Media Convergence: The Cross-Media Communication Revolution in the Post-Broadcast Era

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Abstract: With the rapid development and widespread adoption of digital technology, digital media convergence has become an important trend in the development of the media industry in the new era. In order to comprehensively explore the trends and changes of digital media convergence in the new era, this essay first analyzes the essence and characteristics of digital media convergence, especially examining what changes will arise under the backdrop of new technologies in the modern era. Subsequently, utilizing theories from various disciplines such as communication studies, political science, and film studies, it dissects the changing features of digital media convergence trends, focusing on aspects like content innovation, technological advancement, and content dissemination. Qualitative and quantitative methods, including literature review, case analysis, trend analysis, and mind mapping, are employed to investigate these issues. Finally, from a theoretical perspective, it puts forth strategies and recommendations for developing digital media convergence, providing a theoretical reference for research and practice in related fields.
Keywords: Cross-Media; Communication; Media Characteristics; Content Production; Communication Order; Personalized Media

1. INTRODUCTION

Media convergence refers to the integration and interaction between different media, combining various forms of media such as traditional media, digital media, and the Internet. Its background can be traced back to the rapid development of information technology and communication technology, as well as changing user demands. In 1983, Professor Ithiel de Sola Pool of the Massachusetts Institute of Technology first introduced the concept of media convergence in his book "Technologies of Freedom" and

provided some explanations. "Technological development is the driving force behind media convergence, as various media gradually merge into a trend of multifunctional integration" (Mario & Ithiel, 1983). Since the late 20th century, the rapid development of information technology and the rise of digital media have brought about unprecedented changes in the media landscape (Röst & Sadeghimanesh, 2023).

The diversification of media forms and the permeation between different media have led to a radical change in the way information is disseminated. In this entirely new communication landscape, traditional media and emerging media no longer exist in isolation but are integrated and interact with each other, thus giving rise to a completely new era of media convergence. In the traditional era of communication, media was one-way and closed, where information dissemination was solely the prerogative of media institutions to the audience, with limited feedback and participation from the audience. However, with the rapid development of the Internet, social media, mobile communication, and other technologies, the media industry has undergone a profound transformation. The emergence of new digital media has broken the boundaries of traditional communication models, making information dissemination more free, diverse, and open. In the post-broadcast era of media convergence, there has been a revolutionary transformation in the media ecosystem. Traditional media and emerging digital media have merged, creating a new landscape of cross-media communication. Traditional media has expanded its reach on new media platforms through digital transformation and internet integration (Song & Hu, 2024).

On the other hand, emerging digital media leverage the resources and brand influence of traditional media to further broaden their audience base. Throughout this process, the boundaries of media communication have been broken, communication channels have become more diversified and flexible, and the impact of communication has become increasingly significant. The communication revolution brought about by media convergence has had a profound impact not only on the media industry but also on various aspects of society, cultural heritage, and the political landscape. Media convergence has made information dissemination more efficient and convenient, increased audience participation and discourse, and enhanced the breadth and depth of information transmission. However, media convergence also faces a series of challenges, such as information overload and issues related to the authenticity of information, which require in-depth exploration and resolution.

