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Research on the Problem of Smart Public Transport for the Elderly

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Abstract: Intelligent transportation systems integrate numerous advanced technologies such as the Internet of Things, artificial intelligence, and cloud services, thereby forming a comprehensive and intelligent transportation service platform. Although this platform has brought great convenience to people's daily travel, it is insufficient in terms of adaptability for the elderly group. Based on this, the author will conduct an in-depth analysis of the current problems in the aging-friendly construction of smart public transportation in this paper and propose corresponding solutions, hoping to provide some references and help for readers.

Keywords: Smart public transportation; Aging-friendly; Urban construction

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1. Introduction

With the intensification of the global population aging trend, the contradiction between the travel needs of the elderly group and the supply of social public transportation services has become increasingly prominent. According to data from the United Nations, the global population aged 60 and above is expected to exceed 1.2 billion in 2025. Among them, China, as one of the countries with the fastest aging speed, has seen the proportion of elderly population exceed 18%. Against this background, how to build an intelligent transportation system that adapts to the needs of an aging society through technological innovation and optimization of public services has become an important issue in urban governance and people's livelihood projects. As the main reliance for the elderly in their daily travel, the aging-friendly transformation of public transportation is not only related to social equity, but also a key indicator to measure the degree of urban civilization and humanistic care.

2. Problems in the age-friendly construction of smart public transport

2.1. Technical-level problems

At the technical level of building age-friendly smart public transport, hardware facilities, as the physical carrier of age-friendly services, their degree of improvement directly affects the travel experience of the elderly. Currently,

the coverage rate of barrier-free facilities in China's public transport vehicles is still insufficient. Age-friendly configurations such as low-floor designs and barrier-free ramps have not been popularized, which makes it extremely difficult for wheelchair users or elderly people with mobility difficulties to get on and off the vehicles. Platform facilities also have shortcomings: the lack of barrier-free passages, such as ramps and tactile paving, as well as insufficient anti-slip floors and sunshade facilities, all increase the travel risks for elderly passengers. In addition, the age-friendly design of in-vehicle hardware facilities needs to be strengthened urgently. Issues such as excessively narrow seat spacing and insufficient anti-slip performance of handrails may pose threats to the safety of elderly passengers [1].

In terms of software services, although age-friendly apps have launched an "elderly mode", their operational complexity still needs to be further simplified. Operations such as multiple clicks and swipes still have a learning threshold for the elderly. Moreover, some functions like real-time public transport inquiries and QR code payments may lead to operational errors in actual use due to unintuitive interface designs. As an important part of intelligent services, voice interaction has also exposed limitations in age-friendly scenarios. Problems such as low recognition rates of dialects and lack of offline functions greatly reduce the effectiveness of voice assistants in weak signal or noisy environments, making it difficult to meet the actual needs of elderly passengers.

What is more severe is that the problem of data barriers has become increasingly prominent in the age-friendly construction of smart public transport. Insufficient cross-departmental data sharing leads to lagging analysis of the elderly's travel needs, and there is a lack of accurate basis for route optimization and capacity allocation. On the one hand, internal data of the public transport system, such as passenger flow and vehicle operation status, cannot be effectively integrated with external data from medical institutions, communities, etc., making it difficult to form a comprehensive insight into the travel needs of elderly passengers. On the other hand, problems such as untimely data updates and insufficient accuracy also restrict the precise delivery and dynamic adjustment of age-friendly services in smart public transport [2].

2.2. Issues at the management level

Currently, there is a lack of unified standards for the design, construction, and acceptance of age-friendly public transport vehicles and platforms, resulting in uneven quality of renovations. When promoting age-friendly transformations, some cities, due to the absence of clear regulatory guidance, often have to rely on local experience or enterprise standards. This not only increases the blindness of the transformation but also makes it difficult to guarantee the effectiveness of the renovation. At the same time, the gap in the evaluation mechanism also restricts the quantification and improvement of the effect of age-friendly services. Due to the lack of a scientific evaluation system, it is difficult to objectively assess the actual effect of age-friendly services, thus failing to provide a strong basis for policy adjustment and optimization [3].

