

Article

Research on Empowering Smart Upgrade and High-quality Development of Red Cultural Tourism in Hainan by Digital New Quality Productivity

He Jiong^{1,*}, Jingying Wang¹ and Xiuwen He¹¹ Hainan Vocational University of Science and Technology, Haikou, China

* Correspondence: He Jiong, Hainan Vocational University of Science and Technology, Haikou, China

Abstract: Against the dual backdrop of the Hainan Free Trade Port development and the rapid empowerment of digital new quality productivity, red cultural tourism is undergoing a critical transition from traditional sightseeing models to intelligent, experiential, and high-quality development frameworks. Hainan boasts the enduring Qiongya Revolutionary Spirit, famously characterized by the historical legacy of the red flag standing firm for twenty-three years, alongside an extensive inventory of nearly one thousand distinct red cultural resources. Despite these rich assets, significant challenges persist in the sector, including persistently low digitalization levels, insufficient integration of smart tourist experiences, shallow industrial convergence with modern technologies, and coarse operational management practices. To address these critical gaps, this comprehensive study examines the current status, emerging opportunities, and structural challenges of Hainan's red cultural tourism smart development through the innovative lens of digital new quality productivity. By systematically analyzing six core dimensions—namely, digital technology empowerment, smart scenario construction, data-driven operations, cross-industry integration, talent system support, and institutional safeguards—we explore intelligent upgrade pathways and propose highly actionable strategic interventions. Ultimately, these findings provide robust theoretical references and practical guidance for the innovative development of Hainan's red cultural tourism. The proposed frameworks aim to significantly enhance the regional tourism economy, foster sustainable technological integration, and maximize the sector's contribution to building a culturally strong nation within the broader strategic context of the Free Trade Port.

Keywords: digital productivity; cultural tourism; intelligent upgrading; tourism management; free trade port

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1. Introduction

Digital new-quality productivity, driven by cutting-edge technologies including big data, artificial intelligence, VR/AR, the Internet of Things, and digital twins, is fundamentally transforming the cultural tourism industry. This shift is enabling red cultural tourism to transition from resource dependency to innovation-driven development, from one-way lectures to immersive interactions, and from extensive operations to smart management systems [1]. The Ministry of Culture and Tourism has emphasized that digital technologies should empower high-quality development in red tourism by utilizing modern technological approaches to optimize exhibition methods, innovate experiential scenarios, and enhance service efficiency, thereby revitalizing red culture.

As a major free trade port and international tourism and consumption center, Hainan possesses abundant red resources such as the Red Women's Army Memorial Park, the Muerui Mountain Revolutionary Base, the site of the First Congress of the Communist Party of China in Qiongya, and Hainan Liberation Park, forming a unique spiritual symbol of enduring resilience [2, 3]. Currently, although Hainan's red tourism has

achieved initial success, most scenic spots remain at the stage of static displays and traditional interpretation, with lagging digitalization and smart technologies, monotonous product experiences, low operational efficiency, and insufficient appeal to younger visitors, making it challenging to meet modern tourism market demands. In this context, leveraging digital new productivity as a driving force to promote the intelligent upgrading of Hainan's red culture and tourism and achieve high-quality development has become a critical issue in promoting the Qiongya revolutionary spirit, unlocking the value of red resources, and supporting the development of the free trade port.

2. Core Concepts and Theoretical Foundations

2.1. Definition of Core Concepts

Digital New Quality Productivity: A cutting-edge form of productivity driven by digital technology as the core driver, integrating advanced technologies such as big data, artificial intelligence, VR/AR, the Internet of Things (IoT), and blockchain [4]. Characterized by high technology, high efficiency, high innovation, and high integration, it promotes industrial digitalization, intelligence, and high-quality development. The core principles include technology innovation-driven advancement, data element empowerment, and industrial intelligence upgrading.

Intelligentization of Red Cultural Tourism: Utilizing digital new-quality productivity technologies to achieve a development model featuring digitalization of red cultural tourism resources, intelligentization of experiential scenarios, intelligent operation management, precision service provision, and diversified industrial integration. This encompasses comprehensive upgrades across all dimensions, including digital exhibitions, smart navigation systems, big data operations, AI services, and online cloud tours [2].

High-quality development: Driven by innovation, centered on quality, and guided by integration, achieving coordinated enhancement of political, cultural, economic, and social values in red cultural tourism, along with product optimization, refined services, industrial ecologization, and sustainable development [2].

