Journalism and Mass Communication, Nov.-Dec. 2025, Vol. 15, No. 6, 350-358
doi: 10.17265/2160-6579/2025.06.004

Study on Digital Publishing Value Chain in AIGC Era

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With the breakthrough of technology and the innovation of business models, the digital publishing value chain is undergoing continuous evolution. In recent years, the application of AI (artificial intelligence) technology, particularly generative AI technology in content production processes, has made content organization, dissemination, and even creation more intelligent and efficient. This has resulted in an unprecedented impact on the digital publishing industry which relies on knowledge production and service provision, leading to a comprehensive and profound influence on the digital publishing value chain. The digital publishing industry should capitalize on the opportunities presented by the Artificial Intelligence Generated Content (AIGC) technology and leverage AIGC technology to facilitate industrial transformation and upgrading, and achieve high-quality development of the industrial value chain.

Keywords: AIGC, digital publishing industry, value chain, value activity

Introduction

With the deep integration of digital technology and the publishing industry, various forms of publications such as electronic publications and online publications continue to emerge. The publishing industry is no longer confined to providing printed materials or specific publication formats; instead, it has evolved into an industry that primarily provides content. Simultaneously, digital technology has empowered the publishing sector to transition from manufacturing to knowledge-based services. Consequently, the publishing industry chain is undergoing transformation in response to these changes. In the early stages of development, it should be integrated by platform providers, further integrating production processes with content development, production, and dissemination as the core links, and an initial digital publishing industry chain featuring content providers, platform providers, technology providers, hardware providers, and users has been formed. The advent and widespread use of AI (artificial intelligence)-generated content tools such as ChatGPT have propelled content production into what can be termed as the Artificial Intelligence Generated Content (AIGC) era. The emergence of AIGC has significantly enhanced efficiency and intelligence in knowledge creation, organization, and dissemination. As a result, it has brought unprecedented impact on the publishing industry which relies heavily on knowledge production and knowledge services for its sustenance (Xia, 2023).

Currently, the digital publishing industry has begun applying AIGC technology across different links of the industry chain, which will consequently reconstruct the digital publishing industry value chain from upstream, midstream, and downstream. This study will discuss how AIGC technology reconstructs digital publishing value chain while applied in the digital publishing value activities. Therefore, we may clarify the usage scenario of AIGC in the digital publishing industry and find the structural logic of the new technology for the digital publishing industry value chain.

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Literature Review

The concept of value chain was proposed by Michael Porter in 1985, who pointed out that value chain is a system consisting of interdependent activities, and the competitive advantage of a company comes from the optimal and coordinated relationship between various activities. Value chain consists of several value activities (Porter, 2005). Subsequent researchers have further developed the value chain theory, pointing out that value chain not only exists within a company, but also includes the management of external relationships. The external value chain mainly includes upstream suppliers, downstream distributors, etc., which is the industrial value chain.

The previous research findings on value chain of publishing industry are mainly focused on the composition of publishing value chain. Some scholars point out that the value chain of the publishing industry refers to the enterprise alliance composed of publishing related enterprises with continuous added value relationship based on the publishing value chain (Fang, 2006a). The core is the value-added problem of enterprise behaviors in different links of the publishing industry (Fang, 2006b), which is composed of a series of interconnected value-added activities in the publishing industry.

Other studies have indicated publishing industry has formed an industrial value chain pattern with publishing houses, printing houses, wholesalers, agents, retail bookstores, and other book distribution enterprises as the main pattern, in which each link is composed of a large number of similar enterprises, and there are a large number of information, material, and capital exchange relations between the upstream and downstream links, which are interdependent, mutually restricted and interconnected. A process of value increase is formed through those value activities.

Since the birth of digital technology, the value chain of the traditional printing and publishing industry has been greatly impacted. The application of new technology in the publishing field has given birth to different publishing carriers and subdivided the publishing industry into different fields. However, in general, all fields of the publishing industry still follow the internal logic of publication production, and a series of value activities such as “content publishing—publication production—content dissemination” constitute the publishing industry value chain (Huang & Chen, 2020).

By studying the evolution process of the publishing value chain, we can find that the progress of technology and the innovation of business model have been the two keys to promote the development of the publishing value chain. With the unstoppable application of AIGC in the publishing industry, new technologies and new business models will inevitably impact the publishing industry value chain, especially the digital publishing industry value chain. So far, there is a relatively small amount of literature on the impact of AIGC on the digital publishing industry value chain. This study will focus on the application of AIGC in digital publishing value activities and find out how they change the value links, or even reinvent the digital publishing value chain.

