A Systematic Literature Review on the Ontology of Media Convergence

Tinjauan Susastera Sistematik Ontologi Konvergens Media

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ABSTRACT

Media convergence is a process in which the media adapts to the audience's digital media usage habits. It is a response to the rapid development of technologies and is affected by multiple factors. A systematic literature review of media convergence is crucial for comprehensively understanding the complex merging of traditional and digital media, identifying research gaps, and evaluating trends that inform both theoretical developments and practical applications. This approach also enhances academic rigor, guiding future research and informing policy decisions in a rapidly evolving media landscape. This study employs a systematic literature review methodology, adhering to the PRISMA 2020 standards for classification and summarization. It comprehensively analyzes over 5,000 academic articles on media convergence sourced from three main databases, namely WoS, Scopus and CSSCI, ultimately selecting 53 articles that meet the inclusion criteria. The findings indicated four main components worthy of future studies of media convergence, namely cultural, content, technology, and economic convergence. Each of these components are discussed to reflect the current trend of media convergence worldwide. These four components should be integrated into theoretical framework of media convergence to refine the rapid changes to the interaction between media and technologies worldwide.From this SLR, future studies on media convergence might explore audience behavior, economic models, content diversity, regulatory challenges, and technological innovations, building on insights from the systematic literature review.

Keywords: media convergence; ontology; systematic literature review; traditional media; newspaper

ABSTRAK

Konvergensi media ialah proses di mana media menyesuaikan diri dengan tabiat penggunaan media digital khalayak. Ia adalah tindak balas kepada perkembangan pesat teknologi dan dipengaruhi oleh pelbagai faktor. Kajian literatur sistematik tentang penumpuan media adalah penting untuk memahami secara menyeluruh penggabungan kompleks media tradisional dan digital, mengenal pasti jurang penyelidikan, dan menilai trend yang memaklumkan kedua-dua perkembangan teori dan aplikasi praktikal. Pendekatan ini juga meningkatkan ketegasan akademik, membimbing penyelidikan masa depan dan memaklumkan keputusan dasar dalam landskap media yang berkembang pesat. Kajian ini menggunakan metodologi kajian literatur yang sistematik, mematuhi piawaian PRISMA 2020 untuk klasifikasi dan ringkasan. Ia secara komprehensif menganalisis lebih 5,000 artikel akademik mengenai penumpuan media yang diperoleh daripada tiga pangkalan data utama, iaitu WoS, Scopus dan CSSCI, akhirnya memilih 53 artikel yang memenuhi kriteria kemasukan. Penemuan menunjukkan empat komponen utama yang perlu dipertimbangkan untuk kajian masa depan penumpuan media, iaitu budaya, kandungan, teknologi, dan penumpuan ekonomi. Setiap komponen ini dibincangkan untuk mencerminkan trend semasa penumpuan media di seluruh dunia. Keempat-empat komponen ini harus disepadukan ke dalam rangka kerja teori penumpuan media untuk memperhalusi perubahan pantas kepada interaksi antara media dan teknologi di seluruh dunia. Daripada SLR ini, kajian masa depan tentang penumpuan media mungkin meneroka gelagat penonton, model ekonomi, kepelbagaian kandungan, cabaran pengawalseliaan, dan inovasi teknologi, membina pandangan daripada tinjauan literatur sistematik.

Kata kunci: konvergensi media; ontologi; tinjauan susastera sistematik; media tradisional; akhbar

INTRODUCTION

As early as the 1980s, Nicholas Negroponte (Fan & Liu, 2018) first proposed that electronic information technology could integrate various traditional media into an integrated form of communication, which was considered the prototype of the concept of media convergence. As Albadri (2023) emphasizes, the advent of the new digital landscape compels traditional media to cater to the audience's media requirements through the lens of content, digital social platforms, and even AI and algorithms. In addition, Jenkins et al. (2019) defined media convergence in a cultural context. They categorized media convergence into content convergence, cultural convergence, economic convergence, and technological convergence and described the need for content streams across various media platforms to be collaborative and diverse based on the audience's needs and behaviour (Casero-Ripolles 2020). As the research in media convergence has progressed, scholars have broadened their focus to encompass the convergence of information across diverse platforms rather than solely concentrating on technological aspects (Duan 2020b; Gordon 2003; Kopecka-Piech 2011; Wei 2019). Grant & Wilkinson (2009) explored the roots of "convergence" in journalism and found that media convergence involves integrating various factors such as strategy, organizational culture, technology, and narrative form.

Revolving around these Western concepts, Chinese scholars have expanded the scope of media convergence research by delving into communication modalities, industry capital, and organizational and individual behaviours (Baranova et al. 2020). The study also investigated media convergence concerning news channels, technologies, and carriers to comprehensively comprehend technological convergence requirements and demands. (Duan 2020a; Shi 2011; Wu 2022). Other researchers have advocated for convergence in economics, ecology, and business models to explore new media convergence perspectives. (Chen & Chen 2021; Song 2016; Zhang 2018).