2. LITERATURE REVIEW

A search using the keyword "media convergence" in the SSCI and AHCI databases yielded a total of 2,512 papers (as of July 17, 2023). Researchers from various academic backgrounds have delved deeply into this topic. Analyzing data from websites, we can see that research in the field of media convergence is prolific across 12 high-publishing disciplines. The distribution is roughly as follows (Figure 1):
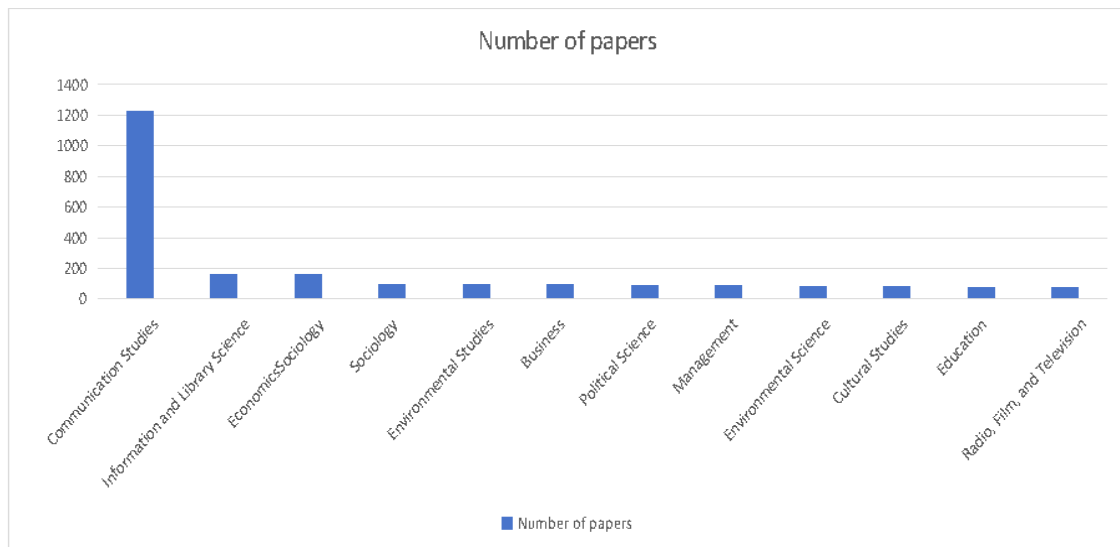

Figure 1: Number of papers

While it is evident that the field of communication studies leads in terms of the number of publications, it is worth noting that in the other 11 research areas, there are also researchers exploring the subject of media convergence. Interdisciplinary research approaches have significantly promoted collaboration and exchange of ideas between different disciplines. Through interdisciplinary research, scholars can share their respective disciplinary knowledge and methods, leading to the development of new theoretical frameworks and research paradigms. This collaboration and exchange can deepen our understanding of media convergence and provide a more comprehensive and in-depth analysis for solving practical issues. A review of recent popular articles on the Web of Science database reveals that the study of media convergence and ideology are closely intertwined. Two scholars from Renmin University of China published an article titled "Media Convergence for US-China competition? Comparative case studies of China Media Group and the US Agency for Global Media." The article points out that given the intensifying competition between China and the United States in the field of media communication, "both countries have been undergoing rigorous

development at the technological and operational levels of convergence to enhance international communication; both are made to show more explicit loyalty to its official ideology, and both have become more monolithic via convergence". While governments worldwide are intensively utilizing media convergence and communication as tools to promote their national images, grassroots organizations are also using social media to form virtual communities across regions. It is believed that, in the digital age, place-based collectivities of people become isolated and individualized through media and technology, replacing 'place-based' communities with placeless 'communities of interest' (Wynn, 2017). Furthermore, media convergence plays a crucial role in shaping communities and fostering interpersonal relationships within them. In terms of content, media convergence also promotes content innovation. According to Taiwanese scholar Lin Chaochen, digital technology has redefined news. His research suggests that "new media appears within traditional news media primarily as an information source rather than as the initiator of news agendas or as a platform for expressing public opinion". From a communication perspective, the use of modern digital communication technology has played a catalytic role in the dissemination of celebrity gossip news. Through the rapid digital transmission of new media, paparazzi have become an integral part of the new media entertainment era. "Given the ability of such agencies to create and distribute exclusive stories, the globalization of paparazzi content has increasing ramifications for new forms of information-based entertainment. (McNamara, 2011)".In summary, interdisciplinary research approaches are crucial in the study of media convergence. They allow for the analysis and understanding of media convergence phenomena from various disciplinary perspectives, promoting collaboration and communication between disciplines and providing a more comprehensive and in-depth understanding of media convergence research. In the new era, media convergence has reconstructed media itself from multiple dimensions, such as content production and content distribution. This article will take a film studies perspective as a starting point to delve into the issues of the deep integration of film and television media with other media, especially contemporary digital media.

