [4]. This article uses Beijing as a typical case to explore the holistic governance mechanism of the smart elderly care industry in the context of digital technology empowerment. This not only provides a broader perspective for research on the smart elderly care industry under holistic governance in theory, but also offers a reference path for other cities across the country in addressing the fundamental contradictions of single supply and coordination failure.

In order to thoroughly analyze this transformation logic, this study adopts a combined approach of policy text analysis and case study. The research will first construct a theoretical framework based on the aforementioned literature review, identifying the segmentation of administrative units and information silos as core variables; secondly, it will conduct an in-depth analysis of relevant policy texts and industry practices in Beijing, demonstrating from the perspectives of breaking down barriers and resource integration how digital technology reshapes the governance logic of elderly care services. The paper will sequentially examine the institutional challenges faced by the smart elderly care industry, the specific path of Beijing's digital transformation, and the optimizing effect of this model on matching industry supply and demand, ultimately summarizing strategies for the high-quality development of the smart elderly care industry in megacities.

2. The Practical Logic of the Development of the Smart Elderly Care Industry in Beijing

Based on this, this chapter introduces the perspective of holistic governance theory to systematically review and evaluate relevant domestic and international literature. It analyzes the key issues and practical contradictions that need to be addressed in the development of Beijing's elderly care service industry. This lays a solid theoretical foundation for the scholarly study of Beijing's 'elderly service' industry and provides a strong basis for subsequent in-depth research on the industry. At the same time, the existing academic research on Beijing's 'elderly service' industry is classified and analyzed dialectically from three dimensions, revealing the underlying causes of the main contradictions faced by the current development of the industry, such as fragmented institutions and information silos. In doing so, it provides a solid theoretical foundation for the scholarly study of Beijing's 'elderly service' industry, particularly for the practical breakthroughs of Beijing's integrated elderly care service platforms [5].

2.1. The Inevitable Choice in the Face of Structural Crisis

As a typical megacity, Beijing is currently at a critical window period where population aging is progressing toward advanced age and increasing levels of empty-nest households. Against the macro backdrop of an aging population before widespread affluence, the popularization of the '4-2-1' family structure in Beijing has led to a sharp weakening of traditional family-based elderly care, forcing the elderly care system to transform from a single life-support model into a comprehensive system that deeply integrates medical care, nursing, and health preservation. However, a comparative analysis of traditional family or institutional elderly care models against modern urban elderly care demands reveals that the existing supply and demand structure exhibits significant mismatches [5]. Although the '90-7-3' eldercare model has been established as a policy goal, in reality, the vast majority of home-based elderly populations face difficulties accessing professional services. At the same time, the institutional eldercare market is caught in an awkward structural dilemma: public eldercare facilities in central urban areas are often hard to get a bed in, while many private institutions face a survival crisis due to high vacancy rates [6]. It can be seen from this that relying solely on the traditional approach of simply expanding bed capacity and facilities is no longer sufficient to meet the urgent demand for social elderly care in megacities. Therefore, a restructuring of supply and demand using digital technology, centered on a 'data platform,' has become an inevitable transformation for Beijing's elderly care service system. Smart elderly care services not only possess technological advantages but also feature high efficiency and strong competitiveness, which is conducive to resolving structural contradictions between supply and demand.

2.2. Institutional Barriers and the Island Paradox

At the level of macro governance systems, existing research has clearly outlined the trajectory of national policy transitioning from a 'gap-filling' approach to an 'inclusive' approach. Beijing has actively responded to this trend by issuing a series of policy documents aimed at achieving full coverage. However, evaluative studies on the effectiveness of these policies point out that the deep-seated obstacle lies in the segmented administrative system. Scholars have thoroughly analyzed this phenomenon, noting that the dual governance by the health care system and the civil affairs system has led to severe 'institutional fragmentation.' This has resulted in a 'two-and-a-half' management structure for medical and health resources versus elderly care resources, 'two separate channels' for funding, and 'two sets of standards' for data. The main entities, resources, and interest relationships within elderly care service provision have long remained fragmented due to administrative segmentation, which fundamentally constrains the top-level design needed to advance smart elderly care and ultimately leads to a lack of coordination when these policies are implemented at the grassroots level.