In a sense, media convergence is a product of traditional media's response to an existential crisis. The decline of newspaper newsrooms commenced in 2008, and the COVID-19 pandemic that emerged in 2020 exacerbated newspaper mortality rates by up to 200% in certain regions (Casero-Ripolles 2020; Finneman 2021). In Malaysia for example, Muhammad Nazeem & Kho (2023) studied the struggle of sports journalists to do the 2020 Olympics sports coverage in the midst of the pandemic with many limitations. China, the United States, Europe, and even Russia, Traditional media encompassing print newspapers, broadcast television, periodicals, and other similar platforms, are having a hard time (Chyi & Ng 2020). Media convergence aims to address the challenge of media survival by bridging theory and practice to navigate the future effectively.

The ontology of media convergence seeks to elucidate the fundamental components that constitute this phenomenon, and understanding the media convergence ontology helps clarify the essence of media convergence.

While it is a philosophical concept that delves into the origin and existence of matters, ontology is highly beneficial in comprehending and identifying the essence of a given concept (Arnould 2022; Bird 2016). There are generally two types of ontologies: authoritative and externally defined by the applications that utilize them and those that are intrinsically ontological, where the intellectual content of the domain determines the structure (Al-Ababneh 2020; Kittler 2009). This paper adopts a constructivist perspective to examine media convergence through external definitions, i.e., what constitutes its presence.

Previous literature reviews on media convergence have predominantly been conceptual and comprehensive, offering extensive long-term research findings holistically. While these reviews provide a comprehensive overview of the current state of media convergence research, their drawback lies in their inclusiveness, encompassing all relevant articles within the scope of the review. At the same time, the current literature are focused on Western-centric databases and excluded rich literature from huge scientific databases such as CSSCI.

The existing gap of studies inspired this systematic literature review of media convergence. The authors opined that a current systematic literature review, considering media and technological changes in the past 10 yeats is crucial to comprehensively understanding the complex merging of traditional and digital media, identifying research gaps, and evaluating trends that inform both theoretical developments and practical applications. This approach also enhances academic rigor, guiding future research and informing policy decisions in a rapidly evolving media landscape.

While the earlier research agenda was primarily based on Technological features, there is a growing emphasis on multiplatform information integration (Casero-Ripollés, 2020). Several authors pinpointed the strategy, organizational culture, technology, and narrative approach as the main aspects of media convergence in journalism (Duan, 2020; Yoedtadi et al., 2021). Chinese scholars have further enlarged the research scope in this regard, studying about the modalities of communication, industrial capital, and organizational behaviors (Baranova et al., 2022; Baranova et al., 2020). Research on convergence has also been focused on in news channels, technologies, and carriers (Baranova et al., 2022; Baranova et al., 2020; Prayogi et al., 2020; Wu, 2022).

Systematic literature review originated in the medical field but has gained widespread adoption across various disciplines and emerged as a prevalent research method in management and social sciences (Cronin 2013). This structured approach has found extensive application in fields such as tourism, education, business, and other social science domains (Cocchia 2014; Klarin et al. 2023; Pahlevan Sharif et al. 2019).

Systematic literature reviews, which aim to address specific research questions by identifying, evaluating, and integrating empirical evidence that meets predetermined eligibility criteria, are less commonly employed in the fields of journalism and communication studies. (Cronin 2013; Klarin et. al., 2023; Mastan 2022). Besides potentially addressing inquiries, systematic literature reviews offer informative guidance for planning and suggest valuable directions for future research endeavours. Adopting a systematic literature review approach will facilitate the clarification of the ontological components and definitions of media convergence, thereby aiding in constructing a theoretical model for media convergence ontology. From the perspective of researchers, it is of great benefit to construct a new generation of ontological models of media convergence to establish a conceptual framework for the next stage of related research.

The theoretical gap in media convergence studies primarily revolves around the need to deepen the understanding of how convergence reshapes power dynamics, user agency, and content creation across digital platforms. While early studies like Jenkins (2006) emphasized the participatory culture and the blending of media platforms, recent critiques, such as those by Couldry and Hepp (2017), highlight the need for more nuanced frameworks that address the implications of corporate control, datafication, and global inequalities. Additionally, there is a call for more intersectional approaches, as suggested by scholars like Duffy (2017), to understand how gender, race, and class intersect with convergent media practices. This gap underscores the importance of developing theories that can better capture the complexities of contemporary media ecosystems.Therefore, one of the objectives of this paper is to propose a model that would contribute to further understanding of media ecology and renew theoretical gap.

Unlike prior conceptual and contextual literature review studies focusing on media convergence, this paper adopts an integrative systematic review. Accordingly, the purpose of this research is to provide a clear understanding of the ontological elements and media convergence definitions for the more careful formation of a theoretical model of media convergence ontology. The findings of this research will provide a conceptual foundation for the development of subsequent studies in this area. All the studies in this paper are categorized and summarized based on the criteria of PRISMA 2020, which is applied on top of several research papers based on this criterion (Moher 2010; Page et. al., 2021; Pahlevan Sharif 2019).

The research questions of this paper are as follows:

RQ1: What are the ontological components of media convergence?
RQ2: What is the definition of relevant elements of media convergence ontology?
RQ3: What might be the ontological model of media convergence?

