

A Preliminary Analysis of the Development Model of Broadcast Television Networks for Smart City Construction (Postprint)

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Abstract

This paper presents a preliminary analysis of the development model of broadcast television networks in smart city construction and their facilitating role in this process. The paper first elucidates the status of broadcast television networks within the smart city framework, followed by a concise overview of their contributions to smart city development. It then systematically examines the challenges encountered in this endeavor, explores the developmental trajectory of broadcast television networks under such circumstances, and ultimately analyzes their development model, aiming to provide valuable reference materials for relevant stakeholders.

Full Text

Preamble

Title: Analysis of the Development Model of Smart City Construction through Broadcasting Television Networks

Abstract: This paper analyzes the development model of smart city construction through broadcasting television networks and examines its promotional effects on smart city initiatives. It begins by describing the current state of broadcasting television networks within the smart city framework, followed by a brief overview of how these networks contribute to smart city development. The paper then systematically examines the challenges encountered in this process, explores the development pathways for broadcasting television networks under these circumstances, and finally analyzes their development model, aiming to provide valuable references for relevant stakeholders.

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2.1 Advantages in Network Aspects

China's economic development has been remarkably rapid in recent years, with continuous improvements in technological capabilities, particularly in computer network technology, which has significantly driven intelligent development. Leveraging Internet technology, urban intelligence levels have achieved substantial progress. The further development of smart cities is built upon this foundation, effectively improving overall urban operations and greatly enhancing people's quality of life. In this process, broadcasting television network construction has gradually shifted toward intelligent development, representing a new direction for the broadcasting industry. Smart city development represents the general trend of urban development in China, and broadcasting television development primarily utilizes network technology to provide residents with intelligent information dissemination methods and video enjoyment experiences, thereby promoting the overall process of smart city construction.

1. Broadcasting Television Networks in Smart Cities

Smart cities encompass not only big data, open data, and Internet of Things technologies, but also feature transparent government affairs, high levels of community intelligence, and significantly improved residents' quality of life. The smart city operation platform connects various urban components into a comprehensive data network, effectively enhancing living safety and promoting urban stability and harmony. Within the smart city environment, broadcasting television has gradually transformed from traditional information and news dissemination to simultaneously assuming certain social responsibilities. At its current stage of development, broadcasting television primarily provides information services to the public, with business content already covering education, tourism, environmental protection, electricity, transportation, and communities. Broadcasting television in smart city construction has become innovative and capable of cross-industry and cross-network integration. Smart communities are essential components of smart city construction, and broadcasting television products largely serve these communities while also providing services for urban safety and e-government.

2. How Broadcasting Television Networks Support Smart Cities

Smart city development presents both challenges and tremendous growth opportunities for the broadcasting television industry. While the telecommunications industry has significantly encroached across sectors into television, leveraging its advantageous position in broadband to capture numerous users, broadcasting television possesses inherent industry advantages that substantially contribute to smart city construction.

In smart city construction, information dissemination is crucial, requiring not only substantial capital investment but also systematic transmission methods. Due to its industry characteristics, broadcasting television enjoys a solid mass foundation with extensive network coverage in both urban and rural areas. This not only facilitates information dissemination but also makes it convenient to popularize smart city knowledge. The full utilization of broadcasting television networks also achieves rational use of idle network capacity, saving financial investment while improving efficiency.

2.2 Advantages in User Base

Despite the rapid development of mobile smart clients and the shift of some young users from television to mobile phones, most households still obtain television program information through TV sets. This is particularly representative among middle-aged and elderly people, who maintain traditional television viewing habits due to lower acceptance of emerging technologies, and this pattern will not change in the near future. This situation not only ensures the user base for broadcasting television but also establishes its position for information dissemination functions in most households.

2.3 Superior Visual Experience

Television provides not only clear pictures during video broadcasting but also superior visual sensory enjoyment that small-screen devices like mobile phones cannot match. Due to the long usage history of television, users' familiarity with it significantly exceeds that of other similar devices. Residents are more accustomed to watching programs through television, and the effects achieved are irreplaceable by other devices.

2.4 Higher Security

Broadcasting television networks offer greater security reliability due to their different transmission methods from general network communication. In today's era of rapid information dissemination, personal privacy and information security have become increasingly important concerns, with frequent incidents of personal information leakage heightening public anxiety. Broadcasting television's unique broadcasting mechanism and associated emergency response sys-

tems provide higher security, allowing users to utilize services without worrying about information security issues. In contrast, the Internet exhibits much lower security during information and video transmission, with frequent occurrences of hacking, network vulnerabilities, and virus attacks.

3. Problems Encountered in Smart City Development

Although broadcasting television networks possess many advantages in smart city development, they also face numerous problems, with the most significant issues being the following:

3.1 Technical Level Fails to Meet User Demands

With smart city development, users increasingly demand higher-quality video and the ability to independently select or customize content. Traditional broadcasting television technology still needs improvement in this regard, far from meeting user requirements, resulting in inconvenience and poor user experience. Although broadcasting television has made certain improvements by increasing content sources, outdated technology causes slow system responses, and long waiting times have led to user attrition.

3.2 Insufficient Reform Momentum and Outdated Products

Broadcasting television has long been responsible for information dissemination and promotion, with later additions of market-oriented products and slower development progress in this area. Due to the relatively limited functions of traditional broadcasting television, despite having many users, insufficient reform momentum has resulted in relatively backward service product quality, creating certain inconsistencies with smart city integration and negatively impacting the overall progress of smart city development.