2.2. Theoretical Basis

The Smart Tourism Theory emphasizes leveraging technologies such as the Internet of Things (IoT), big data, and artificial intelligence to achieve intelligent allocation of tourism resources, smart service delivery, and intelligent operational management, thereby providing a core theoretical foundation for the intelligent upgrading of red cultural tourism.

The Theory of Digital-Cultural Tourism Integration elucidates the principles governing the deep integration and mutual reinforcement between digital technologies and cultural tourism, providing theoretical foundations for the digital revitalization, intelligent experiential engagement, and industrial development of revolutionary culture [3].

The Innovation-Driven Development Theory clarifies that scientific and technological innovation serves as the core driving force for industrial upgrading, guiding red cultural tourism to overcome traditional bottlenecks through technological innovation, model innovation, and business format innovation [2].

Sustainable development theory emphasizes the coordination between the protection and development of red resources, as well as the integration of economic and social benefits, providing value guidance for the intelligent and high-quality development of red cultural tourism [5, 6].

3. Current Status and Foundations of Smart Development in Hainan's Red Cultural Tourism

3.1. Superior Endowment of Red Resources with Enormous Potential for Intelligent Development

Hainan boasts an extensive array of distinctive red cultural resources, encompassing nearly 1,000 revolutionary sites and memorial venues across the province, including

former revolutionary bases, historic conference venues, battlefields, and commemorative parks. Key attractions include the Red Women's Army Memorial Park, Muerui Mountain Revolutionary Base, Wuzhishan Revolutionary Base, the Site of the First Congress of the Communist Party of China in Qiongya, and Hainan Liberation Park. The iconic "Red Women's Army" and "Qiongya Column" have become nationally recognized cultural IPs. These abundant resources provide a solid foundation for digital transformation and smart development, positioning Hainan as a potential national benchmark for intelligent red tourism [7].

3.2. Initial Application of Digital Technologies and Preliminary Achievements in Intelligent Exploration

Several red tourism sites in Hainan have pioneered digital and smart transformation initiatives. The Sanya Red Women's Army Performance Park employs mixed reality (MR), holographic projection, and wire stunt techniques to create immersive live performances, significantly extending visitor engagement time. The Muerui Mountain Revolutionary Base has implemented a location-based service (LBS) smart navigation system with customized educational routes, enabling scene integration and AI-powered commentary [8]. Lingao Hainan Liberation Park underwent upgrades to include an immersive cinema recreating the historic Sea Crossing Campaign. Across the province, 27 key revolutionary heritage sites have completed 3D modeling and digital twin development, establishing a red cultural tourism big data platform that enables intelligent crowd monitoring and resource allocation.

3.3. Strengthened Policy Support and Free Trade Port Dividends Empowerment

At the national level, policies such as the "Opinions on Promoting High-Quality Development of Red Tourism" and the "Action Plan for Utilizing Red Resources to Cultivate New Generation of the Era" explicitly support the digital and intelligent development of red tourism. Hainan has incorporated red cultural tourism into the construction plan for the Free Trade Port International Tourism Consumption Center, issued the "Hainan Province Red Tourism Development Plan," and increased investments in digitalization and policy support [9]. The Free Trade Port's policy advantages in the digital economy, talent recruitment, and cross-border services provide technological, talent, and financial support for the intelligent transformation of red cultural tourism.

3.4. Enhanced Digital Infrastructure and Solidified Foundation for Intelligentization

Hainan is advancing the development of next-generation digital infrastructure, achieving comprehensive 5G network coverage, clustered big data center development, and increasingly sophisticated IoT sensing systems. These improvements provide essential hardware support for the smart transformation of revolutionary heritage sites, data transmission, and technological applications. Additionally, universities such as Hainan University and Hainan Vocational University of Science and Technology have introduced majors in digital cultural tourism and smart tourism. By collaborating with enterprises to establish practical training bases, they ensure a steady talent supply for intelligent development initiatives [2].