3. MEDIA CONVERGENCE: INNOVATION IN TECHNOLOGY AND ART

New technologies have provided a vast space for content innovation in

media convergence. For instance, technologies like Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) have transformed media content from two-dimensional planes to three-dimensional, and the emergence of the metaverse has brought unprecedented possibilities for media convergence. Additionally, artificial intelligence and big data technologies support applications like personalized recommendations and intelligent analysis, making media content more tailored to user needs and thus enhancing the value of media convergence.

4. CONTENT INNOVATION

Content Innovation in the Metaverse: In the article "Journey from Shaman to Techno-Shaman: Cross-media Performance in the Metaverse," the author explores the role of the metaverse from the perspective of embodied media in the context of performance (Hui & Li, 2022). The author suggests that "the 'data body' based on virtual technology becomes the 'medium of spirit' in the metaverse, leading humanity into the era of the 'techno-shaman' with the empowerment of technology." This essentially elucidates the relationship between the emerging virtual medium of the metaverse and the traditional discipline of performance. On the other hand, in the article "Virtual Fantasies of Chinese Painting in the Metaverse and its Cross-media Evolution," the focus is on the relationship between the metaverse and traditional Chinese painting. It becomes evident that the metaverse perspective, as a product of new technology, provides a broad and inclusive medium that fosters connections between various art forms. Through new techniques in cross-media, various art domains have seen the emergence of fresh content and new forms of expression. According to the theory of "technological embodiment," technological embodiment is a process in which "technology becomes the virtual purpose, and the body, which is the real purpose, becomes a means of detachment." This issue is not only encountered in the metaverse context but can also be applied to other domains. The phenomenon of virtual avatars (Vtubers) in media convergence can be explained using embodiment theory. Embodiment theory helps us understand how Vtubers interact with the virtual avatars and the real world, as well as how audiences emotionally connect and interact with these virtual personas. Virtual avatars (Vtubers), defined as "virtual personas who use 2D or 3D avatars generated with real-time motion capture and computer graphics technologies for broadcasting on the Internet," possess inherent cross-

platform and cross-media attributes (Gim et al., 2022). They excel in various domains, from live streaming platforms to web series, animations, and even satirical short videos. Existing research primarily focuses on the impact of Vtubers on audiences and how they affect the efficiency of media content distribution through their emotional influence on viewers. For example, the YouTube channel "Vtubers" specializes in live streaming with virtual avatars (Vtubers). The creators use animated or stylized human-like avatars to provide commentary, record gameplay, or even stream live. Vtuber creators can flexibly control the position and appearance of their avatars, breaking down spatial barriers between the host and the video game, especially when employing techniques such as chroma keying and editing to immerse avatars directly into the game world. This approach significantly enhances engagement and interactivity while creating a new content paradigm in the convergence of visual and video game media. After its introduction, it has gained widespread popularity, as seen from the viewership of the channel's latest five video updates (Figure 2).
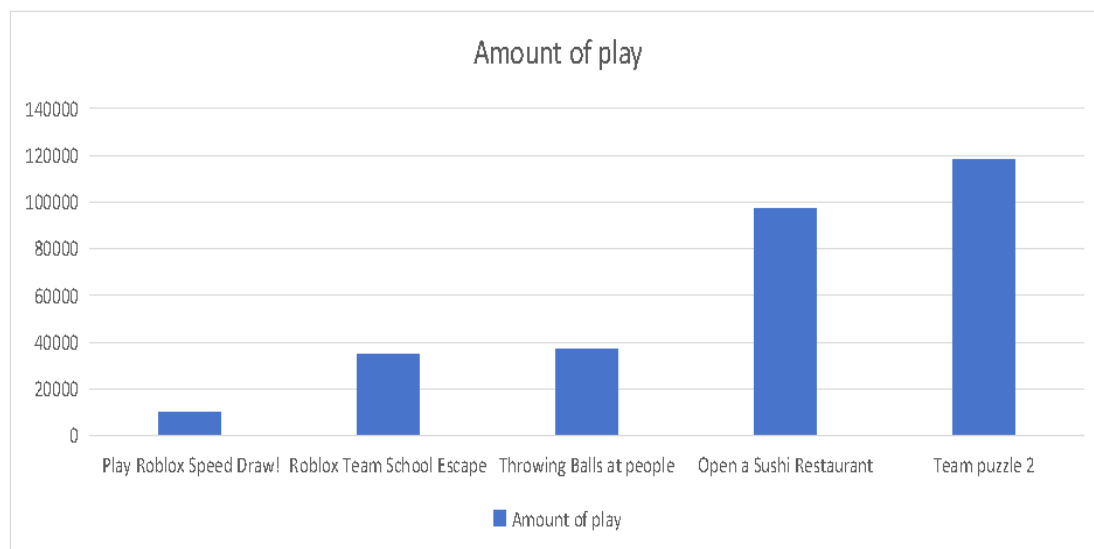
Figure 2: Amount of play

