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The Driving Mechanism and Optimization Countermeasures of New Quality Productivity Empowering High-quality Development of Red Culture Tourism Industry in Hainan

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Abstract: New-type productivity, characterized by technological innovation at its core, data as a fundamental key element, and integrated development as its primary pathway, is fundamentally reshaping the traditional development model and underlying growth logic of red cultural tourism industries. Hainan province, deeply endowed with the historic Qiongya revolutionary spirit of "the red flag remaining unfurled for twenty-three years" alongside abundant red heritage resources, has recently seen free trade port policies create unprecedented and unique opportunities for high-quality development within this vital sector. Despite these advantages, significant structural challenges persist, prominently including severe product homogenization, insufficient digital empowerment across platforms, shallow industrial integration, and acute professional talent shortages. Based on the comprehensive conceptual framework of new-type productivity, this study systematically analyzes the practical foundations and critical pain points currently hindering high-quality development in Hainan's red cultural tourism industry. To address these systemic issues, it constructs a robust driving mechanism operating through five strategic dimensions—technological empowerment, factor-driven economic growth, deep industrial convergence, progressive institutional innovation, and comprehensive talent support—and subsequently proposes highly targeted optimization strategies. Ultimately, this research aims to successfully facilitate the industry's crucial transition from basic resource dependency toward sustainable innovation-driven development, shifting from single-sightseeing models to immersive, comprehensive experiential offerings, and moving from regional fragmentation to holistic coordination, thereby strongly supporting the Hainan Free Trade Port's broader cultural power-building initiatives.

Keywords: new quality productivity; cultural tourism; regional development; driving mechanism; optimization strategies

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1. Introduction

Emerging productive forces serve as the core driving force for high-quality socioeconomic development, characterized by high technology, efficiency, integration, and low resource consumption. Their essence lies in breaking through traditional production constraints through technological innovation, data-driven applications, and innovative business models [1]. As a pivotal sector in cultural-tourism integration, red cultural tourism not only acts as a vital vehicle for inheriting revolutionary legacy and fostering patriotic sentiments, but also functions as a key engine for upgrading cultural industries and revitalizing rural areas within the Hainan Free Trade Port initiative.

Hainan boasts unique and abundant red cultural resources, encompassing nearly a thousand heritage sites including the Qiongya Revolutionary Base, Red Women's Army, and Muerui Mountain Revolutionary Memorial Park, making it a premier destination for red tourism nationwide. In recent years, fueled by the benefits of free trade port policies and the widespread adoption of digital technologies, Hainan's red cultural tourism industry has experienced sustained growth, attracting over 7.2 million visitors in 2023

while witnessing the rise of innovative formats like digital cultural products and immersive experiences. However, from a high-quality development perspective, the sector still faces challenges such as limited product diversity, superficial application of digital technologies, insufficient industrial integration, talent shortages, and weak brand influence, all of which hinder its capacity for upgrading [1].

Against this backdrop, guided by new quality productivity, restructuring the driving force system for high-quality development of Hainan's red cultural tourism industry and overcoming developmental bottlenecks have become imperative choices to promote its transformation and upgrading, as well as to establish it as a national benchmark in red cultural tourism.

2. Core Concepts and Theoretical Foundations

2.1. Definition of Core Concepts

New Quality Productivity: Distinct from traditional productivity models, this advanced form of productivity is driven by technological innovation, utilizes data as a key production factor, and achieves deep integration between digital technologies and the real economy. Characterized by high-tech capabilities, operational efficiency, innovation capacity, seamless integration, and low resource consumption, it manifests in red cultural tourism through digital resource management, immersive experiential design, intelligent operations, industrial convergence, and global brand expansion. **High-Quality Development of Red Cultural Tourism Industry:** This refers to a developmental paradigm centered on red culture, delivering premium offerings to meet people's aspirations for quality living while achieving organic integration of cultural preservation, economic growth, ecological conservation, and social value. Core features include product refinement, service excellence, industrial synergy, green development practices, and international brand recognition [2]. **Driving Mechanisms:** These encompass the composition, interplay, and operational logic of various factors propelling high-quality development in Hainan's red cultural tourism sector. Key dimensions include technological innovation, resource allocation, industrial ecosystem, institutional frameworks, and talent development. Continuous industrial upgrading is achieved through integrated resource utilization, innovative business models, and optimized operational processes.

