

Unblocking the “Last-Mile” Bottlenecks in the High-Quality Development of Harbin’s Silver Economy: A Digital Age-Friendliness Perspective

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Abstract: The high-quality development of the silver economy, empowered by digital technology, constitutes a comprehensive ensemble of economic activities that center on safeguarding later-life wellbeing and improving services for older adults, and that align the age-friendly transformation of the economy with the construction of a modernized economic system through technological innovation and industrial integration. As population ageing intensifies in Harbin, promoting digital age-friendliness to drive the high-quality development of the silver economy has become a defining task in the governance of the city’s ageing society. At present, however, this endeavor confronts multiple constraints: an inadequate supply of age-friendly digital products, lagging innovation in such products, pronounced spatial disparities in the development of digital age-friendliness, and underdeveloped mechanisms for inter-industry coordination. To remove these “last-mile” bottlenecks, a four-pronged approach is proposed: refining development plans and strengthening the policy framework; responding to market demand and expanding the supply of age-friendly products; consolidating foundational support and enhancing older adults’ digital application capabilities; and stimulating market dynamism while optimizing the development environment.

Keywords: Digital age-friendliness; Silver economy; High-quality development

1. Introduction

The period of the 15th Five-Year Plan (2026–2030) represents a pivotal five years for Harbin, a phase that builds upon past achievements while opening new horizons—a period of strategic opportunity in which the city rides the tide of national rejuvenation, strives for new breakthroughs in high-quality development, and writes a new chapter of comprehensive and all-round revitalization. By the end of 2024, the population aged 60 and above in Harbin had reached 2.71 million, accounting for 29.78% of the city’s registered population^[1]. Population ageing is thus a major challenge that Harbin must confront on its path toward modernization. As a deeply ageing society arrives in full, China is simultaneously experiencing the most rapid and profound phase of digital economy development^[2]. How to drive the high-quality development of the silver economy by promoting digital age-friendliness in Harbin has therefore become an important yardstick for assessing the effectiveness of ageing-society governance.

The Opinions on Developing the Silver Economy and Enhancing the Wellbeing of Older Adults, issued by the State Council in January 2024, defines the “silver economy” as the sum of economic activities that provide products or services to older adults and prepare individuals for old age^[3]. Within this framework, the high-quality development of a digitally empowered silver economy should be understood as a comprehensive ensemble of economic activities that center on safeguarding later-life wellbeing and improving services for older adults, and that coordinate the age-friendly transformation of the economy with the construction of a modernized economic system through technological innovation and industrial integration. The combined effects of demographic change and digital technological innovation constitute both a challenge to the governance of Harbin’s ageing society and an opportunity for the high-quality development of its silver economy. Investigating how digital age-friendliness can drive such development is a task of the times, grounded in the profound transformation of population structure and economic transition in the new era. It can inform local governments in formulating silver economy policies and offer insights for selecting economic development strategies centered on digital age-friendliness.

2. The Real Bottlenecks Constraining the High-Quality Development of Harbin's Silver Economy

The development of Harbin's silver economy is currently at a stage of structural constraint. Breaking through this bottleneck hinges on the systematic advancement of digital age-friendliness.

2.1. Insufficient Supply of Age-Friendly Digital Products Exacerbates the Grey Digital Divide

Products for older adults constitute a set of functional goods specifically designed in response to the physiological decline associated with ageing, with the core purpose of meeting the particular needs of older adults in their daily activities ^[4]. From the supply side of Harbin's elderly consumer market, the application of digital age-friendly technologies to renew the production and provision of concrete products—such as wellness and care services and health monitoring devices—remains markedly inadequate. Alongside socioeconomic development and the continuously rising prevalence of chronic non-communicable diseases, the health consumption market for older adults has undergone significant structural change ^[5]. By product attribute, the goods currently available to older adults in Harbin can be classified into functional clothing, nutritional foods, assisted-living devices, medical rehabilitation equipment, and health protection products. Nevertheless, Harbin's industry for products serving older adults remains at a primary stage of development and displays evident structural deficiencies. First, the product spectrum is narrow: market supply is still concentrated in basic appliances and other low value-added goods, leaving it disconnected from the rapidly evolving digital era. Second, an industrial ecosystem has yet to take shape: the layout of the age-friendly digital industry started relatively late, and a significant gap persists relative to the mature supply systems for elderly products found in more developed regions.