4. Bottlenecks in the Intelligent Development of Hainan's Red Cultural Tourism from the Perspective of Digital New Quality Productivity

4.1. Insufficient Empowerment by Digital Technologies and Overall Low Level of Intelligence

The development of digital exhibitions remains inadequate, with most revolutionary heritage sites still relying predominantly on text panels and physical displays. Advanced technologies such as VR/AR, holographic projection, digital twins, and AI-driven interactions are not sufficiently utilized, leading to a lack of immersive and interactive experiences. Smart service systems are also underdeveloped, missing essential features such as intelligent ticketing, AI-guided tours, contactless payments, and personalized recommendations, which reduces visitor convenience and engagement. Additionally, online digital content offerings are limited, with few options such as virtual tours of

revolutionary heritage sites, digital collectibles, and short video live streams. Weak outreach efforts through new media further hinder engagement with younger audiences [10].

4.2. Insufficient Innovation in Smart Scenarios and Severe Experience Homogenization

The experience model remains monotonous, primarily relying on static tours and passive narration, lacking innovative elements such as real-scene puzzles, interactive narratives, role-playing, and immersive theater experiences, resulting in insufficient engagement and entertainment value. Homogenization is prevalent, with smart tourism projects at red heritage sites across regions showing striking similarities—mostly limited to basic navigation systems and simplistic digital displays—while failing to create differentiated smart scenarios that integrate Qiongya's revolutionary history and Hainan's regional characteristics. Digital IP development remains underdeveloped, with insufficient efforts in digital transformation, virtual avatars, cultural products, and immersive content creation for core IPs like the Red Women's Army and Mother Ruishan, leaving their brand value largely untapped [11].

4.3. Weak Data-Driven Capabilities and Low Efficiency in Intelligent Operations

The data system remains underdeveloped, with fragmented red tourism cultural resources lacking unified databases for resources, visitor management, and operational workflows, resulting in severe data silos. Smart operations lag behind due to the absence of essential systems, including big data analytics, intelligent scheduling, crowd flow forecasting, and emergency management mechanisms. Scenic area management suffers from inefficiencies, irrational resource allocation, and sluggish service responses. Digital marketing efforts are insufficient, with no big data-driven precision marketing framework in place [2]. Weak capabilities in visitor profiling analysis, personalized content delivery, and online traffic acquisition have constrained market expansion potential.

4.4. Insufficient Industrial Integration and Shortage of Intelligent Industrial Chains

The integration framework remains superficial, with fusion models such as "red culture + digital technology + ecological systems + educational tours + cultural innovation" failing to achieve deep intelligent integration. There is a significant lack of high-value-added products, and the industrial chain is fragmented, relying heavily on sightseeing revenue and ticket sales [10]. Emerging sectors, including digital cultural innovation, smart education programs, immersive performances, virtual tours, and red-themed metaverse applications, are underdeveloped. This results in a short industrial chain with low added value. Regional coordination is insufficient, as smart development initiatives for red tourism sites across cities and counties operate independently, lacking unified provincial planning, data sharing, and coordinated route networks. This fragmentation hinders the establishment of a comprehensive smart red tourism ecosystem.

4.5. Deficiencies in Talent and Mechanisms, Coupled with Weak Intelligent Support Systems

There is a shortage of interdisciplinary talents proficient in red culture research, digital technology applications, smart scenic area operations, IP development, and new media marketing. Institutional mechanisms remain underdeveloped, lacking effective coordination frameworks that promote collaboration among cultural tourism, Party history, science and technology, and finance departments. Investment channels are limited, resulting in low participation from social capital. Furthermore, the imperfect profit distribution mechanism hampers the establishment of synergistic development efforts.

5. Digital New Quality Productivity Empowering the Intelligent Upgrade Path of Hainan's Red Cultural Tourism

5.1. Digital Technology Empowerment Path: Building a Full-Chain Intelligent Technology System

With big data, AI, VR/AR, IoT, and digital twin technologies at its core, comprehensive digital and intelligent transformation is being driven across all

dimensions of red cultural tourism resources, experiences, services, and operations [8]. Through digital preservation and revitalization of red heritage resources, technologies such as 3D laser scanning, 3D modeling, and digital twin applications are employed to complete the digital collection and storage of provincial red heritage sites, artifacts, and historical materials, establishing a centralized digital repository for Hainan's red culture resources. Digital museums and cloud-based virtual exhibitions for red heritage are being developed, enabling visitors to "explore red landmarks virtually and preserve historical memories forever."

