Review of New Media Technology Applications in Trade Media and Reflections on the Prospects for Converged Media Technology: Postprint

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Abstract

New media technologies facilitate industry media in transcending the limitations of presentation forms and communication channels, thereby realizing content services with richer modalities. Drawing upon application scenarios of new media technologies from the author' s institution and relevant industry organizations as case studies, this paper concisely reviews the practical explorations and experiential insights of commonly utilized new media technologies in industry publicity. It further anticipates the technical development directions and pathways for promoting deep media integration at the current stage, and grounded in the implementation of General Secretary Xi Jinping' s relevant discourse on deep media integration, presents practical reflections on optimizing media technology management.

Full Text

Preamble

Title: A Review of New Media Technology Application Scenarios in Industry Media and Prospects for Converged Media Technology

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Abstract: New media technology has empowered industry media to break through limitations in presentation forms and communication channels, enabling richer content services. Drawing on examples from the authors' organization and related industry units' new media technology application scenarios, this paper briefly reviews common new media technology practices and experiences in industry publicity, further explores the developmental direction and pathways for promoting deep media convergence at the current stage, and, grounded in the

implementation of General Secretary Xi Jinping' s important speeches regarding deep media convergence, presents practical reflections on how to effectively manage media technology.

Keywords: New Media Technology; Industry Media; Deep Media Convergence; Management

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Introduction

As the Communist Party of China has united and led people of all ethnic groups in great struggles to create a new life, build new projects, and explore reforms, it has achieved remarkable accomplishments that have captured global attention, and is steadfastly advancing toward the Two Centenary Goals and the great historical cause of the rejuvenation of the Chinese nation. Since socialism with Chinese characteristics entered a new era, the Party' s journalism cause has further inherited and developed the Marxist view of journalism, achieving a series of theoretical, practical, and institutional innovations, and creating a new situation in publicity and ideological work.

In this process, media technology has continuously empowered innovations in content production and communication methods, enhancing supply and strengthening interaction, bringing about a comprehensive technological revolution and systemic reconstruction, while also presenting new challenges for media management. The industry media organization where the authors work has attached great importance to technological application in recent years, giving full play to the authoritative and professional characteristics of print media while leveraging the complementary advantages of new media. Through continuous institutional and mechanism reforms, it has expanded and strengthened the mainstream public opinion arena, promoted deep media convergence, and is building a higher development framework and proposing greater management requirements for new media and converged media technology.

On the occasion of the 100th anniversary of the founding of the Communist Party of China, further reviewing and prospecting the innovation and development of media technology represents an important measure for celebration activities in the media technology field, particularly in academic circles. It is also an inevitable requirement for media practitioners to remember their original mission and practice the great historical cause of national rejuvenation, as

well as an action demonstration of firm belief and conviction in upholding and developing socialism with Chinese characteristics in the new era.

1. Brief Review of New Media Technology Application Practice

New media technology refers to new media based on internet technology, possessing inherent technological advantages and information service functions as media. With the continuous upgrading and development of internet technology, new media technology has matured in commercial and civilian applications, and decreasing application costs have gradually adapted to the practical needs of various fields in terms of funding and human resources, particularly gaining increasing application in industry media publicity work. New media technology has broken through limitations in presentation forms and communication channels, providing richer content services for vast industry users and even readers across the entire network.

1.1 Industry News Websites

In the mid-to-late 1990s, internet technology and applications gradually entered China, flourishing thanks to the advantage of a massive user base. At that time, most industry media remained in a newspaper production technical environment of internal local area networks plus Founder typesetting software (early versions even required floppy disk installation). To enhance industry publicity capabilities and standards, industry media began actively embracing the internet, establishing a mutually complementary and co-developmental relationship between traditional print space and cyberspace. Many launched industry news website services around 2000, such as the China Electric Power News Network, which began operation in 1999; the International Business Daily Online Edition (trial), founded in July 1999 and re-launched in the first half of 2001; and China Water Resources Net, which went live in July 2000.

At the software level, website construction mostly relied on content management systems developed in cooperation with technology vendors to achieve content management and publishing. At the hardware level, depending on their resources, organizations either built their own server rooms or rented facilities from their supervising units, enabling news publishing, information dissemination, and data query functions for industry readers. Some further expanded into user interaction and e-commerce, achieving notable social and economic benefits. Today, industry news websites have become a fundamental form of news service for industry media.