At the same time, cloud computing, artificial intelligence, and big data technologies have transformed how content is created and produced. Creators can use cloud platforms to store, share, and collaborate on content, thus improving efficiency and fostering collaboration in content creation. However, it is worth noting that while these technologies have brought many new communication channels for audiences, the monopolization of the media landscape by multinational corporations still restricts users' access to information. In the article "Remediation, Convergence, and Big Data: Conceptual Limits of Cross-platform Social Media," the author explores the application of new communication

technologies. They argue that "the revival of the big data paradigm does not necessarily benefit users. On the contrary, big data was crafted based on choices and decisions that companies made for data gathering and analytics rather than with users' benefits in mind. (Zelenkauskaite, 2017)". Through tools like ChatGPT, Midjourney, and a series of new creative generation tools, the boundaries between different media have been further eroded. Text and images are among the oldest forms of media, and with software like ChatGPT and Midjourney, the boundaries of these traditional media have effectively been shattered. By inputting text information, it's now possible to directly generate images. By inputting text into ChatGPT and optimizing the data model, it becomes possible to generate graphical images more accurately. The specific workflow is as follows (Figure 3):
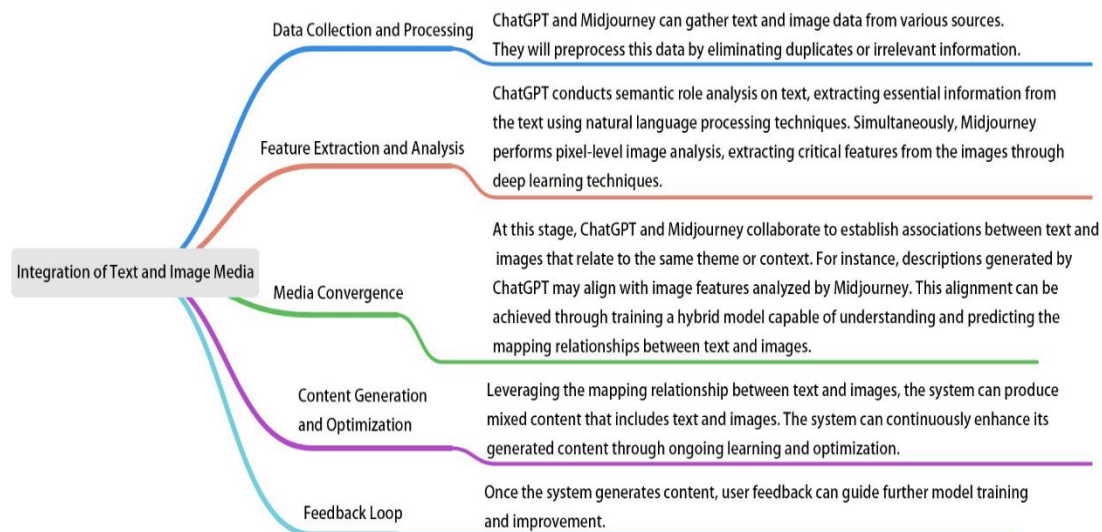
Figure 3: Media Convergence Flowchart

