

Research on Intelligent Design of Cultural Tourism and Elderly Care Spaces under the Context of Smart Wellness

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Abstract

Driven by deep population aging and digital cultural-tourism upgrading, smart wellness facilitates the two-way integration of elderly care and cultural tourism. Traditional cultural-tourism senior spaces are limited in function, age-adaptation, intelligence and humanistic experience, failing seniors' diverse high-quality wellness needs. Guided by smart-wellness and cultural-tourism integration concepts, this paper analyzes values and bottlenecks of space-intelligent design from four dimensions, and explores corresponding principles and strategies. It provides theoretical references for space renovation and planning and promotes sustainable high-quality growth of wellness-tourism industry.

Keywords

Smart wellness, cultural tourism and elderly care, spatial design, intelligence, age-friendly design.

1. Introduction

As China's population aging accelerates, the first generation of "new seniors" is emerging, driving continuous growth in the silver economy. Active and healthy aging has become a core national strategy for elderly care development. Cultural tourism-based retirement spaces-serving as key platforms for senior travel, wellness, leisure, and cultural experiences-are directly shaping the quality of development in the wellness tourism industry through their spatial standards and service systems.

The smart wellness model, enabled by digital technologies such as the Internet of Things, big data, artificial intelligence, and digital twins, effectively overcomes the functional limitations of traditional elderly care environments. It enables digital upgrades in elderly services, spatial environments, and cultural tourism experiences, offering new pathways for innovation in cultural tourism retirement spaces. Currently, most such spaces in China remain at the stage of basic landscape enhancement and fundamental wellness facilities, commonly suffering from fragmented smart applications, homogenized age-friendly design, and poor integration between technology and physical environments. These shortcomings fail to meet seniors' diverse needs for health monitoring, safety assurance, and cultural and emotional fulfillment. From the perspective of smart wellness, this paper focuses on intelligent design for cultural tourism retirement spaces, identifies existing industry challenges, and proposes systematic design strategies to promote the transformation of these spaces from basic residential models to intelligent, experience-driven wellness destinations[1].

2. An Overview of Smart Health and Intelligent Design for Cultural Tourism Retirement Spaces

2.1. Core Content of Smart Healthcare

Based on the concept of active aging, smart healthcare integrates various resources-such as health management, daily life support, cultural tourism experiences, and safety protection-by leveraging modern digital and intelligent technologies, thereby establishing a human-centered, precise, and intelligent new healthcare service system. While traditional healthcare primarily focuses on basic life support and medical care, smart healthcare places special emphasis on seniors' physical, mental, and emotional well-being. By incorporating technology into services, it enables personalized care, precise environmental adaptation, and efficient, intelligent operation and management, comprehensively enhancing seniors'sense of happiness, security, and fulfillment during their retirement lives through travel [2].

2.2. Definition and Value of Intelligent Design for Cultural-Tourism Health Spaces

Smart design of cultural-tourism health spaces involves deep integration of intelligent health technologies, age-appropriate structures, and the creation of cultural-tourism environments. Its goal is to digitally optimize landscape zones, public activity areas, residential buildings, and service zones within cultural-tourism health environments, making them more youth-friendly and improving their quality. Its practical significance manifests in three main directions: first, enhancing safety, comfort, and convenience through smart technologies, adapting to the physiological and psychological characteristics of older adults, and reducing risks associated with travel during retirement; second, integrating cultural tourism and healthcare delivery via intelligent scenarios-deepening cultural experiences and providing personalized health services to overcome limitations of conventional models that offer uniform experiences; Third, achieve precise space management by leveraging big data and intelligent operations and technical services, effectively reduce operational costs, and improve service quality.