To create immersive smart experiences, VR/AR experience centers, holographic theaters, and AI interactive exhibition halls have been established at key attractions including the Red Women's Army Memorial Park, Mother Rui Mountain, and Hainan Liberation Park, recreating revolutionary historical scenes from Qiongya. Interactive features such as "Digital Red Army Route Re-tracing," "Red-themed Puzzle Solving," and "Virtual Historical Figures Dialogues" allow visitors to deeply experience revolutionary spirit. The comprehensive smart service system features the "Hainan Red Smart Tourism Platform," integrating online reservations, AI-guided tours, intelligent commentary, contactless payments, personalized recommendations, and emergency assistance functions to enable "one-device access to all Hainan's revolutionary sites." IoT-enabled sensors are deployed to achieve intelligent monitoring and management of scenic area environments, security systems, and facilities.

Intelligent big data operation management involves establishing a red cultural tourism big data center to integrate data on visitor flow, consumption, behavior, and evaluations [2]. This enables precise tourist profiling, intelligent visitor flow forecasting, optimal resource allocation, and operational decision analysis. A smart performance evaluation system is also established to enhance management efficiency and service quality in scenic areas.

5.2. Innovative Pathways for Smart Scenarios: Building a Differentiated Immersive Experience Matrix

Building on Qiongya's distinctive revolutionary heritage, diversified smart experiences are innovated to address homogenization challenges. Immersive red history scenarios utilize digital twin technology, panoramic audio-visual effects, and motion-sensing interactions to create the "Qiongya Flames of War" immersive theater, the "Twenty-Three Years of Unyielding Red Flag" holographic experience hall, and the VR battlefield "Red Women's Army Combat Chronicles," achieving lifelike historical reconstructions. Interactive smart experiences include real-scene puzzle-solving with "Red Intelligence Agents," AR navigation for "Retracing Qiongya Ancient Trails," AI-powered narration of "Red Family Letters," and virtual check-in activities like "Revolutionary Soldier Costumes," enabling visitors to engage with and inherit revolutionary spirit through hands-on participation [12].

The Red Study Smart Classroom establishes an AI-powered red education base, developing intelligent study courses, digital Party history textbooks, and virtual practical teaching systems to integrate online and offline learning with virtual and real-world experiences, meeting the needs of ideological and political education in primary and secondary schools as well as Party member training. Leveraging digital cultural innovation and metaverse technologies, it creates digital collectibles featuring the Red Women's Army and Qiongya Column, along with virtual avatars and AI-generated cultural products [13]. The initiative also explores red cultural tourism metaverse applications, constructing virtual red tourist attractions and digital red communities to enable cross-temporal cultural experiences and social sharing of revolutionary heritage.

5.3. Data-Driven Operational Approach: Achieving Refined Intelligent Management

With data as the core element, we will drive the transformation of red cultural tourism operations from extensive management to refined strategies and from experience-based approaches to intelligent systems [14]. By integrating and sharing data resources, we will break down data barriers through consolidating provincial-level red cultural

resources, visitor data, operational metrics, and marketing insights. A unified data standard and sharing platform will be established to enable cross-regional and cross-departmental data interoperability. Precision digital marketing will leverage big data analytics to understand visitor preferences, enabling personalized content delivery, targeted advertising campaigns, and live streaming engagement. The "Hainan Red" new media matrix will be developed to expand reach through short videos, live streaming, virtual tours, and themed challenge competitions.

Intelligent operational management involves deploying smart ticketing systems, passenger flow analytics, facility monitoring, and emergency command systems to achieve real-time crowd monitoring, dynamic crowd diversion guidance, intelligent resource allocation, and rapid emergency response, thereby enhancing operational efficiency and safety standards. For service quality optimization, we establish AI-powered service evaluation systems, automated complaint resolution mechanisms, and visitor feedback platforms to continuously refine service processes, elevate service quality, and boost tourist satisfaction [15].

5.4. Cross-Industry Integration Path: Building a "red + Digital + N" Smart Ecosystem

We will promote deep integration of red-themed cultural tourism with digital technologies, eco-tourism, educational programs, cultural industries, rural revitalization initiatives, and free trade port business models to cultivate innovative smart tourism formats. The "Red + Digital Eco-Tourism" initiative connects revolutionary heritage sites with tropical rainforests and coastal ecosystems, creating smart eco-travel routes that blend "red culture, green landscapes, and blue marine experiences." This includes developing ecological monitoring systems, AI-powered navigation solutions, and immersive hiking experiences. Meanwhile, the "Red + Digital Education & Wellness" program focuses on establishing smart revolutionary study bases and wellness towns, offering AI-enhanced educational courses, digital health experiences, and integrated red culture wellness programs [16].

