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Exploring the Digital Development Path of China's Cultural Industry Empowered by Artificial Intelligence Technology

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ABSTRACT

The digital development of cultural industry, as a national strategic plan, has become a new driving force to stimulate domestic demand and promote economic growth, and has continuously spawned a variety of new business forms and modes. Artificial intelligence(AI)as a new technology paradigm with machine intelligence and creativity, has great potential to integrate with content-heavy and highly creative cultural industries, and is of great significance in empowering the transformation of cultural industries' production, upgrading of products, and improving the quality of consumption. This paper reveals the dynamic trend of the digital development of China's cultural industry by analysing cases of the integration of AI and the cultural industry. We further propose a path for AI-enabled cultural industry development from five dimensions: content, experience, technology, operation and industry, to achieve the goal of making China's outstanding traditional culture "live" and "go out", as well as conveying the rich connotation and contemporary value of Chinese traditional culture to the world.

Keywords: AI technology, China's culture industry, Digitisation

INTRODUCTION

In recent years, driven by the rapid iterative upgrading of Internet information technology and the increasing demand of the people for spiritual and cultural products, the digital culture industry has ushered in great development. Artificial Intelligence (AI) technology as a technology that uses machines to achieve intelligent activities, with features such as deep learning and intelligent interconnection, is intervening in more and more cultural industries, and promoting the cultural industry to a completely new stage of development.

As a strategic industry in China, the cultural industry has been developing rapidly under the promotion and policy support of the government, and has made great strides towards the pillar industry of the national economy (Sun et al., 2019). In 2021, Chinese enterprises in the cultural and related

industries realised operating revenues of 16.4 trillion dollars. Among them, the 16 industry subcategories with more obvious characteristics of the new cultural industry achieved operating income of 544.38 billion dollars (China National Bureau of Statistics, 2022). It can be seen that the cultural industry through digital transformation and upgrading to the penetration of other industries, forming an open, networked and intelligent new cultural production system, and constantly giving rise to new scenes, new models, new forms of business, stimulating the new momentum of industrial development. More importantly, AI provides new advantages for international competition in the cultural industry, promotes industrial transformation, innovation and upgrading, and facilitates the application of AI in the field of cultural industry (Liu et al., 2022).

However, there is a relative lack of systematic study on AI-enabled development paths for China's digital culture industry under the AI wave. In this study, We analyze the digital development trend of China's cultural industry and the new industry of digital innovation in the cultural industry. Based on this, we propose a path for AI-enabled cultural industry development.

TRENDS IN CHINA'S DIGITAL CULTURE INDUSTRY DRIVEN BY NEW TECHNOLOGIES

Integration of Cultural Industries With Others to Create New Value

In the era of the digital economy, the integration of digital technology and the economy is characterised by new trends, a prominent feature of which is the expansion of the penetration of digital technology from the field of consumption to the field of production. For instance, the wide application of digital technology has generated economies of scale, economies of scope, and long-tail effects, which can provide better matching mechanisms and incentives for innovation; it can expand the boundaries of the industrial chain's division of labour, reduce transaction costs, enhance the value-added space, and force changes in demand, leading to the emergence of new manufacturing modes, such as service-based manufacturing and networked collaborative manufacturing (Fu, 2022).

The radiation-driven role of the digital culture industry as a productive service industry will be brought into full play, and it will play a greater role in the field of social development (Zhang, 2017). The fields of cultural big data, digital content, media integration, intelligent cultural tourism, artificial intelligence, and digital cultural and blogging have become new hotspots for industrial integration, and have penetrated into cultural heritage resources, venue education, performing arts and entertainment, and all-media industries, constantly giving rise to new scenes, new modes, and new forms of business (Jiang, 2021).

New Technologies Further Promote Digital Transformation and Upgrading of the Cultural Industry

Digital technology is an "accelerator" for the high-quality development of the cultural industry. China's President Xi Jinping has pointed out that

"digital technology is being fully integrated into all fields and processes of human economic, political, cultural, social and ecological civilisation construction with new concepts, new business forms and new modes, bringing extensive and profound impacts on human production and life." The powerful combination of Artificial Intelligence (AI), Big Data Analytics (BDA), Internet of Things (IoT), Industrial Internet of Things (IIoT), Machine Learning (ML), Cloud Computing (CC), Robotics and Collaborative Robotics, Cyber-Physical Systems (CPS), Additive Manufacturing, Digital Twins, and Augmented Reality/Virtual Reality (AR/VR) not only adds value to the overall digital transformation of the global manufacturing industry (Gadekar et al., 2022), but also fuels the digital culture industry's steady progress towards the stage of quality development.