1.2 Professional Photo Libraries

Industry media generates massive amounts of photographic resources during news gathering, including images of industry figures, science and technology,

engineering projects, facilities, emergencies, and landscapes. These digital assets have extensive value for repeated publicity and commercial development within the industry and throughout society, making professional photo management and utilization worthwhile from a business perspective. For instance, the China Police Photo Network leverages advanced information and image processing technologies to provide a practical and convenient online platform for searching and using images, allowing photographers to conveniently store and manage their photos. With thousands of photographers distributed throughout the national public security system, the network can leverage its industry advantages to reach scenes first and provide frontline legal images that meet reader needs. These news photos have opportunities for further publicity in the People' s Public Security Daily and other legal publications and programs.

China Water Resources News also began building the China Water Resources Photo Library in 2003 and collaborated on more segmented domain-specific image libraries. Using a B/S architecture and introducing development toolkits for automatic image editing, the system enables functions such as image uploading, online editing, watermarking, display management, and user access and download permission control. The photo library system can integrate with payment interfaces to enable commercial functionality. Operational experience shows that with dedicated operation and maintenance teams and established groups of professional photographers or enthusiasts, a truly user-purchasing model can be realized, providing industry news websites with visually striking and user-friendly news image resources.

1.3 Professional Blogs and Forums

Blogs and forums represent typical self-media applications, but their content production and dissemination attributes inevitably connect closely with industry media publicity. First, media can find richer news resources or leads from blogs and forums. Additionally, blogs and forums can extend and deepen news reporting limited by space or program time. Furthermore, they provide a more acceptable feedback channel for news media. To this day, industry-specific or professional blogs and forums continue to exist, gathering diverse industry information, professional knowledge, and user discussions.

As core functions of blogs and forums are similar, platform software such as Oblog, Supesite, Discuz, and WordPress emerged. Based on these platforms, some industry media established industry online communities. For example, the China Environment Liangshan Forum opened sections for online surveys, casual photography, discussion halls, and journalist exchanges. The China Water Resources Net Jilang Community has produced outstanding works or hot topics on water conservation, flood control, and drought relief, which were further promoted through news portals, becoming a front for industry public opinion.

Industry media community construction represents the earliest attempt at UGC (user-generated content) and an early exploration of the MCN (multi-channel

network) model through invitation-based core user teams. Although limited by single presentation forms and channels and the lack of big data-driven precision promotion, many industry media communities lacked sustained momentum. However, the recent trends of mobility, socialization, and visualization in international communication have made this service form still worthy of attention.

1.4.1 Flash Technology Application

Although internet services gradually became popular after 2000, industry media news services still primarily featured static text and image content. The birth of Flash technology injected new vitality into media content presentation. With capabilities for animation production, independent playback, and comprehensive audio-video support, the software "appeared on 65 million mobile devices, consumer electronics, televisions, media players···even refrigerators." Industry media websites widely used this technology for navigation bars, image carousels, and advertising icons, with news animation production becoming a phenomenal application.

In a 2009 online exhibition for a water conservancy project, the development team used Flash technology to create display interfaces, achieving novel dynamic and three-dimensional effects that remain indexed by Baidu with over 1.02 million related pages. In recent years, Flash technology-produced news animation products have played vivid and effective roles in promoting the nationwide river chief system, being reposted by multiple websites and gaining widespread user recognition.

1.4.2 H5 Technology Application

With Flash' s development constrained by its paid ecosystem, high resource consumption, and security vulnerabilities, it gradually lost out in standards competition. However, its difficult standardization process provided valuable lessons for the H5 standard' s establishment. After nearly eight years of effort, the World Wide Web Consortium finally achieved unification of hypertext markup language and standard specifications, greatly promoting new developments in the internet and applications. H5 has become representative of current industry new media applications in terms of visual graphics, diverse content, and interactive design.

Today, industry media can easily produce simple H5 products using platforms from technology companies such as MAKA, Yiqixiu, and Fanku Interactive, or further plan more story-driven IP content, compile content scripts, and organize front-end development teams for more exclusive and flexible scenario development, such as China Energy Daily' s "Golden Brick Treasure Hunt" and People' s Court Daily' s "Unboxing the Supreme Court Work Report."

