Structural Change and Mode Innovation Based on Recommendation Algorithm and 5G Technology -- a New Format Brought by Streaming Media for China's Documentary Industry

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Abstract: The streaming media platform represented by Netflix is constantly promoting the vertical integration of content and platform providers by using algorithms and data, changing the previous transmission mode of documentary. Documentary is no longer limited by the schedule threshold of traditional media and film festivals. It has a wider transmission channel and obtains positive marketing under the agenda setting. Virtual reality technology and Web online interaction technology will also change documentary from recording the reality to experiencing the reality in the future. With the introduction of Netflix algorithm and mode, the industrial trend in North America will also affect the documentary production in Chinese speaking areas. Compared with the documentary industry in North America, this paper predicted the structural changes and mode innovation of Chinese documentary industry brought by streaming media algorithm and technology, and discussed the opportunities and challenges that Chinese documentary creation will face in the streaming media era.

1. Introduction
Since 2018, documentaries have become a hot spot on the internet. Netflix has suddenly launched a series of self-made documentaries such as Our Planet. In China, food documentaries like A String of Life, Once Upon A Bite, launched by Tencent, bilibili and other streaming media platforms have also become the topics of discussion. Throughout the global documentary industry, whether it is North America, whose scale and standard can be regarded as the industry benchmark, or in the emerging and growing China, the streaming media platform is becoming a force that cannot be underestimated. Nowadays, the recommendation algorithm is constantly improving, and the form of media transmission is changing with each passing day. The progress of these technologies promotes the streaming media platform to change the way of production and distribution of documentaries, and gradually enhances its voice in the documentary industry. The commercial use of 5G technology and the development of social economy also give documentary more commercial attributes. China's documentary industry is ushering in a new format.

At present, Netflix has become the most influential streaming media platform in the world. According to the statistics platform, as of the first quarter of 2019, Netflix has more than 148 million global paid subscribers (Watson, 2019). According to the report released by the Motion Picture Association of America (MPAA), the total subscription volume of streaming media in North America has reached 613.3 million, more than 556 million for cable TV (Yu Ming, 2019). It can be said that the streaming media platform represented by Netflix has changed the North American film and television
market controlled by traditional producers and cable TV giants to some extent. The same is true in China. According to the statistics platform, the monthly active users of Tencent's video app exceeded 600 million and the number of paid members exceeded 62.59 million in 2018 (Blazyte, 2018).

Table 1 Number of Netflix paying streaming subscribers in the United States from 3rd quarter 2011 to 1st quarter 2019 (in millions)

| Quarter       | Subscribers in millions |
|---------------|-------------------------|
| Q3 2011      | 108                    |
| Q4 2011      | 118                    |
| Q1 2012      | 125                    |
| Q2 2012      | 139                    |
| Q3 2012      | 155                    |
| Q4 2012      | 173                    |
| Q1 2013      | 193                    |
| Q2 2013      | 213                    |
| Q3 2013      | 235                    |
| Q4 2013      | 259                    |
| Q1 2014      | 283                    |
| Q2 2014      | 308                    |
| Q3 2014      | 333                    |
| Q4 2014      | 359                    |
| Q1 2015      | 385                    |
| Q2 2015      | 413                    |
| Q3 2015      | 441                    |
| Q4 2015      | 469                    |
| Q1 2016      | 493                    |
| Q2 2016      | 526                    |
| Q3 2016      | 553                    |
| Q4 2016      | 580                    |
| Q1 2017      | 608                    |
| Q2 2017      | 634                    |
| Q3 2017      | 664                    |
| Q4 2017      | 693                    |
| Q1 2018      | 720                    |
| Q2 2018      | 748                    |
| Q3 2018      | 776                    |
| Q4 2018      | 804                    |
| Q1 2019      | 832                    |

While streaming media is seizing the broadcast platform of traditional film and television industry, it is also gradually penetrating into the documentary industry. Since 2017, Netflix has launched a series of documentaries, such as Abstract, Wild Wild Country and Our Planet, and gradually cultivated documentaries as its important content plate. According to statistics, 12.9% of Netflix's subscribers in North America chose to watch documentaries. This data ranked third in all categories of self-made content, just behind 37.9% of comedies and 21.1% of family and children’s dramas (Watson, 2018).

