WHIOCE PUBLISHING PTE. LTD.
PROVIDING
FIRST-CLASS SCIENTIFIC INFORMATION
FOR TOP SCHOLARS

2025 Volume 3, Issue 11
Contemporary Education Frontiers
ISSN:3029-1879 (Online)
ISSN: 3029-1860 (Print)

Industrial-Education Integration Empowers Environmental Art Innovation Design Strategy for Cultural Tourism Market Space in Hainan Free Trade Port

Yupeng Hu*
Hainan Vocational University of Science and Technology, Haikou 571126, Hainan, China

Author to whom correspondence should be addressed.

Abstract: The development of Hainan Free Trade Port has raised higher requirements for spatial quality and environmental experience in cultural tourism markets. However, existing markets face challenges including spatial homogeneity, superficial cultural expression, and weak industry-education collaboration. Grounded in the concept of industry-education integration, this study explores how aligning educational chains, talent pipelines with industrial and innovation chains can drive environmental art design innovation in cultural tourism markets. Research indicates that industry-education integration serves not only as a reform pathway for talent cultivation but also as an effective mechanism for spatial innovation. By establishing collaborative platforms involving government, schools, industries, and enterprises, promoting deep integration of teaching with local projects, and guiding design practices through research initiatives, we can significantly enhance regional cultural identity, experiential interactivity, and ecological adaptability of cultural tourism markets. The paper proposes four strategies: scenario narrative based on cultural gene decoding, interactive experience strategies leveraging digital technology integration, flexible growth strategies through modular construction, and localized revitalization strategies utilizing indigenous materials. These approaches aim to provide theoretical references and practical pathways for high-quality development of cultural tourism markets in Hainan Free Trade Port.

Keywords: Industry-education integration; Hainan Free Trade Port; Cultural tourism market; Environmental art design; Innovation strategies

Online publication: Dcecmber 20, 2025

1. Introduction

As a national strategic initiative, the Hainan Free Trade Port development is propelling the island toward higher levels of openness and high-quality growth. In this process, the deep integration of culture and tourism has been endowed with new contemporary missions. Cultural tourism markets, composite public spaces combining cultural exhibitions, tourism consumption, leisure entertainment, and community interaction, have rapidly expanded across Hainan. These venues serve as vital windows showcasing island charm, Li and Miao ethnic cultures, and memories of overseas Chinese communities,

while also functioning as key platforms for the nighttime economy and holiday tourism. However, rapid expansion has exposed spatial limitations in some markets, including homogenized design language, superficial exploration of regional cultural elements, monotonous functional layouts failing to meet tourists' growing demand for immersive experiences, and insufficient consideration of fragile island ecosystems during construction and operation. At the root of these challenges lies a disconnect between talent cultivation in environmental art design, knowledge production, and industrial practice, with innovation ecosystems remaining incomplete [1].

Industry-education integration, as an educational philosophy and development model that deeply aligns industrial demands with teaching processes, offers innovative solutions to address the aforementioned challenges. It aims to dismantle barriers between academic institutions and industries, ensuring that institutional design expertise and faculty-student innovation capabilities precisely meet practical industrial needs. By incorporating cutting-edge industry trends and real-world projects into teaching practices, this approach enhances the relevance and effectiveness of talent cultivation. Within the context of Hainan Free Trade Port, integrating industry-education collaboration into environmental art design for cultural tourism markets not only provides continuous intellectual support and innovative solutions for design practices, but also fosters localized high-caliber design professionals who "understand Hainan, cherish Hainan, and excel in designing Hainan." This initiative holds significant practical value for creating culturally immersive tourism consumption scenarios with international recognition and local vitality, while optimizing the business environment and living conditions in the free trade port. This paper explores how industry-education integration empowers innovative environmental art design in Hainan Free Trade Port cultural tourism markets, analyzes underlying mechanisms, examines existing challenges, and proposes systematic design strategies [2].