RESEARCH METHODOLOGY

This research employed the PRISMA 2020 protocol in conducting the systematic literature review. While PRISMA 2020 are often applied within the health sciences studies, recent social sciences literatures, particularly in the field of media and communication studies had been applying the PRISMA 2020 protocols (Tri Sakti et. al., 2022; Kho & Zawawi, 2023) ranging from health communication studies to political communication studies. PRISMA 2020 is highly relevant to communication studies as it provides a rigorous and transparent framework for conducting systematic literature reviews, essential for synthesizing research in a field with diverse methodologies and perspectives. By minimizing bias and emphasizing clarity in reporting, PRISMA 2020 ensures that reviews are reliable and reproducible, which is crucial for evaluating media effects, digital communication, and other key areas. Its adoption promotes evidence-based practice in communication studies, helping scholars build a robust theoretical and empirical foundation through comprehensive and transparent synthesis of existing research.

This systematic literature review takes into consideration papers on media convergence regardless the methodology used (quantitative or qualitative). By integrating insights from these varied approaches, this paper provide a comprehensive analysis of how ontological definitions in media studies are shaped by different research methods and theoretical perspectives. This synthesis ensures that the ontological concepts discussed are both theoretically grounded and empirically supported, offering a nuanced understanding of media realities. Four main aspects of this review include the Eligibility Criteria, Information Sources, Risk of Bias, and Synthesis of Results.

ELIGIBILITY CRITERIA

Since researchers from China are not only proficient in their native language and English but also able to read high-level papers in other languages through translation, there is no language restriction in literature searches.

This review article delineates two phases of the search procedure based on predefined inclusion and exclusion criteria: the time range of the selected articles was from 2003-2023 to reflect the most recent discussion, and secondly, they should be either peer-reviewed publications or papers. Furthermore, emphasis is placed on selecting articles that primarily investigate the essence or constituent elements of media convergence.

Before the formal study, we excluded papers with identical titles, first authors, study designs, sample sizes, and numbers of citations or references. To ensure the robustness of our review process, researchers meticulously scrutinized each paper. The lead author's name was employed to determine whether each retrieved research article should be included or excluded. Furthermore, all publications authored by these individuals underwent thorough examination and screening to enhance the credibility of our research.

Exclusion criteria encompass (i) articles not specialized in the field of communication studies, (ii) non-peer-reviewed publications, (iii) discussions unrelated to media convergence, and (iv) content not pertaining to the components of media convergence. Prior to the selection process, duplicate articles were eliminated. The first author screened each retrieved title and abstract article to determine its inclusion or exclusion. The primary objective of this exclusion process is to eliminate irrelevant papers that may arise through keyword searches. The subsequent section presents the findings of this study.

TABLE 1. Selection Criteria for Review

NO.	Selection criteria	Inclusion criteria	Exclusion criteria
1	Articles to be within Communication Studies	YES	NO
2	Duplication of Article	NO	YES
3	Availability in full text	YES	NO
4	Publication within indexed journal	YES	NO
5	The full text should be at least three pages in length	Three pages and above	Under three pages
6	Discuss the components of media convergence	YES	NO

The systematic literature review considers only journal articles that are available in full text. The authors took all open access papers and for the paywalled papers, all researchers utilized individual institution access to gain as many papers as possible. The need to only take full-text available papers is to ensure a thorough and in-depth analysis of media ontology. This approach is practical, enabling researchers to manage the scope of review effectively while capturing a diverse range of perspectives. The researchers acknowledge the limitation that some papers are behind paywalls which are not accessible to the institution. However, the selected papers provide a sufficient, exhaustive and representative overview of the field grounded in detailed, accessible sources.

Within the three databases, the search commands are different. Therefore, in order to standardized the search, eleven keywords with its variation are identified to be used in the search strings. The words were: Cross-media integration; Digital convergence; Convergent media; Platform convergence; Multimedia integration; Media integration; Hybrid media; Content convergence; Media fusion; Transmedia and Omni-channel media.

INFORMATION SOURCES

The search process was conducted in three renowned Chinese and English databases, namely WOS, SCOPUS, and CSSCI. The Web of Science (WOS) serves as the primary database convergence platform for accessing global academic information, with SSCI being one of its sub-databases. Launched by Elsevier in November 2004, Scopus is the largest abstract and citation database, encompassing peer-reviewed literature such as scientific journals, books, and conference proceedings. In China's humanities and social science evaluation domain, CSSCI holds the utmost authority as a database. These three databases collectively provide an extensive collection of

English and Chinese resources worldwide that sufficiently cater to the data requirements of this research. Since the total number of articles with this keyword before 2003 is not more than five and the number of citations is small, the search period spanned from 2003 to 2023, and the search keyword used was "media convergence and 11 variation of keywords as explained above. All authors independently evaluated the titles and abstracts of the articles. Articles that met the inclusion criteria were selected for further review, ensuring the complete availability of these articles. Any discrepancies during the evaluation were resolved through author discussions leading to a consensus; if necessary, a third party acted as an arbitrator.