2.2. Theoretical Basis

The New Quality Productivity Theory provides fundamental guidance for the high-quality development of Hainan's red cultural tourism industry, identifying technological innovation, data elements, and industrial integration as core drivers. It guides the industry to transcend traditional resource dependence and shift toward innovation-driven growth [3]. The Cultural Tourism Integration Theory emphasizes the deep integration of red cultural essence with tourism industry platforms and digital technologies, advocating for moving beyond the limitation of "cultural tourism as cultural tourism" to establish a "Red+" integrated business model, thereby providing direction for building industrial momentum mechanisms.

Innovation-Driven Development Theory, centered on technological innovation, model innovation, and industry innovation, drives transformations in production methods, supply mechanisms, and marketing strategies within the red cultural tourism sector, serving as a core engine for high-quality development. Industrial Life Cycle Theory emphasizes that industries must adjust their growth drivers according to lifecycle stages. As Hainan's red cultural tourism industry transitions from the growth phase to maturity, it requires upgrading through new quality productivity to extend its lifecycle and enhance development quality [4].

3. Current Status and Challenges of Red Cultural Tourism Industry Development in Hainan

3.1. Current Development Status

Hainan boasts unique red cultural resources with solid foundations. The island preserves the enduring legacy of the Qiongya Revolution's "Twenty-Three Years of Unyielding Red Flag," along with premium attractions including the Red Women's Army Memorial Park, Muerui Mountain Revolutionary Base Memorial Park, and Lingaojiao Landing Battle Memorial Hall. These resources have formed a distinctive spatial layout known as "One Core, Three Belts"—centered around the Red Women's Army National Memorial Park, with three premium tourism routes stretching across eastern, central, and western regions. In recent years, Hainan has intensified efforts to protect these red resources, completing multiple rounds of comprehensive surveys and digital documentation to lay a solid foundation for industrial development [5].

Policy and market opportunities converge: National initiatives including the promotion of high-quality red tourism development, Hainan Free Trade Port construction, and the "Million Talents to Hainan" program provide top-level support for red cultural tourism [3]. The island-wide tourist highway connects 25 red heritage sites, forming a closed-loop tour route with continuously improved transportation infrastructure. The upgraded version of the Offshore Duty-Free Policy has established dedicated zones for red-themed cultural products, expanding industrial monetization channels. Market demand for red cultural tourism continues to grow, with visitor numbers at attractions like the Red Women's Army Memorial Park surging during the May Day holiday in 2025.

Preliminary exploration of business model innovation: Some scenic spots have initiated digital upgrades, such as the Red Women's Army Memorial Park offering immersive audio guides and VR experiences. Enterprises have launched revolutionary-themed educational programs and cultural products (e.g., coconut shell-carved "The Long March Suite"), achieving monthly sales exceeding 2 million yuan [6]. Integrated routes combining "revolutionary themes with green tourism" and "revolutionary heritage with coastal attractions" are being rolled out, establishing a diversified business ecosystem.

3.2. Core Pain Points

Homogeneous product offerings and shallow experiential depth: Most red-themed cultural tourism products remain stuck in the traditional "tour + commentary" model, featuring monotonous exhibition formats and limited interactivity [2]. A significant 31% of visitors reported insufficient innovation in experiential programs. Red-themed cultural and creative products suffer from crude designs, lack of regional characteristics, and severe homogenization, failing to effectively revitalize red culture. Digital empowerment remains superficial with lagging technology adoption: Digital solutions are predominantly limited to online promotions and basic VR experiences, lacking deep integration of resource digitization, intelligent operations, and immersive experiences. Red heritage sites exhibit low digitalization levels, lacking technologies like digital twins, AI-guided tours, and big data analytics. The delayed development of smart scenic areas fails to meet the digital demands of Generation Z travelers.