3.3 Low Overall Cost-Performance Ratio

Cost-performance ratio is a key consideration for users before selection, and broadcasting television prices are relatively expensive for users who already have network access. Particularly after network operators introduced policies of providing free TV boxes with broadband installation, traditional broadcasting television has faced severe impact.

4. Development Directions for Broadcasting Television in Smart Cities

To promote the development of smart cities in Zhuji City, Zhejiang Province, broadcasting television stations must not only leverage various advantages but also improve their intelligence level to enable more intelligent dissemination of smart city-related information. The Zhuji City Radio and Television Station can develop its advantageous position through the following aspects:

4.1 Develop Video and Media Services Vigorously

Broadcasting television stations should advance media services and video services simultaneously. First, while continuously developing traditional media, they should focus on developing new media technologies to enable mutual progress. Second, they should provide platforms for new media and self-media development to make television programs more distinctive and more easily accepted by users.

Broadcasting stations should leverage their advantages in this area by increasing interactive project design while simplifying operations for greater intelligence. During development design, they can integrate with smartphone apps to enable anytime operation, improving intelligence levels while facilitating user convenience.

4.3 Innovate Development Concepts by Integrating with Latest Technologies

Broadcasting television stations should innovate their development concepts and actively integrate with the latest technologies. In addition to integrating with the Internet and telecommunications, they should also keep pace with the latest technological developments. Popular technologies such as VR and split-screen can be combined with television gaming to achieve interactive functions and multi-user online capabilities, enhancing users' visual and sensory enjoyment while fully leveraging television's advantages.

4.4 Enhance Humanization of Functions

When providing services, broadcasting television should consider the viewing experiences of different populations, especially the elderly. As China gradually enters an aging society, providing thoughtful services for the elderly should be a key consideration for every industry. Since many elderly people have difficulty reading text on small screens like mobile phones, television can utilize its advantages combined with VR technology and handwriting input methods to reduce inconvenience for the elderly and improve functional humanization while enhancing their usage experience.

4.5 Classify Users Rationally and Provide Appropriate Services

With a large and diverse television user base, providing suitable services requires first classifying users into categories. Users can be broadly divided into elderly groups, middle-aged and young adult groups, and children's groups. The elderly group responds best to traditional television applications, middle-aged and young adults prefer OTT products, and children primarily watch cartoons. Broadcasting stations should provide appropriate service content based on the characteristics of different groups.

4.6 Expand Cooperation Scope

Generally, broadcasting television network companies do not have specialized product departments, making it difficult to timely grasp product market value development and leaving them vulnerable to being eliminated by new technologies. Therefore, broadcasting television stations should expand their cooperation scope. In smart city construction, broadcasting television profit models mainly rely on industry applications, and further development should involve organic integration of industry characteristics with broadband networks. During practical application, public welfare services can be promoted more extensively to increase user attention.

5.1 Recommendations for Broadcasting Television Construction in Smart Cities

The core content of broadcasting television in smart cities is data and information, utilizing big data technology to achieve business value-added and user growth. Traditional broadcasting stations transmit data information unidirectionally without user interaction capabilities, making them incomparable to smartphones. While smartphone users can exchange and share information and operate anytime and anywhere, they also have disadvantages and inconveniences, such as inability to handle multiple tasks simultaneously and potential eye damage from prolonged operation. Television has considerable advantages in this regard, with display screens many times larger than phones and much clearer picture quality.

When providing related business services, special consideration should be given to the needs of people with mobility difficulties, such as the elderly and children. Operation methods should be convenient, utilizing touch controls to reduce difficulty. Additionally, functions should include connectivity with smart mobile terminals such as smartphones and tablets, with graphical and textual annotations or voice prompts provided during operation.

Promote the construction of smart government. Smart government construction is essential in smart city development to drive further development in other areas such as smart communities. Broadcasting television stations possess unique advantages to seize this opportunity. Broadcasting networks can easily achieve large-scale policy information dissemination and education while providing new channels for government affairs transparency. Data sharing technology enables digital urban management solutions, and through collecting urban information and utilizing mobile positioning and digital communication technologies, management personnel can be provided with high-tech management information combining images and videos to facilitate timely event handling, command, and supervision.

Develop secure payment models. For financial payments, security is of paramount importance, and broadcasting television networks have significant

advantages in this area that can be leveraged to increase development in financial payments.

5.2 Research Trends for Broadcasting Television in Smart Cities

During smart city development and construction, target users primarily include government departments, the general public, and enterprise sectors, while terminal products include televisions, mobile phones, tablets, laptops, and desktop computers. The intelligent platform connects these two components, mainly comprising user platforms and management platforms. Platform functions include providing unified standard access methods for users, offering corresponding business services to different users, or providing more services through third-party business access and unified user management. Primary application services include smart education, smart transportation, smart government, smart healthcare, smart environmental protection, and smart communities. The required infrastructure such as basic databases, map engines, message engines, payment platforms, and data mining engines mainly processes and analyzes data while providing storage, viewing, management, and analysis functions. The most critical component in this solution is the network—whether wired or wireless—as it forms the foundation for all functions.

5.3 Development Planning for Broadcasting Television Networks in Smart Cities

Smart city construction represents the development direction of China's urban development, in which broadcasting television network construction plays a crucial role in promoting its development model and provides new development directions for broadcasting television networks. Although China's development in smart cities lags behind the international community to some extent, leveraging the advantages of broadcasting television networks to advance both fields represents a mutually beneficial approach that should be vigorously promoted.

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

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