3. Current Challenges in the Field of Intelligent Design of Cultural Space and Healthy Tourism.

3.1. Distributed Intelligent Design without System Planning

At present, most projects in the field of cultural tourism have no overall planning of intelligent projects, which means that there are obvious signs of dispersion. Many projects are installing basic intelligent devices such as access control systems, surveillance cameras and intelligent lighting, rather than integrating them into a consistent system to run these devices. There is a serious imbalance between "equipment accumulation" and "function implementation", and the ability to meet the health needs and cultural experience of the elderly limits the basic advantages of intelligent medical care.

3.2. Design is not Enough to Ignore the Different Needs of the Elderly.

In addition, the industry is very homogeneous, and does not distinguish the health needs of the elderly, the disabled and Alzheimer's patients, so the intelligent service with a "one size fits all" solution cannot be realized.

3.3. The Weak Combination of Technology and Cultural Tourism Leads to the Lack of Humanistic Experience.

At present, there is a common misunderstanding of "over-emphasizing technology, ignoring culture and weakening user experience" in the design of cultural tourism and intelligent space for the elderly, mainly focusing on the lack of integration of intelligent technology.

3.4. The Transportation and Maintenance System is Imperfect and the Capacity for Sustainable Development is Insufficient.

It is particularly important for engineering construction to take precedence over operation. In the intelligent development of cultural tourism and old-age space, most projects only pay attention to the initial installation of equipment, lacking comprehensive equipment maintenance, data management and upgrading systems.

4. Basic Principles of Intelligent Design of Cultural Tourism and Nursing Space for the Elderly under the Background of Mental Health

4.1. Give Priority to Young People and the Elderly, and Put People First.

The basic principle of intelligent design is to serve the elderly, strictly follow the people-oriented method, and give priority to the factors that are friendly to the elderly. The application, spatial planning and equipment selection of all intelligent technologies should conform to the physiological, psychological and behavioral characteristics of the elderly, simplify the operation and optimize the interaction mode, so as to reduce the obstacles to the digital use of the elderly. At the same time, space must be really useful and convenient, create multi-level intelligent service scenarios, fully meet the diverse needs of the elderly, and ensure that technology adapts to the elderly users, rather than requiring them to adapt to technology. [3]

4.2. The Integration of Culture and Tourism is Driven by Culture.

The main feature of cultural tourism space for the elderly is different from tradition, which is the fusion of culture and tourism. Intelligent design must be deeply integrated with local culture, folk customs and natural landscape, so as to easily combine intelligent technology with cultural experience, landscape creation and leisure tourism scenes. By using technology to strengthen cultural exchanges and enrich cross-cultural travel and life experiences, these spaces aim to create a multi-faceted healthy place and combine technological innovation with humanistic charm.

4.3. The Principle of System Coordination and Effective Adaptation

Give up scattered and decentralized design methods and adhere to the principle of integrated system planning. The integration of various intelligent modules, including health monitoring, safety, cultural tourism, life service and operation management, creates a unified intelligent system for connecting devices, data interaction and service collaboration. Ensure the harmonious integration of space function, landscape aesthetics and intelligent technology, ensure the high compatibility between intelligent design and space environment, and greatly improve the overall efficiency of space utilization.

4.4. The Principle of Long-term Sustainability and Moderate Intelligence

In the design process, we must adhere to the principle of moderate intelligence, avoid the blind accumulation of technology, and strike a balance between construction cost, user demand and operational complexity. At the same time, it is necessary to establish a long-term operation mechanism with sufficient flexibility in technology upgrading, space transformation and service iteration, to ensure that smart devices, data systems and space environment adapt to the development trend of the industry, and to ensure the continuous and stable utilization of cultural tourism and nursing space for the elderly.