Red-themed digital cultural performances leverage revolutionary heritage IPs to create immersive live shows, digital stage productions, themed cultural gift boxes, and AI-powered creative products, extending smart industrial chains. The Red-themed Free Trade Port initiative integrates smart services including duty-free shopping, cross-border e-commerce, international exhibitions, and cruise tourism, developing innovative models such as "Red-themed Duty-Free," "Red-themed Exhibitions," and "Red-themed Cruise Tours" to elevate red cultural tourism to global standards. Through digital rural revitalization, red villages serve as hubs for blending revolutionary culture with Li and Miao ethnic traditions and pastoral landscapes, creating smart red villages that feature themed homestays, digital agricultural experiences, and online agricultural product sales platforms.

5.5. Comprehensive Regional Synergy Development Path: Establishing an Integrated Smart Red Tourism Framework

Adhering to the principle of "a unified provincial strategy," resources, data, routes, and branding are coordinated to establish a comprehensive smart red tourism system. Through integrated planning, the "Hainan Red Cultural Tourism Smart Development Master Plan" is formulated to define spatial layouts, key projects, and technical standards [17]. This initiative aims to create a smart red tourism network featuring "one core (Haikou Red Cultural Core Area), three belts (Eastern Red Women's Army Belt, Central Muerui Mountain Ecological Red Belt, Western Coastal Liberation Red Belt), and multiple nodes."

By integrating cross-regional smart tourism routes, five premium smart red tourism itineraries spanning multiple cities and counties have been launched, enabling seamless data exchange among scenic spots, unified ticket sales, shared navigation services, and mutual tourist referral systems. This initiative drives the integrated development of regional smart red tourism networks, including Ding'an-Qionghai, Wuzhishan-Qionghong, and Haikou-LinGao. A unified brand strategy has been implemented to create the provincial flagship "Qiongya Red Flag·Digital Smart Hainan Red," featuring

standardized visual branding, intelligent service protocols, and digital marketing frameworks. The Hainan Smart Red Tourism Festival and Digital Red Culture Forum are regularly held to amplify brand influence.

5.6. Talent and Mechanism Support Pathways: Strengthening the Foundation for Intelligent Development

To cultivate interdisciplinary talents, Hainan universities are supported in establishing interdisciplinary programs integrating red cultural tourism, digital technology, and smart operations. Schools and enterprises collaborate to establish training bases and implement customized talent development programs. High-end professionals and teams specializing in digital technology, IP development, and smart operations are recruited, with incentives and subsidies provided under free trade port policies [6]. Institutional innovations include establishing a provincial-level Leading Group for Smart Development of Red Cultural Tourism to coordinate multi-departmental efforts, setting up dedicated funds for smart cultural tourism development, and encouraging private capital participation through PPP models and industrial funds. A win-win benefit-sharing mechanism involving governments, enterprises, village collectives, and farmers is being developed.

The policy framework has been refined, with the issuance of the "Implementation Opinions on Intelligent Development of Red Cultural Tourism in Hainan," which clarifies technical standards, construction specifications, and supportive policies. A rating system for intelligent red tourism attractions has been established to promote standardized and regulated industry development.

6. Practical Strategies and Key Projects

6.1. Digital Technology Empowerment Project

The smart transformation of core scenic areas supports five major attractions, including the Red Women's Army Memorial Park, Muerui Mountain, and Hainan Liberation Park. This initiative involves establishing immersive digital experience centers, intelligent scenic area management systems, and big data operation platforms, aiming to create 2-3 national benchmarks for red-themed smart tourism. The Red Digital Resource Database project has completed digital collection and 3D modeling of 100 key red heritage sites and cultural relics across the province, resulting in the establishment of Hainan's Red Culture Digital Resource Central Repository and online cloud museum. The Smart Service Coverage Initiative achieves full integration of smart ticketing systems, AI-guided tours, and IoT monitoring technologies in all provincial 4A-level and above red tourism sites, complemented by the official "Hainan Red Smart Tourism" mini-program.

