Applied Research on Grid Management Theory in Radio and Television Network Operation and Maintenance: Postprint

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Abstract

The advent of the information era has accelerated China' s development, while the advancement of multimedia and other communication transmission technologies has also gained momentum. Consequently, traditional operational models for conventional communication transmission technologies can no longer satisfy the demands of contemporary societal development, necessitating innovation and refinement. This paper employs grid management as its foundational theoretical framework, utilizes relevant management theories to offer a scientific and rational interpretation of grid management, and conducts an in-depth investigation into its applications. Furthermore, it proposes corresponding countermeasures for the implementation measures and improvement models of grid management in the operation and maintenance of broadcast television networks.

Full Text

Preamble

Title: Research on the Application of Grid Management Theory in Broadcasting Network Operation and Maintenance
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Abstract: The advent of the information age has accelerated China' s development, with multimedia and communication transmission technologies advancing rapidly. Consequently, traditional operational models can no longer meet contemporary societal development needs and require innovation and improvement. This paper employs grid management theory as its foundational framework, applying relevant management theories to provide a scientific and rational explanation of grid management. It conducts in-depth research on the application of grid management and proposes corresponding strategies for implementing

and improving grid management in broadcasting network operation and maintenance.

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1. Current Status of Broadcasting Network Management

Current broadcasting networks still face issues such as inadequate protection of user interests and a lack of initiative and motivation in the market economy. With increasingly fierce competition, broadcasting enterprises that fail to improve and innovate, implement internal management measures, and achieve satisfactory service quality will ultimately be marginalized in the context of triple-network convergence. Therefore, broadcasting network enterprises must transform their mindset to keep pace with the times, thereby attracting more customers and expanding their business operations. Broadcasting network enterprises should prioritize customer service, ensuring that all grid managers within the organization clearly understand this customer-oriented philosophy. They must adopt scientific and reasonable management measures to regulate workflows and work styles, thereby enhancing management efficiency and internal effectiveness [1].

The failure of managers to elevate their ideological awareness leads to lagging progress, ineffective improvement of economic benefits, and stagnant development for broadcasting network enterprises. Since enterprise development is directly linked to management mechanisms, managers whose thinking fails to evolve with the times will restrict enterprise growth and slow business expansion. Thus, innovation and improvement are imperative.

2. Concept of Grid Management

Grid management, in simple terms, resembles a fishing net or checkerboard pattern. In formal terms, it involves using vertical and horizontal lines to delineate small squares on a two-dimensional plane, commonly applied in map-making. As a management methodology, grid management is frequently employed in urban administration. Based on regional distributions, areas are divided into small grids centered on roads, with each grid assigned a dedicated manager. These grid managers can utilize information network management platforms to allocate and manage various urban resources, staying informed about all events within their grids at all times to ensure proper management [2].

3. Methods for Grid Division

The management of broadcasting network enterprises is conducted through grid management, which must permeate all operational activities. Enterprises need to establish scientific and reasonable regulations to constrain and manage staff, thereby safeguarding economic benefits. Managers must emphasize and strengthen internal systems and philosophies, improve institutional frameworks, clarify responsibilities, enhance staff efficiency and work quality, and reduce operational loopholes [3].

3.1 By Business Development Status

As broadcasting network enterprises gradually expand their operations, the number of customers and business volume within each grid unit continues to increase. Grid sizes must be adjusted according to business volume and customer count to accommodate these changes and deliver optimal service. Following triple-network convergence, competition has intensified, with each operator striving to leverage its advantages to drive business and economic growth. Broadcasting networks, based on digital television, have also promoted broadband and internet services. Therefore, after adopting grid management, enterprises can increase or decrease grid sizes according to business development conditions to enhance market competitiveness [4].

3.2 By Product Type

With China' s accelerating economic and technological development, broadcasting network enterprises must transform, moving beyond traditional radio and television marketing toward digital television innovation. Broadcasting products have become increasingly diverse, including high-definition television, video-on-demand, and other services. Therefore, grids can be established based on product types, with each grid assigned a dedicated manager to provide one-on-one quality service to customers [5].

3.3 By Regional Space

Regions are divided into various areas such as urban, rural, and construction sites, which differ significantly in both spatial distribution and characteristics, typically distributed along road segments. Consequently, broadcasting network pipeline paths must follow street distributions, and equipment room configurations must be established according to building characteristics within each region. This approach enables grid division for broadcasting networks, facilitates resource distribution and management, and clarifies boundaries between grids. Under this premise, grids can be categorized as primary, secondary, or tertiary based on operational regions and business development conditions, with equipment rooms also allocated accordingly [6].

