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Article

The Generative Logic and Evolutionary Pathways of Emerging Occupations in the AIGC Era: An Analytical Framework Based on Technology-Skill-Society Dynamics

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Abstract: This study presents a comprehensive theoretical framework to examine how generative artificial intelligence transforms occupational structures through the dynamic interplay of technological capabilities, skill requirements, and societal adaptation. Departing from conventional analyses focused on technical specifications or ethical risks, we develop a novel "technology-skill-society" triad to systematically investigate AIGC's role in occupational evolution. Our analysis reveals three distinct pathways for emerging professions: (1)prompting and optimization-led roles that combine human creative direction with AI execution, (2)evaluation and decision-augmenting positions emphasizing human oversight of AI outputs, and (3)interaction and agent-based occupations redefining human-AI service delivery. Through illustrative analysis of transformed and newly created occupations across multiple sectors, we identify a hierarchical progression of skill demands—from operational tool proficiency through synergistic workflow integration to strategic innovation capabilities. This study reveals that AIGC drives non-linear occupational transformation characterized by professional boundary erosion, cross-domain skill integration, and the rising premium on uniquely human capacities for ethical judgment, complex problem-framing, and emotional intelligence. We further delineate critical governance challenges in algorithmic accountability, intellectual property regimes, and workforce transition management. This study contributes to labor economics and technology sociology by providing a unified framework to understand occupational metamorphosis in the AI era, offering preliminary insights for policymakers, educators, and organizational leaders navigating the human-AI symbiosis.

Keywords: Generative Artificial Intelligence; Emerging Occupations; Human-AI Collaboration; Skill Transformation; Technology-Society Interface

1. Introduction

Amidst the accelerating new global wave of technological revolution and industrial transformation, generative artificial intelligence (AIGC) has emerged as a core driver of leaps in social productivity, reshaping value creation models and occupational structures with unprecedented depth and breadth. The Report to the 20th National Congress of the Communist Party of China explicitly advocated "promoting deep integration between the internet, big data,

artificial intelligence, and the real economy". The introduction of China's Interim Measures for the Management of Generative Artificial Intelligence Services(2023) marked the formal inclusion of AIGC into the country's regulated development framework, while China's 14th Five-Year Plan for Digital Economy Development further emphasized "accelerating the formation of a new productivity structure based on artificial intelligence". Additionally, China's Guidelines on Accelerating Scenario Innovation to Promote High-Level Application of Artificial Intelligence for High-Quality Economic Development, jointly issued by the Ministry of Science and Technology and five other Chinese government agencies, provides systematic policy support for the rise of new occupations enabled by AIGC across multiple dimensions including technology implementation, ethical governance, and industrial empowerment.

AIGC technology is built around a core architecture of "pre-training, prompt engineering, and alignment optimization", utilizing multimodal large-scale models with hundreds of billions to trillions of parameters and reinforcement learning from human feedback (RLHF) to achieve cross-modal content generation, editing, and reasoning. Its applications have already demonstrated significant effectiveness: in creative design, diffusion model-based image generation systems can produce high-fidelity images from natural language descriptions, with Inception Score (IS) values exceeding 4.5; in code generation, models such as China-developed DeepSeek achieve pass rates over 70% on the HumanEval benchmark, greatly enhancing development efficiency; in decision-support scenarios, AIGC-driven predictive models show a significant accuracy improvement compared to conventional methods in areas such as financial risk control and medical diagnosis (Bammey, 2024). These advances are not only redefining content production paradigms but also driving a shift in the occupational system from "skill-based specialization" toward "intelligence augmentation".