Impact of AIGC on the Upstream Value Chain of Digital Publishing

The upstream of digital publishing value chain in AIGC era involves value activities mainly including content production and processing, and the participants of these value activities mainly include publishers and technology providers. With the explosion of data, the development and management of massive content resources has become a difficult problem that publishers must face, while AIGC technology can quickly extract, identify, integrate, and analyze information, which can help publishers maximize the utilization of content resources.

AIGC Empowers Content Utilization and Development

AIGC, combined with big data, machine learning, data mining, and other technologies, can quickly retrieve and integrate market information resources, collect and analyze data in specific fields, so as to understand market trends and readers' needs, accurately grasp market demand, and achieve accurate input and efficient output. Meanwhile, AIGC can also help broaden the scope of topics; through data mining and analysis, publishers can find the relatively blank potential market. Generative AI can provide a broader vision and deeper analysis, and it can sift, combine, and even construct entirely new topic suggestions from numerous pieces of information (Xie & Li, 2023). In this way new market space and growth point will be opened up and mined for publishing houses.

AIGC Leads Content Creation Revolution

The application of AIGC in the production of digital publishing has revolutionized the existing creative methods of human beings. Whether it is artificial intelligence to independently produce content or human-machine collaboration to assist content production, it can reduce the burden of creation, reduce costs and increase efficiency, and ultimately optimize the structure of production links.

AI-automated content generation is not only several times more efficient than human works; it has also reached a high quality appearance that is almost indistinguishable from human work. In 2019, Springer Nature published a fully AI-generated book, *Lithium Batteries* followed by another AI-generated literature review, "Climate, Planetary and Evolutionary Sciences: A Computer-Generated Literature Review" in 2021, using a human-machine cooperation approach. In 2022, at an art fair held in Colorado, the painting *Space Opera* generated by the AI drawing software Midjourney won the digital art category champion… The literary, scientific, and artistic value of AI-generated content is being recognized. As the era of weak artificial intelligence evolves into the era of strong artificial intelligence, AIGC will show extraordinary talents in content production. The digital publishing industry has diversified product forms, and AIGC can independently generate multi-form content such as text, audio and video, which can significantly improve the production efficiency and user experience of digital publishing products.

AIGC Facilitates Editorial Innovation

AIGC can be used for automated intelligent proofreading of content. Most publishers have already made use of AI for language spelling and grammar checks and proofreading of text. In the proofreading work with strong objectivity and standardization, the proofreading accuracy of AI is greatly improved after being trained by massive data in the corpus. Besides, some publishers began to try to use machine learning technology for review, to help screen and edit manuscripts. In addition to the basic language check, intelligent editing can also judge the accuracy and rationality of the words and sentences in the manuscript, and even distinguish and correct the illogical and emotional contradictions (Jiang, 2023). For example, Founder Technology Group Co., Ltd. had introduced its intelligent auxiliary proofreading system. The system uses natural language processing and big data technology for corpus processing and text extraction, and establishes proofreading language models, which can effectively help editors solve common problems in manuscript editing, such as font, style, and citation.

AIGC can be used for multiple developments of the same content resource. AIGC can easily and efficiently convert existing resources into publishing products in different media forms, such as the conversion of text works to audio books, comics, and animation works, while the same publication can also integrate different publishing forms such as picture, sound, video, AR, and VR at a lower cost. This has greatly enriched the product form of

digital publishing, and gradually formed a complete product system. Publishing units using AIGC to upgrade content resources, increase the use of resources, and broaden the use of resources scenarios, can make existing resources burst new vitality, and increase the income of enterprises.

Impact of AIGC on the Midstream Value Chain of Digital Publishing

The main value activity in the middle reaches of the digital publishing industry value chain is the marketing and dissemination of publications on major distribution platforms, and the main participants are publishers, platform vendors, and technical vendors, and some platform providers also play the role of technology vendors. The role that AIGC plays in midstream value activities is to enhance marketing efficiency and reduce marketing costs. As the significance of AIGC continues to grow, the status of technology companies in this process is expected to increase.

AIGC Helps Develop Marketing Strategies

AIGC can understand the situation of competing products and user needs by conducting research on market and user data. Meanwhile, by using AIGC to analyze the content of digital publishing products, publishers can recognize the target market, audience, which is vital in market competition. As soon as the core competitiveness is mastered, product sellers can lay a solid foundation for product promotion.

After the positioning of digital publishing products is completed, AIGC can formulate the overall strategy of product communication, including communication objectives, communication channels, communication content, and communication schedule. It can also customize personalized communication methods for different target users to ensure that product information can be accurately and effectively transmitted to target users.