Since its initial appearance in March 2022, Midjourney has garnered a user base of 13,743,603 users in just a year and a half (as of July 21, 2023). Within Midjourney, numerous forum sections have also emerged, dedicated to contributing to the collaborative use of ChatGPT and Midjourney. In conclusion, the combination of ChatGPT and Midjourney enables the convergence of text and images, providing creators with more possibilities for content creation. This fusion makes works more vivid, diverse, and appealing, promoting the intersection of artificial intelligence and artistic creation. The old-age debate of "content is king" versus "technological determinism" now seems somewhat pale in the age of AI's ability to autonomously produce content. The boundaries between technology and content have become increasingly blurred, and perhaps someday in the future, they will merge seamlessly. In the context of contemporary media convergence, a high level of attention to technological

development is undoubtedly justified.

5. COMMUNICATION AND INTERACTION

Virtual Reality (VR) and Augmented Reality (AR) technologies have enabled content to be created and experienced in entirely new ways. Creators can seamlessly integrate virtual elements into real-world settings, creating more immersive experiences. At the end of the 20th century and the beginning of the 21st century, due to the rapid advancement of film technology, there were concerns about the future of film. Many theorists argued that "the value of film lies in the material (film stock), and without this material foundation, the authenticity of film is undermined. (Niessen, 2011)" These concerns about the "death of cinema" have persisted to the present day. In reality, the transformation of cinema began long ago. From previous technologies like Augmented Reality (AR) to Virtual Reality (VR), cinema has consistently embraced the technological advancements of the new era. French film theorist Jean-Michel Frodon believes that even during the classic period of cinema, film has always been "a convergence of art and industry, a crossroads between factual recording and artistic creation. (Jean-Michel & Yang, 2005)". Under the influence of video games, modern 3D sensory technologies have become highly developed. People are no longer satisfied with the process of recreating the material world solely through visual and auditory means. In the post-cinema era, which began around 1999, games explored the sense of touch, for instance, through dance games. This exploration has continued and evolved into an effective form of game interaction. Companies like Nintendo have taken the lead in enhancing the player's interactive experience through tactile sensors, gravity sensors, and more, leading to the creation of outstanding games such as "Need for Speed". In the article "Research on Electronic Games and User Body Experience Based on Tactile Sensors, (Wei, 2011)" the author categorizes tactile sensors into different functions, including "touch sensors, force-torque sensors, pressure sensors, and sliding sensors," highlighting the various ways in which these technologies enhance user experiences. In the realm of cinema, VR technology has brought new dimensions to film production and presentation. Some film production companies and directors have begun using virtual reality technology to create VR films, offering viewers a more immersive experience through 360-degree panoramic videos and interactive elements. Additionally, certain film festivals have introduced VR sections to showcase exceptional

VR film works. Sensory technologies like touch, 3D, VR, AR, and others have transitioned from video games to the realm of cinema, shaping a new ecosystem for film development. In the realm of communication, it's important to note that video game players have become a significant part of the audience for game-to-film adaptations in the process of media convergence. In recent years, a series of popular games like "World of Warcraft" and "Assassin's Creed" have been adapted into films, which have not only brought substantial box office revenues but also stirred controversy. There has been a certain level of conflict between the desires of gamers and movie enthusiasts. While there's a considerable amount of research on media convergence, there is relatively little research on the cross-cultural aspect of the primary subjects, the "audience," within this convergence. Only one relevant study was found in the Web of Science, which conducted extensive surveys to investigate how various communities, such as gaming fans and movie enthusiasts, perceive game-to-film adaptations. This two-franchise study of fans' pre-release gratifications sought from game-to-film transmedia consumption reveals the usual medium-specific suspects (e.g., enjoyment, escape, socializing), and general alignment with classic models for media use (e.g., facilitation connections with self and other). However, novel gratifications emerged (e.g., contextual pleasures, fan-status affirmations, community legitimization) along with novel indicators of media use—principally the target medium's status as both source and referent of the gratification (Banks & Wasserman, 2019). It is worth noting that even with a large fanbase, cross-media adaptations don't always receive positive reviews. Rotten Tomatoes, a popular movie review aggregator website, once published a report that ranked fifty game-to-film adaptations based on their Rotten Tomatoes' freshness ratings from highest to lowest. The result of this ranking is summarized in the following table.