The use of digital technology not only allows the traditional cultural industry to transform and change, resulting in new surprises, but also promotes the emerging cultural industry to continue to carry out business model innovation, and become a driver to lead the new round of cultural consumption.

Digital Cultural Content Innovation Is at the Heart of Market Competition

The epidemic of recent years has accelerated the integration of digital technology and the cultural industry, and has gradually cultivated users' consumption habits of high-quality content, with consumer groups increasingly willing to pay for high-quality content. The upgrading of cultural consumption not only brings huge market opportunities, but also the fierce market competition that comes along with it. Currently, the problem of structural contradiction between supply and demand in China's cultural industry remains prominent, including a large volume of cultural products but insufficient creative innovation, and a scarcity of high-quality enterprises and projects (Fan, 2020).

Therefore, the digital supply of high-quality cultural content, also known as cultural creativity, is the core of the high-quality development of the cultural industry and the root of digital innovation in the cultural industry. David Throsby, in his descriptive definition of the cultural industries, identifies creativity as the most central dimension of culture, followed by products with a high degree of cultural content that are formed using creativity, and the third tier is other industries with cultural content (David, 2001).

Digital Culture Goes Overseas in All Dimensions

On 31 May 2021, President Xi Jinping stressed the need to strengthen the building of China's international communication capacity, tell China's stories, disseminate China's voice, and present a true, three-dimensional and comprehensive China during the thirtieth collective study session of the Political Bureau of the Communist Party of China (CPC) Central Committee.

Affected by the global epidemic and other factors, the export of China's traditional cultural industry has been hindered, while relying on the development of AI, cloud computing and other advanced technologies, all kinds of

original works and IPs with Chinese characteristics have been pouring out to the overseas in a constant stream in a digitalised way, especially the digital cultural industry represented by games, online literature, online social networking, live video broadcasting and other digital cultural industries have increased their efforts to go to sea, and have become a new carrier and a new manifestation of the Chinese culture's foreign propagation.

AI TECHNOLOGY-LED INNOVATION IN THE DIGITAL CULTURE INDUSTRY FORMAT

AI Technology Empowers Traditional Cultural Industry Upgrading

The development of AI technology is particularly effective in promoting the transformation and upgrading of traditional cultural industries (Qi et al., 2021). Nowadays, digital technology is constantly intervening in different fields of traditional cultural industry and traditional business mode, which makes the traditional cultural industry renewed - whether in the content and display form of cultural products, communication media and scene, or in shaping new types of cultural business mode, all of them have shown great energy.

Media and Arts Industry

A common feature of the media industry and the arts industry is the focus on content production, with products that are extremely dependent on innovative thinking (Yu and Jiang, 2021). However, with the rapid development of AI technology represented by ChatGPT, the application of AI in the field of media and arts is driving the innovation and dissemination of content.

Firstly, the use of intelligent algorithms and high technology to assist in the processing of a large number of complex environments or repetitive content, improving the efficiency of cultural production, as well as bringing new inspiration and means for creation. Secondly, it intervenes in the whole process of cultural production and promotes better display and accurate dissemination of original content. At the same time, AI technology also provides new business models and innovation space for art education, identification, investment and other fields. Thirdly, the combination of artificial intelligence (AI) technology and artistic creation improves the enthusiasm of art lovers for artistic creation and communication, and expands the scope of application of AI technology (Liu and Liu, 2021).

The involvement of AI technology in the content production process, news writing and artistic creation is becoming the norm, and new products that use AI systems to generate content are also being created. For example, Tencent's "Dreamwriter" writing robot, the Los Angeles Times' "Quakebot", Japan's AI composing robot "Shimon" and Microsoft's "XiaoIce" robot, etc., have contributed to the AI Generated Content (AIGC) model.

Film and Publishing Industry

The development of AI technology has greatly contributed to the improvement of content quality and the upgrading of distribution channels in the film and publishing industry.

The film and television industry can use AI to carry out intelligent post-production of film and television works, including intelligent video screen de-field, intelligent image enhancement processing and so on. For example, in order to improve the visual effect of the film, Netflix analyses the image information of each frame by means of image enhancement algorithms and automatically adjusts parameters such as brightness, contrast, colour saturation, etc., to make the picture clearer, brighter and fuller of colours.