4. Network Division Implementation

4.1 Coarse Network Division

Based on front-end equipment room coverage, the network is coarsely divided, with areas covered by 12 sub-front-end equipment rooms designated as primary grids, and areas outside urban districts designated as primary grids by township. Within these large grids, relevant information is collected from each major grid unit, including:

1. Analyzing business implementation in each grid according to different service projects, identifying potential customers, and providing premium services to long-term cooperative clients through close attention.
2. Continuously monitoring customer counts and potential customer acquisition, tracking user activation status and service adoption from other operators.
3. Conducting detailed grid division by observing and recording whether equipment rooms exist in completed or under-construction buildings.
4. Inspecting equipment and line issues within equipment rooms, maintaining continuous records, and promptly repairing faulty equipment.
5. Registering pipeline and duct distribution and usage, while timely inspecting power resources and facilities to prevent usage or specification issues.
6. Recording the distribution of optical cable junction boxes and indoor distribution boxes, checking their models and specifications, monitoring usage, and conducting timely repairs when problems arise.
7. Adjusting grid sizes to enhance market competitiveness [7].

4.2 Fine Network Division

On the basis of coarse division, grid regional distribution is refined using roads or residential communities as basic units. After implementing grid management, broadcasting network enterprises can maximize resource utilization and conduct grid division according to optimal coverage methods. Specifically:

1. Following fine division, each unit' s equipment room configuration must be perfected to ensure it meets all customer needs and business development within the grid area.
2. Remote equipment rooms should be established in areas far from user concentration or central regions to reduce pipeline construction costs.
3. During equipment room establishment, property rights should be purchased whenever possible to avoid unnecessary complications [8].

5. Implementation of Grid Management System

After grid division is completed, scientific and reasonable grid management must be implemented by establishing grid managers. Drawing on management models from relevant enterprises, regional management systems can be applied to grid management, with each grid manager responsible for implementing and

managing all broadcasting network operations and customer needs within their area. The responsibilities of each grid manager include:

First, broadcasting network grid managers must serve customers and maintain faulty equipment, as well as maintain all resources within their jurisdiction. They are responsible not only for resolving issues within the grid but also for participating in initial grid establishment and network deployment.

Second, grid managers must provide comprehensive, unified, one-stop service. Customers need only report issues to their grid manager, who handles all subsequent processing and maintenance regardless of complexity, protecting customer rights without requiring repeated follow-ups.

Third, broadcasting network enterprises must provide strong support to grid managers to ensure all tasks can be completed from initial grid establishment through service activation.

Fourth, after implementing grid management, grid managers must conduct periodic inspections of pipelines, optical cables, and other equipment to ensure normal operation, performing immediate maintenance when issues arise to guarantee network functionality.

Fifth, grid managers' contact information should be provided to property management and neighborhood committees, with their details posted throughout communities to facilitate customer consultation and fault reporting [9].

6. Adhering to Integrated Operation and Maintenance Grid Management

Grid manager supervision represents a major challenge for broadcasting network enterprises. Reasonable application of internet information technology to grid manager oversight can significantly improve monitoring and review while greatly enhancing motivation and initiative. Integrating all grid managers into a unified system enables administrators to conveniently and strictly manage each individual while clearly tracking business operations and issues in every grid, reducing management costs and humanizing the management process [10].

Regarding compensation management, traditional assessment methods based on customer count after business implementation cannot meet modern grid manager income management needs. Therefore, a new approach uses existing user count within each grid area as the 核算标准 (calculation standard), with all business activities incorporated into performance evaluation criteria.

When implementing salary management, five factors must be emphasized: task progress, online user count, user churn, new business development, and customer service assessment. This approach prioritizes efficiency and follows distribution according to work principles. While this mechanism creates income disparities, it serves as a positive motivator—on one hand, income gaps stimulate work enthusiasm; on the other hand, it fosters a corporate environment where reform

stimulates vitality, strict evaluation promotes implementation, and emphasis on rewards and penalties drives development [10].

Establishing a task-based, work-based, and competency-based human resources platform facilitates the cultivation of digital talent teams. First, digital talent analysis and big data-based talent demand matching platforms determine precise incentive schemes for team members. Second, clear digital evaluation standards enable objective and fair assessment of digital talent value creation through digital measurement, analysis, evaluation, and expression. Third, based on value assessment results, corresponding incentives are identified on digital incentive platforms. Finally, talent incentive big data and AI-driven incentive analysis systems dynamically and timely adjust incentive methods.

How broadcasting networks can transform, innovate, and expand development space is a question every staff member must consider. In this rapidly developing era, broadcasting networks must innovate and improve internal management to adapt to the times and ensure smooth development.

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