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JFSE Journal for Future Society and Education

JFSE | eISSN: 3078-6010 | Vol. 2 No. 4 (2025) | OPEN ACCESS

https://doi.org/10.3991/jfse.v2i4.59265

PAPER

Research on Legal Strategies for Eliminating "Technical Barriers to Benefits" of the Elderly Group under the Perspective of Chinese Digital Divide Governance

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ABSTRACT

In the digital age, while intelligent technologies have significantly boosted productivity and convenience, the rapidly growing elderly population faces a significant "digital divide" in adopting digital tools due to various subjective and objective limitations. Addressing how to help seniors bridge this divide and ensure they benefit from social progress has become a critical challenge in the digital era. Against this backdrop, safeguarding elderly digital rights has become imperative, with the concept of "benefiting through technology exclusion" gaining prominence. By analyzing power imbalances in the "technology-rights-society" triad that drive digital exclusion among seniors, we analyze the technical, institutional, and developmental adaptation risks faced by legal strategies for "eliminating technological barriers" among the elderly population. We can refine the "benefit exclusion mechanism" within existing legal frameworks for elderly digital rights protection. Through multi-dimensional strategies—including clarifying "digital exclusion benefits," strengthening "digital empowerment programs," and advancing age-friendly adaptations of smart devices—these measures will bridge the digital divide, enhance social harmony, and ultimately contribute to realizing the vision of a modern socialist the whole body of mankind societal where all citizens thrive.

KEYWORDS

China, digital divide, technology barriers to benefit access, protection of rights of older persons in the digital age

1 INTRODUCTION

Since the Chinese government proposed the goal of building a digital China, intelligent technology has become a driving force for transforming the social production and lifestyle in our country. However, the drastic changes in production and lifestyle have also triggered an increasingly widening "digital divide" between the elderly population and intelligent technology. The 2023 "Overall Layout Plan for Digital

Chenxiang, X., Xun, Z., Hui, M. (2025). Research on Legal Strategies for Eliminating "Technical Barriers to Benefits" of the Elderly Group under the Perspective of Chinese Digital Divide Governance. *Journal for Future Society and Education (JFSE)*, 2(4), pp. 55–65. https://doi.org/10.3991/jfse.v2i4.59265

Article submitted 2025-09-17. Revision uploaded 2025-10-29. Final acceptance 2025-11-04.

China Construction" issued by the Chinese government proposed to accelerate the innovative application of digital technologies in key areas such as finance, education, and healthcare. However, while the digitalization process accelerates, it also exacerbates the technological challenges faced by the elderly population. Data from the National Bureau of Statistics shows that in 2024, China's population aged 60 and above reached 310.31 million, accounting for 22.0% of the national population. In the previous year of 2023, China's population aged 60 and above was 296.97 million, representing 21.1% of the total population.[1] Based on the 2015 national 1% population sample survey as the main prediction parameter source and relying on the population prediction (DemProj) module in the latest version of Spectrum software, it is predicted that the elderly population in China will continue to grow in the first half of the 21st century, reaching 412 million people in 2035 and 480 million people in 2050 [1]. Along with the aging of the population is the social intelligence caused by emerging technologies such as the Internet and artificial intelligence. With the vigorous development of emerging technologies such as the Internet of Things, cloud computing, and intelligent technology, the current society is undergoing great changes, and human society is entering a new era characterized by digitization. [2] While society has fully embraced the digital age, the "digital divide" between intelligent technologies and older adults continues to widen, leading to adverse consequences such as wealth disparity and social isolation.

To address this, it is crucial to thoroughly examine factors contributing to elderly digital exclusion, including technological design biases, access barriers, and escalating intergenerational conflicts. By evaluating China's existing digital rights protection framework for seniors, we must legally define the digital entitlements of older adults in the digital era, analyzes the reference significance across legal systems, and propose a globally replicable strategy template according to the applicability of legal systems. This will enable the formulation of targeted legal strategies to safeguard their digital rights, achieve technological equity, and ultimately enhance the whole body of mankind's societal harmony and stability.