Technological developments have likewise enabled the publishing industry to move away from traditional publishing methods and towards digital publishing (Zhang and Song, 2021). For example, with the continuous integration of emerging technologies such as 5G, AI, AR/VR, wearable, big data, cloud computing and other emerging technologies with the book publishing industry, it has greatly broadened the boundaries of the publishing industry. Fundamental changes have occurred in the book publishing industry's product content and form, organisational form and business processes, communication channels and profit models, prompting publications to develop in the direction of digitalisation, interactivity, personalisation and multimedia.

Performing Arts and Cultural Tourism Industry

Enhanced by the deep learning of AI technology, virtual performances, off-site viewing, digital cultural and entertainment, and other viewing methods have broken the time and space limitations of the performing arts and cultural and tourism industries, and have become an important form of the performing arts and cultural and tourism industries under the epidemic norm. AI technology has also brought new development modes to the performing arts industry and cultural tourism industry, and emerging modes such as all-area tourism and smart tourism that are based on technology have gained rapid development.

In 2019, version 2.0 of the WeChat app, jointly created by the Palace Museum and Tencent, was launched. This mobile-based guided tour app uses a variety of advanced technologies, including AI, 360-degree panorama technology, and AI Lab's "image description generation technology". Through the AI guide assistant "Fuda Ren", this app provides personalised and interesting services for visitors. It not only explains the attractions and cultural relics, recommends special tour routes, but also interacts with tourists in casual chats, talking about historical anecdotes.

AI Technology Drives Innovation in Emerging Cultural Industries

Emerging technologies have not only transformed the traditional cultural industry, but also promoted the new cultural industry to carry out business innovation and model innovation on the basis of the original, showing great potential in leading a new round of cultural consumption (Xie and Chen, 2021). The emerging cultural industries represented by online animation and games, live webcasting, online social networking, etc. are relying on the advancement of modern communication technology for continuous innovation and development.

Video and Live Streaming Industry

The new generation of information technology has inspired innovative new forms of exhibitions and performances, giving rise to cloud live broadcasting, cloud performances, cloud viewing exhibitions, cloud tourism and other new forms and modes of business. In 2016, more than 300 live webcasting platforms appeared one after another in China, and the number of live broadcasting users grew rapidly, which was called the first year of the live broadcasting e-commerce industry.

Compared with traditional live streaming methods, AI live streaming brings users a richer and more customised live streaming experience by enhancing the sense of participation, improving the personalised interactive experience and providing more autonomy of choice. In addition, thanks to the increase in data traffic in communication technology, short videos, as the hottest form of communication and the windfall of the mobile Internet nowadays, will continue to develop towards personalisation, intelligence, immersion and high speed in the 5G era with AI technology, 4K/8K and other cutting-edge technologies.

Game and Animation Industry

The application of AI technology in the game and animation industry further enhances the interactivity, immersion and realism of games and animation. Supported by AI algorithms, on the one hand, the AI rendering engine can not only restore the details of the screen in a realistic and clear way, but also significantly increase the rendering speed and reduce costs. On the other hand AI technology for the gaming industry to bring beyond the traditional way of naturalised interaction game intelligent devices, so that the virtual elements of the game, the environment performance is more realistic, as well as more emphasis on user interaction, through a more humane human-computer interaction to enhance the user experience.

Ubisoft is a globally recognised game development and publishing company that uses technologies such as Generative Adversarial Networks (GANs) to automate the generation of game environments, terrain, buildings, and other elements to improve production efficiency and increase gameplay variety, providing players with more challenging and unique experiences.

Social Networking Industry

AI technology has brought a new form of realisation to the development of the social industry, and virtual social networking based on intelligent matching has become a new growth point for the social industry.

The application of AI in the social space can help to address the social barriers faced by users, provide more personalised services and improve their social experience. While AI cannot completely replace real human interactions, it can provide users with assistance and support to help them better engage in social activities and build meaningful relationships.

A good example is the stranger social app "Soul", which uses a soul model to recommend other users who are a good match and the UGC content they like. This personalised recommendation system provides a better social experience, helping users to quickly find people who match their interests and

preferences and browse their favourite content. By leveraging AI technology, stranger social matching becomes more accurate, efficient and fun.