At the level of specific service provision models, the integration of medical care and elderly care, as well as home and community-based elderly care, face dual dilemmas. Regarding the integration of medical care and elderly care, although it is considered a core strategy for addressing the care needs of disabled elderly individuals, existing research reveals deep-seated gaps in its funding and management. Medical insurance funds struggle to cover daily care, while long-term care insurance is still in pilot stages. This incompatibility in the payment system has led to a persistent imbalance of "strong in medical care but weak in elderly care." As for home and community-based elderly care, introducing market forces into community-based elderly services still cannot completely overcome the problem of "insufficient endogenous motivation." Ultimately, due to the lack of a unified resource allocation platform, various market participants struggle to form a sustainable business cycle because of minimal profits, resulting in a highly fragmented supply of community services. Focusing on the technological application of smart elderly care, although big data and Internet of Things technologies are highly anticipated, the academic evaluation of the current development model tends to be rational. Research indicates that the smart elderly care industry is caught in a dual paradox. The first is the information silo paradox on the technology side: due to the aforementioned administrative barriers, departments treat data as their private property, leading to a lack of data interconnection mechanisms,

making it difficult for platforms to accurately profile elderly individuals, and hindering the sharing and utilization of information resources. The second is the commercial model dilemma on the market side: by neglecting the real experiences of elderly people, many products face a disconnect between technological supply and actual demand, and the lack of a clear payer prevents the industry from forming a sustainable endogenous growth mechanism. As scholars have noted, the industry has not yet established a mature business model, and the involvement of social capital remains very limited [7].

2.3. The Path to Breaking Through Toward Holistic Governance

In summary, the existing fragmented governance model and isolated technological applications can no longer meet the complex demands of elderly care services in megacities. Based on the analysis of the drawbacks of institutional fragmentation and information silos mentioned above, the future development trend must shift from simply stacking hardware technologies to deeply reconstructing governance models. This requires reforms to go beyond the functional scope of a single department and to establish a cross-departmental, cross-level 'unified data foundation' to achieve coordinated management of various elderly care resources. Smart elderly care based on big data technology can effectively ensure information sharing, efficiency, and sustainability among organizations, promoting the provision of elderly services to move from 'fragmented operations' to 'holistic governance.' Following this logic, building a city-level integrated service platform becomes a key path to breaking the deadlock. In line with the 'Beijing Comprehensive Elderly Service Platform Construction Work Plan,' future optimization should focus on using digital technology to break administrative barriers and establish a citywide unified smart hub that manages medical, elderly care, and community resources in an 'all-in-one' manner. This is not only a technological upgrade but also a leap in governance thinking from fragmented to holistic governance. This path analysis provides a solid theoretical foundation for subsequent chapters to explore in-depth how Beijing can address these issues through specific platform practices [8].

3. Transformation Path of Beijing's Smart Elderly Care Industry

This study believes that only by extending digital empowerment from the technological level to the dimensions of institutional restructuring and ecological cultivation can the structural remodeling of urban elderly care service systems and the transformation of governance paradigms be truly achieved. Future development should not be limited to the physical construction of platforms, but should focus on building long-term mechanisms from the perspectives of administrative coordination, market mechanisms, and humanistic care.

The primary path to breaking institutional barriers lies in deepening holistic governance. Moving from technical connections to institutional integration is the foremost approach to breaking these barriers. Previous research results indicate that the dual governance of the health and civil affairs systems is the root cause of "information silos." Simply building a unified software platform is only a physical-level connection; without coordination of administrative power, data still cannot truly flow. Coordination is not only the fundamental mechanism and deep core of holistic governance but also the solution to fragmentation problems. Therefore, it is recommended that Beijing, in promoting the "Comprehensive Elderly Service Platform Construction Work Plan," further establish a cross-departmental elderly data governance committee or joint meeting system. The core of this mechanism is to establish ownership and sharing standards for data, turning the call to break up silos into a strict administrative assessment indicator. Through institutional design, relevant government departments should be required to connect interfaces between the healthcare system and the civil affairs elderly care system, achieving real-time synchronization of elderly health records and care documentation. Only by achieving institutional isomorphism within the administrative system can the technical platform truly become a governance hub for coordinating resources, thereby thoroughly eradicating the deep-seated problem of resource fragmentation [9].

The government should focus on building a 'data-payment' closed-loop ecosystem, leveraging the long-term care insurance system to stimulate endogenous market forces. In summary, regarding the challenges in the business model of Beijing's long-term care insurance and the insufficient self-sustaining capability of enterprises, full use should be made of Beijing's status as a pilot city for the long-term care insurance system to turn the smart elderly care platform from a mere information display window into a hub for service transactions and payment settlement. The government should fully utilize policy tools, such as financial support and tax incentives, to effectively promote foundational industry guarantees and the implementation of smart elderly care model [10]. The current market exists because enterprises cannot achieve sustainable profits through low-frequency elderly care services, while government-purchased services have relatively limited coverage. But more importantly, the question is how to directly use health data from smart wearable devices, records of in-home service orders, and similar information as verification for long-term care insurance claims and government subsidy disbursements. This would make data a 'hard currency' for enterprises to obtain medical insurance payments and commercial insurance claims. Such an innovation in the mechanism would effectively stimulate market participants' enthusiasm, solve the core problem of 'who pays,' and drive the industry to shift from relying on financial injections to a healthy cycle with self-sustaining capabilities.