In addition, the weakness in operation and maintenance management is also a major challenge at the management level. In practice, some cities have the phenomenon of "emphasizing construction over operation". They excessively pursue the coverage rate of intelligent equipment while neglecting the later operation and maintenance management. This leads to high equipment failure rates and short service life, which not only affects the travel experience of elderly passengers but also increases operating costs. Furthermore, insufficient personnel training also restricts the improvement of the quality of age-friendly services. Frontline service personnel, such as drivers and platform staff lack special training in age-friendly services, fail to respond timely to the needs of elderly passengers, and even have problems such as poor service attitude, which seriously damages the travel

rights and interests of elderly passengers [4].

Finally, the lack of a supervision mechanism is also a major hidden danger at the management level. In the process of age-friendly services, due to the lack of an effective supervision mechanism, it is difficult to conduct real-time monitoring and evaluation of service quality. This leads to problems such as substandard service quality and even illegal operations among some service providers, which seriously damage the legitimate rights and interests of elderly passengers. Moreover, the insufficient public participation also restricts the continuous improvement of age-friendly services. Due to the lack of effective public participation channels and feedback mechanisms, it is difficult to timely understand the needs and opinions of elderly passengers, thus unable to make targeted improvements and optimizations to the services.

2.3. Issues at the social level

In the eyes of some members of the public, aging-friendly renovations are seen as a form of "special care," and some even consider them a "waste" of public resources. This cognitive bias stems from an underestimation of the importance of the travel needs of the elderly population and a neglect of the social value of aging-friendly services. In fact, aging-friendly renovations are not only a necessary measure to safeguard the travel rights and interests of the elderly but also an important manifestation of building an inclusive society and achieving social equity. However, this cognitive bias has led to many obstacles in the promotion of aging-friendly services, such as difficulties in raising funds and ineffective policy implementation. In addition, with the continuous development of smart public transportation technology, intelligent devices have gradually become standard in travel services. For the elderly group, however, these devices often become barriers to their travel. Due to restrictions such as age and educational background, some elderly people are not proficient in operating smart devices such as smartphones and apps, and some even have a resistant attitude. This digital divide not only limits the elderly's access to the convenience of smart public transportation services but also exacerbates their sense of isolation and helplessness during travel.

Aging-friendly services require the joint participation of multiple parties, such as the government, enterprises, and communities, to form a synergy. However, in practice, there are often problems such as insufficient government investment, low enthusiasm of enterprises to participate, and inadequate community services. This lack of social support has caused many difficulties in the promotion of aging-friendly services, such as slow progress in facility renovation and uneven service quality.

In the process of building aging-friendly smart public transportation, the younger generation often plays the roles of designers and promoters. However, due to differences in age and life experience, the younger generation often finds it difficult to fully understand the travel needs and pain points of the elderly group. This intergenerational communication barrier leads to a situation where aging-friendly services are often designed based on "assumptions," making it difficult to truly meet the actual needs of the elderly [5].

Finally, the needs of elderly groups for aging-friendly services may vary across different regions and cultural backgrounds. For example, in some rural areas, the elderly may be more accustomed to traditional travel methods and have a lower acceptance of intelligent devices. Therefore, in the construction of aging-friendly smart public transportation, it is necessary to fully consider cultural differences and formulate service plans in accordance with local conditions.

3. Optimization strategies for aging-friendly construction of smart public transport

3.1. Accessibility upgrading of hardware facilities

Hardware facilities form the foundation of aging-friendly smart public transport. Through systematic renovation and upgrading, a safer and more convenient travel environment can be created for the elderly.

In terms of vehicle modification for the elderly, efforts should be made to promote low-floor and low-step buses to reduce the height difference between the vehicle and the platform, making it easier for the elderly to get on and off. For example, Xingyi City in Qianxinan Prefecture has deployed low-floor vehicles on hospital-specific lines, greatly facilitating the elderly's travel for medical treatment. The interior of the vehicles should be equipped with anti-slip floors, and the density and height of handrails should be increased to ensure that the elderly can grip them stably. Adjustable seats should also be installed to facilitate getting up. Meanwhile, priority seats for "the elderly, weak, sick, disabled, and pregnant" should be equipped with eye-catching signs and seat belts [6].

The aging-friendly construction of bus stops and hubs is equally crucial. Smart waiting pavilions should integrate large-font electronic stop signs with voice broadcast functions, allowing the elderly to clearly know vehicle information. Spacious, comfortable seats with backrests should be provided for the elderly to rest while waiting. Barrier-free passages and ramps are also necessary to facilitate the movement of wheelchair users. For the "last kilometer" from communities to bus stops, feeder bus services can be increased, and community transfer stations can be added to reduce the walking distance for the elderly. In addition, clear and prominent guiding signs should be set up in hub transfer areas, and staff or volunteers should be arranged at key nodes to guide the elderly, helping them transfer smoothly. Through the comprehensive upgrading of hardware facilities, the mobility threshold for the elderly to take buses can be effectively reduced, and their travel experience can be improved.