AI-ENABLED DIGITAL INNOVATION DEVELOPMENT PATH FOR THE CULTURAL INDUSTRY

Content Dimension: Heritage and Innovation

Content innovation is the source and core link in the digital culture industry, determining the width and breadth of the industry (Luo, 2021). The rich cultural content resources are deeply excavated, and the innovative, creative and high-quality transformation of Chinese excellent traditional cultural resources is the core, which is integrated into the modern world in a living and digitalised form to bring out its value of the times. Adapting and integrating cultural content with the new forms and elements of digital technology will not only enhance the level of content production, but also cultivate and shape a number of original IPs with distinctive Chinese cultural characteristics, and create more digital cultural brands with wide influence.

In addition, Chinese cultural connotations can be expressed through cultural symbols and language forms that are generally recognised domestically and internationally, helping to create high-quality national culture IPs and culture going overseas, and laying a solid foundation for realising the international leadership of outstanding national culture and promoting international dissemination in the new pattern of development of the double-cycle.

Experience Dimension: Cultural Interaction

Digital experiences are changing the way the public interacts with culture and driving new forms of cultural engagement and practice (Staupe-Delgado and Rubin, 2022). Digital technology has made cultural experiences more accessible than ever before: whether it's visiting museums, admiring artworks, watching performances, learning, experiencing theatres and attractions immersivity online, or customising and purchasing cultural and creative products, e-tickets of all kinds online.

The public is no longer just a passive recipient of cultural content. Rather, they are more interested in interactive experiences, as well as in selecting, sharing and distributing content on demand and co-creating the cultural product itself. Therefore, with the help of data element-driven, technology platform support, and cultural brand value empowerment to realise the user's full-process experience based on the user's needs, it can enable the culture and the user to establish a deeper, closer or more meaningful new relationship, allowing the culture to truly enter the heart of the user (Luo, 2020).

Technological Dimension: Cultural Empowerment

AI technology continues to give rise to new scenarios, new models and new business forms, forming an open, networked and intelligent new cultural production system, in which everyone around the world has the opportunity to experience culture, participate in culture and create culture.

Firstly, AI technology provides a new way of collaborative innovation enabling cooperation between people, people and machines, and machines and machines across time and space, across domains, and across reality and reality, and smooth communication of talent, technology, and knowledge (Jiang and Meng, 2021). Secondly, AI technology can reach and attract new users or provide users with newer and deeper ways to experience culture. Finally, utilising the potential of AI technology can also diversify and engage audiences through new forms, mediums, and channels.

Operational Dimension: Platform and Communication

With the support of AI technology empowerment, the industry chain and value chain of the cultural industry have been reshaped, and multiple subject connections as well as all-media innovative communication methods have been constructed in the operation and communication links (Lei and Zhou, 2019) which can provide a digital sharing and interaction platform for the all-round output of our cultural industry.

The digital platform can attract a wider range of market players (producers, consumers, etc.) to collaboratively participate in the industrial chain's large-scale production, making it possible to expand the boundaries of the division of labour, improve the efficiency of resource allocation and reduce transaction costs. It can also promote and accelerate the agglomeration, reorganisation and flow of cultural products and services as well as factor resources (capital, talents, technology, information, etc.), and export factors and production capacity to an international scale.

Industry Dimension: Integration and Development

Firstly, innovating the industry linkage development model, promoting the integrated development of "digital economy + cultural industry", and building an efficient linkage mode within and among cultural industries to facilitate the transformation of the growth mode of cultural industries. Secondly, building a regional synergistic development mechanism and digital cultural industry clusters.Transform the cultural industry from a traditional, single, discrete industrial development mode to a highly efficient development mode of the cultural industry that transcends geospatial and technological constraints and is co-creative in multiple industries and fields. Thirdly, accelerate the promotion of the combination of "on-site, on-premises, and online" (Hua, 2021), to improve the connection of facilities, services, scenes, and users to the Internet.

CONCLUSION

As an ancient civilisation with a long history and profound deposits, as well as a digital culture power and one of the most dynamic digital culture markets in the world, China has distinctive features and unique advantages in the digital development of cultural industries. Firstly, it has abundant traditional cultural resources and huge potential for digital innovation (Chen and Li, 2021). Secondly, the super-sized market and consumption potential provide possibilities for AI-enabled innovation in the digital culture industry.

This study conducts a series of research on AI-enabled development of China's cultural industry and proposes a path for AI-enabled development of China's cultural industry from five dimensions: content, experience, technology, operation and industry. However, this study also has some limitations. As AI technology continues to develop rapidly, the characteristics presented by China's digital culture industry will also change, and we need to consider more possible development paths to promote the digitisation of China's culture industry to a higher quality.

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