AIGC can also price digital publishing products. Pricing is one of the core components of the product marketing strategy. With the emergence of diversified sales channels and the expansion of consumers' access to information, pricing plays an increasingly important role in market competition. It is directly related to the market appeal and profitability of the product. Through a reasonable pricing strategy, digital publishing products can not only achieve profit, but also expand its influence. AIGC can deeply analyze data such as sales history, market demand, and pricing trends. With these analytical data, marketers can determine the optimal price for a product, thereby realizing the maximum profit potential. Some foreign publishers have already successfully used artificial intelligence tools to develop automated repricing systems. This will make a great improvement for the traditional manual pricing adjustments.

AIGC Generates and Optimizes Marketing Messages

AIGC can be used to modify or generate marketing copy and videos. In the current era of live streaming and short video marketing, high-quality marketing content can increase the market exposure and user attraction of products, thereby improving economic benefits. AIGC can integrate big data technology to deeply analyze the emotional tendencies contained in users' comments about products, thereby enabling publishing units to distill the most concerning issues for users and achieve effective marketing. In the area of marketing content optimization, artificial intelligence can also play a huge role. By analyzing users' preferences through big data, marketing content such as poster copy, text ads, email, social media push, and promotional videos can all be optimized and re-created with precision. For example, a foreign publisher used artificial intelligence to analyze the book descriptions on the Amazon platform and used AIGC tools to rewrite the content, then manually edited and optimized it to achieve better marketing promotion effects.

Digital publications often spread in market circles in a segmented manner, from the selection of topics to publication, they are aimed at different user groups, and segmented dissemination enables the digital publishing industry to maintain its long tail market operation. With the assistance of powerful computing power of AIGC, digital publishing products are constantly improving in personalized dissemination (Zhou, 2024). AIGC can collect and analyze large amounts of user data, including reading history, purchase behavior, and search records, by which marketing staff can gain a deep understanding of users' reading preferences, purchasing power, and consumption habits. Based on this, AIGC can create user profiles and segment the target market into user groups with similar characteristics and needs, before delivering targeted marketing information to the relevant users. Through AI-driven precision targeting, digital publishing products' marketing information can accurately and efficiently reach potential consumers, and improve marketing efficiency and conversion rates.

AIGC Evaluates Marketing Effectiveness

In the process of marketing information dissemination, AIGC can also monitor and analyze user feedback and behavior data in real-time, such as click-through rate, page views, and conversion rate, to quantitatively evaluate marketing effectiveness. These data reflect the interest level and purchasing intent of users towards marketing information, providing publishers with intuitive marketing effectiveness indicators. If the conversion rate of a marketing campaign is low, AIGC can assist publishers in adjusting strategies in a timely manner and optimizing the content and delivery methods to improve marketing effectiveness and user satisfaction.

AIGC can seamlessly integrate with other marketing tools and systems to bring together various data resources and assess marketing effectiveness from multiple angles. For instance, AIGC can work with e-commerce platforms and social media platforms to gather comprehensive user behavior and purchase data, enabling a more thorough evaluation of digital publishing product performance across different channels. It can automatically generate detailed reports on marketing effectiveness based on the assessment results, offering publishers a clear and easy-to-understand overview. The report not only presents specific numerical values for each evaluation indicator but also provides interpretations and recommendations for marketing effectiveness, helping publishers gain better insights into market trends and user needs while providing strong support for future marketing decisions.

Impact of AIGC on the Downstream Value Chain of Digital Publishing

In the downstream of the digital publishing industry value chain, the main value activity is the transaction of products. As users increasingly focus on personalized and differentiated user services, AIGC has also found a place in product transactions. In addition to intelligent user services, AIGC will also continue to drive innovation in consumer scenarios and provide continuous after-sales tracking.

AIGC Innovates User Service Scenarios

In the book *The Coming Scene Age: How Big Data, Mobile Devices, Social Media, Sensors, and Location Systems Are Changing Business and Life* by Robert Scoble, a well-known global technology journalist, five elements related to the scene era are pointed out: big data, mobile devices, social media, sensors, and location systems, namely the "five forces" of the scene era (Scoble & Israel, 2014). They believe that the five elements that make up the scene are changing the information consumption environment and consumption experience

faced by audiences. Different scenarios can create different contextual products, and the inherent advantage of these contextualized products is not to win by quality or quantity, but to be the most suitable products for the user's surroundings and current needs in a specific context. By strengthening the connection between digital publishing products and scenarios through AIGC and combining new technologies such as VR, AR, and MR to create new usage scenarios, opportunities for growth in digital publishing industry will arise.