2. The intrinsic logic and value orientation of industry-education integration driving spatial design innovation in cultural tourism markets

2.1. Paradigm shift from talent supply to innovation synergy

Traditional talent cultivation models prioritize the transmission of generic skills, resulting in prolonged adaptation periods for graduates when entering specific projects. Industry-education integration promotes an innovative collaborative paradigm grounded in real-world challenges and scenarios. In cultural tourism market design, university faculty and students move beyond theoretical discussions to directly address operational pain points, community needs, and visitor expectations. The design process itself becomes an integrated entity combining teaching, research, and social services. For instance, design programs at local institutions like Hainan University and Sanya University can collaborate deeply with concrete projects such as Haikou's Qilou Old Street and Sanya Tianya Town, embedding graduation projects and course designs within authentic site contexts and operational requirements. This model effectively stimulates student creativity, enables teachers to find practical applications for research, and provides market operators with cost-effective, high-quality diversified solutions, achieving innovative collaboration that benefits all stakeholders [3].

2.2. Deep empowerment of indigenous culture exploration and translation

Hainan boasts a rich and diverse cultural heritage, encompassing ethnic symbols such as Li ethnic brocade, boat-shaped dwellings, and facial tattoos, alongside maritime folklore derived from Nanyang overseas Chinese architecture and fishing-farming traditions. However, transforming abstract cultural resources into perceptible and experiential spatial narratives presents significant challenges. Industry-education integration offers a profound empowerment pathway. Universities and research institutions possess methodological strengths in cultural studies, historical analysis, and semiotic interpretation, enabling systematic decoding and encoding of regional cultural genes. Through field surveys, oral history collection, and literature research, faculty-student teams identify core cultural archetypes and narrative threads. These elements are then organically woven into urban facades, landscape features, public furniture, lighting environments, and signage systems via environmental art design techniques. This research-driven design approach effectively avoids simplistic accumulation and vulgarization of cultural

symbols, transforming cultural tourism markets into immersive theaters that tell Hainan's stories [4].

2.3. Meeting the high standards for spatial quality in free trade port development

Hainan Free Trade Port aims to achieve world-class openness in its development, which inherently requires urban spaces and public services to meet international standards. As a showcase of the city's image, cultural tourism markets directly influence how domestic and international visitors perceive Hainan. Extensive, homogeneous spatial designs fail to align with the free trade port's strategic positioning. Industry-education integration can more effectively incorporate cutting-edge design concepts, technological approaches, and sustainable development principles into market renovation projects. Latest advancements in low-carbon ecological design, barrier-free environments, and smart interaction systems can be implemented and optimized through university-industry collaboration programs. The participation of faculty and student teams injects dynamic, experimental innovations into market spaces, small-scale yet impactful, elevating regional aesthetic appeal and cultural sophistication. From a long-term perspective, such continuous micro-innovations and incremental upgrades constitute the essential pathway to creating high-quality free trade port spaces.

3. A practical review and core challenges of environmental art design for cultural tourism markets in free trade port contexts

3.1. Superficialization of cultural imagery and lack of narrative depth

Many contemporary cultural tourism markets in Hainan exhibit superficial appropriation of local culture through symbolic elements. While Li brocade patterns adorn sunshades and boat-shaped houses are simplified into street sculptures, these designs fail to convey the historical depth, artisanal craftsmanship, and emotional resonance embedded within them. The spaces lack coherent cultural narratives, resulting in superficial visitor experiences that fail to foster deep cultural identification or emotional connection. Moreover, the cultural ties between these markets and surrounding indigenous communities remain severed, reducing them to isolated consumer products rather than organic components integrated into local life contexts. This narrative deficiency stems from inadequate regional cultural research during the design phase and the absence of effective mechanisms to translate academic findings into tangible spatial experiences [5].

3.2. Homogenization of spatial experiences and lack of interactive fun

The rapid replication of business models has led to homogenization in spatial layouts, business mixtures, and architectural styles across cultural tourism markets in Hainan's cities and counties. Antique-style streets exhibit uniform designs, tourist souvenirs follow repetitive patterns, and standardized food stalls diminish visitors' sense of exploration and novelty. While spatial experiences often emphasize static visual displays, they rarely engage multiple senses like sight, smell, and touch, nor incorporate interactive designs that encourage active participation or create personalized memories. Particularly amid rapid digital advancements, the integration of market environments with technologies such as virtual reality, augmented reality, and smart sensing remains underdeveloped, failing to deliver tech-savvy and immersive experiences for Generation Z travelers.