However, existing research has largely focused on the technical principles of AIGC, its ethical risks, or isolated use cases, leaving a lack of comprehensive theoretical frameworks that systematically explain the inherent logic and evolutionary pathways through which AIGC generates and transforms emerging occupations. Key issues such as the generative mechanisms of AIGC-driven professions, patterns of skill reconstitution, and their interaction with social structures—remain theoretically underdeveloped. China is currently at a critical juncture in its pursuit of high-quality economic development and digital transformation. Report on the Work of the Government (2024) proposes to "further advance the AI Plus initiative"; the Chinese Ministry of Industry and Information Technology's Action Plan for Artificial Intelligence to Empower Industry Digital Transformation(2024–2026) calls for "building a new occupational system that integrates AI with the real economy"; and the Chinese Ministry of Education's Implementation Plan for Developing a High-Skilled Talent System in the New Era highlights the need to "accelerate responses to changes in occupational skill structures brought about by artificial intelligence". Together, these Chinese policies underscore both the urgency and strategic importance of investigating the development dynamics of emerging occupations in the age of AIGC (Septiandri et al., 2024).

In this context, grounded in the sociology of technology and theories of skill formation, this study constructs a three-dimensional "technology-skill-society" analytical framework. It aims to uncover the underlying mechanisms and evolutionary trajectories through which AIGC fuels the emergence of new professions via three core pathways: "content generation, decision optimization, and interaction transformation". The research will focus on how AIGC deconstructs conventional task structures, reshapes skill hierarchies, and interacts with social institutions and organizational forms. Ultimately, this study seeks to provide a theoretical foundation and practical insights for building a human resource development system and industrial policy framework suited to the age of artificial intelligence.

2. The Technological Core of AIGC and Its Foundational Drive in Occupational Generation

2.1 The Technical Paradigm and Core Capabilities of AIGC

The defining characteristics of generative artificial intelligence lie in its capacity for cross-modal content generation, semantic understanding and interaction, and continuous self-improvement. Its technical architecture is built upon large-scale multimodal models with massive numbers of parameters, utilizing advanced neural network structures such as the Transformer to achieve unified representation and generation of text, images, audio, and video. More specifically, AIGC relies on a technical pathway involving pre-training, fine-tuning, and reinforcement learning from human feedback to construct and map high-dimensional semantic spaces. In the domain of natural language generation, for instance, large language models with hundreds of billions of parameters (e.g., those based on the GPT-4 architecture) have surpassed human baseline performance on several natural language understanding benchmarks (such as SuperGLUE), achieving unprecedented levels of textual fluency and logical coherence.

In terms of interaction mechanisms, AIGC employs prompt engineering to enable natural language collaboration with humans, allowing users to finely control the style, structure, and creativity of generated content through detailed instructions. Meanwhile, multimodal fusion technologies—exemplified by models like CLIP and DALL·E—facilitate cross-modal generation between text and images, with outputs approaching the level of professional human creators as measured by objective metrics such as the Inception Score and Fréchet Inception Distance(FID). Furthermore, AIGC exhibits continuous evolutionary characteristics: through online learning and federated learning mechanisms, it can continually integrate new knowledge while preserving data privacy, thereby improving the quality and factual accuracy of its outputs. This adaptability offers dynamic support for complex tasks in professional settings.

2.2 Technological Complementarity of AIGC and Its Restructuring Effect on the Occupational Ecosystem

The core capabilities of AIGC do not exist in isolation; rather, they deeply complement fields such as data analysis, decision science, and interpersonal collaboration, collectively restructuring the occupational ecosystem. This complementarity operates on two levels: first, as a productivity enhancement tool, AIGC can automate highly repetitive and rule-based creative and cognitive tasks—such as generating text and images, auto-coding, and multilingual translation—thereby freeing human practitioners from routine labor and allowing them to focus on higher-value strategic, emotional, and innovative work. Second, as an innovation enabling platform, AIGC lowers the technical barriers to entry in domains like graphic design, music composition, and short video production, enabling non-specialists to participate in high-quality content creation. This, in turn, stimulates innovative activity in long-tail markets and gives rise to numerous freelance and micro-entrepreneurship models(Stanikzai & Mittal, 2025).

