# Application Research of Blockchain Technology in Broadcasting Content Review: Postprint

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## Abstract

Integrating blockchain technology constitutes a significant trend in the development of China' s radio and television industry. To explore the application of blockchain technology within content review scenarios for China's radio and television sector, this study conducts in-depth interviews with practitioners from content regulatory authorities in Hubei Province. By examining the current state of content review standards and technological capabilities, it summarizes the industry' s existing demands regarding content regulation and analyzes in depth the pain points confronting content review during the era of deep media convergence. Furthermore, the paper constructs a systematic application framework for blockchain technology in radio and television content review from three dimensions: the blockchain-enabled content review process, approaches to handling on-chain information, and the establishment of a points-based evaluation mechanism, with the objective of achieving precise accountability, enhancing sampling efficiency, building a content evaluation system, and preventing redundant reviews.

## Full Text

### Research on the Application of Blockchain Technology in Radio and Television Content Review Scenarios

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**Abstract:** Integrating blockchain technology represents an important trend in the development of China' s radio and television industry. To explore the application of blockchain technology in radio and television content review scenarios

in China, this study conducted in-depth interviews with practitioners from radio and television content regulatory authorities in Hubei Province. By examining the current status of content review standards and technological applications, we summarize the existing demands of the radio and television industry in content supervision and deeply analyze the pain points facing content review in the era of deep media convergence. We then construct a systematic application scheme for blockchain technology in radio and television content review work from three perspectives: the blockchain content review process, the handling of on-chain information, and the establishment of a points-based evaluation mechanism, aiming to achieve precise accountability, improve sampling inspection efficiency, build a content evaluation system, and avoid redundant reviews.

**Keywords:** radio and television; blockchain; content review; application scenarios

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This study is based on in-depth interviews with practitioners from radio and television content regulatory authorities in Hubei Province. By combining the current status of content review standards and technological applications in the broadcasting industry, we identify the pain points and demands of content supervision under the background of deep media convergence, and seek to construct a systematic application scheme for blockchain technology in radio and television content review. This approach aims to drive innovation through blockchain technology, accelerate the modernization of radio and television network audio-visual governance systems and capabilities, enhance the credibility and regulatory capacity of radio and television, improve the efficiency of content review, and achieve unified and comprehensive supervision and management of radio and television content.

## 1. Pain Points and Needs Analysis in Radio and Television Content Review

As an emerging technology with significant development potential, blockchain brings new opportunities for China' s radio and television industry. In the context of radio and television content review, the current approach relies primarily on manual review supplemented by machine review, with supervision and auditing conducted across three stages: transmission, production, and broadcasting.

However, no systematic blockchain application scheme has yet been developed for large-scale implementation, and few scholars have explored how to apply blockchain technology throughout the entire content review workflow.

Current academic research on radio and television content review primarily focuses on three directions: First, theoretical research on content review mechanisms, employing gatekeeping theory and the concept of gatekeepers to analyze the importance of content review work [1]; second, a technological perspective that uses the "Smart Radio and Television" initiative as a platform to analyze the advantages of integrating 5G, artificial intelligence, and big data technologies with content review, aiming to build more intelligent review systems [2]; and third, analyses of current dilemmas facing content review under new circumstances, offering recommendations for improvement [3]. Blockchain technology still holds considerable untapped potential for application in radio and television content review.

### 1.1 Multiple Stakeholders in Content Supervision, Difficulty in Identifying Responsible Entities

China' s radio and television industry has long been characterized by regional development, resulting in the coexistence of radio and television networks at various levels across different regions. The industry involves numerous stakeholders, including content producers, content providers, content broadcasters, and content reviewers. The industry possesses both ideological attributes (in the metaphysical sense) and information industry attributes (in the physical sense). Its broadcast content encompasses both government-led ideological propaganda and market-driven entertainment content. This complexity leads to multi-sector participation and creates an extensive, criss-crossing system of responsible entities, making it difficult to identify accountability for content supervision.

### 1.2 Imbalanced Content Review System, Weak Provincial Supervision of Lower Levels

Currently, China has established a "four-level management" administrative system for radio and television at the central, provincial, prefecture, and county levels, with a centralized content review mechanism to ensure technical, content, and safety reviews of television broadcasts. However, this centralized management model places enormous pressure on provincial bureaus, which must review content broadcast on provincial platforms while also monitoring prefecture-level and county-level broadcasts. For prefecture and county media organizations, human resources are scarce, and some counties lack independent content review departments altogether, causing the entire province' s review pressure to accumulate at the provincial level. Moreover, given the limited development of machine review capabilities, most content review work remains manual. Manual review is inefficient and burdensome, resulting in weak supervision by provincial bureaus over lower-level entities.