The integration of industries remains superficial with fragmented industrial chains: The synergy between red-themed cultural tourism and rural revitalization, wellness tourism, intangible cultural heritage preservation, and digital technologies is insufficient, resulting in small-scale and low-tier "red+" integrated business models. The industrial chain is confined to basic service segments like dining, accommodation, transportation, sightseeing, shopping, and entertainment, lacking high-value-added components such as red-themed cultural product development, digital content production, and cultural tourism management operations, which weakens industry profitability. There is a shortage of specialized talent with structural imbalances: The province has only 812 certified red-themed tour guides, 65% of whom lack systematic Party history training. A critical gap of over 3,000 professionals with expertise in red culture, digital technology proficiency, and operational management skills persists [4]. Higher education programs in red-themed cultural tourism lag behind industry demands, featuring outdated curricula and a scarcity of dual-qualified instructors, failing to meet the requirements for high-quality industrial development.

Insufficient brand influence and uneven regional development: Hainan's red cultural tourism lacks nationally recognized core IPs, with limited brand communication channels and lower international recognition compared to regions such as Jinggangshan and Yan'an [7]. Regional development is imbalanced, with a revenue disparity of 2.3 times between eastern and western Hainan scenic areas, coupled with inadequate resource integration and collaborative development.

4. The Driving Mechanism of New Quality Productivity Empowering High-Quality Development of Hainan's Red Cultural Tourism Industry

Based on the core characteristics of new quality productivity and the development challenges of Hainan's red cultural tourism, a "five-in-one" driving mechanism has been established [8]. This mechanism features technology innovation as the driver, data element empowerment as the enabler, industrial integration as the support, institutional innovation as the safeguard, and talent team building as the foundation. It ensures coordinated efforts and positive interactions among all driving elements.

4.1. Technology Innovation Drive: Breaking through Technological Bottlenecks in Industrial Development

Technological innovation serves as the core of new productive forces and the driving force behind the high-quality development of Hainan's red cultural tourism industry [2]. It primarily encompasses three categories: digital technology, green technology, and creative technology. Digital technology empowers product innovation by utilizing VR/AR/MR, holographic projection, digital twin technology, and AI-generated content to recreate historical red-themed scenes and create immersive experiences such as the "Long March Retracing" VR experience, red-themed murder mystery games, and holographic projection theaters. The development of digital twin scenic spots, AI-powered tour guides, and multilingual digital human guides enhances visitor engagement and experience quality. Digital technology also drives operational upgrades through establishing red cultural tourism big data centers that integrate visitor profiles, consumption data, and resource information for crowd monitoring, precision marketing, and intelligent scheduling. Smart scenic area operation platforms enable intelligent management of ticketing, navigation, security, and services across the entire process, improving operational efficiency and service quality. Green technology promotes sustainable development by applying energy-saving technologies and eco-friendly materials in red scenic area construction and operations to create low-carbon destinations. Integrating "red culture + ecology" with Hainan's tropical rainforests and coastal resources, innovative red-themed eco-tourism programs are developed to achieve a win-win scenario of ecological conservation and industrial growth.

4.2. Data Element Empowerment: Activating Endogenous Driving Forces for Industrial Development

As a critical production factor of new-quality productive forces, data serves as the core support for driving the precise and efficient development of Hainan's red cultural tourism industry. Data integration and sharing: Establishing a big data platform for Hainan's red cultural tourism sector by consolidating data from multiple stakeholders, including government agencies, scenic areas, enterprises, and universities. This initiative breaks down data silos to enable real-time sharing and intelligent coordination of red cultural resources, tourist demand, and industrial operation data [9]. A digital asset trading platform for red cultural resources will be developed, utilizing blockchain technology to achieve digital rights confirmation and copyright protection for cultural relics.

