

An Investigation on the Impact of 5G on New Media

Huaxiang Liu, Kuok Tiung Lee

Abstract—New media has unique advantages in the media industry due to its rich content, wide audience, fast spread and diversified presentation. With the rapid development of communication technology, we have entered the 5G era. 5G communication has the characteristics of high speed, wide coverage and low latency, which can well promote the development of new media. In this paper, the impact of 5G on new media is discussed in detail. The challenges faced by new media in the 5G era and the future development trend are also investigated.

Keywords—5G; New Media; Development Trend

I. INTRODUCTION

Every update of communication technology will bring innovation to the mode of information dissemination. The first-generation mobile communication technology (1G) supports analog voice signal communication and solves the most basic voice communication problems. The second-generation mobile communication technology (2G) introduces digital communication technology. The third-generation of mobile communication technology (3G) has popularized the need for mobile terminals to access the Internet, and can transmit pictures and text. The fourth-generation mobile communication technology (4G) supports more complex interactive applications and data transmission requirements of smart phones, and ushers in the era of mobile Internet.

At present, it comes to the era of the fifth-generation mobile communication technology (5G). 5G is not an independent and new wireless access technology. It is a technological evolution of existing wireless access technologies, including 2G, 3G, 4G and WiFi. Based on key technologies such as network slicing, millimeter wave, small base station, massive multiple input multiple output, beamforming and full duplex, 5G network can provide high-speed data transmission, ultra-low latency, low energy consumption, low cost, ultra-reliable data transmission and massive equipment connection[1-3]. 5G can not only improve the transmission rate, but also diversify terminals, access methods, transmission coverage methods and content. It can accommodate more business applications and provide better user experience.

5G can support a variety of applications. According to its business characteristics, these applications can be divided into enhanced mobile broadband (eMBB), ultra-reliable low latency

communication (URLLC) and Massive Machine Type Communication (mMTC) [4]. The eMBB makes virtual reality (VR), ultra-high-definition (UHD) video, wireless broadband and other high-traffic services possible or better. The URLLC meets the needs of unmanned driving, industrial automation and other low latency, high reliable connection services. The mMTC can handle large-scale and high-density Internet of Things services, supporting 1 million device connections per square kilometer.

The arrival of the 5G era will inevitably be accompanied by an increase in video consumption. It will promote the upgrading of media technology and bring major opportunities to the media industry. Compared with traditional media, new media has diversified forms, rich content, wide audience, fast transmission, convenient communication and other characteristics, which has unique advantages in the media industry. The typical technical features of 5G can well promote the rapid development of new media. In the 5G era, the information transmission form and content of new media will usher in a new round of changes [5-6]. In this paper, the concept and characteristics of new media are first described. Then the impacts of 5G on new media are discussed. Next, the challenges faced by new media in the 5G era are discussed. Finally, the development trend of new media is prospected.

II. OVERVIEW OF NEW MEDIA

New media is a form of communication that uses digital technology to provide users with information and services through computer networks, wireless communication networks, satellites and other channels, as well as terminals such as computers, mobile phones and digital television [7-9]. Compared with traditional media, it has the advantages of large capacity, interactivity and real-time communication. With digital compression and wireless network as technical guarantees, cross-border global media communication has been realized.

Enabled by digital technology, new media is characterized by breaking the barriers between different kinds of media. It dissolves the boundaries between media, regions, administrations, and even between communicators and receivers. New media also shows the following characteristics.

A. Prominent media personalization

In the past, almost all media released content according to the arrangement of their respective programs. Audiences could only passively read or watch news and entertainment content,

Manuscript received on March 15, 2023

Huaxiang Liu is with the Faculty of Social Sciences and Humanities, University of Malaysia Sabah, Kota Kinabalu 88400 Malaysia Kuok Tiung Lee

is with the Faculty of Social Sciences and Humanities, University of Malaysia Sabah, Kota Kinabalu 88400 Malaysia

and sometimes they might miss their favorite programs due to time constraints. However, new media can be targeted at a more segmented audience, and users can customize the content they are interested in according to their preferences. In other words, the information content received by each new media audience can be similar or different.

B. Increased Audience Selectivity

In the new media, everyone can receive information, and everyone can also act as an information publisher. Users can watch TV programs while playing music, and at the same time participate in voting for programs and retrieve information. Just like new media such as TikTok and Kuaishou, which have become popular in recent years, everyone can be a publisher of information, which breaks the limitation that only news organizations can release news, and fully meets the segmentation needs of consumers.

