

Postprint of the Construction Practice of the China Broadcasting Chongqing Digital Culture Project

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Abstract

[Objective] To facilitate the implementation of the national cultural digitalization strategy, this study explores the construction practices of digital cultural projects in Chongqing within this strategic context.

[Methods] Based on local policy support in Chongqing and with China Broadcasting Network Chongqing Corporation as the principal entity, this research examines the construction of big data infrastructure for the cultural industry and the development of digital cultural applications, analyzing both infrastructure development and application outcomes.

[Results] Chongqing has achieved remarkable progress in constructing big data infrastructure for the cultural industry, establishing a “one cloud, one network, one platform” architecture; it has successfully developed multiple digital cultural applications including “High-Quality Cultural Life,” “Light and Shadow Chongqing,” and “Chongqing Cloud Museum,” thereby promoting the integrated development of culture and tourism.

[Conclusion] Chongqing’s digital cultural project construction provides valuable experience for implementing the cultural digitalization strategy; future endeavors should further enhance technological innovation and application promotion, foster deep integration between culture and technology, and propel high-quality development of the cultural industry.

Full Text

Construction Practice of China Broadcasting Chongqing Digital Culture Projects

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Abstract

This study examines the construction practices of digital culture projects in Chongqing within the framework of China's national cultural digitization strategy, aiming to facilitate the implementation of this strategic initiative. Grounded in local policy support and led by China Broadcasting Chongqing Corporation, the research investigates infrastructure development for cultural industry big data and the construction of digital cultural applications, analyzing both infrastructure achievements and application outcomes. The results demonstrate that Chongqing has made significant progress in building cultural industry big data infrastructure, establishing an integrated "One Cloud, One Network, One Platform" architecture. The city has also successfully developed multiple municipal-level digital cultural applications, including "High-Quality Cultural Life," "Light and Shadow Chongqing," and "Chongqing Cloud Museum," thereby promoting integrated development of culture and tourism. These digital culture project construction efforts provide valuable experience for implementing the national cultural digitization strategy. Future work should further strengthen technological innovation and application promotion, deepen the integration of culture and technology, and drive high-quality development of the cultural industry.

Keywords: Cultural digitization, Cultural industry big data, Digital cultural applications, Culture-tourism integration, Cultural digitization strategy

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With the rapid development of information technology, cultural digitization has become a major global trend in the cultural industry. In 2022, the General Office of the Communist Party of China Central Committee and the General Office of the State Council issued the "Opinions on Promoting the Implementation of the National Cultural Digitization Strategy," which proposes exploring effective pathways for digital transformation and upgrading [1], elevating cultural digitization to a national-level strategy and outlining eight key tasks and safeguard measures. Among these, three tasks—"strengthening cultural digitization infrastructure," "building cultural data service platforms," and "developing new scenarios for digital cultural consumption"—are closely related to broadcasting and television, providing broad space for broadcasting network companies to participate in cultural digitization construction.

Furthermore, the company's cloud service platform, which was first established in 2016 and has undergone three phases of development, now comprises 67 high-performance computing service nodes capable of delivering approximately 2,000 cloud hosts. The platform offers comprehensive services including cloud storage, cloud networking, elastic scaling, load balancing, security groups, elastic IP, image services, and backup services, meeting the requirements of most application

scenarios. In early 2021, the company comprehensively upgraded its cloud security platform by deploying next-generation firewalls and intra-cloud security software, establishing robust “north-south” and “east-west” three-dimensional security protection capabilities for its cloud platform.

1. Infrastructure Construction for Cultural Industry Big Data

As the main entity for the national cultural private network and national cultural big data system construction, and to implement the Party Central Committee’s strategic deployment for advancing national cultural digitization, China Broadcasting Chongqing Corporation has comprehensively sorted out its existing infrastructure. Building upon its original network foundation, the company has planned an upgrade path for the integrated “One Cloud, One Network, One Platform” architecture, systematically advancing the construction of its digital foundation to provide robust support for the digital transformation of cultural institutions.

1.1 “One Cloud”

Leveraging existing computing resources, the company constructed the China Broadcasting (Chongqing) Data Center and actively built it into the “One Cloud” computing warehouse for the Chongqing center of the national cultural big data system, establishing advanced cultural computing service capabilities. Officially launched on April 26, 2023, the China Broadcasting (Chongqing) Data Center has a total construction area of 20,203.44 square meters, built according to national Grade A and international T3+ standards. Designed to accommodate 1,500 racks, it essentially meets the computing power demands of cultural digitization and the interconnectivity requirements of the consumption side, and has already joined the Chongqing cluster of the Chengdu-Chongqing national computing hub.