Table 1(a): Rotten Tomatoes Rating chart

No.	Movie Title (English)	Release Date	Rotten Tomatoes Rating
1	Werewolves Within	2021	86
2	The Angry Birds Movie 2	2019	73
3	Sonic The Hedgehog 2	2022	69
4	Pokémon Detective Pikachu	2019	68
5	Sonic The Hedgehog	2020	64
6	The Super Mario Bros. Movie	2023	58
7	Mortal Kombat	2021	54
8	Tomb Raider	2018	53
9	Rampage	2018	51

Table 1(b): Rotten Tomatoes Rating chart

No.	Movie Title (English)	Release Date	Rotten Tomatoes Rating
10	Mortal Kombat	1995	45
11	Final Fantasy: The Spirits Within	2001	44
12	Monster Hunter	2020	43
13	The Angry Birds Movie	2016	43
14	Uncharted	2022	41
15	Prince Of Persia: The Sands Of Time	2010	37
16	Resident Evil: The Final Chapter	2016	37
17	Resident Evil	2002	35
18	D.O.A.: Dead Or Alive	2006	33
19	Silent Hill	2006	32
20	Resident Evil: Welcome To Raccoon City	2021	30
21	Warcraft	2016	29
22	Super Mario Bros	1993	29
23	Lara Croft Tomb Raider: The Cradle Of Life	2012	28
24	Lara Croft Tomb Raider: The Cradle Of Life	2003	24
25	Resident Evil: Extinction	2007	24
26	Need For Speed	2014	22
27	Resident Evil: Afterlife	2010	21
28	Ratchet & Clank	2016	21
29	Pokémon 3: The Movie	2001	21
30	Lara Croft: Tomb Raider	2001	20
31	Assassin's Creed	2016	19
32	Resident Evil: Apocalypse	2004	19
33	Pokémon The Movie 2000: The Power Of One	2000	19
34	Doom	2005	18
35	Pokémon Heroes	2003	17
36	Hitman	2007	16
37	Pokémon: The First Movie	1998	16
38	Pokémon 4ever	2002	16
39	Max Payne	2008	15
40	Street Fighter	1994	11
41	Wing Commander	1999	10
42	Postal	2007	9
43	Hitman: Agent	2015	8
44	Silent Hill: Revelation	2012	8
45	Bloodrayne	2005	4
46	Mortal Kombat Annihilation	1997	4
47	In The Name Of The King: A Dungeon Siege Tale	2007	4
48	House Of The Dead	2003	3
49	Street Fighter: The Legend Of Chun-Li	2009	3
50	Alone In The Dark	2005	1