2.2. Lagging Innovation in Age-Friendly Digital Products Leaves Silver Economy Demand Unmet

With continuous socioeconomic progress, the consumption demand of the majority of China's older population has shifted from subsistence-oriented necessities to enjoyment-oriented non-necessities ^[6]. The elderly consumer market is moving from “frugal ageing” toward “proactive enjoyment of later life” ^[7], generating increasingly diversified demand. Older consumers in Harbin exhibit a characteristic consumption duality: while maintaining rigid demand for products from traditional industries, they are rapidly forming structural demand for digital products. On the one hand, the rigid demand of older adults for traditional industrial products persists, reflecting stable consumption preferences shaped by physiological needs, consumption habits, and cultural identity. On the other hand, influenced by the diffusion of digital technologies, this group is accelerating its adoption of demand for digital products and services. In Harbin's silver economy market, digital products and services tailored to different categories of older adults remain relatively scarce. Some older adults with high net worth possess considerable purchasing power and a strong willingness to adopt emerging digital products and services, yet the supply of innovative, age-friendly products of high quality and high added value is inadequate, resulting in a pronounced supply–demand mismatch.

2.3. Spatial Disparities in Digital Age-Friendliness and Marked Intra-Group Differences in Technology Adoption

The development of digital age-friendliness in Harbin exhibits notable spatial disparities, which constrain the high-quality development of the silver economy. First, developed areas, leveraging the advantages of technology diffusion, have constructed age-friendly service ecosystems that generate new sources of economic growth, whereas less developed areas, constrained by limited resources, struggle to establish effective technical support networks. The result is a “core–periphery” spatial pattern of older adults' digital participation. Second, substantial heterogeneity exists within Harbin's older population, and this heterogeneity leads to differentiated outcomes in the conversion of digital age-friendliness achievements into silver economy benefits. Differential accumulation of economic, cultural, and digital capital has produced a graded hierarchy of technological adaptability among older adults in Harbin ^[8]. Older adults of higher socioeconomic status are able to achieve technological empowerment through resource-compensation mechanisms: they benefit from digital age-friendliness and, in so doing, stimulate economic growth. By contrast, certain disadvantaged groups, trapped in digital poverty, fall into a self-reinforcing cycle of “digital exclusion–market exclusion,” further aggravating the spatial disparities in digital age-friendliness.

2.4. Incomplete Mechanisms for Inter-Industry Coordination and Weak Incentives for Market Participation

From the perspective of institutional supply, the policy instruments required for digital age-friendliness—including fiscal and tax incentives and financing support—remain fragmented, and no full-cycle policy framework spanning technological R&D, inter-industry coordination, and market commercialization has been established. These institutional deficiencies result in insufficient integration of the industrial chain when digital age-friendliness is used to drive the silver economy, making it difficult to form a self-reinforcing, closed-loop industrial ecosystem.

In its pursuit of digital age-friendliness, Harbin has yet to develop a replicable pathway for business model innovation, leaving industrial clustering without economies of scale. Compounded by uncertainty over investment return horizons and an imbalance between risk and return, market actors' expected returns have become short-term oriented and risk-averse, impeding the release of the economic vitality that digital age-friendliness could generate. Moreover, ambiguity in the technical standards system exposes social capital to transaction costs such as unclear market entry prospects and rising compliance expenditures, which suppresses market actors' willingness to make strategic investments.

3. Recommendations for Unblocking the “Last-Mile” Bottlenecks in the High-Quality Development of the Silver Economy

The practical orientation of digital age-friendliness is to apply digital technologies to meet the needs of older adults, while the silver economy constitutes the economic system that emerges around those needs. For Harbin, developing the silver economy by unleashing the potential of digital technology is not only a livelihood project that addresses the diverse needs of older adults but also a key lever for optimizing industrial structure and unlocking domestic demand potential ^[9].

3.1. Improving Development Planning and Strengthening the Policy Framework

3.1.1. Formulating a roadmap for digital age-friendliness and establishing a long-term mechanism for silver economy development

Guided by the strategic thinking of actively responding to population ageing, Harbin should seize the opportunities for high-quality silver economy development arising from the simultaneous transformation of ageing and digitalization, and align closely with the key tasks set out in the Opinions on Developing the Silver Economy and Enhancing the Wellbeing of Older Adults to construct a forward-looking and holistic strategic framework covering the entire city. A three-tier “province–city–county” transmission system of dedicated planning should be established, through which digital age-friendliness drives the high-quality development of the silver economy: at the provincial level, the macro direction of digital age-friendliness and the economic conversion of its outcomes should be defined; at the municipal level, supporting implementation plans for digital age-friendliness should be formulated; and at the county level, the delivery of specific age-friendly digital industries and services should be advanced. Planning alignment will enable the precise, “drip-irrigation” delivery of policy dividends.