Data-Driven Precision Marketing: Leveraging big data analytics on tourist behavior, target demographics such as teenagers, Party members, government officials, and international travelers are accurately identified to develop customized products and marketing strategies. Through digital channels, including short videos, live streaming, and metaverse platforms, targeted communication campaigns are implemented to

enhance brand influence and expand domestic and global markets [2]. Data-Driven Industrial Decision-Making: By analyzing market demand trends, industry performance metrics, and resource conservation status, scientific evidence is provided for government policy formulation, corporate strategy adjustments, and university talent development optimization, thereby elevating the scientific rigor and foresight of industrial development.

4.3. Industrial Integration Support: Expanding Spatial Boundaries for Industrial Development

Industrial integration serves as a core pathway for enhancing productivity quality. Through cross-sector integration under the "Red+" framework, extending industrial chains and expanding development space have become crucial pillars for high-quality growth in Hainan's red cultural tourism industry. The deep integration of "Red+Culture & Tourism" leverages Hainan's "red, green, and blue" resources to create composite products such as "red-themed educational tours combined with eco-experiences," "revolutionary culture paired with coastal resorts," and "revolutionary spirit integrated with wellness tourism," establishing a comprehensive tourism ecosystem. By connecting revolutionary heritage sites with tropical rainforests, Li and Miao ethnic villages, and coastal attractions, premium travel routes are developed to extend consumption chains. The innovative "Red+Education" initiative features customized revolutionary study programs, Party-building training courses, and experiential courses like "A Day in the Life of the Red Army," deeply integrating red cultural tourism with school education and government training. The development of the "Cloud-based Red Education" VR platform expands online red education scenarios, significantly broadening educational reach.

"Red + Technology" Integration Upgrade: Promotes the convergence of red cultural tourism with digital technology, creative design, and film media industries to develop digital cultural products, red-themed films, and interactive games. Establishes a red cultural tourism technology incubator to nurture innovative enterprises in digital creativity and immersive experiences, fostering new business models. "Red + Rural" Integration for Rural Revitalization: Aligning with Hainan's rural revitalization strategy, integrates red cultural resources with rural tourism and specialty agriculture to create red-themed tourism destinations. Encourages villagers' participation in red cultural tourism operations through profit-sharing mechanisms, boosting local incomes and achieving mutual growth between industrial development and rural revitalization.

4.4. Institutional Innovation Safeguards: Optimizing the Institutional Environment for Industrial Development

Institutional innovation serves as a crucial safeguard for the development of new-quality productive forces. By removing institutional barriers and refining policy frameworks, a favorable environment is created for the high-quality growth of Hainan's red cultural tourism industry. Management system innovation involves the establishment of the Hainan Red Cultural Tourism Industry Development Leading Group, which coordinates resources from government agencies, scenic areas, enterprises, universities, and industry associations, breaking down regional and departmental barriers to achieve collaborative governance. A pilot "Management Committee + Operating Company" dual-track system has been implemented to clarify responsibilities and enhance operational efficiency. Policy system innovation includes the introduction of the "Hainan Red Cultural Tourism Industry High-Quality Development Special Plan" and a dedicated development fund to increase financial support for digital technology applications, business model innovation, and talent cultivation. Financial products such as "Red Cultural Tourism Loans" and "Copyright Loans" have been developed to address corporate financing challenges. Leveraging the advantages of free trade port policies, institutional innovations have been demonstrated in land approval processes, foreign investment access, and cross-border tourism initiatives [10].

Standard system innovation establishes local standards for protecting Hainan's revolutionary cultural tourism resources, service quality, product development, and talent cultivation. Tiered classification management is implemented with an exit

mechanism for underperforming entities. The development of revolutionary-themed cultural products and scenic area operations is standardized to enhance industry practices. Regulatory model innovation includes the development of a smart supervision platform utilizing AI early-warning models and big data analytics to enable real-time monitoring of scenic area safety, service quality, and market order. A tourism credit evaluation system is established, along with a dedicated complaint channel, to foster a fair and orderly market environment.