In practical development and application, H5 requires coordination with JS, CSS, and other programming methods, leveraging mature development frameworks to achieve comprehensive, hybrid, and agile requirement fulfillment and

relatively extreme user experiences. Using this technology, Economic Reference Network launched online e-book reading and purchasing services; People' s Railway website' s online railway museum deeply excavated and integrated cultural relics resources, displaying railway culture and fine traditions to society, with some exhibitions even featuring VR effects.

1.5 Mobile Reading

The popularization of 4G and WiFi technologies has brought fast communication, convenient reading, and entertaining experiences. Industry media has followed this trend, launching news reading formats suitable for mobile phones, tablets, and outdoor screens, effectively utilizing readers' fragmented time and achieving incremental communication effects.

1.5.1 Digital Newspapers Digital newspapers repackage traditional print newspaper content, preserving the layout style and cultural characteristics of conventional newspapers while integrating additional content such as video, audio, and animation. Screen adaptation accommodates different reading experiences, offering environmental friendliness, intuitive operation, and convenience that bring fresh experiences and easy, fast reading to readers.

Most industry media have launched digital newspaper reading. The popular format combines page images with content pages, which can be static web pages or Flash or PDF files. Hot zones are set in page images, and clicking a zone displays corresponding multimedia content. Many industry newspapers, such as China Quality Daily, China Culture Daily, China Food Daily, and People' s Railway Daily, launched digital newspapers early on. China Metallurgical News and China Taxation News have implemented online subscriptions for digital newspapers and developed more digital services based on this foundation. The electronic version of China Water Resources News has been integrated into the water conservancy system' s large-screen reading system, enabling reading anytime in venues equipped with touch-screen devices.

1.5.2 WAP Sites WAP stands for Wireless Application Protocol, which standardizes wireless communication devices. Based on this standard, industry media developed WAP websites enabling lightweight and convenient reading, extracting and displaying the most important information. For example, Health Daily and Consumer Daily both established WAP sites using m.-type secondary domains, accessible through mobile browsers without additional operations.

1.5.3 App Reading The emergence of mobile apps, besides continuing to satisfy previous mobile reading functions, more critically realized true end-to-end "understanding" and "connection." For the first time, based on mutual selection between publishers and recipients, algorithms real-time matched editorial policies with user reading habits.

Content differentiation creates development space for industry media apps, which can be developed natively for Android or iOS platforms or using H5 development. They can either connect to existing website data or completely establish new business processes. However, limited operational manpower may prevent app content from achieving differentiation from news websites, while industry scale largely determines download volumes and daily active users, becoming credible indicators for evaluating publicity effectiveness. Industry media such as China Energy Daily, China Petroleum Daily, China Tourism Daily, and State Grid News have launched news apps. According to Huawei App Market data, download volumes range from tens of thousands to millions of users.

1.5.4 Mobile Newspaper SMS and MMS represent early mobile reading applications with excellent effects for precise user push. Industry media can use this method to conduct publicity toward specific users. Publications such as China Water Resources News, China Land and Resources News, China Taxation News, China Culture Daily, China Gold Daily, and Agricultural Materials Guide all have mobile newspaper (or SMS) publicity channels. China Water Resources Mobile Newspaper, for instance, uses MMS to push curated news information and link guides to industry civil servants at all levels, engineering technicians, grassroots water conservancy workers, and mobile users who care about water conservancy.

The implementation method involves renting telecom gateway channels that can send to mobile, telecom, and Unicom networks. Repeated testing should ensure delivery rates, content display, and mobile compatibility meet expectations. Unified requirements for publishing format standardize MMS title, header, guide, columns, titles, line breaks (frame changes), and copyright information. China Water Resources Mobile Newspaper also integrates gateway Webservice interfaces with its own editorial system for more secure and efficient content publishing. Today, mobile newspaper technology platforms can choose to cooperate with super MMS or 5G SMS for attempts at larger content capacity and more presentation forms.

2. Prospects for Converged Media Technology

The development of industry media technology depends not only on media organizations' courageous exploration based on their own strengths but also on strong support from technology vendor platforms. In recent years, both sides have learned from each other' s strengths and actively cooperated. On the path of media convergence development, several exploratory directions are emerging: first, actively carrying out third-party platform integration has substantively achieved communication effects of "seeing the industry from outside the industry" ; second, mobile-first has become consensus, with mobile internet business becoming an active and inevitable choice for improving communication timeliness; third, video business will be a hotspot for a period, representing both the

objective need for print media to supplement its communication forms and the focal point for further deep integration between newspaper and broadcasting businesses; fourth, management system innovation remains a key driving force that will determine the direction of institutional mechanism upgrades for future integrated development and lead the development trend of converged media technology.

