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## Technological Empowerment and Social Risks of the Cultural Industry Value Chain: Postprint

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### Abstract

Information technology centered on artificial intelligence has precipitated profound transformations across all segments of the cultural industry's value chain. In the content production phase of the cultural industry, artificial intelligence expands the scope of content creation, engendering diversified modalities of product expression; during the dissemination process, through real-time and precise user profiling, it enables accurate product recommendations to users; in the marketing process, it leverages deep neural network technology to perceive audience emotional engagement with and evolving responses toward cultural content. Confronted with this unstoppable technological surge, it is imperative to systematically comprehend the legal and talent risks engendered by these technologies.

### Full Text

## Technology Empowerment and Social Risks in the Cultural Industry Value Chain

**Abstract:** Information technology centered on artificial intelligence is profoundly transforming every link of the cultural industry's value chain. In content production, AI broadens the scope of creation and enables diversified product expressions. During dissemination, real-time and precise user profiling allows for accurate product recommendations. In marketing, deep neural network technologies perceive audience emotional engagement and changes in cultural content. Faced with this unstoppable technological wave, we must systematically understand the legal and talent risks triggered by technology.

**Keywords:** artificial intelligence; cultural industry; value chain; social risks

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The advent of modern industrial revolutions has not only overturned industrial forms and production models but also profoundly transformed humanity's spiritual world. The fourth industrial revolution, based on combinatorial technological innovation, is now endowing global economic activities with tremendous energy and bringing revolutionary changes to the cultural industry's ecosystem. New cultural industry formats are emerging endlessly, and cultural products are being endowed with new value. From media to film, television, and gaming, technology's driving force on the cultural industry evolves daily, with artificial intelligence technologies—represented by robotics, speech recognition, image recognition, and natural language processing—producing immeasurable impacts on both the production and consumption of cultural industries.

The cultural industry comprises six categories: cultural content production, cultural communication channels, cultural equipment manufacturing, cultural consumption terminal manufacturing, productive cultural services, and cultural production services. Centered on content production and related services, the industry relies on digital technology for creation, production, dissemination, and service delivery across various sectors (design, culture, media, arts, etc.). In this integration process, technology—represented by artificial intelligence—extends the cultural industry's value chain, promoting the upgrading of traditional cultural industries while simultaneously generating various risks.

## 1. Technological Innovation: The Internal Driving Force of Cultural Industry Innovation

The internal driving forces of cultural industry innovation development include content innovation, technological progress, human capital, and business models, among which scientific and technological advancement occupies a core position. Technological innovation enhances the technological content of every link in the cultural industry chain through comprehensive technological investment, maximizing the potential and vitality of the cultural industry.

Artificial intelligence refers to methods that enable machines to acquire abstract and cognitive abilities to solve problems previously handled by humans. In the AI era, industry entities combine cultural resource conditions with big data intelligence, cross-media intelligence, and human-machine hybrid augmented intelligence to conduct industrial innovation practices under fully explored market demands. This reshapes and transforms cultural content, forming new cultural industry formats and economic growth points. Throughout the processes of information collection, content production, information dissemination, and user management in the cultural industry, AI technologies—including virtual agents, robotic automation, machine learning, deep learning, biological and speech

recognition, natural language generation and processing (NLP), hardware optimization, and decision management—can provide services such as content personalization algorithms, audience target and preference identification, and automated news content production. They can also provide decision-making bases for IP investment and market research, becoming important drivers of industrial innovation.

## 2. AI Empowerment of the Cultural Industry Value Chain

Porter noted that every production and operation activity of an enterprise is a value-creating activity, and all these distinct yet interrelated production and operation activities form a dynamic process of value creation. According to the value chain formation process, the cultural industry's value chain can be divided into five stages: cultural introduction, product production, product distribution, product marketing, and product service. Information technology centered on artificial intelligence is profoundly changing every link of the cultural industry's value chain, injecting new vitality into content production, communication methods, and advertising marketing.