C. Various forms of presentation

The new media has a variety of forms and rich presentation process. It can integrate text, audio and pictures, and expand the content instantly and infinitely, so that the content becomes a "living thing". Recently, the new media platform has become a new front for government image promotion. As an application field of government new media, TikTok has a noticeable impact on the construction and dissemination of government image in China.

D. Real-time information release

Compared with radio and television, only new media has no time limit, and can easily achieve 24-hour online, and can be processed and released at any time. The advancement of media technology has brought about a reduction in the cost of communication. New media has become a mass media with lower cost of communication, more convenient means of communication and richer content of information dissemination. The content and form of its communication have even changed people's way of life to some extent.

III. THE IMPACT OF 5G ON NEW MEDIA

The 5G network has brought ultra-high speed data transmission, large-flow broadband capacity, ultra-low latency, low-cost and low-power transmission, and massive equipment connection to the network. The subject, form, presentation and user experience of new media information transmission will be completely subverted in 5G era.

With the continuous subdivision and deepening of the applications of 5G network in the scene, the dissemination of new media information will be extended to all fields of society through the network, forming a new communication mode. 5G new media will appear in different industry scenes in different forms and presentation methods.

A. Stable transmission of UHD video stream

5G networks can implement network slicing technology according to the needs of different industries. Through network visualization, network deployment can be more flexible. The

way of networking on demand ensures the high quality and stability of network communication. The high-traffic mobile broadband in the eMBB application scenario has improved the quality of video definition, and people no longer have to worry about the resolution limit. The high-definition of 3D, 4K and 8K videos, the degree of color reproduction, and the smoothness of video playback allow the audience to experience the visual enjoyment brought by video images more realistically, and satisfy the auditory pleasure brought by high-definition voice. UHD video is one of the easiest directions for 5G new media to achieve, and may be the first to usher in explosive growth.

B. Immersive interactive experience

The high data transmission rate of 5G network can apply VR and mixed reality (MR) to daily life, and present data information in virtual 3D through wearable devices, such as VR glasses [10]. Under 5G network, large-flow broadband can meet the data traffic required for VR and MR transmission. The ultra-low latency of milliseconds can make the scene displayed in front of the user completely keep up with the movement of the line of sight, minimizing the dizziness caused by image clarity and latency. At the same time, the information about the interaction between users and scenes is transmitted to the computer through data. After the computer performs calculations, the information is fed back in time through the screen, allowing users to achieve the ultimate experience of immersion and presence.

In addition to VR and MR, holographic projection technology can record and restore real images, and can also achieve a viewing effect that is both real and fake. "5G+holographic technology" breaks the boundary between the real world and the virtual world, creates a precedent for multi-temporal remote interviews, and becomes a new way of information presentation in the news field.

C. Cloud Collaborative Production

In the 5G era, relying on the high data transmission rate and large traffic broadband provided by the eMBB application scenario, the production process and dissemination process of video media will be completely changed. Users do not need to build high-performance servers themselves. They can rent cloud servers, such as Alibaba Cloud, Tencent Cloud, Google Cloud, Amazon Cloud, and so on, to obtain high-threshold audio and video technologies at a lower cost. Journalists upload the collected news video materials to the cloud server through the high-speed 5G network. Several news workers can directly edit and produce the video through the application on the cloud server. After the production is finished, the audience can watch the news video through each terminal. Making videos through the cloud will save work costs to a greater extent, and it will no longer require large-capacity storage devices. In addition, the terminal only needs to be responsible for playing video images, which largely reduces requirements on terminal performance. Traditional media and news video production under 4G networks have more steps and take longer time. The production

of news video through the cloud under 5G network can achieve multi-person cooperation, shorten the process of video production, accelerate the speed of news production, and fully highlight the immediacy of news.

D. Diversified Terminal Equipment

In the mMTC application scenario of 5G network, a large number of devices can be connected to the network. Everything can be connected, such as smart home, smart city, enterprise automation, telemedicine, smart building, commercial logistics, smart agriculture, intelligent transportation, etc. In many scenarios, 5G networks will be used to connect the entire society and the natural world. This means that people can obtain a wide range of information from a variety of terminal devices.

The construction of smart homes, smart cities, and smart transportation will enable a large number of terminal devices to access the 5G network, and these terminal devices are carriers for information presentation. At home, different appliances are connected to the network through network communication technology, audio and video technology, automatic control technology, etc. Multiple devices are linked to obtain information more quickly and efficiently and provide timely feedback to realize a smart life. Through information technology, multiple systems and services of a city are connected, such as power, transportation, and security. This allows for digital upgrades of campuses, communities, etc., which improve the efficiency of resource utilization, optimize urban management, and increase citizens' quality of life, contributing to the development of smart cities. With smart cars connected to 5G networks, safe and reliable automatic driving can be enabled by ultra-low latency and reliable data in the URLLC scenario, freeing up people's hands.