2.1 Third-Party Platform Integration and API Development

As comprehensive cyberspace governance advances, commercial platforms actively integrate into the mainstream melody, while mainstream media actively establish presence on commercial platforms for deep cooperation. The urgent needs of industry newspapers in terms of technical strength and communication channels have effectively integrated with the resource advantages of commercial platforms, gradually entering a state of collaborative development. Currently, sizable commercial platforms include WeChat Official Accounts, Weibo, Toutiao, Baijiahao, Douyin, Kuaishou, People' s Daily, Xinhua Cloud, Yangshipin, Lishipin, Sohu, Dayu, Video Channels, Bilibili, iQiyi, etc., with content covering text, illustrated stories, short videos, audio programs, and external links. However, practical usage shows that commercial giants' technology platforms have more complete content production and management, with more impressive push data—for instance, WeChat' s management functions are relatively comprehensive; single articles on Baijiahao can reach millions of pushes, and Douyin videos can accumulate hundreds of millions of pushes (related to calculation methods). Meanwhile, media still need to actively carry out campaign operations to achieve greater dissemination volumes and fan bases.

2.1.2 Mini-Program and Quick App Development For complex and special publicity tasks, basic functions of third-party platforms alone cannot suffice, requiring further mini-program development to achieve more product or service scenarios based on information connectivity. During a river culture publicity campaign, China Water Resources Net launched mini-programs and cloud services (video on-demand, database storage) to display publicity content, schematic diagrams, and promotional videos for over 20 rivers, and conducted real-time mobile number verification through official account interfaces to enable authentic and effective voting. Thanks to the campaign' s significant influence, the announcement quickly exceeded "100,000+" clicks after release, with the mini-program effectively supporting 1.238 million votes and attracting 60,000 fans for the official account, representing a successful example of industry media using mini-programs for publicity services.

In addition to third-party software platforms, nine major mobile phone manufacturers including Huawei jointly launched a new "Quick App" application ecosystem based on hardware platforms. Users can click and use without downloading or installation, enjoying native app performance experiences, achieving lightweight application development similar to mini-programs. With promotion

through manufacturers' app markets or mobile OS search functions, one development can achieve cross-manufacturer device deployment. Industry media can further research this new content distribution mechanism and attempt to integrate into the new traffic ecosystem.

2.1.3 Data Interface Development With numerous third-party platform options, industry media cannot realistically manage content across all platforms. Instead, they can use platform interface functions to produce through one main platform and synchronize pushes to other platforms, disseminating information faster and more widely to gain more reader attention and feedback, promoting fan growth.

RSS, as a standardized content aggregation technology, can conveniently share news content for other platforms to crawl. Platforms with large user bases such as Baijiahao and Huawei' s information push interfaces support this method. Using their own website CMS systems and modifying template tags can conveniently generate XML files conforming to RSS specifications and submit them to content aggregation platforms for timed reading and content updates.

2.2 Mobile Internet Platforms

Implementing a mobile-first strategy, industry media must build a business platform foundation centered on mobile internet applications, transforming previously scattered and independent digital communication processes to mobile internet and cloud communication levels. Driven by technology platforms, this evolves editorial forms and extends communication effects, gradually using productivity transformation to drive changes in production relations, and promoting the transformation from print-based traditional news content communication operations to new cultural communication patterns based on mobile internet applications.

Taking a mobile internet platform built by China Water Resources News as an example: first, it established an efficient unified communication platform on mobile terminals, integrating email systems, instant messaging systems, and telecom channels to achieve comprehensive connectivity between the newspaper headquarters, traveling employees, and local correspondent stations. This enables rapid completion of mobile business processes and, relying on mobile office capabilities, expands information collection and transmission channels, improving rapid response and handling capabilities for breaking news.

Second, by building a complete process for interactive content creation, composition, and publishing based on design tools and templates, it supports interactive multimedia content production and management, broadening the scope of mobile product development. Leveraging professional advantages, it expands services for governments, enterprises, and readers in the mobile communication field, achieving cloud communication patterns and opening new industrial spaces.