1.2 “One Network”

After years of network upgrades and transformation, the company now supports integrated wired and wireless (Broadcasting 5G) network access methods. For fixed networks, the company has built a fully connected backbone network architecture covering 40 district-level counties in Chongqing, including municipal backbone optical cables, IP bearer networks, OTN transmission networks, 40 regional central machine rooms, and over 400 township machine rooms. The coverage breadth of municipal backbone optical cables and OTN transmission systems in administrative counties has reached 100%, with district-level counties establishing 10/40G PTN metropolitan area rings. Access networks now cover the entire Chongqing municipality, basically forming a “two centers, one hub” layout with the China Broadcasting (Chongqing) Data Center and Fuling IDC as the two data centers and the Broadcasting Building as the transmission

hub. For wireless networks, the China Broadcasting 5G core network Chongqing node has been put into operation with inter-network interconnectivity capabilities. According to the co-construction and sharing agreement signed between China Broadcasting and China Mobile, the company actively coordinates with Chongqing Mobile to fully deploy 5G base stations, basically achieving continuous wireless network coverage across the city.

In June 2023, the China Broadcasting IP Backbone Network (CBNET) Chongqing node was officially launched, with network bandwidth capabilities of 200G access to CBNET and 10G access to the national “cultural private network.” The company will fully leverage this secure and reliable IP national backbone network to actively promote national cultural digitization construction.

1.3 “One Platform”

Under the guidance of the Chongqing Municipal Committee of the Communist Party of China Publicity Department in 2021, the company invited the State Administration of Radio and Television Planning and Design Institute to compile and demonstrate the construction plan for the cultural data service platform. In 2023, the first batch of national cultural big data identification bases was established in Yongchuan, Chongqing, and the company actively connected and carried out related construction work, with dedicated lines being connected successively. Additionally, in April 2024, China Broadcasting Corporation Limited launched the construction plan for the national cultural big data service platform project, and the company immediately reported and communicated, with Chongqing being included as one of the seven regional central platforms for planning.

2. Digital Cultural Application Construction

On April 25, 2023, Chongqing convened the Digital Chongqing Construction Conference, proposing the goal of “forming key capabilities in one year, basic capabilities in three years, and systematic capabilities in five years,” accelerating the construction of the “1361” overall framework, and developing a batch of major applications with Chongqing’s distinctive features and national influence [3]. Following the requirements for integrated construction of “cultural digitization” and “digital culture” in Digital Chongqing, the company adopted a work approach of “comprehensive layout, focusing on advantages, breakthroughs in individual areas, and driving the whole scene with points.” It identified “blade projects” in advantageous fields to drive large scenarios with small cuts, successfully creating multiple municipal-level digital cultural applications. Simultaneously, the company comprehensively sorted out existing projects and promoted the renewal and upgrading of multiple projects.

2.1 “High-Quality Cultural Life”

The “High-Quality Cultural Life” comprehensive scenario application, led by the Chongqing Municipal Commission of Culture and Tourism Development and implemented by the company, focuses on building a high-level public cultural service system as a major digital culture application in Chongqing. The application was successfully selected as one of the ten major landmark achievements of Digital Chongqing’ s first anniversary.

Functionality and Services: Centering on “cultural facilities, talent, and services,” the application provides full coverage access to cultural venues and institutions across the city, comprehensively collects data resources on cultural service activities, and forms a “unified public cultural resource service and data capability base” for the entire municipality. Taking the construction of an “integrated operation public cultural digital service platform” as the entry point, it creates ten scenario-based services for public benefit including “Visiting Venues,” “Enjoying Reading,” and “Learning Talents,” building a “15-minute quality cultural circle.” Supported by a “comprehensive public cultural supervision digital brain,” it connects municipal, district, township, and village-level cultural institutions, constructing a core indicator system for public cultural development and improving the balanced allocation mechanism for public cultural resources (see Figure 1).

[Figure 1: see original paper]

2.2 “Light and Shadow Chongqing”

The “Light and Shadow Chongqing” digital application, led by the Chongqing Municipal Committee Publicity Department (Chongqing Film Bureau) and jointly organized by the Chongqing Municipal Radio and Television Bureau, is specifically implemented by the company. Focusing on comprehensive online services for the film and television industry, it reshapes the entire digital workflow of film and television creation, shooting, screening, and public benefit. The application won the national first prize in the 5G messaging and new calling special competition of the 7th “Blooming Cup” 5G Application Contest.

Functionality and Services: The platform aggregates filming resources across the city, providing convenient services such as cloud-based VR location scouting, online film coordination, film base reservations, and extras recruitment, creating the nation’ s first territory-wide “one-stop film shooting service platform.” Empowered by AI, 5G messaging, and other new technologies, it enables one-stop processing of film, TV drama, and micro-short drama filing and review matters, improving the efficiency of digital management services for film and television creation. It also curates public benefit film selections, enabling functions such as online ordering by the public, real-time task dispatching, and one-code evaluation for viewing, enhancing the convenience of film-watching for citizens. The platform monitors real-time data on the film screening market, analyzes market trends and demands, manages screening content supply, and improves cinema

management efficiency.