E. Video Reshaping The Media Landscape

With the support of 5G and relying on the advantages of content resources, traditional media have entered the video field one after another, especially short video. Through the creation and dissemination of short videos, the content production capacity of traditional media has been stimulated, and the influence in the era of media convergence has been enhanced. It can be foreseen that short video and live video will become the mainstream way of obtaining news information and data information, and it will be an important starting point and key layout field for future media integration.

IV. CHALLENGES FACED BY NEW MEDIA IN THE 5G ERA

As the speed of information dissemination accelerates, information dissemination becomes more efficient and convenient, new media has ushered in a more prosperous development, and new challenges have also followed.

A. Accelerated dissemination of false information

With the development of 5G communication technology and fast transmission speed, the number of information resources and the scope of transmission have been absolutely increased, and the efficiency of network users receiving information has

been absolutely improved. The transmission speed of 5G network is 10-100 times faster than that of 4G network. The high-speed data transmission rate of the 5G network makes the dissemination of information faster and wider, greatly shortening the time it takes for the audience to receive information. With the rapid spread of news information, the false information attached to the new media has penetrated into people's lives at the same speed. The speed of dissemination of false information is far greater than the speed of information verification and clarification of facts, which often leads to wrong guidance of public opinion.

B. No way to ignore Data Security

The Internet of Things technology is developing rapidly around the world, integrating with industrial manufacturing, commercial logistics, intelligent driving, smart home, smart city and other fields, expanding the connection and service of information networks to "things and things", to achieve "Internet of things", "everything is media", and "technology is productivity". Object exchange, the spread of information through the network, and a large number of objects connected to the network will lead to an increase in management difficulties. In addition, the threat of network attacks will be greatly increased. In industrial production, the severity of the consequences of data breaches increases. In terms of personal privacy protection, the possibility of leakage of personally identifiable information, biometric information, geographic location, and private data has increased. In the age of artificial intelligence (AI) and big data, one danger is the privacy violation of users due to the collection and distribution of their data.

C. Single Information Recommendation Direction

The traditional media does not cater to the audience's preferences, but reports on politics, economics, social issues, sports and other aspects of news. The audience is able to receive a relatively wide range of news. With the rapid development of big data and AI, users can independently choose the type of information they receive. Through the collection and precise control of massive social data and personal data, the AI algorithm will form a highly customized information flow for users, truly realize the sorting of information flow according to user interests and characteristics, and improve the accuracy and interaction efficiency of information dissemination. For example, based on the analysis of data such as video content watched by users, viewing time, interaction level, and favorite degree, similar information is pushed to users. According to intelligent content, big data pushes the information that users are interested in for a long time, easily leading to the simplification of the information received by users. It is not conducive to the expansion of knowledge, and is prone to narrow thinking. The information is too easy to obtain, and the real-time update is fast, which can easily lead to the psychological impetuosity of the audience.

D. Limited Scope of New Media

The spread of new media is limited by the coverage of 5G

networks. The 5G network is vulnerable to geographical impact and expensive to deploy. It is difficult to provide effective means of communication for remote scenes, resulting in the inability of residents in remote areas, aircraft passengers in the air, crew and passengers of ships in oceans and large lakes, train passengers crossing the desert, and field researchers to obtain new media resources in a timely manner. Satellite communication has the advantages of long communication distance, wide coverage area, free from the influence of terrain and geological disasters, and is expected to serve as a powerful complement to the 5G network [11]. At the same time, satellite communication expands the coverage and application scenarios of 5G, provides strong support for the realization of 5G large-capacity multi-device access, and realizes the true global Internet of Everything. The ubiquitous availability and connectivity of satellites will help accelerate the widespread connectivity and global deployment of 5G networks on the ground, at sea and in the air. Combining low-orbit satellites with 5G technology can achieve global coverage of the network, thereby ensuring that new media can be spread globally.

V. FUTURE DEVELOPMENT TREND OF NEW MEDIA

In the face of the rapid changes of the times, it is necessary to clearly understand and grasp the changing trend and development characteristics of new media. At present, AI, 5G and other technologies are making continuous progress, and the field of new media will usher in new changes again. Through continuous innovation of communication methods and good use of new high-technologies, information communication will reach a new commanding height.