2 THE CHINA DILEMMA AND CHALLENGE OF "DIGITAL DIVIDE" IN THE ELDERLY GROUP IN THE INTELLIGENT ERA

The theory of technological justice advocates for technology to serve as a "public good for all," ensuring equitable distribution of its benefits across society rather than becoming a tool for private gain by select groups. Technological advancement inevitably triggers redistribution of power and structural transformations in society. As a product of the tripartite interaction between technology, power, and society, the digital disability challenges faced by older adults demand thorough examination of the underlying power imbalances in this context.

2.1 Technical dimension: Technical design bias

Digital technology design predominantly targets younger demographics, often overlooking the physiological characteristics, cognitive capabilities, and operational habits of older adults, resulting in inherently biased systems from the outset. While digital services and devices feature diverse functionalities with interfaces

[1] National Bureau of Statistics: "Bulletin of the Seventh National Population Census (No.5)", https://www.stats.gov.cn/sj/tjgb/rkpcgb/qgrkpcgb/202302/t20230206_1902005.html

tailored to youth preferences, elderly users frequently struggle to adapt to these "youth-oriented" designs due to age-related physical decline and synchronized deterioration of cognitive abilities and memory. Moreover, given that older adults possess smaller working memory capacities and slower information processing speeds compared to younger individuals, handling complex interfaces that require multitasking across multiple information elements often exceeds their working memory limits, leading to difficulties in information processing. [3] The Law on the Construction of Barrier-Free Environment explicitly states in Article 4 that barrier-free environment development should be integrated with age-friendly renovations. Article 54 further stipulates that the state provides financial support, government procurement incentives, and tax breaks for the research, development, and application of barrier-free facilities, information systems, and services. However, the core provisions of this law remain focused on infrastructure construction and information exchange, failing to explicitly address the broader digital rights of elderly populations. This ambiguous legal framework regarding digital rights for older adults has resulted in inadequate protection of their digital welfare. In 2022, the UK government updated its Digital Strategy, aiming to establish a more inclusive, competitive, and innovative digital economy model through digital transformation. By strengthening digital infrastructure, cultivating digital talent, and optimizing the innovation environment, this marks a crucial step for the UK to secure a leading position in global digital governance. However, its community digital training program only covers 30% of the rural elderly, which intuitively shows the lack of coverage of the collaboration mechanism and points out the direction for the optimization of the collaboration mechanism in the future.

2.2 Rights dimension: Digital access dilemma

Telecom operators have a wide variety of network packages and complex tariff structures and do not provide products and services specifically for the elderly group. When choosing phone plans, the elderly group lacks in-depth understanding of modern communication technology and service content and is prone to choice dilemma due to information asymmetry and too many packages [4]. The dilemma of digital access is not only reflected in the micro choice of packages but also reflected in the macro imbalance of information infrastructure construction between different regions [5]. In terms of 5G base station construction, as of the first half of 2024, Guangdong, Jiangsu, and Zhejiang—leading the development of 5G infrastructure—have built 320,000, 237,000, and 220,000 5G base stations respectively, while Xizang, Ningxia, and Qinghai have only over 10,000, 14,000, and 16,599 5G base stations, respectively.[2] In addition, in terms of 5G network coverage, by July 2024, prefecture-level cities and county urban areas have basically achieved full 5G network coverage, but the 5G network coverage rate in administrative villages is only 90 percent, and nearly 48,900 administrative villages still cannot enjoy 5G services.[3] This infrastructure imbalance traps elderly seniors in the West in a "dual digital divide"—lacking both the means to purchase digital devices and access to information networks. Particularly in fields like telemedicine and senior care services, slow internet

[2] TD Industry Alliance: 5G Industry and Market Development Report, https://www.tdia.cn/Uploads/Editor/2025-03-14/67d41b8d633d6.pdf

[3] China News Network: "Five Years of 5G Commercialization: What Changes Has It Brought to Production and Life in Prefecture-Level Cities and County Urban Areas?" https://www.chinanews.com/cj/2024/06-06/10229369.shtm

speeds make it difficult for older adults to use digital tools, thereby blocking their access to digital dividends. This creates a vicious cycle of "lagging infrastructure, access barriers, and digital exclusion." The 2024 Development Report of Canada reveals striking regional disparities in 5G coverage. While rural western regions have a mere 55% coverage rate, urban eastern areas boast a remarkable 98%. This uneven distribution of digital infrastructure provides crucial data to refine regional digital development strategies and bridge the urban-rural digital divide.