4.5. Talent Foundation Building: Strengthening Talent Support for Industrial Development

Talent serves as the core driver of new-quality productivity, with high-caliber professionals forming the foundation for Hainan's red cultural tourism industry to achieve high-quality development. A comprehensive talent development system integrating "cultivation, recruitment, and utilization" has been established. In higher education, institutions such as Hainan University, Hainan Tropical Ocean University, and Hainan Vocational College of Economics and Trade are encouraged to introduce specialized programs in red cultural tourism, enhancing curricula with courses on digital technologies, cultural-tourism integration, and red culture studies [3]. The "dual-mentor system" is implemented to collaborate with tourism enterprises in training industry-academia aligned instructors, ensuring precise alignment between talent development and industrial demands.

Vocational Skills Training: Implement digital skills training programs for red cultural tourism professionals, covering tour guides, operational staff, and cultural creative designers to enhance their digital technology application capabilities and service quality. **Launch the "Red Cultural Tourism Talent Thousand Plan"** to cultivate interdisciplinary professionals and address talent shortages. **Talent Acquisition and Incentives:** Establish a dedicated talent fund to attract high-caliber experts in red culture research, digital technology, and cultural tourism operations through flexible recruitment approaches. Improve incentive mechanisms by recognizing outstanding talents with awards and incorporating their achievements into professional title evaluations and performance assessments, thereby stimulating innovative potential.

5. Optimization Strategies for Enhancing High-Quality Development of Hainan's Red Cultural Tourism Industry through New Quality Productivity

Based on the constructed "Five-in-One" dynamic mechanism and aligned with the practical development of red cultural tourism in Hainan, specific optimization strategies are proposed across five dimensions: technological empowerment, data application, industrial integration, institutional innovation, and talent cultivation. These strategies aim to ensure the effective implementation of the dynamic mechanism.

5.1. Strengthening Technological Innovation to Drive Digital Transformation of Products and Operations

Promoting Digital Protection and Development of Red Cultural Resources: Utilize technologies such as 3D scanning, drone mapping, and blockchain to digitally archive red heritage sites, cultural relics, and historical materials, establishing Hainan's Digital Red Cultural Tourism Resource Library. Develop digital cultural products incorporating Hainan's distinctive Li and Miao cultures along with coconut traditions, creating recognizable red-themed IPs to enhance product value. **Create immersive experience venues:** At core attractions like the Red Women's Army Memorial Park and Muerui Mountain Revolutionary Base, build VR/AR immersive experience centers, holographic projection theaters, and red-themed murder mystery bases, offering immersive performances and scenario-based experiences to transition from "sightseeing-oriented" to "experience-oriented" tourism. **Develop metaverse spaces for red cultural tourism,** creating virtual scenic areas and educational environments to expand online engagement boundaries. **Establish smart scenic area management platforms:** Achieve 5G full coverage in key attractions, develop digital twin platforms for intelligent crowd monitoring, emergency alerts, smart navigation systems, and ticket management [11]. **Build Hainan's**

Red Cultural Tourism Big Data Operations Center to integrate industry data, enable precision marketing and intelligent scheduling, and improve operational efficiency.

5.2. Activate Data Elements to Build a Data-Driven Industrial Development System

We will establish an integrated data-sharing platform leveraging the digital infrastructure of Hainan Free Trade Port to create the provincial "Hainan Red Culture and Tourism Big Data Center." This initiative will consolidate data from Party history research, tourism management, natural resources administration, public security departments, as well as market data including scenic area operations, online travel agency platforms, and third-party payment systems, effectively breaking down data silos. Blockchain technology will be employed for rights confirmation and digital certification to ensure the security and circulation of digital assets related to red cultural resources and cultural IP copyrights.