A. Transformation of form

At present, the main form of new media has changed from graphics and text to video, live broadcast and other forms, and the media of communication is also more diversified. With the high speed of 5G, the live broadcast will no longer be restricted, and the interactive form of netizens will no longer be limited to pictures and texts. In the future, the comment area may be more real-time video comments. The low latency feature of 5G will not only improve the application experience of AR and VR, but also expand the application scenarios, and at the same time, the threshold will become lower and lower. Therefore, with the gradual maturity and popularization of 5G technology, with the support and guarantee of new technology, new media must be more diversified in terms of production, dissemination and interaction, which can help create more value in new forms.

B. Change of content

The arrival of the 5G era will also usher in a surge in resources. The acquisition of materials for content production will be more convenient and faster. In the future, self-media will grow exponentially, and the competition will be more intense. High-quality content will also become the basis of foothold. Secondly, the popularization of 5G technology will greatly increase the scope of the audience. The future Internet

will not only belong to young people, but also the middle-aged and elderly people. For content, not only the form should be diversified, but also the refinement and accuracy of content are equally important. Since new media has been developed for a long time, various laws, regulations and regulatory systems will be gradually improved. The review mechanism for content will also be gradually improved. The development of new media will no longer be extensive and brutal. At the same time, there are more and more channels for audiences to receive information, and their tastes are becoming more and more difficult to satisfy. Therefore, the requirements for content innovation will become higher and higher, and the pace of introducing the old and bringing forth the new will also be faster and faster.

VI. SUMMARY

The development and application of 5G communication technology provides higher-speed, lower-cost, more stable and reliable technical support for the development of new media, provides users with high-definition, immersive video experience, and accelerates the intelligence of news production and dissemination. The combination of 5G and satellite Internet can achieve global coverage of the network, providing a reliable way for the global dissemination of new media. High-speed data dissemination poses more severe challenges to privacy protection, data security, and information authenticity, and requires journalists to be more professional. It is possible to introduce blockchain technology into the new media industry to address the data and information security challenges it faces [12]. For new media-related industries, it is necessary to follow the development trend, make adjustments in time and lay out the future as soon as possible.

REFERENCES

- [1] 5G white paper, NGMN, 2015
- [2] 5G-Advanced Technology Evolution White Paper, Huawei, 2018
- [3] Ahmed A M, Hasan S A, Majeed S A. 5G Mobile systems, challenges and technologies: a survey [J]. Journal of Theoretical and Applied Information Technology, 2019, 97(11):3214-3226.
- [4] 5G-Advanced Scenario Requirements and Key Technologies White Paper, IMT, 2020.
- [5] Li X, Center T M, CCTV. The Development of New Media in 5G Era [J]. Radio & Television Information, 2016.
- [6] Ding H. Exploration on Sports News Communication Strategies of Traditional TV Media in the Context of New Media [J], 2020. <https://doi.org/10.18686/mcs.v2i1.1284>
- [7] Huang F R. On Definition of New Media [J]. Journal of Shiyuan Technical Institute, 2013.
- [8] Cartwright W, Peterson M, Gartner G. New Media: From Discrete, to Distributed, to Mobile, to Ubiquitous [J]. Springer Berlin Heidelberg, 2006.
- [9] Caruso G, Nucci F, Gordo O P, et al. Embedding 5G solutions enabling new business scenarios in Media and Entertainment Industry [C]. 2019 IEEE 2nd 5G World Forum (5GWF). IEEE, 2019. <https://doi.org/10.1109/5GWF.2019.8911735>
- [10] Zhang G, Kou X. Research and application of new media urban landscape design method based on 5G virtual reality [J]. Journal of Intelligent and Fuzzy Systems, 2021(1):1-9. <https://doi.org/10.3233/JIFS-189836>
- [11] 6G white paper, IMT-2030, 2021.

- [12] Gervais A, Karame G O, K Wüst, et al. On the Security and Performance of Proof of Work Blockchains [C]. Acm Sigsac Conference on Computer & Communications Security. ACM, 2016.
<https://doi.org/10.1145/2976749.2978341>



Huaxiang Liu was born in China on Sept. 22, 1985. He earned his Master's degree in 2011 in the field of translation at Capital Normal University, Beijing, China. He is now a doctoral student in the field of communication at University of Malaysia Sabah. He is currently employed at Capital Normal University, Beijing, China, as the Program Coordinator for joint master degree program between Capital Normal University and Flinders University.

His current research interest lies in new media and education management.



Kuok Tiung Lee is an Associate Professor in the Communication Department, Faculty of Social Sciences and Humanities, University of Malaysia Sabah. He received his Doctoral degree in communication from the National University of Malaysia. His research interests include journalism research with focus on news framing, changing journalistic norms and values, and communication laws and ethics.