

Development of Mobile Communication Technology and Its Profound Impact on Broadcasting Media (Postprint)

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Abstract

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Full Text

Preamble

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Keywords: mobile communication technology; broadcasting media; new media transformation

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1. Development of Mobile Communication Technology

1.1 First-Generation (1G) Mobile Communication Technology

In 1986, the first mobile communication system was born in Chicago, USA, employing analog technology and Frequency Division Multiple Access (FDMA) to convert voice signals ranging from 300Hz to 3400Hz onto high-frequency carrier waves in the MHz range. The primary standard for 1G was AMPS, with NMT and TACS also widely adopted in Canada, South America, Australia, and the Asia-Pacific region.

1.2 Second-Generation (2G) Mobile Communication Technology

2G, short for second-generation mobile communication technology, was centered on voice and text transmission. It could not send emails, software, or other information; it was a mobile communication specification that only supported voice calls and basic data such as date and time. However, Short Message Service (SMS) was available in certain 2G specifications. The two main 2G standards were GSM, which used Time Division Multiple Access (TDMA) technology, and CDMA, which used Code Division Multiple Access (CDMA) technology.

1.3 Third-Generation (3G) Mobile Communication Technology

As demand for mobile networks continued to grow, third-generation mobile communication networks required new standards on new frequency bands to deliver higher data transmission rates. Compared to first- and second-generation technologies, 3G offered bandwidth of over 5MHz, with transmission speeds ranging from a minimum of 384 Kbit/s to a maximum of 2 Mbit/s. This laid a solid technical foundation for transmitting high-bitrate data over mobile networks, enabling faster and more convenient wireless applications such as wireless Internet access. Capable of supporting higher-speed data transmission and mobile audiovisual services, 3G technology was regarded as ushering in a new era of mobile communications.

The three main 3G standards were WCDMA, CDMA2000, and TD-SCDMA. Among them, TD-SCDMA was independently developed by China. Although less mature than the other two standards, TD-SCDMA represented China's first mobile communication standard with independent intellectual property rights, holding significant importance.

1.4 Fourth-Generation (4G) Mobile Communication Technology

4G is an integrated technology product that combines third-generation mobile communication with WLAN, capable of transmitting higher-quality video im-

ages with resolution reaching high-definition levels. 4G can achieve download speeds of up to 100Mbps and upload speeds of 20Mbps. Moreover, 4G can be deployed in areas not covered by cable TV and DSL networks, thereby expanding coverage across entire regions. Consequently, 4G offers clear advantages. Fourth-generation mobile communication technology includes two standards: TD-LTE and FDD-LTE. The core technology of 4G systems is Orthogonal Frequency Division Multiplexing (OFDM). OFDM's network architecture offers high scalability, excellent noise resistance, and strong anti-interference capabilities, providing superior solutions for establishing 4G wireless networks. 4G mobile communication provides technical support for increasingly demanding broadband wireless connections, enabling seamless integration of wireless networks across various environments.

2. Profound Impact of Mobile Communication Technology on Traditional Broadcasting Media

Due to technical limitations, the 1G and 2G eras could only transmit voice and text, exerting minimal influence on traditional broadcasting media. However, the application of 3G and 4G mobile communication technologies has laid a solid technical foundation for the comprehensive development of mobile Internet services, while simultaneously posing a serious existential crisis to traditional broadcasting media. From another perspective, this also represents an opportunity for traditional broadcasting media to achieve renewed growth and development.

Supported by 4G technology, the emergence of smart mobile terminals has turned every individual into a self-media entity. Through apps such as WeChat, Moments, Weibo, and Toutiao, each person can instantly publish news from their surroundings. This mesh structure of interconnected self-media entities has fundamentally transformed the composition of traditional media, profoundly impacting television, radio, and newspapers, and triggering another revolution and reshuffling in the media industry.

Traditional media must leverage their own strengths and actively embrace this sweeping transformation. For example, through new media technology, CCTV News has formed a “5+1” new media platform centered on its television channel, comprising International Vision, Weibo, WeChat, news client, and CCTV News Network. The user base has grown continuously to 182 million (as shown in the figure). During the September 3rd military parade commemorating the 70th anniversary of the victory in the War of Resistance Against Japanese Aggression, three directing systems (A, B, and C) were employed, with System C only available for half an hour before the parade. The formal parade primarily used Systems A and B. Through its “5+1” platform, CCTV News New Media continuously integrated audiovisual resources from System C and pushed them in real-time to multimedia terminals during the live broadcast, providing view-

ers with a unique perspective on the parade. The total readership over three days reached 4.69 billion.

After several years of development, the new media division of Linyi Broadcasting and Television Station has evolved from initial uncertainty to now operating five major live streaming platforms: television channel, radio channel, iLinyi website, 89.9 Kaiba App, and WeChat video live streaming platform (Linyi Live). It also manages 15 influential WeChat public accounts, including “Linyi News” (as shown in the figure). During the 2016 “Great Righteousness in Yimeng” Linyi Heroic Courage Awards ceremony, Linyi Broadcasting and Television Station, following the requirements of building a “central kitchen” project to promote deep media convergence, pooled its converged media resources and conducted simultaneous live broadcasting across its five platforms. The 15 major WeChat public accounts, leveraging their cluster advantages, presented the award ceremony to the city’s residents from multiple angles and through multiple media in real-time, interacting with the audience online and enabling citizens to follow the live event in various forms. During the live broadcast, the total clicks on the 15 WeChat public accounts, iLinyi website, and Kaiba App exceeded 200,000, with over 70,000 interactive comments. From the pre-event announcement to the conclusion of the ceremony, total readership exceeded 300,000. This represented an in-depth practical application of new media technology by Linyi Broadcasting and Television Station. Strong technical support ensured the great success of this converged media live broadcast interaction, earning widespread praise from the public.

3. Conclusion

New media technology is the core element driving the transformation of traditional media. Simplicity and usability are key, while user-centric thinking is fundamental. By relying on content as the foundation, integrating new media technology, and establishing two-way positive interaction with users, media can integrate into users’ life scenarios. From this perspective, new media has never been the enemy but rather a touchstone for traditional media to break through development bottlenecks.

The upcoming 5G era will become an even more powerful driving force for new media convergence development. A single small base station can satisfy 200 people simultaneously uploading and downloading high-definition video, completely eliminating the need for fiber optic cables or satellites in live television broadcasting. Through 5G and media asset platforms, content can be pushed to television and multimedia terminals, enabling real-time interaction between large and small screens and between users and platforms. Looking further ahead, AR and VR fields based on 5G technology will be new frontiers for the television industry. Future competition in applying new technologies and seizing new opportunities will be extremely fierce. Only by emphasizing, engaging with, and

accumulating these technologies early can media organizations avoid being left behind in this transformative wave.

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

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