Third, it digitizes historical newspaper materials and establishes a functional, manageable, full-text searchable, and compatible historical data system for permanent storage, preserving valuable historical text, images, and layouts while enabling physical or mobile reading products that enhance publicity effects for water conservancy news, water culture communication, and water situation education.

Fourth, it innovates data information service models by launching content analysis, decision-making, and public opinion analysis services, providing more precise decision-making analysis for newspaper development and public opinion references for the public and relevant institutions, maximizing economic and social benefits.

2.3 Video Business Platforms

As network costs gradually decrease, video on-demand and live streaming technologies become increasingly popular, with video being predicted by news professionals as the "ultimate expression of news." At the policy level, industry media can expand business by obtaining online audio-visual program transmission licenses and radio and television program production licenses. Video represents the last opportunity for traditional media transformation.

Within industry newspapers, for instance, China Petrochemical News has established a video website with on-demand and live streaming businesses, displaying over ten thousand videos; China Real Estate Network launched a Fangshipin secondary channel with sections like ZFB Frontline, Business Dialogue, ZFB Living Room Property Observation, and Live Streaming; the CPPCC website' s video channel features committees' living rooms and anchor one-minute segments. China Water Resources News also launched virtual studio construction in 2019, currently achieving virtual scene connectivity, while equipping cameras, video editing workstations, and conducting video content interviews, editing, and post-production. Relying on the water conservancy Lanxin video conferencing system, it has attempted cloud interviews and cloud broadcasts. Additionally, it has explored mobile video platform construction, planning an information, user, and business operation App platform based on the newspaper' s media attributes, business needs, and focus on mobile and video features.

2.4 Smart Converged Media Construction

General Secretary Xi Jinping pointed out that the key to integrated development lies in integration and becoming one. The recently released "CPC Central Committee' s Proposal for Formulating the 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives Through 2035" explicitly proposed "promoting deep media integration and implementing all-media communication projects." Industry media can start from integration and smart concepts, concentrating resources such as media forms and talent data, overcoming old production efficiency and mechanism obstacles, and using tech-

nology platform construction as a lever to help media reform and upgrading achieve genuine transformation from within.

China Aviation News adapted to profound changes in the public opinion ecology, media landscape, and communication methods by building the first deep integration cloud architecture media platform for central enterprises and industry media—Aviation Cloud—in 2020. Through resource integration beyond media and innovative industry cloud management models, and relying on the new operational mechanism of the media convergence center, it is establishing a complete news publicity work system integrating "public opinion, policy, gathering, editing, distribution, and evaluation," creating a batch of new mainstream media with the aviation power client as the main position, and building a vivid, three-dimensional, positive, and controllable public opinion ecosystem.

To accelerate the construction of an integrated and unified communication pattern, China Water Resources News proposed the concept of building a "Smart Converged Media Platform," striving to construct a news gathering and editing integrated management platform to coordinate water conservancy news resources and integrate management of editorial teams and necessary self-media resources. It aims to build a media convergence center integrating news reporting command decision-making, task distribution, tracking feedback, and on-site interaction, achieving real-time resource allocation, seamless data return, traceable actions, and smooth distribution communication. It also plans to build an intelligent content management system relying on big data to achieve AI-assisted editorial production and connect with smart communication systems for digital content, and a smart communication management system to achieve algorithmic news push, from multi-channels to multi-terminals, from visual interaction to virtual reality, building a converged communication pattern.

3. Reflections on Media Technology Development and Management

The widespread application of new media and converged media technology provides solutions for industry media to optimize processes, rebuild platforms, and effectively integrate resources and production factors, achieving mutual integration of content, technology, and management. It gradually exerts driving effects, contributing wisdom to industry media' s further consolidation and development of mainstream ideology and public opinion, enhancing social communication capabilities, compensating for weaknesses, leveraging strengths, and improving industry news and cultural communication standards. Faced with the requirements of the 14th Five-Year Plan and 2035 long-range objectives to base on new development stages, implement new development concepts, and build new development patterns, technology work requires more reflection and action in assisting media reform, development, and deep integration.

3.1 Technology Development and Application Require Holistic Vision

Industry media development concerns the shaping of industry public opinion ecology and image, as well as the vital interests of readers and practitioners. Under the new development pattern, media technology work needs to examine its inner self, identify its positioning, manage its own development, and thus adapt to the overall economic development situation. Technology work should consider more from the strategic perspective of media development, exerting actual driving effects in enhancing media productivity, communication power, and influence, assisting various business links, and even connecting with local media convergence resources to achieve overall innovation and circular development. Each technology practice should be both a people' s livelihood project and a top-level project, tightly integrated with the construction of "four-all" media.