2.3 Social dimension: Intergenerational conflict intensifies

Chinese family members, being the closest to elderly relatives in daily life, should shoulder the responsibility of helping them acquire digital skills. However, the fast-paced lifestyle and demanding work schedules of modern society often leave family members overwhelmed, making it difficult for them to address seniors' digital learning needs. This situation inadvertently widens the intergenerational digital divide. On the surface, older adults appear increasingly marginalized in the digital society due to their weaker digital literacy and information skills. Yet at its core, this reflects an issue of intergenerational equity in digital resource distribution. According to the "Intergenerational Contract" theory, different generations should support each other—each generation must create favorable conditions for the next while also benefiting from the achievements of previous generations. In today's digital era, however, younger generations, shaped by their upbringing and educational backgrounds, hold a clear advantage in resource allocation, creating growing disparities with older adults. This unfair distribution not only exacerbates the digital divide but also violates the fairness principles advocated by the "Intergenerational Contract." Intergenerational conflicts extend beyond resource distribution to include socioeconomic status and discourse power. As natural extensions of the digital age, digital nations and societies grant younger generations greater advantages than older adults in employment and entrepreneurship. Moreover, through social media platforms, the younger generation amplifies their voices, influencing government decisions to secure greater benefits for themselves. However, at the present stage, the actions of social organizations are more derived from their own social responsibilities, and there is no positive incentive measure to form a scale effect.

2.4 The international contribution of the China plan

The digital divide is not only a domestic governance issue but also a common challenge for aging societies worldwide. China's practices in protecting the digital interests of the elderly provide important reference examples for developing countries, especially those along the "Belt and Road." The China solution adheres to the concept of "digital justice" and forms a collaborative governance mechanism through comprehensive legal systems and policy measures, with government guidance, corporate participation, and social support. Regarding special legal institutions and common law systems, in 2023, Cynthia Adams, an American senior citizen, filed a lawsuit against Amazon and Amazon Services LLC at the Western District Court of Virginia (Case No. 2:2023cv00913), alleging that Amazon's automatic renewal practices violated both Virginia's statutory laws and common law. This proposed class action lawsuit was also filed by Adams on behalf of other similar cases. Amazon, the defendant, sought to transfer the case to the Western District Court of Washington,

citing exclusive jurisdiction clauses in the "Terms of Service" that Adams agreed to when logging into her Prime account. This move illustrates the practical application of liability allocation logic under the jury system, as common law primarily relies on case law, with juries playing a crucial role in fact-finding. For civil law countries like France, the adjustment of rights relief pathways to "first attempt administrative mediation, and if no settlement is reached within 15 working days, then file a lawsuit in administrative court" aligns with their advanced administrative law systems. Since civil law primarily draws from statutory law and has well-developed administrative law frameworks, such adjustments facilitate effective rights protection. Chinese solutions and practices in the legal protection of digital interests for the elderly not only have great reference value for the majority of developing countries but also contribute important theoretical wisdom to the construction of "humanity development."

3 REFERENCE RISK OF LEGAL PROTECTION OF DIGITAL INTERESTS OF THE ELDERLY

Within the tripartite framework of "technology-rights-society" interaction, the three types of risks confronting legal strategies for "technology barrier removal benefits" among the elderly population are not isolated phenomena, but rather concrete manifestations of dynamic coupling imbalances among these three elements. The indiscriminate iteration of technology, passive assertion of rights, and homogenized social responses intertwine to create three critical risks: 1) Technological adaptation risks arising from the disconnect between regulatory frameworks and technological development pace; 2) Institutional adaptation risks stemming from conflicts between legal systems, judicial traditions, and cultural structures; 3) Development adaptation risks resulting from mismatched protection standards with economic development levels. To thoroughly analyze the risk generation logic in this tripartite interaction, it is essential to first clarify the specific projections and transmission pathways of each risk within the "technology-rights-society" chain.