### 1.3 Low Utilization of Content Review Data, Untapped Data Value

Under China' s centralized content review mechanism, all provincial radio and television broadcast data is concentrated in provincial bureau content review departments. Currently, these departments only conduct review work and manually compile weekly summaries of review activities; no more effective utilization is made of the province' s broadcast data. The value of radio and television big data remains untapped. In the digital age, the value of information data is as important as the content itself, or even more potentially exploitable [4]. Therefore, if this broadcast data could be integrated and utilized to establish a radio and television content evaluation system, it would enable not only content supervision but also quality assessment, avoiding waste of data resources and maximizing data value.

### 1.4 High Rate of Redundant Reviews, Substantial Resource Consumption

Due to the current repeat-broadcast repeat-review system and the practice of broadcasting the same content across multiple platforms, radio and television content review involves substantial redundant work. To ensure broadcast content safety, the State Administration of Radio and Television requires comprehensive manual pre-broadcast review of all content, strictly adhering to the "whoever broadcasts is responsible" review mechanism. Consequently, even for rebroadcast content or content from other sources, repeat reviews are required regardless of prior approval. This approach creates enormous workloads for reviewers, consuming substantial human and material resources. However, until effective technical assistance emerges, this redundant review mechanism remains necessary to maintain strict control over mainstream media content broadcast safety and ideological security.

## 2. Blockchain Application Scheme in Radio and Television Content Review

As a key support for media convergence development, blockchain technology offers innovative solutions for radio and television content review. Guided by the demands of content review and based on our research findings, this paper constructs a blockchain technology application scheme for radio and television content review, leveraging blockchain' s characteristics of immutability, distributed ledger, decentralization, traceability, collective maintenance, and transparency.

### 2.1 Alliance Chain Content Review Process

Alliance chains are permissioned blockchains for inter-institutional use, accessible only to members of a specific group and limited third parties. Although not fully "decentralized," they offer advantages in efficiency and cost optimization, making them suitable for constructing blockchain-based content review systems within the radio and television industry. Participants in the radio and television

content review alliance chain include content reviewers, content providers, content broadcasters, and regulatory authorities, all of which can join as independent nodes and jointly maintain the chain, ensuring multi-party participation and credibility.

The general process of alliance chain content review proceeds as follows: First, content providers initiate review applications for video and audio content on-chain. Then, the designated content reviewers examine the content and define the review outcome, issuing review certificates for approved content. Based on the alliance chain' s consensus mechanism, review results are synchronized to all institutional nodes within the alliance and become immutable once recorded on-chain. Content providers can also initiate content transactions with broadcasters on the alliance chain; after transaction completion, broadcasters can obtain review certificates directly from the chain, trusting the current review results. Provincial regulatory units possess the authority to implement member management, permission management, data monitoring, and rule-making within the alliance. The alliance chain can also provide external query interfaces for content providers and broadcasters to conduct on-chain inquiries.

### 2.2 Handling of On-Chain Information

When uploading content for review, reviewers must process metadata for the content, recording detailed information about content providers and the content itself, including but not limited to descriptive information such as content title, keywords, category, duration, key production personnel, production organization, and participating staff, to facilitate subsequent systematic processing. Additionally, after completing the review, reviewers should record the review outcome information, which should include relevant details such as reviewing institution, reviewer, review conclusion, and review date.

After relevant information is recorded on-chain, blockchain encryption technology can be employed to ensure information security. Furthermore, the blockchain content review system features traceability functions; if content issues arise, the traceable and immutable characteristics can be used to hold review institutions and personnel accountable. Simultaneously, proper classification and programmatic collection of content review information, combined with big data technology for periodic analysis of review data and generation of visualized review reports, enables better summarization of review work.

### 2.3 Establishing a Points-Based Evaluation Mechanism

The points-based evaluation mechanism primarily serves as an indicator of review institutions'professionalism in content review, providing an important basis for other broadcasters to determine whether re-review is necessary or whether content can be broadcast. This mechanism incentivizes content review institutions to improve review quality, further reducing redundant review workloads and fostering a well-functioning content review environment. After each review

task, the system generates an authentication certificate for the reviewed content, awarding points to the responsible reviewers and to the review institution that recorded the certificate on-chain. For content with review errors, regulatory authorities generate an accountability certificate; the institution that made the review error receives point deductions, while the institution responsible for recording the accountability certificate receives point rewards. Regulatory authorities can also generate evaluation reports as references for review units. Finally, based on accumulated points, review units can be rated and classified quarterly, with corresponding reward and penalty measures implemented.