Table 2 Monthly active users on leading online video apps in China as of May 2018 (in millions)

| App           | Monthly Active Users (in millions) |
|---------------|-----------------------------------|
| Tencent video | 634                               |
| iQiyi         | 664                               |
| Youku         | 493                               |
| Mango TV      | 395                               |
| iFeng         | 266                               |
| LeTV          | 956                               |
| PPTV          | 922                               |
| FunTV         | 333                               |
| Suzhi         | 406                               |
| EyeTV         | 105                               |
The upsurge of streaming media has gradually shown its influence in China's documentary industry. Tencent Video released the second season of the BBC produced documentary "The Blue Planet" in 2018, and it won 260 million album plays online (Tencent Video). The total number of network hits of “Once Upon A Bite” has reached 1 billion times (Zhang Tongdao, 2019). Bilibili's "Masters in The Forbidden City" received a total of 4.928 million times of play and a total of 97,000 danmu (real-time comments) (bilibili, 2016). In the first season of "A String of Life", the number of broadcasts was 60.844 million, with a total of 1.131 million bullet comments (bilibili).

2. Streaming media reforms the transmission mode of documentary

2.1. Algorithm’s directional recommendation brings the narrowcasting and agenda setting to documentary

There are three main channels for the traditional release and viewing of documentaries, cinema, TV station and Film Festival. The traditional channel has three limitations, firstly, limited broadcast location; secondly, limited broadcast time; and thirdly, lack of interaction between the media and the audience. Compared with the wide coverage of traditional media, the way of streaming media to spread documentaries can be described as "newsstand selling" (McDonald & Smith Rowsey, 2016). All newsstands share a database of newspapers and magazines. However, according to the different reading habits of the community, the newspapers and magazines sold in different geographical locations are slightly different. Newsstand owners will recommend magazines that meet users' preferences according to customers' purchase history. This dynamic metaphor just explains the characteristics of streaming media's accurate directional transmission of documentaries based on recommendation algorithm. Taking Netflix as an example, it uses algorithms like Personalized Video Ranker and Trending Now to build its own user content recommendation system (Gomez Uribe & Hunt, 2016). The essence of this system is to recommend and predict users' preferences in viewing according to their existing viewing habits, so as to achieve the purpose of accurate content distribution. Peng Lan divided this process into "reaching the destination" and "psychological destination" (Peng Lan, 2018), that is, accurate content matching not only needs to reach a specific user group, but also needs to accurately predict the user's horizon of expectation.

Every streaming media port, whether it's a web page, a mobile phone or a cable box, is a sensor for the platform to collect subscribers' data. These sensors can accurately collect the search and viewing history of subscribers, and timely feedback the transmission effect of documentaries. These data are important sources of the platform for user portrait. Based on the accurate user portrait, each subscriber can get his own personalized home page. Under the influence of the internet, individual users with common psychological, behavioral characteristics and cultural attributes will gradually form a virtual community (Peng Lan, 2018). With the support of sensor data collection and algorithm, the spread of streaming media for documentaries is closer to the narrowcasting for specific virtual communities. According to the "Documentary Content and User Report 2019" (Admaster, 2019) in China released by Admaster, the typical characteristics of documentary audience are in young ages, with high-level education and deep thinking about the theme of the film. Therefore, when a user's portrait conforms to the characteristics of the documentary audience, the documentary will be directly recommended to his home page.

2.2. Progress of transmission technology brings interactivity of “audience participation” in documentary

Another reason for the rise of documentary in the streaming media platform is that the platform has changed the original scene viewing of documentary by using its technical advantages, giving the relatively serious documentary more interactive experience, sensory stimulation and gamification.

With the development of 5G transmission technology and the high integration of streaming media platform itself, VR documentary gradually becomes commercial. VR technology will bring the interactive experience of documentary viewing to a new height, and change people's understanding of
People are always keen to transcend their sensory limitations and create presence experience (Yu Guoming & Yang Yingxi, 2019). Film and television works, especially documentaries, once became the best media to create the presence experience. However, with the progress of theory and people's familiarity with the new media, the presence of media and the separation from audience to the scene will gradually appear. Traditional movies are limited to the screen. What the audience sees is determined by the director of the documentary through the choice of angle, composition and scene, as well as the use of editing. Unable to get rid of the identity of narrator makes the documentary stay in the stage of recording and representing reality. VR creates a three-dimensional scene with digital images to restore reality (Peng Lan, 2017a). Compared with the limitations of the traditional screen frame, the immersion effect of VR is more vivid. The details of the content and the initiative of choosing what to see will be a new experience. The audience can freely choose the content to watch in the virtual "live" environment according to their own preferences. To a certain extent, it gets rid of the content arrangement brought by the traditional movie grammar and obtains a new "on-the-spot experience". If traditional documentaries with narrators are more realistic, VR documentaries play down the existence of narrators and give the audience the choice of viewpoint, making the audience feel like they are in the documentary scene. What it brings is a new "real experience". BBC is the pioneer in VR documentary field. In 2017, the BBC announced the establishment of a virtual studio, BBC VR hub. At present, it has released a number of documentaries including "Congo VR" and "East Rising: Voice of a Rebel" (Wei Wei, 2019). All these documentaries are broadcast through streaming media platform.

