

Research on the Transformation Paths, Opportunities and Challenges of the Film Industry in the Digital Age

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Abstract. With the rapid development of science and technology, digital technology has a profound impact on the global film industry. This thesis aims to explore the transformation paths of the film industry in the digital wave and analyze the opportunities and challenges it faces. Through the analysis of the current situation of the digital transformation of the film industry, this paper expounds on the characteristics of the high-cost production and single profit model of the traditional film industry, as well as the driving forces behind the digital transformation, including technological progress, the rise of streaming media platforms, and changes in user demands. It studies the core areas of film digital transformation, such as virtual production technology and AI-assisted creation in the production process, streaming media distribution and the online-offline integration model in the distribution and screening process, as well as user interaction and data analysis. At the same time, it explores the challenges during the transformation process, such as copyright protection, pressure of technology investment, and conflicts of interest, and proposes corresponding countermeasures. This research has important theoretical and practical significance for the sustainable development of the film industry in the digital age.

Keywords: film industry, digital transformation, streaming media platforms, virtual production, copyright protection

1. Introduction

In recent years, the global film industry has shown a booming development trend. According to relevant data, the global box office reached \$42.2 billion in 2019. Although it was severely hit by the pandemic in 2020, with the normalization of pandemic prevention and control, the film market has gradually recovered. At the same time, digital technology has penetrated all aspects of the film industry at an unprecedented speed. The high-speed and low-latency characteristics of 5G technology provide smoother experience for the online distribution and playback of films; cloud computing technology makes data storage and processing in film production more efficient; AI technology not only plays a role in scriptwriting and special effects generation but also helps with the precise marketing of films. The development of these digital technologies has profoundly changed the pattern of the film industry.

This paper focuses on the transformation paths, opportunities and challenges of the film industry in the digital age. As an important part of the cultural industry, the development of the film industry

is of great significance for cultural dissemination and economic growth. Under the impact of digital technology, the film industry must seek transformation to adapt to the new market environment. In-depth research on this topic can help film industry practitioners grasp the development direction and make reasonable decisions. It also provides a theoretical basis for relevant policymakers to promote the healthy and sustainable development of the film industry.

2. Literature review

In the research field of the digital transformation of the film industry, many scholars have conducted relevant studies. Some scholars emphasize that digital technology promotes the emergence of new film styles and genres, enriches the tools for creation, distribution, and editing, and changes the distribution and viewing habits. For example, Avatar brought a shocking audio - visual experience with the help of digital technology [1]. Technology has promoted the transformation of films into comprehensive audio-visual arts. Digital interaction and other technologies have achieved multi-aspect refinement, creating an immersive experience for the audience. Wandering Earth is a typical example [2].

The platform model has transformed the audio - visual industry. Streaming media platforms represented by Netflix have changed all aspects of the industry and the behavior of the audience [3]. Some scholars have found that the Chinese film industry accelerated its digital transformation during the pandemic. Digital platforms have changed the distribution and screening models through various strategies, such as the innovative models of iQiyi [4]. Furthermore, regarding the Asian film industry, it is pointed out that its market scale has expanded, but it faces competition from the West internationally, and digital transformation brings opportunities [5]. Some scholars have also discussed the development of independent films, believing that digitalization should be combined with innovative business models. The Glasgow Film Theatre is a successful case [6]. Some scholars point out that through research, it is possible to predict the future trends of the film industry, such as the increasing use of smartphones for filming, which will affect the industry value chain and the audience experience [7]. The new methods brought by digital technology, as well as the important role of fan culture and collective emotional experience in film consumption [8].

These research results provide a solid foundation for in-depth understanding of the digital transformation of the film industry. However, there are still problems such as insufficient research on regional differences and less attention to cultural conflict and integration. Follow-up research can be expanded in these directions.

3. The impact of digital technology on the film industry

3.1. The revolution of film production

The development of digital technology has brought revolutionary changes to film production. Some scholars point out that digital technology has promoted the continuous emergence of new film styles and genres, enriching the tools for film creation, distribution, and editing [1]. For example, the application of computer graphics technology, digital audio synthesis technology, 3D technology, etc., enables films to present more realistic virtual scenes and shocking audio-visual effects. Avatar created the fantasy Pandora planet through digital technology, bringing an unprecedented visual experience to the audience. Digital technology has promoted the transformation of films from single-visual arts to comprehensive audio - visual arts, realizing the digitalization of sound, the intelligentization of lighting, and the refinement of the screen [2]. Taking The Wandering Earth as an

example, the film introduced modern scientific and technological elements such as planetary engines and space stations. With the help of digital technology, the audience was brought into a sci-fi world of virtual-real integration, enhancing the immersion of the film. Digital technology has also brought changes to the film production process. In the pre-production stage, creators can use digital tools to draw storyboards and build virtual scenes, planning the content of the film more efficiently. During the shooting process, the use of digital high - definition cameras get rid of the limitations of traditional film shooting, being able to capture images more flexibly. In the post-production stage, the application of digital special effects and editing software greatly improves production efficiency and quality. Through digital technology, film creators can break through the limitations of reality and create a more colorful film world, bringing more novel visual and auditory enjoyment to the audience.