3.3. Neglect of ecological resilience and disappearance of island characteristics

As a tropical island, Hainan's ecosystem exhibits both uniqueness and fragility. Climatic characteristics, including high temperatures, humidity, intense typhoons, and strong ultraviolet radiation, impose specific requirements on material selection, structural design, and sun/shade protection systems for outdoor market spaces. However, inadequate consideration in some designs has led to accelerated facility aging, rising maintenance costs, and a sharp decline in user experience during extreme weather. Meanwhile, excessive reliance on non-native materials, high-energy consumption resources, and exotic plant arrangements in pursuit of "internet-famous" visual effects inadvertently increases environmental burdens and diminishes the island's distinctive spatial qualities of lightness, transparency, and coolness.

Integrating passive ecological strategies into design to highlight the place spirit of tropical islands remains an urgent professional challenge requiring immediate attention.

3.4. Singularity in designing innovation incentive mechanisms and ambiguity in industry-education collaboration

Current cultural tourism market designs predominantly rely on market-oriented institutions. Constrained by project timelines and commercial logic, proposals tend to prioritize stability and efficiency, leaving limited room for innovative exploration. Universities, as key hubs for knowledge innovation and talent cultivation, have yet to unlock their full design potential. Industry-education integration in some projects remains superficial, limited to invitation-based tours and cursory suggestions, failing to establish deep collaborative mechanisms characterized by "joint research initiatives, co-created processes, and shared outcomes." Student internships often turn into low-cost labor rather than innovative practices rooted in research-based learning. Channels for translating academic achievements into industrial applications remain inadequate, hindering the effective accumulation of design expertise. This superficial collaboration results in cultural tourism market spatial designs that lack both critical academic reflection and the bold creativity and vitality characteristic of young generations.

4. Construction of innovative design strategies for environmental art driven by industry-education integration

4.1. Scenario narrative strategies based on cultural gene decoding

The core of this strategy lies in treating cultural tourism market spaces as complete cultural narrative venues. The implementation pathway for industry-education integration involves forming interdisciplinary teams composed of humanities and design faculty and students. These teams conduct systematic research on the historical context, folk traditions, and oral memory of market locations to create detailed cultural genealogy maps. Building upon this foundation, environmental art design professionals lead storyline development and spatial transformation. For instance, in markets themed around "Nanyang Overseas Chinese Letters," architectural elements of letter-writing agencies, timelines of correspondence exchanges, and maritime routes of overseas Chinese to Southeast Asia can be transformed into street paving patterns, landscape wall reliefs, and public seating designs. Each spatial node serves as a narrative chapter, guiding visitors through a time-traveling cultural journey during their exploration. Signage systems function not merely as directional markers but as interpreters of stories, while artistic installations transcend visual focal points to become emotional triggers. This research-driven narrative design ensures accurate and profound cultural expression, endowing market spaces with irreplicable cultural identities.

4.2. Interactive experience strategies based on digital technology integration

The integration of industry and education provides a low-cost, high-failure-tolerance testing ground for innovative applications of digital technologies in cultural tourism markets. Academic programs such as computer science, digital media arts, and interaction design can collaborate closely with environmental art design disciplines to develop interactive installations and experiential systems tailored for market environments. Specifically, augmented reality-based navigation apps could be created where visitors scanning specific buildings or landmarks would experience historical footage overlaid with virtual character narratives. In the Li brocade craftsmanship exhibition zone, motion-sensing interactive virtual weaving games could be designed to help visitors appreciate traditional craftsmanship through interactive entertainment. At night, projection mapping technology could display dynamic marine creatures and Li ethnic mythology on plaza surfaces or building facades, creating dreamlike atmospheres. Smart sensing devices could enable real-time adjustments to lighting, water features, and sound effects based on visitor behavior and density, enhancing spatial engagement. These technological applications prioritize service-oriented value over flashy demonstrations, aiming to deepen cultural

immersion and emotional connections. The industry-education integration model facilitates efficient development, testing, and iteration of cutting-edge technologies within authentic feedback environments.