### 2.1 Technology Empowerment in Content Production

The cultural industry possesses distinct and strong ideological attributes. The production of cultural products is both a process of excavating cultural connotations and a process of cultural innovation, with core production elements being intangible factors such as creativity, information, knowledge, and cultural resources. As the source link of the cultural industry value chain, only by injecting cultural creativity into production and dissemination can industrial added value be increased.

As an intelligence-intensive industry, technological innovation plays an immeasurable role in the content production of cultural products. In the content production segment, AI broadens the scope of creation and forms diversified product expression forms. In the online literature field, machine learning is integrated into IP characters to simulate their values, personalities, and language habits, constructing AI-driven virtual character images that bring originally literary-bound characters to life in the real world. Technology-driven virtual images possess new characteristics of high concurrency, rich interaction, and continuous self-growth, along with emotion and creativity. In 2019, Microsoft Xiaoice's "Empowerment Plan" utilized a complete emotional computing framework to provide novel characters from original novels with dialogue, voice, and skills based on unique personalities, as well as creative capabilities and corresponding knowledge systems in literature, music, and painting. This novel interaction brought users diverse emotional experiences and expanded the boundaries of IP development and derivation.

In the media field, robot journalism has been widely applied across various news reporting domains, penetrating every stage from clue discovery, content collec-

tion, and content writing to content distribution, effect feedback, and internal collaboration. Xinhua News Agency developed the world's first AI composite anchor based on the prototype of host Qiu Hao, using technologies such as facial recognition, facial reconstruction, expression modeling, and deep learning.

Furthermore, using AI-powered big data tools, content information can be identified, mined, processed, and deeply utilized for effective integration with cultural resources. AI technology can be applied to video editing in film and television, participating in music and image editing and synthesis. Some AI-based film and television project management systems use natural language processing technology to automate originally cumbersome processes, automatically breaking down scenes and analyzing characters, dialogues, settings, and props within seconds based on script content. During scriptwriting, the system can automatically generate character and scene lists and intelligently associate character relationships. These operations partially replace traditional manual content production, achieving intelligent content creation and intelligent content editing, thereby improving production efficiency in cultural products. As a labor-intensive industry, AI reduces human costs in large-scale production segments of the cultural industry. In the future, programmatic and repetitive work will be replaced by AI, causing significant changes in production costs and supply conditions of cultural products.

## 2.2 Technology Empowerment in Communication Methods

As the intermediate link connecting cultural content production and consumption, cultural product distribution relies on communication platforms for push delivery, making it highly correlated with technological development. Traditional content product production exhibited unidirectional, centralized characteristics. However, AI can conduct real-time and precise user profiling, analyze user needs on this basis, and accurately recommend products to users through big data, reflecting user initiative in the communication process.

Algorithm-based content distribution platforms such as Toutiao use machine learning and data mining to analyze news topics and content, develop automatic writing technology to create hot news, and automatically distribute personalized content to each user while continuously tracking and analyzing user behavior and habits (including click data, preferences, subscriptions, etc.), achieving intelligent user analysis. Future intelligent push will no longer remain at simple information delivery but will gather users with the same reading preferences to form new community relationships, delivering information based on content-preference social relationships. This approach further bridges content reading and social media.

Moreover, communication methods have become more interesting and humanistic. Virtual reality (VR) and augmented reality (AR) technologies, centered on immersion and presence, have been applied in the cultural industry, bringing consumers entirely new immersive experiences. This is particularly significant

in cultural tourism, film and television, and cultural institutions such as museums, art galleries, and exhibition halls. AR technology endows museums and collections with “vitality,” displaying cultural relics and collections in vivid ways while creatively protecting and inheriting cultural heritage. This also improves the efficiency of cultural communication and prompts transformation in the commercial and economic forms of the cultural industry.