3.2. The transformation of film distribution and screening

In the field of film distribution and screening, digital technology has also triggered profound changes. The rise of the platform model has transformed the audio-visual industry from a "single-media industry" to a "multi-media industry" [3]. The Chinese film industry accelerated its digital transformation during the pandemic. Digital platforms changed the film distribution and screening models through strategies such as shortening the window period and extracting algorithm data [4]. For example, iQiyi launched the quasi-synchronous distribution model and the PVOD model, allowing some films to be watched on the network platform soon after their release in theaters, broadening the distribution channels of films. At the same time, new screening models such as smart cinemas are constantly emerging. Audiences can watch films through mobile phones, computers, and other devices, breaking the time and space limitations of traditional cinema screenings.

In the film distribution link, the entry of Internet capital has made the market complex and diverse. The rise of online video platforms, such as Netflix and iQiyi, has made film distribution no longer limited to traditional theater channels. These platforms analyze user preferences through big data and accurately push film content, improving the dissemination efficiency of films. In addition, the role of social media in film distribution is becoming more and more prominent. The promotion of films can spread rapidly through social media, attracting the attention and discussion of the audience. In terms of screening, in addition to traditional 2D and 3D screening technologies, 4D and VR screening technologies are gradually becoming popular, bringing a more immersive viewing experience to the audience. Some cinemas also enhance the audience's viewing experience by creating special screening halls, such as IMAX halls and Dolby Atmos halls, to attract more audiences to the cinema.

4. Development opportunities of the film industry in the digital age

4.1. Market expansion and enhanced audience engagement

Digital technology has opened up a broader market space for the film industry. The Asian film market is constantly expanding, and digital transformation has brought new opportunities for the Asian film industry [5]. With the development of streaming media services, the dissemination scope of films is no longer limited to traditional cinemas. Audiences can watch films anytime and anywhere through various digital platforms, enabling films to reach a wider audience. Independent cinemas can combine digital transformation with other innovative business models to attract more audiences [6]. For example, the Glasgow Film Theatre has increased the audience's viewing options

and enhanced the interaction between the audience and the cinema by creating a VOD platform and carrying out community activities, thus enhancing the audience's engagement.

The rise of social media and online communities provides a platform for audiences to communicate and share their film-watching experiences. Audiences can express their opinions and evaluations of films on these platforms, interact with other audiences, and form film-related topic discussions. This interaction not only increases the audience's interest in and participation in films but also provides strong support for film promotion. Film producers and distributors can collect audience feedback through these platforms, understand audience needs, and thus better produce and promote films, further expanding the market influence of films.

4.2. Diverse creation and expression

Digital technology provides film creators with more creative means and expression spaces. Zou Yao proposed that digital technology extends the film aesthetics from two-dimensional audio-visual to multi-dimensional immersive experiences. Audiences can feel the scenes, emotions, and concepts of films from different angles [2]. Creators can use digital technology to achieve more complex narrative structures and visual effects, expressing more diverse themes. Some experimental films, for example, use digital technology to explore new film languages and forms of expression, injecting new vitality into the development of film art. At the same time, digital technology also lowers the threshold for film creation, allowing more independent creators to showcase their works and promoting the diversified development of film creation.

In the digital age, creators can use virtual reality, augmented reality, and other technologies to create a more immersive film-watching experience, allowing audiences to be more deeply involved in the film story. Digital technology also reduces the production cost of films. Some independent filmmakers can create unique style works with limited resources. These works often focus on niche themes or unique cultural perspectives, bringing more diversity to the film market. Some independent films obtain financial support through crowdfunding platforms and then use digital technology for production and distribution, successfully gaining a foothold in the market and enriching the film content ecosystem.

5. Challenges faced by the film industry in the digital age

5.1. The impact on the traditional film industry model

The advent of the digital age has had a huge impact on the traditional film industry model. Through Delphi research, some scholars predict that the value chain of the future film industry will change, and the roles and positions of traditional film production, distribution, and screening links may be re-defined [7]. Traditional cinemas are facing the problem of audience loss. Some audiences prefer to watch films at home through streaming media platforms. At the same time, digital technology has lowered the threshold for film production, and a large number of independent films and online films have emerged, intensifying market competition. The market share of traditional film companies has been squeezed to a certain extent. In addition, the rise of digital platforms has also changed the profit model of films. Traditional box-office revenue is no longer the only source of film profits, and the film industry needs to explore new profit-making channels.

