Big Data Technology Driving the Development of Media Convergence —On the 2017 "Wang Xuan News Science and Technology Award" Special Prize Project Post-print of Zhejiang Daily Press Group's "Media Cube" Technology Platform Construction

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Abstract

From 2014 to 2017, Zhejiang Daily Press Group (ZDPG) followed the Party Central Committee's media convergence decisions as its action guide, advancing deep media integration as a major reform project. The Media Convergence Intelligent Communication Service Platform ("Media Cube"), as a platform-level product supporting ZDPG's deep media integration, employs big data technology as a crucial component of platform construction. It supports all editorial terminals—including command centers, PC termi…

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Preamble

In August 2014, during the fourth meeting of the Central Leading Group for Comprehensively Deepening Reform, General Secretary Xi Jinping emphasized that to promote the integrated development of traditional and emerging media, we must follow the laws of news communication and emerging media development, strengthen internet thinking, adhere to the complementary advantages and integrated development of traditional and emerging media, and rely on advanced technology as the support and content construction as the foundation. This important speech pointed the direction for advancing media convergence.

From 2014 to 2017, Zhejiang Daily Press Group (ZDPG) followed the Party Central Committee's media convergence decisions as its action guide, advancing

deep media integration as a major reform project. The Media Convergence Intelligent Communication Service Platform ("Media Cube"), as a platform-level product supporting ZDPG's deep media integration, employs big data technology as a crucial component of platform construction. It supports all editorial terminals—including command centers, PC terminals, and mobile terminals—by integrating data across the entire workflow, driving the complete process of "planning, collection, editing, distribution, and feedback" into an online environment. Within just a few years of advancing media convergence, ZDPG has transitioned from capital accumulation to technology platform construction and then to institutional innovation, which in turn has forced transformation among editorial staff. By "using technological innovation as the driving force, institutional innovation as the breakthrough, and content innovation as the foundation," ZDPG has forged a convergence path where technological innovation and editorial operations are highly coupled.

Award and Recognition

In July 2017, the Wang Xuan News Science and Technology Award was announced, with ZDPG's "Media Cube" technology platform receiving the Special Prize—the first time in many years that this award's top honor was granted to a media technology platform. How did the "Media Cube" achieve such high coupling between technological innovation and editorial operations? How did it use content construction as the foundation and technological innovation as the driver to break through institutional mechanisms and achieve sustainable development on the convergence path? Journalists from *China Media Technology* interviewed Ren Haiping, Deputy Director of ZDPG's Product R&D Center, and Dong Lilin, Deputy Director of the Data Analysis Office of ZDPG's Network Propaganda Office, to explore how the big data-driven "Media Cube" platform advances the sustainable development of media convergence.

Platform Architecture: A Dual-Platform Design

In recent years, mainstream domestic media's convergence practices have generally followed the basic approach of "once-collected, multi-generation, multi-distribution" for technology platform construction. ZDPG's Media Convergence Intelligent Communication Service Platform ("Media Cube") uses big data technology as its underlying support and intelligent services to meet business needs, forming two major components: a big data platform and a communication service platform (business platform). This dual structure lays a solid foundation for the deep integration of big data technology and news operations.

According to Ren Haiping, the big data platform and communication service platform of "Media Cube" are "two sides of the same coin." The platform construction process is also a process of reconfiguring media resources with internet thinking, laying the foundation for convergence between traditional and new media and for expanding from news information to multiple business

models.

The "Media Cube" big data platform serves as both the foundation and the "nervous system." Architecturally, it comprehensively centralizes, correlates, and deeply mines the group's content data, process data, and user data. The content database includes data from 1,003 domestic digital newspapers, heterogeneous resource data, internet news data, government portal data, micro-video libraries, social platform information, news photo libraries, and historical archives—over ten categories of data sources—to build an integrated underlying data source. Using advanced big data storage and computing capabilities and an agile, multi-round data processing system, the platform achieves seamless flow between arbitrary data nodes and processes. On this basis, through natural language processing, machine learning, and other technologies, the platform analyzes and models data to build services for hotspot tracking, auxiliary creation, event analysis, communication impact analysis, and personalized recommendation, helping editorial staff better mine creative inspiration from data.

The platform integrates 660 million user data points, encompassing newspaper readers, website registered users, Bianfeng platform gamers, mobile newspaper subscribers, business users, and external contributor correspondents. By integrating multi-terminal, multi-platform user data, the platform conducts precise user behavior analysis, providing data services for the group's editorial, operations, and business departments.