By integrating AIGC with Internet of Things (IoT) technology, smart terminals, big data, etc., digital publishing enterprises can deeply understand the needs of users in various specific scenarios. Therefore, they can provide real-time digital content that is closely related to social hot topics, transportation, dining and entertainment, shopping and consumption, travel guides, etc., to meet the actual needs of users in their daily lives. In order to further enhance the user experience, digital publishing enterprises need to continuously segment users' various life scenarios, ensuring that the digital content provided can help users solve real-life problems. Under the scenario segmentation, AIGC combined with user profiles and precise delivery technology can achieve efficient matching between user needs and digital publishing content, thereby continuously enhancing user stickiness.

The deployment of VR, AR, and MR technologies has enabled the use of information products to break beyond the limitations of visual perception. Such scenario-based digital publishing products can be combined with wearable devices to enable people to immerse themselves in a completely digital virtual scene and use the products through voice and gestures. In the era of digitalized living, digitalization and intelligence are highly integrated, and the proposal of integrative concepts such as metaverse and blockchain has also raised higher expectations for virtual scenario-based digital publishing products. The application of AIGC will significantly enhance the completion of virtual scenes. Currently, intelligent technologies that meet the needs of scenario-based AI production are gradually becoming established, and ChatGPT 4.0 can now interact through voice. Smart wearable devices are also becoming more sophisticated. For example, Apple's Vision Pro, released in June 2023, combines spatial audio with a large screen to create a powerful sense of immersion, leading the industry into the era of spatial computing. In the future, the digital publishing industry will achieve substantial breakthroughs in new products, new business models, and new scenarios such as publishing big data, large language models, high-dimensional intelligent knowledge services, publishing plus intelligent robots, generative intelligent publications, and metaverse publishing (Zhang & Huang, 2023).

AIGC Provides Customized and Personalized User Services

Intelligent publishing knowledge services are committed to providing users with personalized knowledge products that meet their specific consumption needs. The primary step in achieving this goal is the precise capture of users' knowledge consumption requirements. Subsequently, tailored knowledge content is created for users based on these needs. Ultimately, this content is transformed into product forms that align with users' consumption scenarios, ensuring that the service can satisfy their learning needs, reading habits, and interests and thereby enhance their learning efficiency. In a society where the knowledge economy is flourishing, opportunities for monetizing knowledge abound, and there is a continuous increase in demand for lifelong and on-demand learning. To address users' personalized reading needs in this context, AIGC technology can be utilized to track, record, and analyze users' reading processes and feedback effects in real time. AIGC combines machine learning and data mining technologies to conduct comprehensive processing and analysis of content related to reading as well as professional learning and skill examinations. Additionally, it can establish data correlation models to

deeply explore the intrinsic relationships between reading content and variables such as learning interests, examination results, and reading behaviors. By doing so digital publishing units can accurately predict future trends in user learning behavior which enables them to provide precise customized knowledge services accordingly.

Results

Based on the previous research, we have found that AIGC can empower the full value chain of digital publishing, including upstream, midstream, and downstream. With its powerful, comprehensive, and 24/7 computing capabilities, AIGC will continuously accelerate the efficiency of value-added activities. In terms of cost reduction, one of the most prominent aspects is that AIGC will replace some repetitive, low-skill jobs, thereby saving human resource costs for enterprises. With the deep integration of AI technology and digital publishing, an industrial value chain driven by AIGC will be formed.

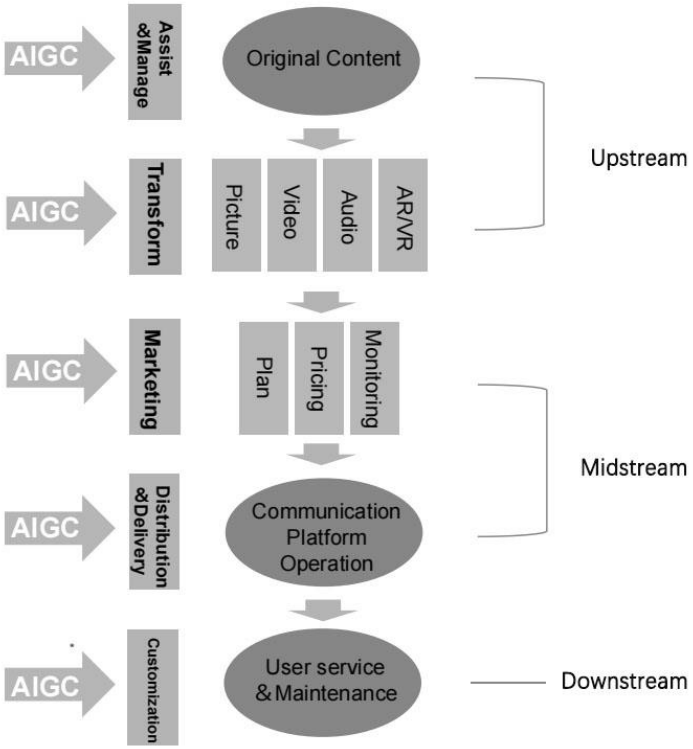

Figure 1. AIGC-driven digital publishing value chain.

