

Rail-Driven Empowerment and Spatial Restructuring: Research on High-Quality Development of Migratory-Bird Healthcare Tourism along Hainan Central-Line Maglev Corridor

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Abstract: Hainan's migratory-bird healthcare tourism industry presents a remarkable spatial imbalance featuring coastal agglomeration and backward development in central regions. Coastal cities such as Haikou and Sanya are saturated with winter healthcare tourists, while central Hainan cities and counties including Wuzhishan, Qiongzong, and Baoting boast high-quality rainforest ecology, mountainous climate, and Li-Miao medical-healthcare resources. Nevertheless, restricted by poor transportation access for a long time, their resource advantages can hardly be translated into industrial advantages. Closely adjacent to central mountainous areas, Baisha Li Autonomous County has developed mature migratory-bird residence and medical-healthcare business forms, which can serve as an important support for the coordinated development of the central healthcare industry. The planned construction of Hainan central-line high-speed maglev rail transit will thoroughly break the transportation bottleneck in central Hainan and offer brand-new opportunities for central regions to receive migratory-bird healthcare tourists and build a province-wide healthcare system. From the perspective of maglev corridor construction, combined with the residence characteristics and healthcare demands of elderly migratory-bird groups, this paper analyzes resource strengths and existing problems for migratory-bird healthcare tourism development along the Hainan central line. Drawing on domestic experience in mountain-based healthcare tourism development, this paper constructs an integrated development path of "rail + rainforest health care" from dimensions including spatial layout, product innovation, brand marketing, supporting-facility improvement, regional coordination, and ecological protection. It helps Hainan form a differentiated province-wide industrial pattern of coastal vacation on the eastern line, ecological tranquil health care on the western line, and rainforest health care in central regions, and promotes balanced and high-quality development of Hainan's migratory-bird healthcare industry.

Keywords: Hainan central line; Migratory-bird residence; Healthcare tourism; High-speed maglev; Tourism corridor

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1. Introduction

Every autumn and winter, large numbers of middle-aged and elderly people from northern China migrate southward to Hainan for winter healthcare residence, giving rise to a huge migratory-bird residence economy which has become the core pillar of Hainan's silver-haired cultural-tourism industry ^[1]. Migratory-bird groups feature long residence cycles, stable consumption and clear healthcare demands, and are highly dependent on ecological environment, living conditions, medical support and transportation convenience. At present, the spatial development of Hainan's healthcare industry is extremely unbalanced. Coastal regions witness mature tourism development and heavy tourist inflow with huge carrying pressure in peak seasons. Central mountainous areas enjoy a favorable ecological environment, no coastal salt-fog hazards, and a mild climate suitable for chronic-disease conditions and long-term tranquil residence. However, due to poor transportation accessibility and lagging industrial development, they have remained marginalized in cultural-tourism development for a long time ^[2]. Relevant studies indicate that the residential environment, transportation conditions, and medical support directly determine migratory-bird seniors' willingness to stay and mobility patterns ^[3].

To address development weaknesses in central Hainan, the Hainan Provincial Government plans to build the central-line high-speed maglev rail transit. Running through core areas of central Hainan and connecting major passenger hubs in the north and south, the line will greatly shorten time-space distance and reshape the locational advantages of central regions. Adjacent to core central areas, Baisha Li Autonomous County boasts superior mountain-based healthcare conditions and mature residential communities, yet it lacks rapid transportation links to central cultural-tourism corridors, resulting in insufficient regional linkage. Empowered by maglev transportation, pre-layout of central healthcare industry, and establishment of a coordinated-development mechanism between central cities-counties and Baisha can effectively activate high-quality central healthcare resources and optimize Hainan's province-wide healthcare spatial pattern. It carries great practical significance for promoting balanced, characteristic, and high-quality development of Hainan's healthcare industry.

2. Foundation and advantages for migratory-bird healthcare tourism development along Hainan central line

2.1. Concept of migratory-bird healthcare tourism

Migratory-bird healthcare tourism refers to the seasonal off-site healthcare residence mode for elderly groups. Different from traditional short-term sightseeing tourism, it is characterized by long-cycle residence, low-intensity leisure and prominent healthcare demands, and relies heavily on a sound ecological environment, senior-friendly supporting facilities, and healthcare service systems ^[4]. Mountain-based health care carries out recuperation and tranquil-stay activities relying on forests, climate and ecological resources. Its industrial development quality is closely related to transportation location, resource endowments, and supporting facilities ^[5].