Deepen data-driven precision marketing by utilizing big data analysis to profile tourists (age, preferences, purchasing power, origin) and build segmented customer models for Gen Z, Party members, and international tourists to achieve personalized recommendations tailored to individual needs. Through TikTok, Xiaohongshu, and the WeChat ecosystem, implement programmatic advertising and live-streaming sales to precisely reach target markets and improve conversion rates [12]. Promote data-driven intelligent supervision and decision-making by leveraging big data to monitor tourist flow capacity, environmental indicators, and public sentiment dynamics in scenic areas, enabling smart early warning and scheduling. Base data analysis to evaluate the operational efficiency of red tourism projects and brand communication effectiveness, providing scientific evidence for government industrial support, corporate investment decisions, and university teaching reforms, thereby enhancing the operational efficiency of the entire industry chain.

5.3. Deepening Industrial Integration to Expand the Breadth and Depth of the "red+" Integration Ecosystem

We will deepen the integration of "red culture + tourism" to create comprehensive tourism complexes, leveraging Hainan's "red, blue, and green" resources to design premium composite routes featuring "red heritage experiences + tropical rainforest wellness + coastal leisure vacations." By strengthening connectivity between the island's tourism highways and revolutionary sites, we aim to establish an integrated tourism framework combining "revolutionary landmarks + greenways + blue ocean access," thereby extending visitor stays and consumption chains [13]. The "red culture + education" synergy will be enhanced through a revolutionary study tour system, collaborating with educational authorities, universities, and schools to develop age-specific thematic curriculum packages. The "Cloud-based Red Education" VR platform will deliver immersive lessons using revolutionary narratives and historical settings, expanding red education outreach while creating a blended learning model that combines "physical sites + digital platforms."

We will deepen the integration of "red culture + technology" to foster innovative digital cultural industries. By adopting technologies such as AIGC and digital twins, we will develop red-themed digital cultural products, NFT collectibles, and interactive games. The establishment of Hainan's Red Culture Tourism Technology Incubator aims to attract digital cultural innovators and immersive experience providers, creating an innovation cluster for red culture tourism and promoting high-value-added business incubation. Furthermore, we will enhance the synergy between "red culture + rural development" to empower rural revitalization. Leveraging Hainan's red heritage villages (e.g., Baisha and Qiongzong regions), we will establish model villages integrating "red culture, tropical agriculture, and rural tourism." Villagers are encouraged to contribute land and property resources as equity stakes in red-themed homestays and cultural agricultural products, establishing a collaborative mechanism of "enterprises + cooperatives + farmers" to drive collective prosperity.

5.4. Strengthening Institutional Innovation to Optimize the Institutional Environment for High-Quality Development

To innovate management systems and achieve collaborative governance, Hainan has established the Leading Group for High-Quality Development of Red Cultural Tourism Industry, led by provincial leaders and coordinating departments including Party history research, tourism, development and reform, and finance to create a cross-departmental and cross-regional coordination mechanism. The scenic area operation model has been innovated through piloting the "Management Committee + Professional Operating Company" model, introducing social capital to enhance market-oriented and professional operational standards.

We will enhance the policy support framework and strengthen financial empowerment by establishing the 5-billion-yuan "Hainan Red Cultural Tourism Industry Development Fund," which will prioritize digital transformation, business model innovation, and talent cultivation. Financial products will be innovated through offerings such as revenue bonds for red cultural tourism projects, copyright-backed loans, and supply chain financing to address financing challenges and high costs faced by small and medium-sized enterprises. Leveraging tax incentives from the free trade port, we aim to attract leading domestic and international cultural tourism enterprises to establish operations in the region.

Establish a standard system to enhance standardization levels, formulate local standards and industry norms such as the "Hainan Red Cultural Tourism Resources Protection Specifications," "Red Study Tour Service Quality Standards," and "Red Cultural and Creative Product Development Guidelines," and implement tiered classification evaluation and dynamic assessment [14]. Establish a vocational skill level certification system for red cultural tourism practitioners to regulate market order.