4.3. Elastic growth strategy based on modular construction

Hainan tourism exhibits distinct seasonal fluctuations, with cultural tourism market demands dynamically evolving as operations mature. Island ecosystems require construction activities to minimize land hardening and environmental damage. This necessitates flexible, reversible, and scalable modular design strategies. Industry-academia collaboration enables university programs in industrial design, architecture, and environmental art design to co-develop standardized prefabricated modules tailored for the cultural tourism market. These modules, including standalone kiosks, rest pavilions, display racks, and planting boxes, utilize lightweight, weather-resistant, and easy-to-assemble materials (such as corrosion-resistant local timber, bamboo, and recycled plastics). Through diverse combinations, they rapidly create street interfaces, small plazas, and temporary exhibition spaces. During off-seasons, modules can be stored, reconfigured, or relocated to reduce maintenance costs, while peak seasons or special events allow swift functional expansion. Students participate in creative module design, structural analysis, material durability testing, and on-site assembly practices. This strategy enhances market adaptability while respecting island ecosystems, transforming construction processes into dynamic hands-on teaching experiences.

4.4. Local construction strategies based on rural material renewal

Advocating the application of local materials and updating their expression through modern design techniques and craftsmanship serves as an effective approach to highlight regional characteristics, reduce environmental impact, and maintain emotional connections with local communities. Industry-education integration offers vast potential in this field. Universities specializing in materials science, civil engineering, and design can collaborate on research and improvement experiments for Hainan's indigenous materials. For instance, enhancing the slip resistance and durability of volcanic stone as flooring materials; exploring innovative applications of agricultural and forestry waste such as coconut fiber and betel nut tree trunks in landscape furniture and installation art; refining traditional coral stone masonry techniques to meet modern seismic and environmental standards. In design practice, students should be guided to experiment with new formal languages while respecting the inherent texture and structural logic of materials. Examples include scaling up traditional bamboo weaving techniques to create sunshade structures with dynamic light effects, or combining discarded old ship timber with steel frameworks to design narrative-rich benches. Crucially, inviting local artisans skilled in traditional craftsmanship to participate in construction processes fosters a collaborative model where "university faculty designs and local artisans execute." This approach not only preserves the authenticity of craftsmanship but also provides students with valuable opportunities to draw inspiration from folk wisdom, ensuring design works are truly rooted in their local context.

5. Establishing a long-term mechanism for empowering innovative design through industry-education integration

5.1. Establishing a collaborative innovation platform for government–school–industry–enterprise partnership

Government authorities (including tourism and culture, education, and urban-rural development departments) should exercise coordinated guidance by introducing incentive policies to provide startup funding, venue support, and streamlined approval processes for university-industry collaboration projects. Industry associations serve as bridges, aggregating common corporate needs, aligning with academic strengths in universities, and organizing discussions on industry standards. Universities should proactively dismantle departmental barriers by establishing interdisciplinary "Cultural Tourism Spatial Innovation Design Research Centers" that integrate expertise from design studies, architecture, tourism management, computer science, and cultural studies. Enterprises (operators of cultural tourism markets) should contribute

real-world projects, practical training bases, and financial support. Through signed strategic cooperation agreements, all parties should clarify responsibilities, establish clear objectives, define roles, and ensure smooth communication to form a collaborative innovation ecosystem with well-defined objectives and effective division of labor.