A total of 5160 articles were obtained initially. After reading through their topics, 3245 irrelevant articles, 17 duplicate articles, and 1092 articles unsuitable for this topic were excluded from consideration. Finally, we identified 53 relevant articles meeting our requirements: the CSSCI database contributed 18 articles, while the WOS database provided 14 articles; additionally, the SCOPUS database yielded another set of 21 suitable papers.

RISK OF BIAS

The selected articles underwent evaluation by the PRISMA 2020 Guidelines for Systematic Review. The studies was assessed based on eight criteria: random sequence generation, allocation concealment, reporting bias, implementation bias, detection bias, attrition bias, and other potential biases. The risk level for each project will be categorized as "low risk," "high risk," or "uncertain," with the latter indicating a lack of information or ambiguity regarding potential biases; the overall findings will be presented accordingly.

DATA ANALYSIS AND SYTHESIS OF RESULTS

To systematically analyze these articles, we have adopted a descriptive and more qualitative review of the literatures. The qualitative analysis primarily focuses on identifying and summarizing four main aspects of media convergence: content convergence, cultural convergence, economic convergence, and technological convergence. We have meticulously coded and classified each article's research content, methods, and conclusions to reveal both commonalities and differences.

This study employs a systematic literature review method to synthesize the ontology of media convergence, with the objective of elucidating the fundamental nature of media convergence. A comprehensive analysis of the gathered data was conducted to discern common themes and patterns related to the ontological components of media convergence, thereby identifying recurring concepts and relationships among the various elements of media convergence. Building upon this extensive dataset, an ontological model of media convergence is established.
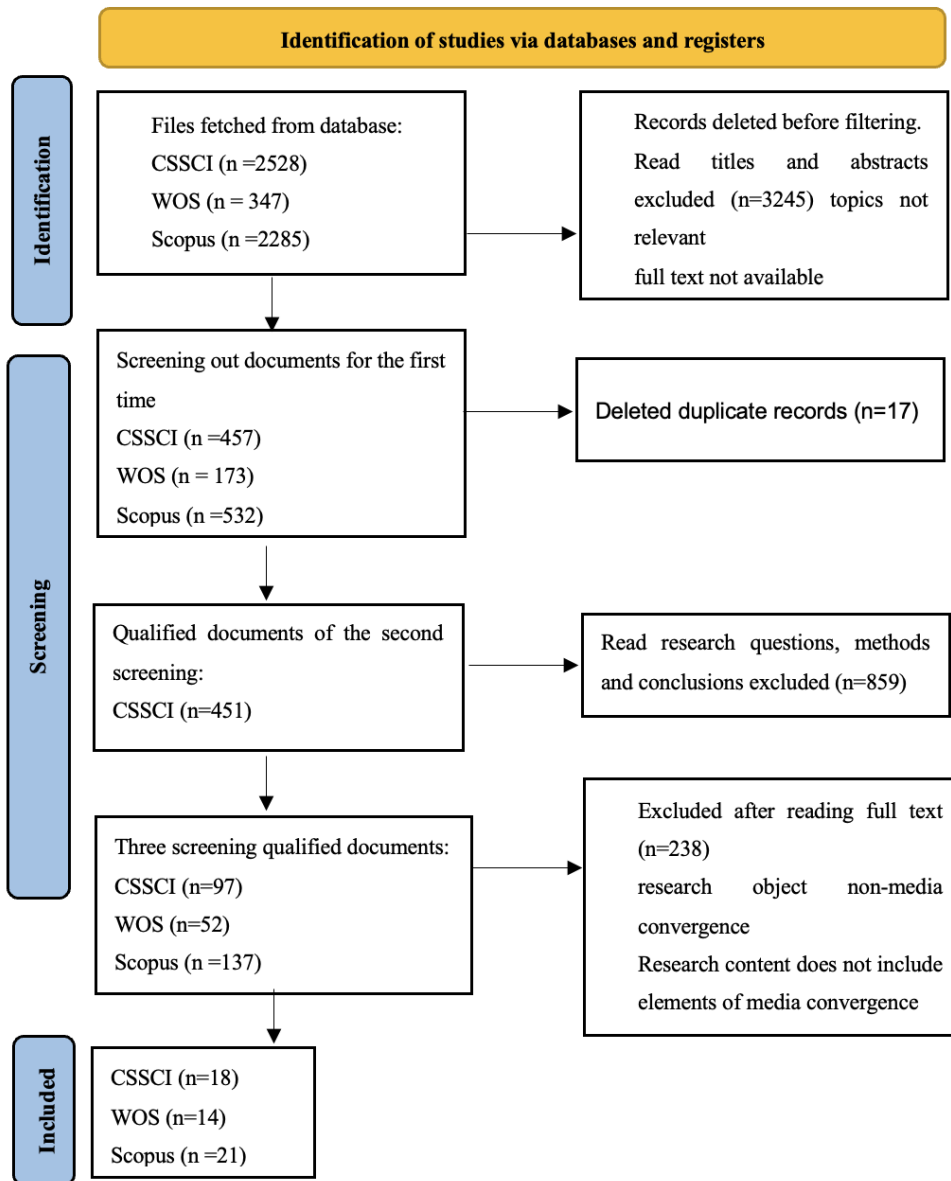
FIGURE 1. PRISMA Flowchart Used to Select Studies

FINDINGS AND DISCUSSIONS

ONTOLOGY OF MEDIA CONVERGENCE

To answer RQ1, the researchers carefully read through all the data to understand the main ideas and patterns. Then, key concepts were identified and labeled with codes that reflected important aspects of media convergence. Similar codes were grouped to form broader components of media convergence that captured recurring ideas across the data. These themes were then reviewed, refined, and clearly defined to ensure they accurately represented the core concepts of media convergence.