In the traditional film industry chain, the production, distribution, and screening links are relatively separated, and the collaboration efficiency between each link is low. In the digital - age film industry, the boundaries between each link are gradually blurred, and closer collaboration is

required. When facing the competition from digital platforms, traditional film companies often need to adapt to new market rules and business models. Some traditional cinemas, in order to cope with the problem of audience loss, have begun to try to cooperate with digital platforms, launching the online-offline synchronous screening model or attracting audiences by creating special services. However, these transformation attempts also face many difficulties, such as the update of technical equipment and the increase in operating costs.

5.2. Challenges of cultural and aesthetic differences

In the digital age, the globalization of film dissemination has led to the collision of film works from different cultural backgrounds. Cultural and aesthetic differences have become important challenges for the development of the film industry. Western culture dominates the global film market, and Asian films face cultural and language barriers in the international market [5]. Some films with local characteristics are difficult to gain wide recognition in the international market because audiences from different cultural backgrounds have different aesthetic standards and understandings of films. In addition, the application of digital technology may also lead to film creation over-pursuing technical effects while ignoring the expression of cultural connotations and artistic values, making film works lack depth and appeal.

Audiences from different countries and regions have different cultural backgrounds, values, and aesthetic habits, which poses challenges to the cross-cultural dissemination of films. The success of some Western films in the global market is often because their cultural values are more easily accepted. When Asian films enter the international market, they need to better understand and adapt to the needs of audiences from different cultural backgrounds. Under the influence of digital technology, some films rely too much on special effects in pursuit of visual effects while ignoring the expression of story content and character emotions, resulting in uneven film quality. The film industry needs to pay attention to the exploration of cultural connotations and the improvement of artistic values while pursuing technological innovation to enhance the international competitiveness of film works.

6. Development trends of the film industry in the digital age

6.1. Continuous technological innovation promotes industry upgrading

With the continuous development of digital technology, the film industry will witness more technological innovations. In the future, filming with smartphones will become more popular, and digital film scenes and virtual actors will develop further [7]. For example, some films have already been shot with smartphones and have achieved good results. At the same time, virtual reality (VR), augmented reality (AR), artificial intelligence, and other technologies will be more widely applied in film production and screening, bringing a more immersive viewing experience to the audience. These technological innovations will promote the continuous upgrading of the film industry, improving the production quality and artistic expression of films.

In terms of production, artificial intelligence can assist in film creation, playing a role in various links from scriptwriting and character design to special effects production. Through artificial intelligence algorithms, a large amount of film data can be analyzed to provide creative inspiration for screenwriters and help directors optimize shooting plans. In terms of screening, VR and AR technologies will enable audiences to experience the scenes in films immersively, enhancing the interactivity and immersion of film-watching. Some cinemas have already started to try to launch

VR film experience areas, allowing audiences to freely choose viewing angles during the film-watching process and interact with the characters in the film.

6.2. Industry integration and diversified development

The film industry will be further integrated with other industries, showing a trend of diversified development. The development of the platform model has made the connection between the film industry and industries such as the Internet and technology closer [3]. In the future, the film industry may be deeply integrated with industries such as games, animation, and literature, forming a cross-media industry chain. For example, some popular films will launch corresponding games, and animation works to achieve diversified content development and dissemination. At the same time, the film industry itself will also show a trend of diversified development. Films of different types and production scales will develop together to meet the needs of different audiences.

The integration of films and games has become a trend. Some games adapted from films are popular among players, such as the Harry Potter series of games. This integration can not only bring additional sources of income to films but also expand the influence of films [9]. The combination of film and literature also provides rich materials for film creation. Many classic literary works have been adapted into films, and the success of films can also drive the sales of the original literary works [10]. In the film industry, in addition to large-scale commercial films, niche films and art films will also have their own development space, meeting the diverse needs of different audience groups for films.

7. Conclusion

This paper comprehensively expounds that the digital age has brought all-round changes to the film industry, with both opportunities and challenges. The application of digital technology in the production, distribution, and screening of films has greatly changed the appearance of the film industry, providing new opportunities for its development, such as market expansion and diversified creation. However, the film industry also faces challenges such as the impact on the traditional industry model and cultural and aesthetic differences. In the future, the film industry should actively embrace technological innovation, strengthen industry integration, and pay attention to the expression of cultural connotations and artistic values to meet the challenges of the digital age and achieve sustainable development. At the same time, the development of the film industry requires the joint efforts of the government, enterprises, and society to create a good development environment and promote the continuous progress of the film industry. In future research, it is possible to further explore the specific development strategies of the film industry in the digital age and how to better meet the film-watching needs of audiences in the digital age, providing more targeted suggestions for the development of the film industry.

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