We will innovate regulatory models to foster a favorable business environment by establishing an "Internet + Regulation" platform that utilizes AI algorithms for real-time monitoring and intelligent alerts regarding scenic area safety, service quality, and pricing compliance. Flexible enforcement measures such as "first violation exemption" and "minor offense penalties waiver" will be implemented, while streamlined tourism-related approval processes will be optimized to create a law-based, internationalized, and user-friendly business ecosystem for red tourism enterprises.

5.5. Strengthening Talent Teams to Consolidate the Foundation for High-Quality Development

We will deepen talent cultivation reforms in higher education institutions, encouraging universities including Hainan University, Hainan Tropical Ocean University, and Hainan Vocational College of Economics and Trade to introduce "Red Cultural Tourism Specializations" within disciplines such as tourism management, cultural industries, and digital media [10, 14]. The curriculum system will be restructured to incorporate elements of new productive forces, such as cultural tourism big data, VR/AR applications, and AI-generated content creation. A "dual-mentor system" will be implemented to jointly train industry-academia collaborative "dual-qualified" teachers, ensuring precise alignment between talent development and industrial demands.

Conduct large-scale vocational skills enhancement training and implement the "Red Cultural Tourism Talent Thousand Plan" to provide digital skills training for existing tour guides, scenic area managers, and educational research mentors, with a focus on improving capabilities in VR/AR operation, new media management, and big data analysis. Establish collaborative training bases through "government-school-enterprise-industry" partnerships to create a lifelong learning system for on-the-job personnel.

We will strengthen talent recruitment and incentives by leveraging the Free Trade Port's "Million Talents to Hainan" policy, establishing a specialized program for red culture tourism professionals, and attracting high-end and urgently needed talents in fields such as red culture research, digital technology, cultural tourism operations, and brand marketing. To enhance talent evaluation and incentive mechanisms, we will link individual contributions to professional title evaluations, compensation packages, and project funding opportunities, thereby stimulating innovative vitality among talents [8].

6. Conclusion and Prospects

New-type productive forces, with their core advantages of technological innovation, data-driven approaches, industrial integration, institutional innovation, and talent support, have created unprecedented opportunities and momentum for the high-quality development of Hainan's red cultural tourism industry. By establishing a "five-in-one" driving mechanism featuring technological innovation as the engine, data empowerment as the catalyst, industrial integration as the foundation, institutional innovation as the safeguard, and talent development as the cornerstone, current challenges such as product homogeneity, insufficient digitalization, shallow integration, talent shortages, and weak brand recognition in Hainan's red cultural tourism sector can be effectively addressed. Through optimized strategies including enhanced technological capabilities, activated data value, deepened industrial synergy, institutional innovation advancement, and strengthened talent cultivation, Hainan's red cultural tourism industry can achieve transformative upgrades—from resource dependency to innovation-driven growth, from single-sightseeing experiences to comprehensive engagement, from regional fragmentation to holistic coordination, and from domestic branding to global influence. These efforts will significantly contribute to the development of Hainan Free Trade Port and the broader advancement of cultural industries.

Looking ahead, as cutting-edge technologies such as generative AI, metaverse, and brain-computer interfaces continue to mature and be applied, Hainan's red cultural tourism industry is poised to undergo profound transformations in its high-quality development. Future research should focus on key areas including establishing operational mechanisms for red cultural tourism metaverse platforms, developing global marketing strategies for red cultural tourism brands under new productive forces, exploring innovative approaches and value assessments for "red+" integrated industries, and pioneering digital-era methods for preserving and revitalizing red culture. These ongoing explorations will provide robust theoretical foundations and practical guidance to help Hainan's red cultural tourism sector seize emerging opportunities and lead advancements in the wave of new productive forces.

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