The systematic literature review indicated that there were four main components of media convergence that ran across the 53 articles, namely content convergence, cultural convergence, economic convergence and technological convergence as reflected in Table 2.

TABLE 2. Group of sources and themes of media convergence studies

Themes	Sources
Content Convergence	Atkinson & Barker, 2023; Li,2023; He,2023; Abbas et al，2022;Jiang, 2018; Feng et al, 2020; Zheng & Xie, 2018; Vázquez-Herrero et al, 2019;Anbin & Liu, 2023; Mahoney & Tang, 2020; Baranova et al., 2020
Cultural Convergence	Erdal, 2019; Peng 2021; García-Marín & Aparici, 2018; Jenkins et al., 2019; Xiong & Zhang, 2018; Menke et al, 2018; Jenkins, 2006; Jerónimo et al., 2022; Ittefaq et al, 2021; Jamil & Appiah-Adjei, 2019; Knoche, 2015; Akalili.2020; Baranova 2022
Economic Convergence	Anderson et al., 2018; Bock et al., 2023; Chen, 2018; Harper, 2017; Hassan & Elmasry, 2019; Picard, 2013; Yan & Li, 2019; Tsfati et al., 2020; He & Li, 2022; Balbi, 2017; Mallick et al., 2023
Technological Convergence	David & Boyagoda, 2022 ; Prayogi et al., 2020; Jia & Lu, 2023; Masip et al, 2011; Anbin & Liu, 2023; Jiang, 2023; Gu & Huo, 2021; Appelgren, 2023; Yin, 2022; Li et al, 2021

These components, derived from a systematic review of 53 articles, highlight how media convergence is not a singular process but rather a complex interplay of different forces. Content convergence emphasizes the blending and distribution of media content across multiple platforms, while cultural convergence underscores the ways in which audiences interact with and influence media. Economic convergence reflects the shifting business models and market dynamics in the media industry, and technological convergence captures the integration of various media technologies that facilitate these changes.

This four-component framework is crucial because it provides a holistic lens through which to analyze media convergence. By categorizing the vast array of convergence phenomena into these distinct yet interconnected areas, this finding offers a clearer understanding of the driving forces behind media convergence, making it easier to develop targeted strategies for navigating the evolving media environment. Moreover, this framework can serve as a foundational model as indicated in the Research Question 3.

DEFINITION AND ELABORATION

To answer RQ2, we defined concepts related to media convergence based on these 53 articles. It includes content convergence, cultural convergence, economic convergence and technological convergence.

Content Convergence. Content convergence is digitally capturing news and processing the relevant data to publish it to the corresponding information platform. Digital platforms have revolutionized how media content is produced, distributed, and consumed, fostering a more interactive and engaging user experience. Content convergence is mainly manifested in three aspects: the convergence of information collection, the convergence of content production, and the convergence of information distribution (Li, 2023; He, 2023).

The first is the convergence of data collection. From a technological perspective, the way journalists collect news has changed a lot from the past. In addition to collecting news on the Internet to get hotspots, it has become common for some journalists to use various opinion monitoring software or other big data means to get news information. These behaviors have broken the traditional media model of reporting and preserving information. However, at the same time, they have also led to the loss of some of the reported content due to incompatible formats (Vázquez-Herrero et al. 2019).

The second aspect is the convergence of content production and storytelling methods. Traditionally, newspapers focused solely on print news. However, it is now a common practice in China for the same interview and editing departments to handle all forms of information production and output (Mahoney & Tang, 2017). This approach not only standardizes and streamlines the news production process but also ensures that news is uniformly disseminated across various channels. News organizations now routinely incorporate videos, infographics, and interactive features into their reports, enriching the narrative and engaging audiences more deeply (Baranova et al., 2020). For example, incorporating live video feeds, interactive maps, and social media integration allows for real-time updates and audience interaction, making the news more dynamic and responsive to viewer interests. Furthermore, this convergence promotes a collaborative environment where journalists, videographers, graphic designers, and social media managers work together seamlessly. This collaboration not only improves the quality of the content but also accelerates the production timeline, ensuring that news outlets can respond swiftly to breaking news and emerging stories.

The third is the convergence of information distribution channels (Anbin & Liu 2023; Atkinson & Barker 2023). Nowadays, after producing news, most news media not only release news through their own traditional channels but also release news through third-party information such as Twitter, Facebook, TikTok, and other communication platforms, or release news through their own news clients (apps). A traditional media outlet that has actively embraced the new media era may publish news on 35 news apps. This dramatically improves the efficiency and influence of news communication and precipitates fans on multiple social media platforms, which is also conducive to the long-term development of media in the era of digital intelligence. (Abbas et al. 2022; Jiang & Fu 2018). This stage represents a deep convergence of content presentation forms and distribution channels, which reflects the core values and objectives of convergence development (Feng et al. 2020; Zheng & Xie 2018). The process involves coordinating and organizing news materials, effectively expressing data and information, and ensuring a high standard and quality of reporting content.