3.2. Humanized innovation in service modes

Humanized innovation in service modes is key to enhancing the elderly-friendly level of smart public transportation. Therefore, local governments should launch special routes for respecting and caring for the elderly. For example, Haikou has introduced 15 such special routes, where everything from vehicle configuration to in-car layout is designed around the elderly group. These routes are equipped with supplies like love kits and first-aid kits, and eye-catching and warm reminders are posted to create a cozy riding atmosphere. At the same time, driver training should be strengthened, and service standards should be standardized. Drivers are required to take the initiative to help elderly people with mobility difficulties get on and off the bus, patiently answer their questions, drive steadily during the trip, and reduce discomfort caused by sudden braking and sharp turns. For instance, Changzhi City has carried out special elderly-friendly service training for drivers of the No. 15 special route.

In addition, improving the emergency guarantee mechanism is also an indispensable and important link. Emergency call buttons should be installed in the bus, with clear and easy-to-understand instructions next to them, so that the elderly can contact the driver for help in the first place in case of sudden discomfort, loss of items, etc. Drivers need to pay real-time attention to the status of elderly passengers through rearview mirrors and in-car monitors during driving and promptly detect abnormalities. Moreover, an emergency response system linked with communities and hospitals should be built. When an emergency occurs, it can quickly contact the elderly's relatives and arrange medical assistance [7].

To meet the diverse needs of the elderly, reservation services can also be launched. For example, "fixed time and fixed point" pick-up and drop-off services can be provided to facilitate the elderly to participate in regular activities. For high-frequency travel scenarios such as medical treatment and shopping, route designs should be

optimized, and direct trips should be set up. Through these humanized innovations in service modes, meticulous care is integrated into the entire process of smart public transportation services, effectively enhancing the sense of security and happiness of the elderly in travel.

3.3. Adaptation of intelligent technologies for the elderly

The adaptation of intelligent technologies for the elderly aims to eliminate the "digital divide" faced by the elderly, enabling smart public transportation to truly serve the elderly group. In simplifying digital service processes, on the one hand, traditional payment methods such as cash and elderly cards are retained; on the other hand, convenient functions like "one-click ride-hailing" and "voice ride-hailing" are promoted. For example, the Haikou 95128 taxi-calling hotline and the service to be promoted in Jinzhou allow elderly people who are not familiar with smartphones to easily book buses. At the same time, develop aging-friendly APPs with oversized fonts, high-contrast interfaces, and simplified operation steps. Integrate functions such as real-time bus inquiry, route planning, and station navigation on the homepage, just like the "Changzhi Public Transport" APP, enabling elderly users to access core services with one click [8].

In terms of strengthening barrier-free information transmission, smart bus stops should not only display vehicle arrival information in large fonts but also have a voice broadcast function with a moderate speaking speed and clear content, so that elderly people with poor eyesight or illiteracy can also obtain information. The in-vehicle broadcasting system needs to be upgraded. In addition to regular station announcements, targeted reminders such as "There are steps at the next stop, please stand firm and hold on" are added, and safety reminders and service guidance are given in easy-to-understand language. In addition, intelligent wearable devices are linked with the public transportation system. For example, elderly people wear bracelets with positioning and emergency call functions. In case of emergencies, bus drivers and background systems can quickly obtain location information and provide help. Through these adaptation measures, intelligent technologies will no longer be an obstacle but a powerful assistant for the elderly to enjoy the convenience of smart public transportation, effectively improving their travel experience [9].

3.4. Policy support and social coordination

Policy support and social coordination form a solid foundation for the elderly-friendly transformation of smart public transportation, requiring multi-party collaboration among the government, enterprises, and communities to establish a long-term guarantee mechanism. First, the government should strengthen policy guidance by incorporating the elderly-friendly renovation of public transportation into local people's livelihood projects and transportation development plans. It should strictly implement policies on free or discounted rides for the elderly. For example, Xingyi City provides free rides for seniors aged 70 and above, effectively reducing the travel burden on the elderly. Meanwhile, it should increase financial input by setting up special renovation funds for vehicle purchases, platform upgrades, and installation of intelligent devices. Local governments should be encouraged to explore innovative subsidy models to attract social capital participation. A case in point is Shenzhen, where a partnership between the government and Gaode Taxi (a ride-hailing platform) has created elderly-friendly pick-up points, achieving complementary resource integration between the government and enterprises.