2.3 “Chongqing Cloud Museum”

The Palace Museum and Shanghai Museum have played an important role by opening “Digital Museums” and “Digital Treasure Halls,” allowing audiences to virtually tour the Forbidden Palace without leaving home and providing both online display and offline experience [4]. The “Chongqing Cloud Museum” cultural heritage digital service platform, led by the Chongqing Municipal Commission of Culture and Tourism Development and constructed by the company, has won multiple awards including the State Administration of Radio and Television’ s “2023 Smart Broadcasting Network New Service,” the third prize in the Chongqing regional competition of the 6th “Blooming Cup” 5G Application Contest, and the Ministry of Industry and Information Technology’ s “2024 Excellent Case of New Digital Services.”

Functionality and Services: First, the platform comprehensively integrates online and offline digital cultural resources from Chongqing’ s museum institutions, combining set-top box large screens with mobile small screens to cover all age groups and serve three ends: government, cultural institutions, and the public. Second, with an innovative approach of “museum clustering + single museum specialization,” it constructs core scenarios including “3D Viewing of Cultural Relics,” “VR Exhibition Tours,” “Cloud Cultural Heritage Tours,” “Social Education and Research,” and “Cultural Creative Product Purchase.” Third, it provides five services for small and medium-sized museums: digital protection and utilization of cultural relics, digital exhibition and display, data management, cultural education and research, and content production and operation.

[Figure 2: see original paper]

2.4 “Yong Shanshui • Metaverse”

In May 2022, the General Office of the Communist Party of China Central Committee and the General Office of the State Council issued the “Opinions on Promoting the Implementation of the National Cultural Digitization Strategy,” proposing the development of new scenarios for digital cultural consumption. Simultaneously, local governments are actively exploring metaverse application scenarios to promote the virtualization, immersion, and digitalization of business formats [5]. The “Yong Shanshui • Metaverse” immersive light and shadow art exhibition, jointly created with Chongqing Boxiang Cultural Tourism Group in Wulong District, Chongqing, represents the first metaverse immersive light and shadow art experience venue in the region and a bold practice of cross-boundary integration between culture and technology.

Functionality and Services: Using digital imaging and digital projection methods, the exhibition presents digital content and scene-based presentations, breaking the traditional aggregated on-demand business format. It achieves the fusion and symbiosis of “large screen,” “small screen,” and “projected screen,”

exploring a one-stop service model for the entire process including “creative design + equipment integration + digital content production and debugging + exhibition presentation + media promotion + after-sales service.”

2.5 “Cloud Tour Chongqing”

The “Cloud Tour Chongqing” slow live streaming platform fully integrates Chongqing’s tourism resources, relying on “digital culture and tourism” construction to form an integrated publicity matrix combining online and offline, tourism and cultural creativity, live streaming and secondary creation, creating a “cloud business card” for Chongqing’s smart tourism.

Functionality and Services: Based on a transmission backbone private network covering 40 district-level counties across the city and integrating 5G+AR/VR technology, the platform accesses scenic area live streaming sources. Using a “large and small screen real-time slow live streaming + original immersive experience columns” approach, it disseminates content through a media matrix of “TV large screen + mobile program + video account + Laidian APP” to publicize tourist attractions, serve travel needs, and promote the digital and intelligent integrated development of the tourism industry.

[Figure 3: see original paper]

2.6 “Culture • Creative Chongqing”

Seizing the major opportunities of new technologies, new business formats, and new consumption, this project systematically plans and implements an important platform and specific measures to support the development of the city’s cultural industry, building the cultural industry development ecosystem in a systematic and chain-based manner. Fully implementing the specific requirements of documents such as the “Opinions on Promoting the Implementation of the National Cultural Digitization Strategy” and “Opinions on Accelerating the Construction of a Strong Cultural City in the New Era,” this application focuses on creating a digital culture domain track.

Functionality and Services: The “Culture • Creative Chongqing” application fully utilizes technologies such as deep data analysis, intelligent tagging, blockchain, and artificial intelligence to aggregate relevant data from cultural enterprises across the city. It builds digital applications including cultural enterprise profiling, industry perspective, regulatory oversight, park linkage, and performance evaluation display boards. Through multi-departmental collaboration, it constructs a closed-loop system for the cultural industry featuring “unified collection, unified supervision, and unified release,” promoting the sustained and healthy development of the cultural industry.