5.2. Innovative "embedded topic-based" and "on-site design-based" teaching models

We are advancing educational reforms by translating practical project needs from cultural tourism markets into a series of teaching topics. Core courses such as "Thematic Design" and "Graduation Design" now incorporate real-world site-based assignments, with industry mentors actively participating in both teaching processes and outcome evaluations. The program further implements an immersive "On-site Design" model, where senior undergraduates or graduate teams conduct weeks-to-month-long fieldwork at designated cultural tourism markets during academic periods or breaks. Students identify on-site challenges, interview visitors and merchants, develop conceptual designs, create physical prototypes, and refine solutions under joint mentorship from academic advisors and industry partners. Selected outstanding proposals gain implementation opportunities, allowing students to witness tangible design outcomes. This approach significantly enhances students' comprehensive problem-solving capabilities for complex real-world scenarios while directly translating educational achievements into productive forces that drive regional development.

5.3. Establishing a knowledge management and achievement transformation sharing mechanism

Design proposals, research reports, technical patents, and visual documentation generated during industry-academia collaboration constitute critical knowledge assets. Clear ownership and sharing mechanisms should be established to incentivize sustained participation from all stakeholders. Publicly accessible foundational research outcomes should be encouraged for open publication and sharing to elevate industry standards. Commercially viable innovative designs can be commercialized through technology licensing or co-entrepreneurship initiatives. Universities may incorporate successful collaboration cases into teaching materials and case libraries to support future education, while enterprises gain external expertise and design reserves for continuous innovation. Regular events such as "Industry-Academia Design Achievements Exhibitions" and "Cultural Tourism Market Innovation Design Forums" should be organized to showcase results to the public and industry peers, amplifying impact, attracting additional resources, and fostering a virtuous cycle.

6. Conclusion

The development of Hainan Free Trade Port has created vast opportunities for high-quality growth in the cultural tourism industry, while also raising aesthetic standards and innovation demands for cultural tourism markets as key consumption and experiential hubs. Industry-education integration, as a strategic approach bridging educational systems and industrial ecosystems, provides effective solutions to address the homogenization and superficiality issues in market spatial design. This initiative not only drives talent supply-side reforms but also serves as a core engine for design innovation. Only by closely aligning universities' research capabilities and creative vitality with real industrial needs and practical application scenarios can we develop spatial design works that combine cultural depth, technological sophistication, and ecological resilience.

The four strategies proposed in this paper, scenario narration based on cultural gene decoding, interactive experience based on digital technology integration, elastic growth based on modular construction, and local revitalization based on rural material renewal, along with reflections on establishing long-term collaborative mechanisms, aim to provide a systematic reference framework for related practices. Looking ahead, with the continuous deepening of free trade port policies and the evolving concept of industry-education integration, the spatial design of cultural tourism markets will develop toward greater intelligence, inclusiveness, and humanistic care. It will become a vibrant carrier showcasing Hainan's unique regional cultural charm, an important platform for stimulating urban vitality and consumption potential, and a dynamic classroom for nurturing new-generation design talents. Through sustained exploration and practice,

industry-education integration will undoubtedly empower Hainan Free Trade Port to create a series of benchmark cultural tourism market spaces that combine international vision, China's grandeur, and island charm, enabling every visitor to perceive a Hainan that is both ancient and youthful, local yet open.

Disclosure statement

The author declares no conflict of interest.

References

[1] Sun Y, Li P, 2024, Narrative Study on Urban Cultural Tourism Space under "Atmosphere" Perspective: A Case Study of Jinan. *Journal of Heilongjiang Ecological Engineering Vocational College*, 2024(4): 11–14, 32.

[2] Tao J, Shi M, Cui Y, 2025, Immersive Cultural Tourism Spaces: Concepts, Models, and Trends. *Library Forum*, 2025(1): 21–28.

[3] Zhang C, 2023, Visual Integration Research on Intangible Cultural Heritage and Cultural Tourism Immersive Space in Shennongjia, thesis, Three Gorges University.

[4] Yang F, Wang X, 2022, Interactive Design in Immersive Cultural Experiences: Core Mechanisms and Implementation Pathways. *Library and Information Science*, 2022(3): 55–62.

[5] Liu Z, Zhao X, Long W, et al., 2020, The Formation Mechanism of Consumer Purchase Intention under Online Live Streaming Sales: An Analysis Based on Grounded Theory. *China Circulation Economics*, 2020(8): 48–57.