Content convergence is a complex process of multimedia integration, cross-platform distribution, and personalized content delivery that enhances the narrative experience, caters to different audience preferences, and promotes greater engagement and interaction.

Cultural Convergence. Cultural convergence is the blending of diverse cultural elements within the media landscape, where audiences play an active role in co-creating and influencing media content. Cultural convergence involves many factors, especially media production and consumption. Henry Jenkins states cultural convergence can be understood from academic and media practice perspectives. In academic terms, cultural convergence refers to the competition and cooperation between media in the digital age. From the media practice perspective, cultural convergence means that users play an essential role in news production, dissemination, and effect. This shows that traditional newspapers actively embrace today's Internet culture (Jenkins 2006). Specifically, cultural convergence refers to the media absorbing and influencing different cultures of its related groups and organizations and forming a new culture through convergence, thus promoting the survival and development of the media itself. This convergence of media and culture makes academic research shift from a single platform to consider the interrelationship between different platforms and practices (Erdal 2019). While social media has allowed audiences to challenge the authority traditionally given to journalists, most journalists do not see users as active participants in the news. For journalists, they are still the primary source of news production (Jerónimo et al., 2022).

One of the most significant aspects of cultural convergence is the role of social media in transforming traditional media consumption. Social media platforms like Facebook, Twitter, Instagram, and TikTok have become central to how people engage with news and entertainment. These platforms enable users to share their perspectives, comment on news stories, and create content, fostering a more interactive and participatory media environment. This shift has led to the emergence of what Henry Jenkins (2006) describes as "participatory culture," where audiences are no longer passive consumers but active contributors to the media ecosystem. (Menke et al., 2018). Mainstream media should face up to the positivity and role of public participation in news and continuously optimize the participation process through various means to achieve better results (Xiong & Zhang 2018).

Another aspect of cultural convergence is the relationship between media and readers, as well as between creators and readers through certain social tools. For example, comments after news can also be regarded as part of the text, and the growth of comments also means the growth of the text. This form of cultural convergence leads to the construction of meaningful content and even new stories that significantly increase audience engagement (Peng 2021; García-Marín & Aparici 2018). On the other hand, readers or audiences are becoming creators of citizen journalism and becoming an essential addition to the news in several countries. Of course, citizen journalists' professionalism, journalistic ethics, and reporting skills have received much criticism and are still a gap with professional news-producing organizations (Ittefaq et al. 2021; Jamil & Appiah-Adjei 2019).

Cultural convergence is driven by the global reach of digital media, allowing content to easily cross borders and contribute to a more interconnected media landscape. However, it also raises concerns about cultural homogenization and the loss of local identities. Media companies balance global reach with cultural diversity by tailoring content to local preferences through localization. This dynamic process reflects the changing relationship between media producers and audiences, shaping cultural narratives in the evolving digital media landscape(Knoche, 2015; Akalili, d2020; Baranova, 2022).

In conclusion, cultural convergence is a dynamic process encompassing cultural elements, the rise of participatory media, the integration of diverse perspectives, and the global exchange of media content. As digital media continues to evolve, cultural convergence will remain a key driver of innovation and transformation in the media landscape.

Economic Convergence. Economic convergence in media convergence refers to the process of multiple economic subjects, economic organizations, and even economic activities between the developed information network as a technological platform, interaction, interpenetration, and re-convergence of all parties in the media division of labor to eliminate boundaries and redundant compartmentalization, to form an organic whole characterized by the sharing of media information and the sharing of financial data to enhance economic efficiency (Anderson et al. 2018; Picard 2013).

Gordon first proposed the concept of media structure convergence, believing that different media with the same function can be united to achieve specific functions. For example, television and newspaper editorial departments can work side by side to complete interviews (Bock et al., 2023). The Super Newsroom is the concrete embodiment of the convergence of media structure (Chen 2018; Hassan & Elmasry 2019). Information gatherers input information in significant quantities based on information and data sharing. Then, the platform provides news information according to the needs of the various seed media, and the editors of each sub-media process this information into the final product. Although there are still some problems, such as fake news and

unsmooth cooperation, it has become the mainstream news production mode of media convergence (He & Li 2022; Tsfati et al. 2020).

The structural convergence of media aims to meet the information required by new and old media as much as possible and to save as much cost as possible in reporting, conceptually overcoming the dilemma of previous media convergence (Harper 2017). The newsrooms of several newspapers were merged into one newsroom in response to rising costs and declining newspaper sales, which have become common in China. This structural shift differs from the past's bold consolidation of big media groups for monopolies. From the perspective of media convergence, the structural convergence of today's newspapers is a passive struggle against the winter brought about by digitalization (Yan & Li 2019).