2.7 “Culture • Sound of Bayu (Emergency Broadcasting)”

This project represents an iterative upgrade of the existing emergency broadcasting system. Addressing issues such as complex multi-departmental coordination in emergency broadcasting use, lack of digital monitoring means for emergency information broadcast effectiveness, and insufficient co-construction and sharing of educational resources, the project designs four cross-scenario functions: monitoring of emergency broadcasting facility distribution locations and status, co-construction and sharing of educational service program content, automatic analysis and release of emergency information, and monitoring and evaluation of information release quality and effectiveness. By innovatively establishing a management and usage mechanism for Chongqing’s emergency broadcasting system, constructing a multi-departmental information closed-loop release mechanism for emergency broadcasting, and creating a public service quality and effectiveness evaluation mechanism for emergency broadcasting, the project leverages the deep coverage advantages of China Broadcasting Network. 5G broadcasting can achieve multimedia public warnings through a combination of cellular and broadcasting networks, greatly improving timeliness [6]. After integration into the “comprehensive integration” urban comprehensive governance system, it can effectively enhance the urban-rural governance capabilities of a mega-city integrating large urban areas, large rural areas, large reservoir areas, and large mountainous areas, making management smarter, more efficient, and more precise.

Functionality and Services: “5G+AI Integrated Video and Broadcasting + Drowning Prevention” : When crowds enter areas around rivers and deep water zones, it triggers the emergency broadcasting warning device to broadcast reminders through facial comparison. “5G+AI Integrated Video and Broadcasting + Xueliang Project” : Combining emergency broadcasting, AI video monitoring, and sound pickers, it utilizes the point-to-point 喊话 (announcement) function of emergency broadcasting to timely remind and persuade the public. “5G+AI Integrated Video and Broadcasting + Smart Cultural Heritage”: Real-time monitoring of conditions around key cultural heritage sites, issuing timely alerts, and recording on-site videos. “5G+AI Integrated Video and Broadcasting + Smart Tourism” : Using the smart tourism monitoring platform to analyze tourism safety and crowd flow information for scenic spots, attractions, hotels, homestays, and rural tourism points across the city, achieving early warning, control, and emergency response.

[Figure 4: see original paper]

2.8 “National Cultural Private Network Western Center”

The National Cultural Private Network Western Center capability platform aims to collect, organize, and analyze culture-related data (such as cultural relics information and intangible cultural heritage) to achieve digitalization of cultural resources, data sharing and exchange, support for cultural industry

innovation, and public education and popularization. By building a cultural data service center to aggregate cultural big data information, it provides cloud services for cultural production and cultural consumption end users, achieving interconnectivity through a new type of radio and television network to form a secure and trustworthy closed-loop cultural production system. Simultaneously, it promotes the construction of a western cultural digital trading professional center to revitalize public cultural data resource assets, driving Chongqing to become a national cultural digital trading professional center in the western region and building a western regional cultural digital professional center that provides services such as cultural data identification and resolution, cultural data management consulting, cultural data management and operation, and agency trading.

Functionality and Services: The platform constructs the “Hundred Museums City” digital project by integrating Chongqing’ s historical and cultural resources and relying on the “Chongqing Cloud Museum” platform’ s capabilities in cultural relics digitization, innovation, and dissemination. It builds “Light and Shadow Chongqing” to showcase cultural tourism characteristics, developing rich and diverse slow live streaming content around core elements such as natural scenery, human history, and modern urban landscape. It constructs district and county platforms in Chongqing as comprehensive scenario applications for “High-Quality Cultural Life,” building comprehensive, multi-functional online platforms serving residents, enterprises, and government agencies to achieve rapid information flow, convenient service provision, and close community connections, while providing effective auxiliary means for government agencies to improve supervision quality and efficiency. It also builds a public electronic screen content supervision system to strengthen the three management stages of pre-event risk early warning, in-event dynamic monitoring, and post-event risk tracking for public electronic screen resources, improving supervision efficiency and accuracy, preventing and resolving public opinion risks, and promoting the establishment of a public electronic screen content safety supervision work mechanism linking various departments.

[Figure 5: see original paper]

China Broadcasting Chongqing Corporation collaborates with various departments to promote the implementation of Chongqing’ s cultural big data system and digital cultural application scenarios. Based on Chongqing’ s actual conditions, the company has achieved certain results in integrated media, advanced video, and digital cultural application construction projects, but there remains room for optimization in key technology research. For example, aspects such as digital cultural content copyright protection, profit distribution, and content quality need further improvement [7]. In terms of culture-tourism integration, through digital cultural application construction, the company promotes the digital transformation of the cultural tourism industry, improves the quality of cultural tourism services, and contributes to the high-quality development of Chongqing’ s cultural tourism.

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Note: Figure translations are in progress. See original paper for figures.

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