3. Commercial demands and technological innovation of streaming media promote the change industrial structure in documentary

3.1. Sensor and accurate algorithm make documentary creation closer to commercial demands
In people's original impression, documentary bears the responsibility of social enlightenment, reveals the social status quo, preserves historical images and materials, whose theme is serious and lacks entertainment. Although the emergence of digital technology has greatly reduced the threshold of documentary production, the traditional digital technology only changes the media of recording images, and the characteristics and production process of documentary have not changed much in essence. The starting point of the topic selection is more about social values, and the planning choice still depends on the personal experience of the practitioners.

The data of streaming media and the function of sensor make documentary enter the era of accurate content production. Documentary topics come from data and algorithms, and the process of transmission is closer to the agenda setting for the audience's viewing habits and psychological expectations. The production-centered creation has changed to the audience-centered creation. As the scale, preferences and needs of audience are quantified, it is possible to explore and endow documentary with more commercial attributes. These commercial attributes not only provide more sensory stimulation to the audience in the transmission technology, but also force the content production of creators to close to the needs of audience, and pursue narrative storytelling and more exquisite audio-visual effects.

3.2. Combination of 5G technology and streaming media platform will blur the boundary of documentary and innovate the form of documentary
The arrival of 5G era will further expand the streaming media platform to the mobile end. If 4G brings the trend of short video, the transmission speed and tariff level of 5G technology may make it possible to enjoy video anytime and anywhere and transmit VR video wirelessly. The multi-screen fusion feature of streaming media platform will be more prominent. The connecting feature of 5G will also strengthen the presence of sensors. Data collection in documentary will usher in the era of comprehensive perception, reliable transmission and intelligent processing (Su Tao and Peng Lan, 2018). In addition, with the rise of short video, ordinary users have the ability to record and spread. They are not only the recipients of the video transmission network, but also the participants. The creation and communication of these users may break the existing transmission mode of documentary in the future, and the boundary
of documentary will be further blurred.

First of all, 5G will blur the boundary of documentary content, and VR documentary will further become the mainstream. At present, the limited transmission speed has been the bottleneck of VR video and AR technology. As a big obstacle to VR technology, the main reason of "VR vertigo" is the delay problem caused by insufficient transmission rate. In addition, VR currently relies on wired transmission or physical storage media (such as Blue ray disc), so the transmission scenarios are limited. 5G technology will help VR enter the wireless mobile terminal, broaden its application scope, and also become the driving force for the development of VR documentaries. Nowadays, VR and interactive technology are constantly blurring the boundary between games and movies, and gamified stories may become a new carrier of human narrative in the future. If today's feature films are constantly integrated with role-playing games, future documentaries may also be combined with exploration games. Media will change the way people perceive society. 5G promotes the further integration of media forms, and makes documentary no longer have a clear type definition and characteristics.

In addition to the blurring of content boundaries, Yu (2019) believes that video expression in the 5G era will become the mainstream. Nowadays, the documentary of streaming media platform mainly comes from limited professional production organizations, which means it still does not jump out of the framework of public space communication. Nowadays, users are more in pursuit of personalized communication space and content needs. Driven by the personalized demand, every documentary audience will not only be the consumers of the documentary industry, but also become the producers of the industry. Although, in the 4G era, limited by the tariff and transmission speed, the length and content of the popular videos on the mobile terminal are less, which is far from the traditional documentary in terms of classification and definition, these short videos actually have some basic elements of documentary. In the 5G era, with the continuous decline of the technical threshold, high-speed transmission has brought the rise of video capacity. User production intervention in the documentary industry is just around the corner, just like the rise of vlog in recent years. Vlog is a kind of video that has a certain length, whose material comes from the real record of life. It has a theme and a point of narrative, already similar to the documentary film. After accumulating experience, some of the creators will also develop into professional fields, which will blur the content source of documentary.

4. Conclusion

The characteristics of convergence of streaming media platform also make the practitioners of documentary industry see more possibilities. Nowadays, 5G technology has entered commercial use, and the era of universal participation in media has come. VR, vlog, interactive TV series and other emerging concepts are constantly changing the face of the documentary industry. As the practitioners of documentary, streaming media brings not only broad prospects but also new challenges. Professional content production and user content production will coexist and compete for a long time in the future. Professional creators no longer have the absolute right to speak. "Audience participation, audience production, audience interconnection" (Yu Gezi, 2019) are bound to become the new norm of documentary industry.

On the other hand, behind the commercial production of documentary, we should also be aware that its own social attribute cannot be ignored. User data has now become the guarantee of the voice of the streaming media platform in the industry, but the "platform capitalism" brought by the monopoly of data will also make the documentary creation blindly turn to commercial demands. How to ensure the value orientation and social education function of the documentary will become a problem for the documentary creators in the era of streaming media platforms.

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