2.2. Development advantages

First, it boasts unique ecological healthcare resources. Central Hainan belongs to the core protection zone of tropical rainforests, featuring high forest coverage, high air negative-ion concentration, and a mild climate, which deliver favorable recuperation effects for respiratory and cardiovascular-cerebrovascular chronic diseases. The region is rich in hot-spring resources. Combined with Li-Miao traditional medicine culture, it has

formed a featured resource system of rainforest health care and ethnic physical therapy, laying a core foundation for the development of the healthcare industry ^[6]. Boasting abundant mountain-forest resources and a dry, quiet climate, Baisha County has multiple mature healthcare resorts and medical-healthcare institutions, which can realize resource complementarity with central mountainous areas.

Second, it has prominent residence cost-performance advantages. Compared with high-consumption coastal residence destinations such as Sanya and Lingshui, central Hainan and Baisha feature low living costs, low population density, tranquil environment, and slow-paced life, which fit the migratory-bird elderly's demands for tranquil residence. They hold huge potential to receive middle-end healthcare tourists ^[7].

Third, it enjoys highly recognizable ethnic healthcare characteristics. As a core settlement for Li and Miao ethnic groups, central Hainan inherits traditional healthcare techniques including Li-medicine fumigation, ethnic medicinal diets, herbal physical therapy, and rainforest wellness. It can create the featured healthcare IP of "rainforest ecology + ethnic medicine," distinguishing itself from conventional domestic coastal and hot-spring healthcare products and forming differentiated competitive advantages ^[8].

3. Existing problems of migratory-bird healthcare tourism along Hainan central line

3.1. Lack of rapid transportation and weak tourist-reception capacity

At present, external transportation in central Hainan mainly consists of ordinary highways and expressways without rail transit support. North-south commuting efficiency is low, and public transport convenience is poor, resulting in an unsatisfactory travel experience for migratory-bird elderly and making it hard to attract large-scale and stable resident tourists. Insufficient transportation accessibility constitutes the core bottleneck restricting tourist accumulation for mountain-based healthcare destinations ^[9]. Though the healthcare industry in Baisha has taken shape, there are no rapid passages linking it with core central areas, bringing great difficulties to inter-regional tourist exchange and industrial linkage.

3.2. Single healthcare products and scanty long-cycle residence business forms

Cultural-tourism development in central Hainan is still dominated by short-term rainforest sightseeing, while healthcare resources are not fully exploited, resulting in fragmented and homogenized products. The region lacks long-term-rental healthcare communities, chronic-disease conditioning bases, and rehabilitation-nursing institutions that meet migratory-bird groups' 3–6-month winter-stay demands. Healthcare business forms remain superficial and leisure-oriented and can hardly satisfy elderly groups' demands for professional and long-term healthcare services. Such problems of single product structure and inadequate residence-oriented supporting facilities are also common development weaknesses of domestic mountain-based healthcare destinations ^[10].

3.3. Low brand awareness and lagging market promotion

Public perception of Hainan tourism is fixed on coastal beach vacations, while understanding of central rainforest health care, mountain-based tranquil stay, and Li-Miao-medicine-based health care is seriously insufficient. Provincial cultural-tourism publicity resources are heavily tilted toward coastal areas, and no unified public healthcare brand has been built for central regions. New-media marketing and targeted tourist promotion are inadequate. Meanwhile, cities and counties in central Hainan and Baisha conduct separate publicity and scattered development, failing to form contiguous brand effects and scale advantages.

3.4. Shortcomings in senior-friendly and medical supporting facilities

Counties in central Hainan are short of high-quality medical resources. Supplies for chronic-disease management, rehabilitation nursing and elderly healthcare services are insufficient. Senior-friendly supporting facilities such as off-site medical-insurance settlement, barrier-free facilities and elderly-activity venues are imperfect, which can hardly fully guarantee the safety of residents and the healthcare demands of elderly migratory-bird groups with advanced age or chronic diseases, greatly restraining the development of the long-cycle migratory-bird healthcare industry in central regions.

3.5. Insufficient regional coordination and unformed province-wide healthcare pattern

Cities and counties in central Hainan carry out independent planning and scattered operations for their healthcare industries, with fragmented tourist routes and low resource integration. No unified healthcare industrial corridor has been established. Meanwhile, there are no regular cooperation mechanisms between central regions and Baisha. Administrative barriers lead to fragmented exploitation of healthcare resources, and the linkage-driven development pattern for province-wide healthcare has not taken shape.