The economic strategy of media convergence is a product of three elements: digitization, corporate concentration, and government deregulation. These factors have allowed media conglomerates to own different kinds of media in the same markets (e.g., TV and radio stations and newspapers) and content companies to own content producers. There are many benefits to convergence among corporations, including reduced labor, material, and management costs. Furthermore, it allows companies to use the same media content across multiple outlets and advertise it as a package deal that appeals to advertisers. Another potential benefit of corporate convergence is improved brand recognition and loyalty from cross-promotion and cross-selling (Balbi, 2017; Mallick et al., 2023).

Technological Convergence. Technology convergence combines different technologies to create new and innovative media representations. By digitally transforming media content, industrial players expand potential relationships and enable the continuous flow of digital content across multiple platforms. Integrating different communication technologies significantly affects the media industry, enabling industry players to develop content suitable for various media (Jia & Lu 2023; Prayogi et al., 2020). The increased networking, digitization, and popularity of the Internet have led to convergence and global content exchange across all mediums on a global scale. Technology has penetrated deep into the newsrooms of news companies and has become a necessary form of news consumption. The news industry is affected by many technological aspects of the production and dissemination of news (David & Boyagoda, 2022 ; Masip et al. 2011).

VR/MR news is commonplace; there have even been instances of brilliant artificial intelligence (AI) hosts co-hosting segments with authentic hosts. With the continuous maturity and popularity of question-and-answer AI intelligence represented by chatgpt, more journalists are combining AI to search for data and news writing. This kind of convergence combining intelligent tools also has problems, such as AI-generated content not being deep enough and difficulty distinguishing between true and false. The application of AI technology in reporting does not diminish the role of journalists in news reporting. However, the cooperation puts higher requirements on reporters and editors (Li et al. 2021).

At present, the technology convergence of media is more evident in China. One type is that Chinese media directly sell their partners' products through live broadcasting and other forms, and they even form joint ventures with the partners to share the profits. In addition, the media actively join the e-government platform, on the one hand, to obtain government revenue, but also through the long-term service to users to charge a part of the fee. These are undoubtedly more advanced forms than the page fees and even subscription fees charged by traditional newspapers (He & Li 2022; Jiang, s2023).

Taking news writing as an example, major news agencies in various countries, including Xinhua News Agency and The Associated Press, and mainstream Chinese and foreign newspapers

such as Guangming Daily and The New York Times, have adopted AI writing technology. AI news writing refers to automatic news writing based on an advanced algorithmic language that can automatically collect, analyze, call, and generate data and complete automatic news writing through preset mathematical operation rules and procedural steps. AI writing has a rapid and accurate advantage in standardized information such as finance, sports, and disasters, realizes customized information content for different segments of people driven by large data technology, and can conduct a structural analysis of massive fragmented data, providing readers with a more global "God perspective"(Yin, 2022)

In addition, technology convergence between different media is also attempted. As small media usually cannot afford the cost of technology development, some large media groups, such as China's People's Daily, set up technology companies and provide IT services so that small and medium-sized media can use digital products at low cost without developing them themselves (Gu & Huo 2021; He & Li 2022).

In summary, technological convergence is a multifaceted process encompassing AI, big data, machine learning, social media, mobile technologies, and immersive technologies like VR and AR. This convergence is driving the evolution of media, enabling more efficient production, personalized content delivery, and enhanced audience engagement. As technology continues to advance, the boundaries between different media forms will further blur, leading to even greater levels of convergence and innovation in the media industry. In essence, media convergence is driven by technological progress. This perspective of technological determinism, spanning from Marx to McLuhan, has been consistently validated by empirical evidence. The fundamental driving force for the convergence of these three media is technological convergence, which is the driving force and support for the development of media convergence. The view of technological determinism of media has been supported by many scholars (Appelgren 2023).

MODEL OF MEDIA CONVERGENCE ONTOLOGY

From the systematic literature review, the researchers have produced a model of media convergence ontology as per Figure 2.
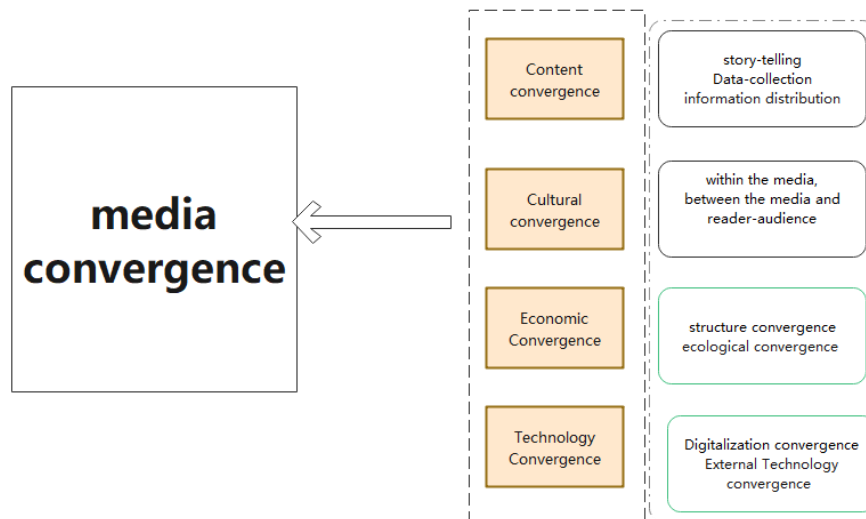

FIGURE 2. Model of Media Convergence Ontology

This model visually encapsulates the comprehensive framework of media convergence by breaking it down into four key components: content convergence, cultural convergence, economic convergence, and technological convergence. Each of these components is further subdivided into specific aspects, such as storytelling, data collection, information distribution for content convergence, or digitalization and external technology convergence for technological convergence.