### **2.3 Technology Empowerment in Advertising and Marketing**

The effectiveness of marketing activities depends on accurately grasping user needs. From a marketing perspective, demand is “the desire to purchase certain goods to achieve satisfaction with payment ability.” Cultural product marketing requires marketers to effectively excavate and satisfy consumer demand for cultural products. The advantage of AI participation in cultural industry value creation lies in providing scientific data analysis, conducting reasonable risk avoidance, and making objective effect predictions. Therefore, AI technology can play a role in marketing research, marketing strategy formulation, marketing strategy execution, and marketing effect evaluation and prediction in the cultural industry.

As cultural consumption becomes increasingly personalized, analyzing consumer emotional and sensory experience data can help analyze and predict market trends. AI can understand consumer usage characteristics in content consumption, perceive audience emotional engagement and changes in cultural content through deep neural network technology, and thereby conduct effective customer management and marketing. Video++, a startup specializing in AI visual recognition technology, applies visual recognition technology to videos, structurally processing information across dimensions such as scenes, faces, expressions, actions, objects, brands, landmarks, and visual feature retrieval, while simultaneously generating trajectory flow data. This information is transformed into situational data using intelligent algorithms and applied to various commercial scenarios, achieving precise advertising and interactive experiences without disturbing user viewing. This completely disrupts traditional video patch and interstitial advertising.

## **3. Social Risks Triggered by Artificial Intelligence**

Against the backdrop of the new technological revolution, AI brings new opportunities for the transformation and upgrading of the cultural industry. However, facing this unstoppable technological wave, we must also systematically understand the corresponding social risks and guard against the negative effects triggered by technology.

### **3.1 Legal Risks**

Currently, AI applications in the cultural industry remain at simple human-computer interaction, with limited AI role in creative production. If AI inter-

venes in dominant creative production links, intellectual property protection issues will arise. Once cultural product production enters a completely AI-dominated model, intellectual property rights will involve the rights of AI technology patent owners and property owners. However, current laws related to machine creativity intellectual property are relatively deficient. Second, the integration of AI and the cultural industry involves using methods such as speech recognition, image recognition, and machine learning, which legally involve utilizing others' personality rights, posing new challenges for protecting rights such as portrait rights and voice rights. Third, AI integration into the cultural industry also involves data property protection issues. On one hand, AI can effectively understand consumer needs, behaviors, and social attributes through collecting and analyzing massive big data to precisely push information, which inevitably involves data rights. Therefore, the balance between high intelligence and privacy security must be considered in industrial technological innovation to ensure data security and avoid data leakage and misuse. On the other hand, since algorithm mechanisms play a core role in AI applications, legal system formulation should consider regulating algorithm mechanisms and their result applications to avoid infringing on others' rights during usage.

### 3.2 Talent Risks

AI-driven automation reaching new heights will inevitably cause structural unemployment risks. On one hand, demand for foundational AI technical talents—such as those mastering data mining, machine learning, computer vision, natural language processing, and database architecture—will increase dramatically. On the other hand, some low-skill positions will become unsustainable under technological impact. Cultural industry production emphasizes creativity and content, and positions focusing on communication, logic, and creation cannot be replaced by AI in the short term. AI uses deep learning networks and algorithms to solve problems; however, imagination and original thinking are uniquely human traits, and human inner emotions and emotional communication abilities are what machines cannot achieve. From this perspective, AI technology development will amplify the importance of soft skills in the cultural industry, placing higher demands on talent' s creativity, emotional communication ability, and complex problem-solving skills, thereby challenging talent skill and quality cultivation.

Centered on key technologies such as deep learning and supported by data and computing capabilities like cloud computing and biometric recognition, AI is causing major transformations in human society. Through integration with content production, communication methods, and advertising marketing, AI will accelerate the value chain reconstruction of the cultural industry and subvert existing industrial forms. To better apply AI technology in the cultural industry, we should understand its technical characteristics and social significance, anticipate possible social risks, avoid negative effects in all production and communication links, embed value norms into technology, and demonstrate technological humanistic care while promoting industrial technological innovation.

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