3.2 Strengthening Integration of Internal and Industry Technology Resources

Industry media' s internal technology resources have traditionally been relatively weak. Relying solely on internal resources can only achieve slow and partial development. It is necessary to identify areas closely related to industry technology resources and actively strengthen integration. At the technical funding level, rely on the more substantial financial advantages of the industry or group to achieve technology upgrades. In project docking, align with current smart industry construction initiatives, exploring the inclusion of industry public opinion and communication effects as important applications in smart industry construction, or as guarantee or influence measures. In daily work, integrate into industry mobile office systems to achieve more comprehensive technical support and guarantees under normalized epidemic prevention and control.

3.3 Achieving New Integration of Technology and Journalism

Under traditional business models, technology work needed close cooperation with journalism, from small changes like font variations affecting system parameters to large changes like layout design and manuscript review process changes requiring platform adaptation and logic implementation. In some ways, technology personnel understood the business better than the business itself. Today, technology is no longer merely a "tool" for media development. Especially in the era of artificial intelligence and big data, technology provides greater extension possibilities for both media and practitioners. From journalism practice, issues such as intelligent distribution accelerating the spread of reversed news, big data bringing privacy violations, and algorithmic recommendations exacerbating information cocoons have emerged. Addressing these issues urgently requires new integration and exchange between technology work and journalism, as well as relevant policies and research fields, along with research projects and response practices.

3.4 New Requirements for Professional Ethics in Technical Positions

As industry media business forms gradually expand to mobile internet terminals, technical position functions are no longer limited to business implementation and support, but extend to data asset and information security management. In recent years, cases of data leakage and server exploitation by black production due to technical personnel negligence, embezzlement, or coercion have occurred frequently. This requires technical positions to further enhance and improve professional ethics under the new situation. On one hand, positions must establish security and confidentiality awareness, promoting security situations, concepts, and knowledge throughout business processes. On the other hand, personnel management should emphasize selecting clean, loyal, and reliable individuals for technical positions. Additionally, secure and stable technical management mechanisms should be established to protect news technical personnel from exploitation and control by black production or even hostile forces.

3.5 Appropriate Weight of Technology Management in Media Management

Deep media convergence requires joint driving by content, technology, and management. Industry media should timely improve the weight of technology management in overall media management, adjusting the personnel ratio among content, technology, and management according to mobile internet business realities to achieve high-level guidance and coordinated development across business segments. Wang Xuan once said, "China' s internet urgently needs management personnel who understand technology. We have taken many detours, and entrepreneurs and operators must reflect deeply on this." This provides valuable experience for industry media' s integrated development to deepen.

References

[1] Baidu Baike. New Media Technology (New Media Based on Internet Technology) [EB/OL]. https://baike.baidu.com/item/%E6%96%B0%E5%AA%92%E4%BD%93%E6%8A%80%E6%9C
2020-10-20.

[2] China Police Photo Network. Photo User Guide [EB/OL]. http://www.policephoto.com.cn/#/aboutus/1, 2020-04-03.

[3] Will Bedingfield. The rise and fall of Flash, the annoying plugin that shaped the modern web. https://www.wired.co.uk/article/history-of-macromedia-flash[EB/OL]. 2019-07-24.

[4] Zeng Lingling. Research on H5 Application in New Media [J]. Mingri Fengshang, 2018(06): 346.

[5] Zhao Shuguang. Blue Book of Online Commentary: Report on the Development of Online Commentary in China (2019) [R]. Beijing: Social Sciences Academic Press. 2019.

[6] Wen Jing. "Can Quick Apps Counter Mini Programs?" [N]. Beijing Youth Daily, 2018-03-21. A16. Financial News.

[7] China Water Resources News Mobile Communication Platform Project Team. Summary Report on China Water Resources News Mobile Communication Platform Project [R]. Beijing: China Water Resources News. 2018.

[8] Li Lidan. Exploration and Breakthrough of Newspaper Video Business [J]. News Front, 2018(15): 78-80.

[9] Yan Hui, Chen Dan. Research on News Ethics Issues Under Artificial Intelligence Technology [J]. Cai Xie Bian, 2021(1): 112-113.

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