6.2. Smart Scenario Innovation Project

The immersive experience project encompasses the establishment of three revolutionary-themed VR/AR experience centers, two holographic revolutionary theaters, and five AI interactive exhibition halls. Additionally, it includes the development of ten interactive puzzle products featuring revolutionary-themed real-scene experiences. For smart upgrade initiatives in revolutionary education, eight provincial-level revolutionary smart study bases will be created, along with twenty AI-enhanced revolutionary education courses aimed at attracting three million smart study tourists annually. The digital IP development campaign will introduce virtual avatars of the Red Women's Army and Qiongya Column, produce digital collectibles, organize two revolutionary-themed digital performances, and create fifty AI-powered cultural and creative products.

6.3. Data-Driven Operations Engineering

The Red Cultural Tourism Big Data Center will integrate provincial-level red cultural tourism data resources to enable comprehensive analysis and application of visitor flow, marketing strategies, operational metrics, and service data. Through precision digital marketing initiatives, the center will produce 100 short red cultural tourism videos and 50 live streaming sessions annually, while launching the "Digital Intelligence Hainan Red"

nationwide campaign to attract younger demographics. Standardized smart operation frameworks will be established, including operational protocols, service guidelines, and safety regulations for red tourism sites, ensuring full coverage of refined and intelligent management systems.

6.4. Industrial Integration and Development Project

Red+Eco-Smart Tourism Routes: Develop five premium "Red+Digital+Ecological" routes and establish three demonstration zones for red-themed eco-smart tourism. **Smart Revitalization of Red Villages:** Create ten provincial-level model villages for red-themed smart rural development, featuring smart homestays, digital agricultural services, and online sales platforms. **Free Trade Port Red Smart Tourism Initiatives:** Launch innovative products such as "Red+Tax-Free" and "Red+Cruise" packages to promote the global integration of red-themed cultural tourism.

6.5. Talent and Support Program

Talent Development and Recruitment: Establish 2-3 provincial-level Red Smart Cultural Tourism Talent Bases, cultivating 200 interdisciplinary professionals annually and attracting 10 high-end talents [18]. **Investment and Financing Innovation:** Launch a 500 million yuan Red Smart Cultural Tourism Industry Fund to expand social capital participation channels. **Standardization System Development:** Introduce Hainan's Red Smart Tourism construction, service, and operational standards system to promote industry standardization.

7. Conclusion and Prospects

Hainan possesses superior red resources, policy support, digital infrastructure, and free trade port advantages, which provide a solid foundation for empowering the intelligent upgrading of red cultural tourism through digital new-quality productivity. However, it faces significant challenges such as insufficient technology application, limited scenario innovation, lagging data-driven development, shallow industrial integration, and inadequate talent mechanisms.

Digital new-quality productivity is driving the intelligent upgrading of Hainan's red cultural tourism sector. To achieve this, six key approaches must be adopted: technology empowerment, scenario innovation, data-driven strategies, industrial integration, regional coordination, and talent support. This will establish a "red culture + digital + N" smart ecosystem, facilitating a transformation from traditional sightseeing to immersive experiences, from extensive operations to refined management, and from single-sector models to diversified integration.

In practice, it is essential to implement five major initiatives: digital technology empowerment, intelligent scenario innovation, data-driven operations, industrial integration and development, and talent cultivation with support systems. Through key projects, targeted actions, and policy refinement, these efforts aim to overcome developmental bottlenecks, stimulate industrial vitality, and promote the high-quality development of Hainan's red cultural tourism.

In the future, as digital productivity undergoes rapid iteration and free trade port development advances, Hainan's red-themed cultural tourism is expected to exhibit three major trends: First, digital technologies will be deeply integrated across the entire industry chain, with widespread adoption of innovations such as the metaverse, AI virtual humans, and brain-computer interfaces, creating more immersive and diverse intelligent experiences. Second, red-themed cultural tourism will achieve deeper integration with the free trade port's digital economy, international consumption markets, and cross-border services, continuously enhancing its global competitiveness, premium positioning, and smart capabilities. Third, the role of intelligent red-themed cultural tourism in rural revitalization, cultural development, and ideological education will become increasingly prominent, establishing it as a core growth driver for Hainan Free Trade Port's cultural tourism sector. Future research should focus on metaverse applications in red-themed tourism, intelligent performance evaluation systems, and

internationalization strategies for free trade port cultural tourism, conducting in-depth empirical studies to provide precise support for the high-quality development of Hainan's red-themed cultural tourism industry.

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