Business Integration: Full-Process Coupling

"Media Cube" integrates high-quality resources from the newspaper using big data, natural language processing, and machine learning technologies. Through scenario-based technological innovation, it enables multi-dimensional topic planning, all-media collaborative command, fragmented content creation, visual process monitoring, multi-channel integrated distribution, and original work communication analysis, thereby tightly coupling big data with production and distribution operations.

Planning Stage: "Media Cube" tracks events, topics, and subjects through data models for hotspots, clues, events, time, region, and domain. It quantifies dimensions such as communication heat, theme distribution, and public reaction, enabling editorial staff to quickly and accurately grasp news dynamics, mine potential value of news information, and advance content creation.

Collection Stage: The system establishes a unified content resource database, connecting data resources from various channels. Through data cleaning and secondary tagging, it establishes multi-dimensional content label systems for reliability classification, regional classification, and public opinion field classification, providing news materials to various vertical editorial departments through permission settings.

Editing Stage: The system automatically extends relevant thematic

manuscripts through computational models, forming real-time manuscript background materials based on keywords, names, institutions, and other information. Combined with trace versioning, sensitive word filtering, and Heima proofreading functionality, it further ensures content quality.

Distribution Stage: In addition to achieving multi-terminal integrated distribution, the system forms user interest profiles, temporal communication profiles, and media influence profiles based on collected content and user data, laying the foundation for subsequent precise resource deployment.

Feedback Stage: The platform establishes a communication impact analysis system. From collecting embedded code data in new media products to calculating single-article internet communication impact indexes using three dimensions—reading, interaction, and republication—with weighted ratios, it forms a user-centered Zhejiang Daily communication impact index evaluation system, providing clear data for evaluating each news product's communication effect and performance assessment.

Institutional Innovation: Organizational Restructuring

To achieve high coupling between editorial needs and technology platform construction, ZDPG established the Network Propaganda Office Data Analysis Room and Public Opinion Analysis Room. These units not only provide data services for business personnel but also serve as bridges between technical and business departments, responsible for collecting editorial needs and user feedback on the technology platform, and communicating promptly with the product R&D center to drive continuous platform iteration and innovation.

To better serve business needs, the "Media Cube" Product R&D Center comprises seven departments: R&D Management, Product Planning, Project and Quality Management, Media Editing, Mobile Editing, Video Editing, and Operations Product. These departments respectively handle business requirement collection, business transformation, requirement analysis, product planning, project construction, quality control, platform R&D, big data construction, mobile and video product development, and media cloud services.

According to Dong Lilin, the "Media Cube" technology platform adds distribution channel and manuscript form tags to the reporting system, allowing departments to select them during topic submission and facilitating discussion in the three editorial meetings. Additionally, the reporting system can associate topics with manuscripts, enabling the all-media command center's monitoring large screen to track real-time distribution of topic-related manuscripts across channels. To meet command and coordination needs, the "Media Cube" reporting and editing systems are adapted for both PC and mobile terminals, allowing reporters and editors to submit topics, collect materials, distribute content, and conduct reviews through either terminal, with manuscript status feeding back to the large screen in real time. This achieves three-terminal connectivity among large screen, PC, and mobile, enabling real-time topic tracking.

Sustainable Development Challenges and Solutions

The application of big data technology in the "Media Cube" platform fully integrates into every aspect of news operations, transforming news production from a linear to a circular data loop and merging "isolated" multi-terminal content production systems into an "integrated" platform. This truly achieves comprehensive organizational reform driven by technology, supporting innovation in work mechanisms, and promotes media convergence development through big data technology and intelligent services.

However, media convergence development is not achieved overnight, and any transformation process faces numerous challenges. In recent years, domestic media convergence practices have shown that while technology platform construction and operational mechanism adjustments have improved news production capacity, they have also brought issues that cannot be ignored, such as increasingly severe content homogenization, non-normalized collaborative production, emergency response mechanisms for sudden events, and the incompatibility of traditional editorial teams with new media public opinion fields during transformation. These details affect the sustainability of media convergence development.

Avoiding Content Homogenization: To avoid content homogenization, ZDPG adopts differentiated restructuring of operational mechanisms as its construction approach, from top-level design to specific editorial operations, achieving diversified, multi-terminal, and multi-form content production to meet different user needs. At the top level, it builds a "three circles" circulation new media matrix: the "core circle" consists of Zhejiang News Client, Zhejiang Online website, Zhejiang Mobile Newspaper, and video client, forming a party media circle centered on mainstream news values. The "close circle" comprises Qianbao Network, Dazhe Network, Zhejiang 24-Hour Client, and Bianfeng News Zone, providing users with diverse news, culture, and life services, forming a metropolitan circle focused on news services and serving as an important extension of the mainstream public opinion stronghold. The "collaborative circle" includes channels such as Weibo, WeChat, and professional Apps, emphasizing vertical and refined content, and actively competing for discourse power through commercial website platforms to drive traffic and expand influence for core and close circle content products. Architecturally, it establishes a hierarchical "central kitchen" content production system that is both centralized—integrating underlying data and process platforms to achieve normalized production of content across all media forms (newspaper, website, terminal, micro-media, video)—and individualized, implementing hierarchical management and control adapted to different media circles. Organizationally, with content construction as the foundation, it forms a "large editorial center + vertical editorial team" structure. The large editorial center divides into night-shift editorial and digital editorial departments, responsible for newspaper front pages, client headlines, and website homepages. Vertical editorial teams cover politics, economy, culture, and social ecology, with editors