5. Practical Design Strategies for Intelligent Cultural Tourism and Elderly Care Spaces under the Context of Smart Wellness

5.1. Systematically Plan the Intelligent Space System to Achieve Integrated Functional Upgrades

Break the fragmented application landscape of smart devices and establish a comprehensive, integrated intelligent space system. Integrate five core modules-intelligent health monitoring, smart security protection, intelligent lifestyle services, smart cultural tourism experiences, and intelligent operations management-into a unified smart management platform powered by IoT and digital twin technologies, enabling seamless data exchange and device interconnectivity across modules. Precisely configure equipment according to spatial functional zones: in residential living areas, deploy age-friendly smart devices such as smart fitness bands, smart mattresses, and emergency call systems; in public activity zones, install smart lighting, temperature control, and voice-activated interaction devices; in cultural tourism experience zones, implement smart navigation and immersive cultural experience technologies to achieve precise alignment between spatial functions and intelligent capabilities.



Figure 1. Rendering of Indoor Age-Friendly Experience Center for Smart Space System

5.2. Optimize Age-Friendly Smart Design to Meet Diverse Elderly Needs

Targeting the pain points of the elderly in digital-device usage, this paper comprehensively optimizes age-friendly intelligent interaction design. Simple interaction modes including large-font display, high-contrast interfaces, voice control and one-touch operation are adopted to simplify device operation levels and lower barriers to digital access. For special elderly groups such as people with dementia and semi-disabled seniors, exclusive functions including anti-wandering monitoring, fall detection and remote guardianship are added. For instance, the ESP32-based smart elderly-care monitoring system delivers integrated intelligent care covering health monitoring, safety protection, environmental perception, emergency call and remote supervision. It demonstrates strong adaptability to intelligent renovation schemes for smart health-care and cultural-tourism senior-living spaces. Meanwhile, hierarchical differentiated design is implemented. Functional zones for active wellness, rehabilitation nursing and cultural leisure are defined, with tiered intelligent services correspondingly provided to meet the residence, health-care and nursing demands of elderly people with varying physical conditions. Human-oriented spatial layout mitigates the cold mechanical impression of smart devices and improves overall spatial comfort.

5.3. Deepen the Integration of Culture and Tourism with Intelligence to Create Distinctive Immersive Experiences

Leveraging intelligent technologies to enhance cultural tourism experiences and address the superficial integration between cultural tourism and wellness. By deeply tapping into local intangible cultural heritage, folk customs, and natural tourism resources, and utilizing immersive VR/AR technologies, smart lighting, digital cultural creativity, and other tools, we create distinctive smart cultural tourism scenarios. Interactive smart landscapes are integrated into scenic design, enabling coexistence among nature, culture, and intelligent environments. Digital intangible heritage exhibitions and intelligent cultural guidance systems allow seniors to immerse themselves in regional cultures. [4]Through big data analysis of user preferences, personalized cultural tourism activities, wellness programs, and travel itineraries are intelligently recommended, delivering customized wellness services and elevating the quality of travel and residency experiences.[5]

5.4. Improve the Operation and Maintenance Support System to Promote Long-term Sustainable Development

Establish a full-cycle operation and maintenance support system encompassing "design, construction, operation, and iteration." During the design phase, prioritize low-failure-rate, easily maintainable, and highly adaptable smart equipment, while reserving interfaces for future technological upgrades. In the operational phase, assemble a professional management team and establish routine equipment maintenance and periodic system update mechanisms. Leverage a big data platform to continuously collect user feedback on living, wellness, and space utilization, dynamically analyze operational shortcomings, and proactively optimize spatial layouts, equipment configurations, and service offerings. Set up simple feedback channels for elderly users to promptly gather their needs, forming a positive feedback loop among design, operation, and optimization to ensure long-term, high-quality facility performance.

6. Conclusion

The deep integration of intelligent health and cultural tourism is the inevitable trend of high-quality tourism development, and intelligent design is the key to spatial upgrading. In order to solve a wide range of industrial constraints, space design must follow the principles of people-oriented, cultural tourism integration, systematic planning and sustainability. By building an integrated intelligent system, optimizing agefriendly design, promoting the integration of cultural tourism technology and completing the complete life cycle maintenance, we can unify the spatial function, intelligent technology, cultural tourism experience and human care. This provides the characteristic space of high-end healthy tourism for the elderly and consolidates the development of industrial innovation.

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