3.1 Technical compatibility risk

If legal strategies define the standard for "eliminating technical barriers" too rigidly, they may impose undue constraints on technological innovation. Digital technologies evolve at a pace far exceeding legal revision cycles. For instance, requiring platforms to adopt "traditional button-style" interfaces for elderly users could hinder the adoption of more inclusive technologies like voice interaction and gesture control. Similarly, mandating companies to establish offline technical support centers might stifle the growth of third-party tech service platforms. This "rules lagging behind technology" risk fundamentally stems from legal strategies overlooking technological development patterns. Ultimately, it could leave elderly users trapped in a "technology-protected by-obsolescence" dilemma, missing out on the convenience brought by digital advancements.

3.2 System compatibility risk

In common law jurisdictions where case law forms the legal foundation, over-reliance on statutory frameworks to protect the "benefits of removing technical

barriers" for the elderly population may create systemic conflicts in legal sources. The core logic of common law lies in developing a dynamically adaptive rule system through the accumulation of precedents. Judges must exercise discretion in applying concepts like the "reasonable care obligation" and "technical accessibility standards" based on specific case circumstances. However, statutory laws often prioritize uniformity and clarity, with rigid provisions that may clash with established judicial precedents. For instance, if statutory law mandates platforms to provide "one-click" technical assistance for users aged 65 and above, this could contradict the principle of "differential liability based on technical feasibility" recognized in previous case law. This would leave judges in a dilemma when citing precedents, fragment existing judicial consensus, and ultimately undermine the stability and predictability of legal application. Such conflicts not only risk delaying case adjudication efficiency but also weaken the flexibility of case law in adapting to technological iterations, causing institutional responses to lag behind the evolving technical needs of the elderly population.

3.3 Develop adaptability risk

When developing countries attempt to bridge the digital divide and establish elderly-friendly technical rights protection systems, blindly replicating high-income nations' standards risks creating a "standard-fiscal" imbalance trap. These advanced standards are rooted in robust economic foundations: Nordic countries require multilingual AI voice assistants in public service platforms and mandate 100% technical support positions at physical service outlets, backed by substantial government investments in digital infrastructure. According to ITU data, high-income countries allocate approximately 0.3% of GDP to digital inclusion subsidies, compared to merely 0.05% in low-income nations. Direct adoption of such standards would impose three fiscal pressures on developing countries: First, infrastructure upgrade costs—installing high-speed networks for rural elderly populations may exceed local budgets. Second, sustained operational expenses—technical support teams and equipment maintenance—create long-term financial burdens. Third, standard iteration costs—struggling to keep pace with high-income nations' technological advancements. This imbalance risks not only superficial policy implementation (e.g., urban-only pilots neglecting rural areas) that exacerbates urban-rural digital divides but also squeezes resources for essential public services like education and healthcare, creating a secondary risk of "digital inclusion crowding out basic livelihoods."

4 THE LEGAL CONNOTATION AND REPRESENTATION OF THE BENEFIT OF REMOVING TECHNICAL BARRIERS FOR THE ELDERLY GROUP

As the digital power structure remains imbalanced, elderly individuals face challenges in accessing the benefits of the digital age. This widening "digital divide" necessitates legal intervention to protect their rights as vulnerable groups and ensure equitable distribution of societal benefits.

4.1 The connotation of benefit of eliminating technical barriers for the elderly group

The capability justice theory advocates that social justice should be measured through human capabilities and functions, focusing on people's actual capacities

and potential rather than merely resource allocation or equal outcomes. Under current legal frameworks, the rationale behind "technological barriers exclusion benefits" originates from Article 3's "active aging" principle and Article 69's obligation to "create conditions for elderly participation in social development" under China's Law on the Protection of the Rights and Interests of the Elderly. This framework represents a digital extension of social rights, combining dual attributes of social and developmental rights. Specifically, the former entails the state fulfilling its duty under Article 71 to "develop senior education," creating inclusive digital environments for elderly learners and addressing algorithmic discrimination. The latter aligns with the "lifelong development philosophy" outlined in the 14th Five-Year Plan for National Aging Development and Elderly Care Service System, where digital empowerment ensures basic guarantees for seniors' digital learning.

4.2 Main manifestations of benefits in removing technical barriers for the elderly

Digital integration benefits. The prioritized protection for the elderly stems from their disadvantaged position in the digital society. Due to physical limitations and cognitive challenges, older adults face multiple barriers in digital integration. According to Vygotsky's sociocultural theory, learning emerges from social interactions, where learners' cognitive development is shaped by the tools and resources available in their sociocultural environment [6]. Therefore, to narrow the "digital divide" of the elderly group, it is not only necessary to tilt material resources, but also a good social and cultural environment is an important link.