In the AIGC era, the digital publishing value chain will have its upstream value activities highly collaborative between humans and machines, with content creation, editing, and management completed by AIGC-driven content production. In the middle stream, AIGC will drive the planning, marketing, and evaluation of the dissemination process. In the downstream, AIGC will continuously innovate user service experiences by combining with user scenarios. AIGC will continuously improve the efficiency of content production, dissemination, and transaction, thereby achieving enhanced value addition in the efficient value chain.

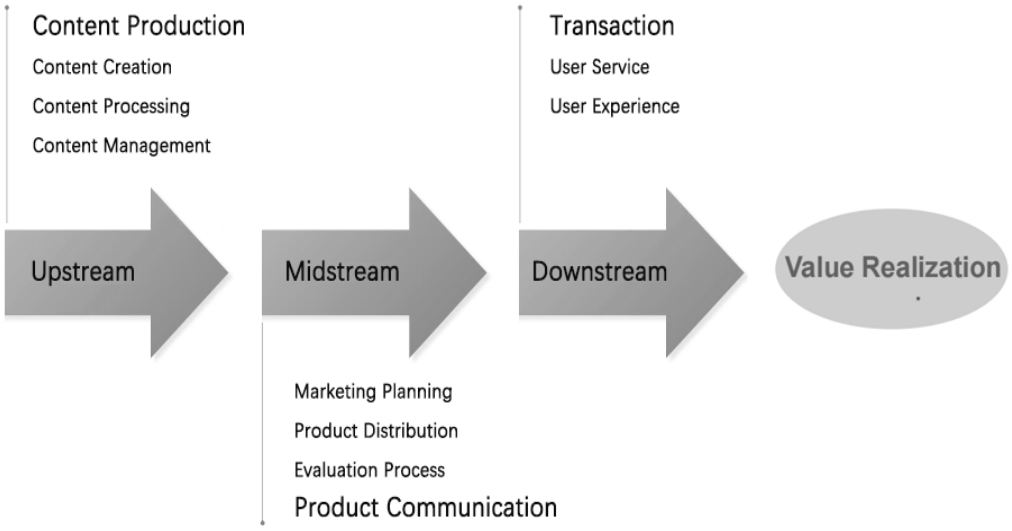

Figure 2. Digital publishing value chain in AIGC era.

Discussion and Conclusion

As technology providers continue to expand their AI business into the digital publishing industry value chain, the entire industry will enter the fast track of development based on AIGC technology. AIGC will continue to empower digital publishing value links from upstream, midstream, and downstream to reduce costs and improve efficiency. Digital publishing value chain will realize intelligent transformation through AIGC, some links of the value chain will face reconstruction, and some roles in the value chain will be eliminated.

The digital publishing industry is at the forefront of technological innovation, committed to using AIGC to drive the industry towards higher levels of intelligence. AIGC provides the digital publishing industry with diverse product forms and personalized service customization. At present, AIGC is mostly a general-purpose tool. In the future, technology vendors and other entities will provide targeted artificial intelligence solutions and services for each link in the digital publishing industry chain. The industrial integration model between publishing and high-tech industries will continue to innovate with the development of AIGC technology, and more business models will emerge, promoting efficient value creation across the entire value chain and a more complete overall industry value chain.

In summary, the digital publishing industry is ushering in a new development opportunity under the leadership of AIGC. The digital publishing industry should pay attention to the innovative trend in technology upgrades and product development, and seize the AIGC era trend firmly. First of all, the digital publishing industry needs to rely on AIGC technology to integrate existing data training sets of human civilization, integrate global resources, and build the next-generation industrial technology development interface and trend—"AIGC+" industrial development new platform based on public and private scenarios. Secondly, adapting to the technological changes brought by AIGC requires reshaping the industrial organizational structure and top-level design, forming operational modes based on human-machine collaboration, data-driven intelligent management, intelligent production, and intelligent services; finally, paying attention to optimizing user services and enhancing user experience, forming a product ecosystem centered on AIGC technology that connects resources and users and creates customizable and interactive products.

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