and journalists starting from vertical content and using media characteristics as distribution timing to differentially edit collected content. In specific measures, while encouraging editors to conduct differentiated editing according to different terminal attributes, the "Media Cube" platform provides duplicate detection and intelligent matching systems, extracting manuscripts with over 70% similarity across multiple terminals and linking them to performance assessments to avoid homogenization.

Normalizing Collaborative Production: To improve collaborative production capacity, ZDPG establishes daily editorial mechanisms based on "Media Cube," including weekly expanded editorial committee meetings to study major topics; an all-media command coordination mechanism that establishes a unified topic clue database, with group duty editors uniformly commanding and coordinating collection and editing forces based on news value and media characteristics; and a three-meeting system (morning, noon, and evening meetings) to 统筹指挥配置报、网、端、微采编资源, achieving all-media, full-process, and all-weather news collection, editing, and release with dynamic follow-up. Morning meetings focus on topic planning for digital terminals beyond daily newspaper content, while noon and evening meetings coordinate newspaper layout arrangements while dynamically following digital terminal topics. During these meetings, the newly established Network Propaganda Office Data Analysis Room and Public Opinion Analysis Room provide data support and services for editorial department planning meetings through data monitoring, hotspot discovery, and analysis, forming an editorial system of "once-collected, multi-terminal sequential differentiated distribution, and full-process data services." For major reports and sudden events, ZDPG establishes a special research mechanism by the editorial committee to uniformly mobilize and command the group's various media collection and editing forces. The "Media Cube" all-media command monitoring system plays its role in normalized operation, real-time tracking of hotspots and event development. Simultaneously, reporters are equipped with mobile "Media Cube" systems and reporter kits, enabling direct live reporting and material transmission via mobile phones for sudden events.

Talent Transformation: Forging a new-type editorial and technical team during transformation is another crucial challenge. While technology platform construction and institutional adjustments enhance news productivity and collaborative capacity, they also bring new issues for editorial team transformation. The increased news production speed and multi-terminal distribution convenience brought by technological transformation, combined with diversified user reading scenarios, compel editorial staff to enhance news production capabilities and transform into all-media reporters. To promote personnel development during transformation, ZDPG adopts all-staff training and complementary advantage strategies. During business personnel transformation, it conducts all-staff digital transformation training and equips reporters with relevant collection devices, while leveraging veteran editors' and reporters' advantages in in-depth reporting, balancing traditional strengths with new media capability cultivation to jointly promote personnel integration and digital transformation. In techni-

cal team construction, "Media Cube" product R&D center technicians include both traditional newspaper technical staff, internet-gene technical personnel, and startup teams. Ren Haiping noted that traditional technical personnel have deep understanding of news business, internet-gene technical personnel possess better R&D thinking, and startup teams are more passionate—each complements the others, jointly advancing group technology platform construction.

Conclusion: A Sustainable Development Path

From technology platform construction to institutional reform and then to personnel integration, ZDPG has transformed from a past circulation of 420,000 copies to today aggregating nearly 660 million registered users, 50 million active users, and 30 million mobile users. During the 2017 National Two Sessions period, Zhejiang Daily ranked first among provincial party newspapers in the national provincial party newspaper Weibo and WeChat official account communication impact list.

As the nation's first provincial press group with overall listing of media operating assets, ZDPG has moved from driving overall listing of media operating assets, establishing Zhejiang Media DreamWorks, acquiring the Bianfeng Haofang online platform, and successfully building a capital platform, to investing 130 million yuan in building the "Media Cube" media convergence intelligent service platform, and then to institutional reform. From capital accumulation to technology platform construction highly coupled with editorial operations, to reengineering operational mechanisms and systems and compelling editorial staff transformation, ZDPG has closely followed the Party Central Committee's convergence development decisions as its action guide, using advanced technology as support and content construction as the foundation to promote multi-faceted integration between traditional and emerging media, forming a sustainable development path where technology platforms and business platforms rise spirally.

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