The smart elderly care industry should adhere to demand-oriented technology ethics in its development, thereby bridging the digital divide and achieving precise service delivery. Given the significant supply-demand mismatch and the digital exclusion experienced by the elderly, as shown by previous empirical data, future smart elderly care initiatives must return to a human-centered approach in technology. Currently, society’s acceptance of smart elderly care and the market environment are not promising; if the needs of the elderly are not sufficiently considered in technological development, it could instead create a 'technology gap' for the elderly [11]. On the basis of addressing the lack of industry standards, on one hand, age-friendly standards and a full-process user participation mechanism should be established; on the other hand, offline service channels should be optimized, and the platform's scheduling capabilities should be extended to the grassroots level to build a closed-loop service system where online technology leads and offline services are implemented. Relevant stakeholders should establish a human-centered concept of smart elderly care, accurately grasping the information interaction needs of the elderly based on a deep understanding of the social and cultural context. Only by deeply integrating technological rationality with humanistic care, and creating a human touch through technology, can the digital divide truly be bridged, ensuring that inclusive elderly care services are readily accessible [12].

4. Conclusion

Against the macro backdrop of the transition from a state-subsidy-oriented elderly care strategy to a more inclusive, large-scale framework, this paper takes Beijing as a representative case to conduct an in-depth analysis of the internal logic of the digital transformation of the smart elderly care industry in mega-cities. The study finds that, although technological investment continues to increase, the dual governance of the health and civil affairs systems has led to serious 'institutional fragmentation.' At the micro level, these administrative barriers manifest as information silos and business model paradoxes, causing data to be unable to flow due to departmental privatization and enterprises to suffer from insufficient self-sustaining financing due to the lack of a closed payment loop. Therefore, the core conclusion of this paper is that the breakthrough in smart elderly care must go beyond mere technological accumulation and move toward institutional reconstruction centered on holistic governance, achieving a fundamental leap from technological connection to institutional integration through the establishment of cross-departmental coordination mechanisms.

The academic value of this article lies in its focus on the research gap concerning the operational mechanisms of city-level platforms from a holistic governance perspective. The article delves into the policy text of Beijing's "Comprehensive Elderly Service Platform Construction Work Plan,"

revealing how digital technology functions as a governance tool to break bureaucratic boundaries and providing a reference model that integrates technology with administration for other cities nationwide facing the pressure of an aging population before becoming affluent. Limited by data access channels, this study has not yet deeply explored the underlying interests behind cross-departmental data sharing. Looking ahead, future research should move from constructing its macro-level model to exploring the operational details of its micro-level mechanisms. Additionally, investigating mechanisms for compensating interests in data sharing will be an important next step, and corresponding research should also address ethical standards for making technology elderly-friendly in the practical implementation of data.

References

[1] Wang Weijin. Development of elderly care services in China During the '15th Five-Year Plan' Period: Opportunities, challenges, and responses. Reform, 2025, 1-12.

[2] Du Chunlin, Zang Luheng. From 'fragmented operation' to 'holistic governance': A study on innovative paths for the supply of smart elderly care services. Learning and Practice, 2020, (07): 92-101.

[3] Wu Xue. Development trends, current challenges, and optimization paths of the smart elderly care industry. East China Economic Management, 2021, 35(07): 1-9.

[4] Liu Yi, Li Xiaona. A comparative study and optimization path of community smart elderly care models in China in the digital era. E-Government, 2022, (05):112-124.

[5] Mu Guangzong. The pension issues in China's urban society: A case study of Beijing. Journal of Renmin University of China, 2002, (02): 80-87.

[6] Jia Yujiao, Wang Cong. Construction of an intelligent home-based elderly care service system driven by demand. Inner Mongolia Social Sciences, 2020, 41(05):166-172 213.

[7] Fa Ruobing, Jin Shengxuan, Fan Peng, et al. Demand, utilization, and supply of community smart senior care services for older people in China. Digital Health, 2025.

[8] Ge Yanfeng, Wang Liejun, Feng Wenmeng, et al. Challenges and strategic choices for healthy aging in China. Management World, 2020, 36(04):86-96.

[9] Huang Jianfeng, Zhang Xiaoyi. Research on policies of China's smart elderly care industry: based on policy instruments and technology roadmap model. China Science and Technology Forum, 2020, (01): 69-79.

[10] Tong Zhao, Qiaoming Hou. Coordination of a dual-channel supply chain of smart elderly care service considering the integration level of products and services. RAIRO - Operations Research, 2025, 59(3):1295-1323.

[11] Tong Feng. Construction and application strategies of a multi-system interactive smart elderly care service system. Journal of Nantong University (Social Science Edition), 2021, 37(02):89-96.

[12] Bai Mei, Zhu Qinghua. Analysis of the current situation and development strategies of smart elderly care. Modern Management Science, 2016, (09): 63-65.