Rotten Tomatoes website uses the "freshness" rating to rate movies. If the freshness rating is equal to or greater than 60, the movie is labeled as "fresh," otherwise, it is labeled as "rotten." According to the table 1 above, we can conclude that among all video game adaptation movies, only five are labeled as "fresh," while the remaining 45 are labeled as "rotten. " This indicates that the process of merging movies and video games is not always smooth, and the results of this fusion are often less than satisfactory. An analysis of the relationship between movie ratings and release years is shown in the chart below (Figure 4).
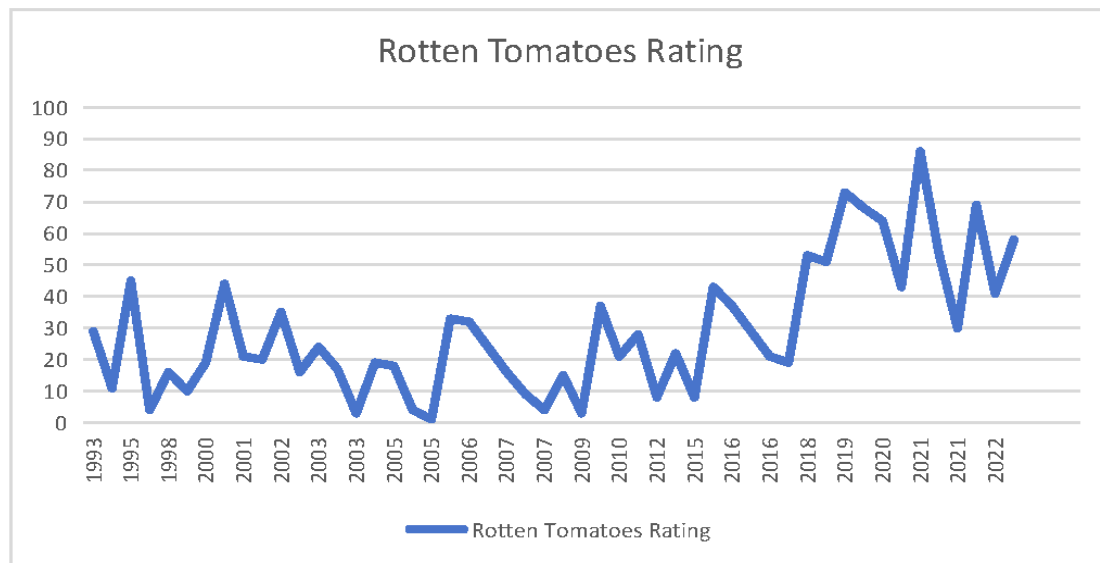
Figure 4: Rotten Tomatoes Rating

Media convergence integrates different forms of media, allowing content to be distributed across multiple channels. Audiences can access content through various platforms such as television, radio, the internet, social media, and more, expanding the reach and impact of the content. Audience feedback can also be collected and responded to across these multiple channels, providing more data sources for product updates and improvements. In this communication process, it is clear from the charts that movie companies continually improve and enhance their movies based on audience feedback. As a result, the quality of movies steadily improves over time, and audience feedback becomes increasingly positive.

6. RECONSTRUCTION OF COMMUNICATION ORDER IN THE "POST-BROADCASTING ERA" OF MEDIA CONVERGENCE

The characteristic of the post-broadcasting era is that "In the post-broadcasting era, the boundaries between communicators and audiences

have been broken. In theory, almost everyone has the potential to become a communicator, and the distinction between communication institutions and individual audiences has also been reduced. (Liu, 2000)" In the traditional mass communication era, because mass communication relies on the market and needs the support of capital or government revenue to sustain its operations, it often falls under the influence of various ideologies. As the post-broadcasting era advances, the process of media convergence exhibits a "decentralized" characteristic. Audiences have access to alternative information channels and no longer blindly trust traditional media. Some may even hold a skeptical or hostile attitude toward the ideologies conveyed by traditional media. A research paper on South Korean media investigation, based on a survey of over two thousand South Korean audiences, shows that "issue involvement, ideology extremity, and political participation lead to media dissociation, which enhances media distrust. (Lee et al., 2004)". In the post-broadcasting era, audiences often express their protests and rebellions against mainstream media's information dissemination by deconstructing and recombining traditional media. For example, audiences, tired of the stereotypical "handsome men" image, take the initiative to reinterpret and create content based on mainstream TV variety shows, which they share on self-media platforms. Taking the example of "Cai Xukun," an idol trainee who gained fame, searching for "Cai Xukun" on the popular self-media platform Bilibili yields 34 pages of search results. Among them, only a few directly repost the official TV variety show content. If you open the "Most Viewed" section, you'll find that out of the top 25 videos with the highest views, 24 of them are user-generated content, involving remixing, parody, and dubbing, often satirizing and caricaturing the original material. These user-generated content pieces challenge the original content. In this new media landscape, traditional ideological transmission is profoundly affected, making it more diverse, fast-paced, participatory, and open. This transformation brings both opportunities and challenges and requires greater attention and research into the impact of media convergence on societal ideologies.