3.1.2. Establishing a dedicated support fund for digital age-friendliness in Harbin, focusing on innovative projects such as smart elderly care, health monitoring, and telemedicine

Instruments including loan interest subsidies and risk compensation should be used to reduce firms' financing costs and encourage the inflow of social capital into the R&D of age-friendly digital products. In addition, a digital consumption subsidy scheme for older adults—covering, for example, subsidies for smartphone purchases and reductions or waivers of mobile data charges—should be introduced to lower the cost of accessing digital services and unlock consumption potential.

3.2. Targeting Market Demand and Improving Product Supply

3.2.1. Developing age-friendly products and enhancing user experience

With regard to the visual, auditory, cognitive, and operational characteristics of older adults, the design of intelligent terminals should be optimized through measures such as large fonts, high-contrast interfaces, voice interaction, and one-touch emergency assistance, alongside simplified operating procedures, reduced complex navigation, and clear guidance prompts ^[10]. At the same time, enterprises in Harbin should be encouraged to develop innovative products in areas including health monitoring,

emergency calling, and smart home applications, so as to meet the demands of the elderly consumer market and improve daily convenience.

3.2.2. Increasing support for technological R&D and innovation and accelerating the economic conversion of digital age-friendliness outcomes

Dedicated R&D funding should be established. Industry associations should be supported in formulating technical standards for age-friendly design, and local enterprises should be encouraged to collaborate with universities and research institutions to tackle key age-friendly technologies—such as AI voice assistants, contactless health monitoring, and remote diagnosis and treatment. Pilot demonstration projects should be launched in communities and elderly care institutions, where user feedback can be collected and products refined. Collaboration between upstream and downstream segments of the industrial chain should be promoted to secure the supply of digital products and services.

3.3. Consolidating Foundational Support and Enhancing Application Capabilities

3.3.1. Improving network coverage and closing the digital divide

Priority should be given to strengthening network infrastructure in rural areas, urban–rural interfaces, and other underserved localities, and to raising 5G and broadband coverage rates. “Digital Service Stations” should be established in communities, senior activity centers, and similar venues, staffed by volunteers who guide older adults in using smart devices. Public-interest programmes such as “Digital Assistance for Older Adults” should provide basic data allowances to older adults in difficulty, ensuring that they “can access and can afford” digital services, thereby removing the “last-mile” bottlenecks that hinder their integration into digital age-friendliness and, in turn, the high-quality development of the silver economy.

3.3.2. Delivering tiered training to improve digital literacy

Differentiated training courses should be designed for older adults of different ages and educational backgrounds, covering skills such as QR-code payments, video calls, online shopping, and appointment registration. A combined “offline classes + online tutorials” model should be adopted, drawing on community lectures, assistance from family members, and short-video instruction to help older adults acquire practical skills. In addition, a “Harbin Digital Tutors” scheme should be established, whereby volunteers or community workers provide one-on-one coaching to resolve problems encountered in daily use. This will broaden older adults’ trust in age-friendly digital products and strengthen their willingness to purchase emerging digital products designed for their needs.

3.4. Stimulating Market Dynamism and Optimizing the Development Environment

3.4.1. Removing institutional barriers and promoting fair competition

Approval procedures for the supply of age-friendly digital products and services should be streamlined, with fast-track channels established to accelerate market entry. At the same time, the technical standards system for age-friendly design should be improved to advance industry standardization, and the digital upgrading of community elderly care service centers should be supported through the introduction of intelligent health monitoring equipment and telemedicine services to raise service efficiency. Intellectual property protection should be strengthened and infringements rigorously penalized so as to safeguard firms’ incentives to innovate. Industry associations should be encouraged to build technology exchange platforms that foster inter-firm collaboration and avoid duplicated R&D and resource waste.

3.4.2. Innovating service models for digital age-friendliness and cultivating new growth drivers for the silver economy

Enterprises should be encouraged to explore new age-friendly digital business formats, such as online medical consultation, smart home-based care, and social platforms for older adults. Public–private partnerships should be used to attract market actors and optimize resource allocation, thereby building a sustainable silver economy ecosystem. In parallel, market regulation should be reinforced to protect the consumption rights and interests of older adults and to foster a safe and trustworthy digital consumption environment.

4. Conclusion

In sum, the development of digital age-friendliness is not only a key driver for unblocking the “last-mile” bottlenecks in the high-quality development of Harbin’s silver economy, but also an integral component of the city’s modernization process—one capable of offering a replicable “Ice City” model for the governance of ageing societies across China. Empowering social inclusion through technological innovation and fostering intergenerational harmony through digital sharing constitute a distinctive hallmark of a Harbin modernization path that balances efficiency with equity, and technology with human warmth. As digital age-friendliness continues to deepen in the years ahead, it will undoubtedly open broader avenues for the high-quality development of Harbin’s silver economy.

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