At the enterprise level, public transportation operators must take the initiative to assume social responsibilities by integrating elderly-friendly services into their performance evaluation systems and establishing incentive mechanisms to reward drivers who provide high-quality services. Tech enterprises should leverage their

technological strengths to collaborate with public transportation departments in developing elderly-friendly intelligent systems, lowering the threshold for elderly users. Communities serve as a crucial link between policies and the elderly. They can join hands with social organizations to carry out training programs on intelligent technologies, helping the elderly master skills such as using public transportation apps and scanning codes for rides through "one-on-one" assistance and regular lectures. Additionally, communities can organize volunteers to be stationed at bus stops during morning and evening rush hours to assist the elderly in boarding/alighting and answer their questions. Furthermore, the media should strengthen public awareness and guidance. Through public service advertisements, special reports, and other forms, they can promote the ethos of respecting and assisting the elderly, raise public attention and participation in elderly-friendly public transportation initiatives, and foster a positive social atmosphere where the whole society supports and participates in these efforts. This will drive the continuous deepening of the elderly-friendly transformation of smart public transportation [10].

4. Conclusion

In summary, the construction of age-friendly smart public transportation is a systematic and comprehensive project related to people's livelihood. During the construction process, it is necessary to lay a solid foundation for aging adaptation through barrier-free upgrades of hardware facilities and convey warmth through innovations in humanized services. In the future, with the continuous advancement of aging-friendly transformations, smart public transportation will truly become a warm link connecting cities and the elderly group, inject more humanistic care and development momentum into an aging society, and help achieve the dual goals of transportation inclusiveness and social equity.

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References

[1] Chen Y, 2024, "Smart Brain" Empowers Online Hailing-style Public Transport and Driverless Buses as New Explorations for Urban Public Transport Paths. China Business Journal, China. DOI: 10.38300/n.cnki.nzgjy.2024.002962.

[2] Duan K, 2024, Research on the Evaluation of Age-friendly Public Transport Services in the Context of Smart Transportation. China Venture Capital, 2024(32): 32–34.

[3] Luo J, Shi Y, Wu L, et al., 2024, Research on the Exploration of Smart Public Transport Service Operation Modes in Urban Low-passenger-flow Areas. In: Urban Transport Planning Committee of China Urban Planning Society. Green Digital Intelligence, Improving Quality and Efficiency: Proceedings of the 2024 China Urban Transport Planning

Annual Conference. Shenzhen Urban Transport Planning & Design Institute Co., Ltd., 2116–2123. DOI: 10.26914/c.cnkihy.2024.038717.

[4] Zhang Y, 2024, Research on the Problems of Age-friendly Construction of Smart Public Transport in Xi'an, thesis, Beijing University of Posts and Telecommunications.

[5] Li X, Jia Z, 2024, Research on the Evaluation of Age-friendly Public Transport Services in the Context of Smart Transportation. Logistics Sci-Tech, 47(08): 76–82. DOI: 10.13714/j.cnki.1002-3100.2024.08.021.

[6] Li X, 2024, Research on the Evaluation of Age-friendly Public Transport Services in Taiyuan from the Perspective of Smart Transportation, thesis, Taiyuan University of Science and Technology. DOI: 10.27721/d.cnki.gyzjc.2024.000266.

[7] Yu Z, Lü C, 2024, "Green + Smart" Opens a New Experience of Public Transport Travel. Xi'an Daily, China. DOI: 10.28843/n.cnki.nxarb.2024.000061.

[8] Ding C, Huang X, 2023, Smart Technology Empowers Green Travel, and Integrated Parking and Charging Helps a Better Life. People's Public Transport, 2023(11): 38–40. DOI: 10.16857/j.cnki.cn11-5903/u.2023.11.004.

[9] Han J, 2023, Application of Service Design Thinking in the Design of Urban Smart Bus Stops. Smart China, 2023(10): 77–78.

[10] Bo L, 2023, Digital Empowerment, Smart Public Transport Changes Life. People's Public Transport, 2023(07): 26–27. DOI: 10.16857/j.cnki.cn11-5903/u.2023.07.043.