7. PROSPECTS FOR FUTURE DEVELOPMENT PATH

With the integration of digital media and traditional media forms, the media industry has undergone significant transformation and development. The future development path is primarily influenced by the following trends:

1. Multimedia Convergence and Enhanced Interactivity: Digital media integration combines different media formats such as text, images, audio, and video, providing richer ways of presenting media. In the future, digital media integration will further enhance interactivity, promoting user participation and creation. This may include the increased application of technologies like virtual reality (VR) and augmented reality (AR), allowing users to engage more deeply with media content (Figure 5).

Figure 5: Word Cloud

2. Data-Driven Personalized Communication: With the development of big data and artificial intelligence, future digital media integration will focus more on personalized communication. By analyzing users' interests, behaviors, and preferences, digital media can accurately deliver relevant content to meet users' personalized needs. Personalized communication can enhance the user experience, and increase media impact, and commercial value.

3. Importance of Social Media and User-Generated Content: Social media plays a crucial role in digital media integration and will continue to influence the future. Social media platforms provide users with opportunities for sharing, communication, and engagement, and user-generated content becomes a vital component of digital media. Media organizations need to actively participate in social media, interact with users, listen to their voices, and incorporate user-generated content into media reporting.

4. Proliferation of Mobile Devices and Wireless Transmission: With the widespread use of smartphones and mobile devices, future digital media will pay more attention to mobile communication. Mobile devices provide the convenience of accessing information anytime, anywhere, and the development of wireless transmission technologies makes content

distribution more efficient and speedy. Media organizations need to optimize content for mobile devices and provide media that adapts to different devices and platforms. By using technology to crawl web page data from the top six pages on Google with "Future; Media Convergence" as a keyword, and by translating and analyzing the keywords found in the web page data, we generated a word cloud. Through the analysis of the word cloud, we found that the most frequently mentioned term by internet users regarding the future development of the media convergence era is "design." Other high-frequency terms include "virtual," "era," and "INNOVATION." These high-frequency terms reflect the focus and expectations of internet users on the future development of the media convergence era. "Design" is a significant keyword, and it may represent internet users' belief that the future development of the media convergence era requires better design and user experience. The terms "virtual" and "era" may reflect the concerns and expectations of internet users regarding user experiences in the future digital and media convergence era. "Innovation" represents the belief of internet users that the future development of digital media requires more innovation and new approaches, including both technological and content innovation. Overall, almost all the high-frequency terms are positive, indicating that internet users have high hopes and aspirations for the future of the digital media world.

8. CONCLUSION

Since the beginning of the new millennium, an increasing number of contemporary media convergence phenomena have emerged. Studies have revealed that contemporary media convergence is a multifaceted phenomenon cutting across various disciplines, media forms, and cultural contexts. In the post-broadcast era, media convergence has made content dissemination more diverse, breaking the traditional boundaries of media to a great extent, and allowing virtual bodies to roam in digital spaces. The advancement of a series of media technologies has accelerated the pace of media convergence, to the point where technology itself has become a part of media content, blurring the boundaries between media in the contemporary era. In the process of communication, media convergence allows different media audience communities to interact and collide, sparking creativity. Within this process, media content itself is optimized based on feedback from different audience communities. The authority constructed by traditional media is gradually deconstructed in the post-

broadcast era, and a new communication order based on individual audiences is being restructured. The pace of media convergence will not slow down. In the future, media convergence will span more academic disciplines, encompass more research dimensions, and undoubtedly have a broader research space.

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