This model is valuable because it offers a clear and structured approach to understanding the multifaceted nature of media convergence in the last 10 years By visually organizing these components and their sub-elements, the model helps researchers and practitioners quickly grasp the complex interactions within the media landscape. It also highlights the interconnectedness of these components, emphasizing that media convergence is not a singular phenomenon but a dynamic interplay of content, culture, economics, and technology. This structured representation can guide future research, strategy development, and practical applications in media and communication fields, making it an essential tool for analyzing the evolving media environment.

While arguably these four components existed in the traditional theory of media convergence, this model add values to the old theoretical framework as it considers the idea of data collection and information distribution in the new era. The old media convergence theory is Western-centric and this model built on the systematic review that considers the worldview of Chinese researchers, offer a more nuanced look into key areas of media convergences across a global context. These newer elements such as data collection, information distribution, structural and ecological convergence (that considers different countries systems) and the relationship between media, within media and with audiences contributes to enhancing the original theory of media convergence.

LIMITATIONS

The limitations of this paper are threefold: Firstly, the selection of databases, while comprehensive, was limited to three major sources—WOS, Scopus, and CSSCI. This selection may have inadvertently excluded relevant studies published in other reputable databases, potentially limiting the scope of our findings. Future research should consider including additional databases such as Google Scholar, PubMed, and specialized repositories to ensure a more exhaustive literature search.

Secondly, despite rigorous efforts to minimize bias and adhere to the PRISMA 2020 standards, there is always a possibility that certain relevant articles were either excluded or overlooked due to keyword selection and search constraints. To address this limitation, future systematic reviews could employ broader search terms and include grey literature to capture a wider range of studies.

Lastly, the dynamic nature of media convergence means that new developments and technological advancements are continually emerging. This review captures the state of media convergence up to 2023, but future studies should aim to update and expand on these findings to reflect ongoing changes in the media landscape.

FUTURE RESEARCH DIRECTIONS ON MEDIA CONVERGENCE ONTOLOGY

1. Integration of Advanced Technologies in Media Convergence
Future research should focus on the role of emerging technologies such as Artificial Intelligence (AI), Machine Learning (ML), and Big Data analytics in media convergence.

2. Cross-Cultural Analysis of Media Convergence Practices
Media convergence is a global phenomenon, and its practices and impacts vary across different cultural contexts. Future studies can compare media convergence practices in different countries to identify unique challenges and opportunities.

3. Ethical and Legal Implications of Media Convergence
Future research should investigate the ethical implications of converged media practices, particularly in data privacy, content authenticity, and the spread of misinformation. Additionally, exploring the legal frameworks that govern media convergence can help identify gaps and areas for improvement to ensure responsible and ethical media practices.

4. Longitudinal Studies on the Evolution of Media Convergence
Such studies can provide valuable insights into the changing dynamics of media convergence and its long-term impacts on the media industry. This research can help identify trends, patterns, and critical milestones in developing media convergence.

5. Methodological Innovations in Media Convergence Research
Future research should also focus on developing and applying innovative methodologies to study media convergence. This includes using mixed-methods approaches, advanced statistical techniques, and digital ethnography. Methodological innovations can enhance the rigour and depth of media convergence research, providing more comprehensive insights into this complex phenomenon.

CONCLUSION

Although there are some limitations in data collection, this review reviews the relevant concepts of media convergence ontology based on the systematic literature. Media convergence is divided into four aspects: content convergence, culture convergence, economic convergence, and technology convergence. Among them, content convergence includes integrating information collection, information production, and information distribution channels. Cultural convergence refers to the cultural exchange and sharing within the media and the cultural interaction between the media and the readers. It also includes the cultural intersection in media education.   The media economy mainly involves the coordination and convergence of internal organizational structure, and the coordination and unity of various factors in the external ecological environment need to be considered. In addition, technology convergence is the underlying force driving the continuous development of media convergence.

Previous research primarily focused on isolated aspects of media convergence. This study contributes by providing a comprehensive overview and synthesis of these aspects. For researchers, it provides a clear lens through which to study media convergence, enabling more focused investigations into each component and how they interrelate. For media professionals, it

offers practical insights into how convergence impacts content creation, audience engagement, business models, and technological innovation, helping them navigate the rapidly evolving media environment. Overall, this framework is a valuable contribution to the field, offering both theoretical clarity and practical relevance.By leveraging this knowledge, they can develop more effective strategies to enhance audience engagement, optimize content distribution, and improve economic efficiency. The role of emerging technologies like AI and big data in shaping media convergence practices warrants deeper exploration. The review concludes that media convergence is a dynamic and evolving field. The proposed ontological model of media convergence serves as a foundational framework for future studies.

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