The digital exclusion interest. Every senior citizen has the legitimate right to reject digital services and opt for traditional alternatives. As social inclusion mechanisms demonstrate, diverse service models inevitably lead to power structures that marginalize vulnerable groups and erode core societal values. This reality necessitates establishing a "harmony in diversity" framework based on mutual respect. Guided by modern legal principles, such a system should create rights-based consultation mechanisms to safeguard the dignity and practical capabilities of disadvantaged populations [7]. This is reflected in the application of digital intelligence technology in the retention of traditional service methods.

4.3 Concept of benefit with clear removal of technical barriers for the elderly

The exclusion benefit of technological barriers for the elderly refers to the support from the state, society, and enterprises that the elderly enjoy when they encounter digital technological barriers so as to ensure that the elderly can equally enjoy the dividends brought by the digital era [8]. Fundamentally, addressing technological barriers to safeguard seniors' rights extends beyond material assistance. It fundamentally addresses social equity, justice, and human rights, ensuring older adults don't face disadvantages in the digital age due to technological gaps. Governments, communities, and businesses must collaborate to bridge the digital divide through concrete actions. By fostering inclusive and equitable social environments, we can create more equal and harmonious living conditions for seniors. Resolving these technological barriers not only elevates the quality of life for older generations but also strengthens societal harmony and stability.

5 RESEARCH ON THE CONSTRUCTION OF LEGAL SAFEGUARD STRATEGIES FOR THE ELIMINATION OF TECHNICAL BARRIERS TO THE ELDERLY GROUP

In the thriving digital age, intelligent technologies have permeated all aspects of society, profoundly transforming production and lifestyles. However, elderly individuals face significant barriers in accessing these technological conveniences, with the "digital divide" becoming increasingly pronounced. To effectively safeguard seniors' digital rights and ensure they equally benefit from technological advancements, develop country-specific strategy templates based on regional differences, which is great significance to the development of all mankind.

5.1 "Digital Empowerment" Facilitating Digital Integration for the Elderly

Establishing a government-led digital assistance system for the elderly, with broad participation from all sectors of society, is a crucial step in addressing the digital divide among older adults. Achieving equitable intergenerational distribution of digital resources requires balancing "digital reverse mentoring" and "digital legacy." While younger generations teach older adults' digital skills, they themselves also gain valuable "digital heritage" from their elders [9]. Legal incentives to encourage family members and younger generations to actively teach digital skills to seniors represent a crucial measure for achieving "digital reverse mentoring." By explicitly incorporating digital mentoring provisions into family support regulations, this initiative establishes the acquisition of digital competencies as an integral part of elderly care obligations. For instance, the revised Law on the Protection of the Rights and Interests of the Elderly explicitly mandates that family members assist seniors in mastering digital devices and acquiring essential digital skills, thereby enabling them to better adapt to digital lifestyles.

5.2 Intelligent products and services adapted to aging

Establishing unified national standards and industry guidelines for age-friendly adaptations of smart products and services forms the foundation for ensuring elderly users can access these technologies seamlessly. When designing interfaces, simplicity should be prioritized by removing complex or infrequently used features that might confuse seniors, thus preventing interface clutter from functional overload. Public service apps, given their universal applicability and critical importance, require particularly rigorous age-friendly adaptations. Key measures include streamlining workflows by limiting core functions to three steps, eliminating redundant operations, and implementing "one-click access" shortcuts [10]. Beyond essential features like 16-point large fonts, high contrast ratios, and simplified interfaces, standardized information presentation methods should be implemented. Special attention must be given to potential operational errors by elderly users, with clearly marked return, undo, and help buttons to enable timely corrections. As providers of smart products and services, companies bear inescapable legal responsibilities for age-friendly adaptations. From a corporate social responsibility perspective, businesses should not only pursue economic benefits but also consider social impacts on diverse demographics. Given that seniors constitute a vital part of society, companies must provide accessible support systems to help them integrate into the digital world.