## 3. Advantages of Blockchain-Based Radio and Television Content Review

### 3.1 Recording Production Process and Review Information On-Chain for Accountability

In radio and television content review, reviewers must assess not only the technical standards of broadcast content but also its authenticity and value orientation. Therefore, recording every step of content production on the blockchain platform, with jointly maintained ledger records ensuring the immutability of on-chain information, realizes a "chain-based" transparent content production model [5]. Anyone can trace back to previous steps to reconstruct the original production process, enabling effective news verification, content issue accountability, and unified content and content producer supervision.

Simultaneously, recording review outcome information and reviewer details on-chain ensures that every review step is traceable. Currently, radio and television review information is only retained within the system for one month; blockchain-based content review information can be permanently preserved through joint maintenance by all participants on the chain. Once broadcast content issues arise, the corresponding content and complete information about the production process and content review can be immediately located, enabling comprehensive, full-process monitoring and achieving synchronization and integration of content production, dissemination, and supervision.

### 3.2 Recording Review Results from All Levels to Facilitate Higher-Level Oversight

By constructing a blockchain content review alliance chain, content review units at all levels are responsible for reviewing content within their jurisdiction and recording results on-chain. Through blockchain technology and based on principles of transparency and data sharing, provincial bureaus can directly access review processes and results on-chain when inspecting prefecture-level or county-level content review work. This approach retains the centralized characteristics of China' s radio and television content review system, ensuring unified management and guidance from the central administration over prefecture and county levels, while simultaneously leveraging blockchain' s decentralized features to

facilitate provincial content review spot-checks and enhance management efficiency.

### 3.3 Empowering Big Data Technology to Build Content Evaluation Systems

Big data technology offers tremendous development potential, and combining it with blockchain technology creates limitless possibilities. The massive storage capacity of big data provides an information space for blockchain applications, while efficient data analysis techniques significantly enhance the value attributes of blockchain data [6]. When recording review results on-chain, reviewers tag and classify content, then use big data technology to directly generate weekly review reports and other statistical data, establishing a content evaluation system on this foundation. Based on the public, highly credible, and traceable nature of review result information on-chain within the alliance, content providers' review results and credibility become transparent and traceable, gradually establishing a credibility assessment mechanism for content providers.

This approach greatly improves information resource utilization efficiency and enhances weekly report production efficiency. Through such a content evaluation system, high-quality broadcast content can be more objectively identified and analyzed to guide future content production, creating a virtuous cycle that further improves media dissemination capacity, guidance, influence, and credibility.

### 3.4 Enhancing Trust in Reviewed Content to Avoid Redundant Reviews

The blockchain content review scheme can promote review efficiency by establishing trust mechanisms, providing trust channels, and achieving data sharing and value mutual trust among review units at various levels, while simultaneously reducing redundant review workloads for non-compliant content. Particularly for unqualified content, the system can effectively pinpoint violations through shared non-compliant content review results on-chain, preventing redundant resource investment in reviewing violations across units. For approved content, all units can share review results. For important disseminated content, higher-level second reviews can be conducted, granting multiple review certifications for the same content. This approach retains the strict control characteristics of China' s radio and television content review system while addressing the issue of redundant reviews to a certain extent.

Blockchain technology, with its characteristics of distributed ledger, immutability, transparency, encryption, and collective maintenance, can bring new opportunities to radio and television content review work, establishing trust among multiple parties within the review system and ensuring transparency in the review process. However, the application of blockchain technology in the radio and television industry remains in its infancy, with considerable exploration still

needed in both academic and industrial circles. Various indications suggest that blockchain technology may have become a revolutionary technology capable of disrupting all contemporary conventions, and its potential should not be underestimated [7]. On one hand, we must recognize the important role of blockchain technology in radio and television industry development, actively exploring its application across various scenarios in the industry to solve current problems, improve work efficiency, and even transform working methods. Simultaneously, we must guard against excessive optimism that expects a single technology to solve all industry problems in the short term; we should maintain an objective and prudent attitude in accordance with the fundamental laws of technological development.

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