4. Reference experience of domestic healthcare tourism development

Mature domestic cases of mountain-based health care and transportation-empowered cultural-tourism development can provide important references for the “maglev + health care” model in central Hainan. Relying on winter sunlight-climate resources, Miyi of Panzhihua in Sichuan Province deeply explores the migratory-bird residence market. Through brand building, business-form cultivation, and targeted tourist marketing, it has built a well-known domestic winter healthcare destination, proving the feasibility of developing the migratory-bird healthcare industry in non-coastal mountainous areas.

By upgrading transportation infrastructure, Liupanshui in Guizhou Province revitalizes its mountain-based summer-escape healthcare market. Through the layout of business forms along rail lines, improvement of senior-friendly services, and cultivation of community activities, it effectively extends tourists’ length of stay. It verifies the core driving role of transportation corridors for the mountain-based healthcare industry, yet it also suffers from excessive seasonal limitations and insufficient year-round operational capacity.

Drawing on rainforest ecology and ethnic-medicine integration, Xishuangbanna in Yunnan Province develops a featured healthcare industry and builds a featured healthcare product system. Its development mode of “ecology + culture + health care” fits the resource endowments of central Hainan. To sum up, high-quality development of mountain-based health care must adhere to the development ideas of prioritizing transportation, differentiated branding, long-term-oriented business forms, senior-friendly supporting facilities, and industrial clustering.

5. New development opportunities brought by central-line maglev corridor

Running through north-south Hainan and connecting all core cities and counties in central regions, the Hainan central-line maglev corridor will thoroughly reshape the locational pattern of central Hainan. First, it can effectively divert saturated coastal tourists, guide winter migratory-bird tourists to flow into central regions, and activate idle ecological and land resources in central areas. Second, rail-station-based construction of a vertical healthcare industrial main axis, with Qiongzong hub linking Baisha healthcare zone, can realize resource

linkage and tourist exchange between central regions and Baisha. Third, draw on public attention to this major transportation project to raise the visibility of the central healthcare industry and build a public brand for rainforest healthcare.

Upgrading transportation infrastructure can effectively optimize the spatial layout of the healthcare industry. Carrying out industrial planning in advance and building regional coordination mechanisms during the construction window period of the maglev project can realize seamless connection between transportation construction and industrial development. Meanwhile, the introduction of special policies for Hainan's healthcare industry provides solid policy support for balanced and characteristic development of the healthcare industry in central regions.

6. Development paths empowered by maglev corridor

6.1. Conducting top-level planning and building a three-tier spatial system for rail-based health care

After the completion of maglev rail transit, locational conditions in central Hainan will achieve leap-forward improvement. Pre-made top-level spatial layout planning is required. Based on station hierarchies, locational advantages, and resource differences, a three-tier healthcare spatial system of “north-south hub distribution, core central undertaking, and multi-point linkage along the corridor” shall be built.

As provincial transportation hubs and tourist entrances, Haikou in the north and Sanya in the south shall focus on constructing migratory-bird healthcare service distribution centers to deliver comprehensive services including reception of out-of-province migratory-bird tourists, healthcare consultation, route guidance and healthcare reservation, and realize the transformation of overflow coastal tourists.

Located in the geometric core of central Hainan with optimal ecological conditions and broad hinterland, Qiongzong and Wuzhishan shall serve as core undertaking zones for rainforest migratory-bird health care. Priority shall be given to the layout of high-end forest health care, chronic-disease recuperation, long-cycle residence communities, healthcare apartments, and rehabilitation-nursing centers, focusing on high-quality winter tranquil-stay, chronic-disease conditioning, and ecological-recuperation products to receive highly-loyal long-stay migratory-bird tourists.

Ding'an, Tunchang, and Baoting shall pursue differentiated development according to resources along the corridor. Ding'an focuses on volcano cold-spring health care and idyllic leisure health care; Tunchang features tranquil mountain-forest health care and cultural-leisure health care; Baoting develops rainforest hot-spring health care and folk-custom healthcare experience, forming a mutually-complementary micro healthcare industrial belt with distinct features along the corridor. Meanwhile, build fast connecting routes based on the Qiongzong transportation hub to link the Baisha healthcare zone and realize resource sharing and tourist exchange.

6.2. Tapping resource characteristics and building diversified healthcare product system

Drawing on rainforest ecology, mountain-based climate and Li-Miao cultural resources in central Hainan, combined with migratory-bird seniors' core demands for long-term winter residence, rehabilitation recuperation and leisure wellness, build a trinity product system covering ecological health care, ethnic health care and social-leisure health care.