5.3 Traditional service model retention and protection

In the digital age, the rights of elderly individuals regarding digital exclusion should be explicitly articulated in relevant laws and regulations to ensure their legitimate interests are fully protected. When revising the Law on the Protection of the Rights and Interests of the Elderly, a dedicated chapter on "Digital Rights" could be established to systematically develop a framework for senior citizens' digital entitlements. A core principle of this chapter would be granting seniors autonomy in choosing service methods. The chapter must clearly stipulate that elderly individuals legally retain the right to opt for traditional service options during digital service scenarios. In healthcare provisions, legislation requires hospitals to maintain designated on-site registration counters during regular working hours—a fundamental requirement to meet seniors' medical needs. These counters should be located in prominent, easily accessible locations within hospitals, equipped with clear signage and directional guidance facilities for easy identification. Equally crucial is the deployment of professional and patient-guiding staff who not only understand hospital registration, payment, and consultation procedures but also possess basic medical knowledge to address common questions. Regarding public transportation, transit hubs, including buses, subways, and train stations, must retain manual ticketing windows and refrain from arbitrarily reducing their number [11]. When scheduling window opening hours, we must fully consider the travel patterns of elderly passengers. For instance, during peak hours when seniors tend to travel more frequently—such as morning grocery runs, exercise sessions, and evening rush hours—providing additional ticket windows can effectively reduce their waiting time. Additionally, maintaining a portion of offline ticket sales channels is essential, particularly during holidays and peak travel seasons. This ensures elderly passengers can purchase tickets through physical outlets, guaranteeing their travel convenience.

5.4 Optimize and adjust regional differences in the international area

Adjusted according to the level of economic development, high-income countries adopt a "corporate investment + tax incentives" model tailored to their economic development levels. They clarify corporate accountability by requiring platforms to integrate age-friendly adaptations into mandatory product development processes, such as submitting age-friendly feature test reports during app updates. Tax incentives include a 30% corporate income tax deduction for R&D investments in age-friendly technologies, along with 15% annual operational cost subsidies for companies establishing offline technical support centers. Low-income countries maintain traditional service channels, mandating that core sectors like government services, healthcare, and finance retain physical service counters. Banks must continue providing manned counter services, and communities must maintain offline service points. They implement cost-effective adaptation solutions to avoid high-tech upgrades, such as developing SMS-based government notification services in regions with widespread feature phone adoption.

Adjusting according to cultural differences, East Asian cultural spheres are strengthening "legally mandated digital literacy guidance for families." Relevant legislation explicitly defines parental responsibilities, requiring adult children living with elderly parents to provide basic digital skills training, such as assisting with mobile payments and health code applications. Supporting measures

include community-organized "digital literacy workshops" offering teaching materials and venues, as well as age-friendly apps developed by companies for "parent-child collaborative learning" where children can remotely help parents set up interfaces and troubleshoot issues. In Western cultural spheres, "community incentive programs" are implemented. These mechanisms encourage youth and retired technicians to volunteer through "community digital volunteers" programs, offering public service discounts (e.g., free access to community fitness facilities and priority participation in community activities) to those meeting service duration standards. Companies collaborate through "Corporate Community Service Days" to supplement volunteer efforts.

6 CONCLUSION

In the digital age, ensuring elderly individuals' access to technological benefits constitutes a systemic undertaking that intertwines technological innovation, social equity, and legal system development. From the perspective of social development theory, safeguarding these elderly citizens' interests represents a crucial indicator of comprehensive societal progress. Social advancement should not be a solo performance by specific groups but rather a collaborative journey for all members. Establishing technological accessibility benefits for seniors embodies the profound practice of legal fairness. Laws must not only maintain social order but also protect vulnerable groups' legitimate rights, uphold principles of fairness and justice, and demonstrate legal humanistic care and social responsibility. Practically speaking, through establishing digital feedback mechanisms, adapting smart products and services for elderly users, and preserving traditional service models, we can gradually bridge the digital divide between older generations and modern society, enhancing their sense of fulfillment, happiness, and security. Moving forward, as digital technologies continue evolving, ensuring elderly access to technological benefits will face new challenges. This requires deepening theoretical research, continuously optimizing legal strategies, uniting diverse stakeholders, fostering a society-wide collaborative environment, and promoting equal, holistic development for seniors in the digital era—ensuring that the fruits of digital progress truly benefit every member of society.

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