Taking high-negative-ion rainforest environment as carrier, develop ecological healthcare products such

as forest hiking, rainforest tranquil stay, mountain-climate recuperation and ecological residence to meet conditioning demands for respiratory and cardiovascular-cerebrovascular diseases. Further explore Li-Miao traditional healthcare culture, and standardize featured healthcare programs including Li-medicine bath, herbal fumigation, ethnic medicinal diets and ancient physical therapy to create non-replicable ethnic healthcare IP.

Meanwhile, improve senior social-leisure business forms. Offer calligraphy-and-painting leisure, folk-custom experience, healthcare community activities and light outdoor-leisure programs to enrich migratory-bird groups' residence life, effectively extend their stay duration and improve residence satisfaction and revisit rate.

6.3. Unifying regional brand and implementing joint marketing & promotion

Against the problems of a weak central healthcare brand, low visibility, and scattered publicity, integrate the healthcare resources of five central cities-counties and Baisha, and build the unified regional public brand of "Hainan Central Rainforest Migratory-Bird Health Care," changing the public stereotype that "Hainan only features coastal vacations."

Take advantage of public attention to maglev-project construction to conduct pre-heating market promotion. Create immersive rainforest healthcare scenario content via short-video platforms, cultural-tourism platforms, and healthcare self-media. Launch targeted promotion for core winter-stay tourist origins in Northeast and North China, and gradually build market recognition and brand advantages for mountain-based central health care through joint exhibition participation, off-site promotion and community-driven traffic diversion.

6.4. Making up for facility shortcomings and improving senior-friendly healthcare service system

Fully improve infrastructure and public supporting facilities in central regions targeting migratory-bird seniors' four major demands for residence, medical treatment, travel and health care. Introduce high-quality medical resources to settle in central regions, improve services for chronic-disease diagnosis-and-treatment, rehabilitation nursing and elderly health care, and fully implement direct settlement for off-site medical insurance.

Carry out senior-friendly renovation for scenic-spot roads, homestay residences and public activity spaces, add barrier-free passages, rest facilities and emergency rescue equipment to improve safety and comfort for elderly residents. Establish a two-way referral, talent exchange and resource-sharing mechanism for healthcare institutions in central regions and Baisha, so as to comprehensively lift regional overall healthcare service capacity.

6.5. Breaking administrative barriers and establishing province-wide coordinated-development mechanism

Based on Hainan's island-wide cultural-tourism pattern, strengthen the differentiated-development positioning for eastern, western and central regions, and form a complementary pattern of coastal leisure-vacation in the eastern line, original-ecology tranquil residence in the western line, and rainforest-ecology health care in central regions. Promote the seasonal rotational residence mode for migratory-bird groups to ease winter overload in coastal areas and optimize the temporal-spatial distribution of provincial tourists.

Set up a central healthcare industry alliance to coordinate healthcare industrial development plans of five cities-counties and Baisha, unify service standards, integrate tourist routes and carry out joint market promotion. Break county-level administrative barriers to realize tourist sharing, resource co-construction and common industrial prosperity.

6.6. Sticking to ecological bottom line and promoting green & sustainable development of healthcare industry

Tropical rainforests constitute the core resource foundation for the central healthcare industry. We must adhere to the principle of ecological priority and green development, strictly implement rainforest ecological-protection red lines, and keep large-scale real-estate development and excessive commercial construction under control.

Develop the healthcare industry with light-asset, original-ecology, and low-intensity development modes; protect forest ecology, water-body environment, and biodiversity; maintain the original-ecology background of central healthcare; realize coordinated progress of ecological protection, residence development, and industrial efficiency improvement; and guarantee long-term sustainable development of the healthcare industry.

7. Conclusion

To sum up, central Hainan boasts rare rainforest ecology, pleasant mountain-based climate and unique Li-Miao healthcare culture with superior-quality healthcare resources. Coupled with the mature residence-industry foundation in Baisha, it holds huge potential for developing a high-end migratory-bird healthcare industry. For a long time, factors including poor transportation access, single business forms, insufficient supporting facilities, and scattered regional development have restrained the value realization of central healthcare resources.

The planned construction of Hainan central-line maglev rail transit completely changes the locational disadvantages of central regions and brings brand-new opportunities for healthcare industry upgrading, tourist introduction, and province-wide coordinated development. Empowered by a rail-driven economy, by optimizing spatial layout, building featured products, improving senior-friendly supporting facilities, strengthening brand marketing, deepening regional linkage, and adhering to ecology-oriented development, we can foster a distinctive and competitive rainforest migratory-bird healthcare industrial system in central Hainan, make up for the spatial imbalance of Hainan's healthcare industry, and facilitate high-quality, balanced, and sustainable development of Hainan's healthcare industry.

Disclosure statement

The author declares no conflict of interest.

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