This technological complementarity has profound restructuring effects on occupational contexts. For example, in digital marketing, AIGC tools can generate personalized ad copies and visual materials in real time based on user profiles, allowing "intelligent marketing strategists" to manage hundreds of customized campaigns simultaneously, greatly enhancing creative efficiency and targeting precision. In software development, AIGC-based programming assistants(e.g., GitHub Copilot) can automatically generate code snippets, perform unit testing, and even design software architectures, shifting the role of programmers toward "code review and system architecture". Moreover, AIGC has catalyzed emerging occupations—such as "AI trainers", "prompt engineers", and "algorithm ethics consultants" in fields including education, healthcare, and law. These roles require practitioners not only to possess traditional domain

knowledge but also to develop interdisciplinary skills in human-AI collaboration, algorithmic evaluation, and ethical governance. Therefore, the widespread integration of AIGC is driving a paradigm shift in the occupational ecosystem—from "human-led, tool-assisted" to "human–machine mutual empowerment and intelligent collaborative creation". This transformation is not only reshaping skill combinations and workflows but also redefining the role of humans within value-creation networks.

3. The Generative Logic and Classification Framework of Emerging Occupations Driven by AIGC

Based on the technology-skill-society analytical framework, the emergence of new occupations in the AIGC era stems from the systematic restructuring of the social division of labor and skill composition by technology. Essentially, AIGC lowers the barriers to content production and cognitive decision-making, deconstructing traditional occupational tasks while reorganizing new units of value creation centered on "human-AI co-creation". According to the depth of integration and functional complementarity between AIGC and humans in value creation, this study categorizes AIGC-induced emerging occupations into the following three paradigms:

3.1 Prompting and Optimization-Led Occupations

This category centers on a "human creative guidance-AIGC generation and optimization" collaboration model. Human practitioners leverage domain knowledge, aesthetic judgment, and contextual understanding to construct high-quality prompts, set generation constraints, and filter, edit, and refine AIGC outputs. AIGC, in turn, undertakes highly repetitive and high-volume content generation tasks. For example, a prompt engineer designs precise text-based instructions to steer large language models in generating context-aware marketing copies, code frameworks, or strategic proposals. The core of this role involves iterative debugging to enhance the reliability, relevance, and creativity of generated outcomes (Jiang et al., 2025). These occupations rely on human capabilities such as critical thinking, domain expertise, and prompt-design skills, while AIGC serves as a high-performance content generation engine, significantly boosting productivity in creative and knowledge-based work.

3.2 Evaluation and Decision-Augmenting Occupations

In this paradigm, AIGC is responsible for extracting patterns from large-scale information, simulating scenarios, and generating alternative solutions. Humans assume the role of making final value judgments, conducting ethical reviews, and formulating strategic decisions. For instance, an AI ethics auditor examines AIGC-generated recommendations (e.g., credit scoring, medical diagnosis) for bias detection, interpretability analysis, and compliance assessment, ensuring outputs align with ethical standards and social values. This category highlights the irreplaceability of human capacities for moral reasoning, contextual interpretation, and trade-off analysis within complex systems, while AIGC acts as a strategic tool that enhances the precision and scope of human decision-making.

3.3 Interaction and Agent-Based Occupations

This type encompasses occupations where AIGC serves as a front-stage interaction agent—such as virtual humans, AI customer service agents, or AI companions—replacing or extending human social and emotional labor. Human practitioners shift to back-stage responsibilities, including character design, knowledge base updating, emotional strategy planning, and system maintenance. For example, a virtual human operations manager constructs the personality, dialogue logic, and multi-modal expression strategies of digital personas and continuously optimizes their expressiveness and empathy based on user

interaction data to sustain emotional connection and user trust (Bröchner, 2024). Under this paradigm, AIGC becomes a scalable agent of human emotional and social capabilities, while humans focus on higher-order tasks such as narrative construction and experience design.

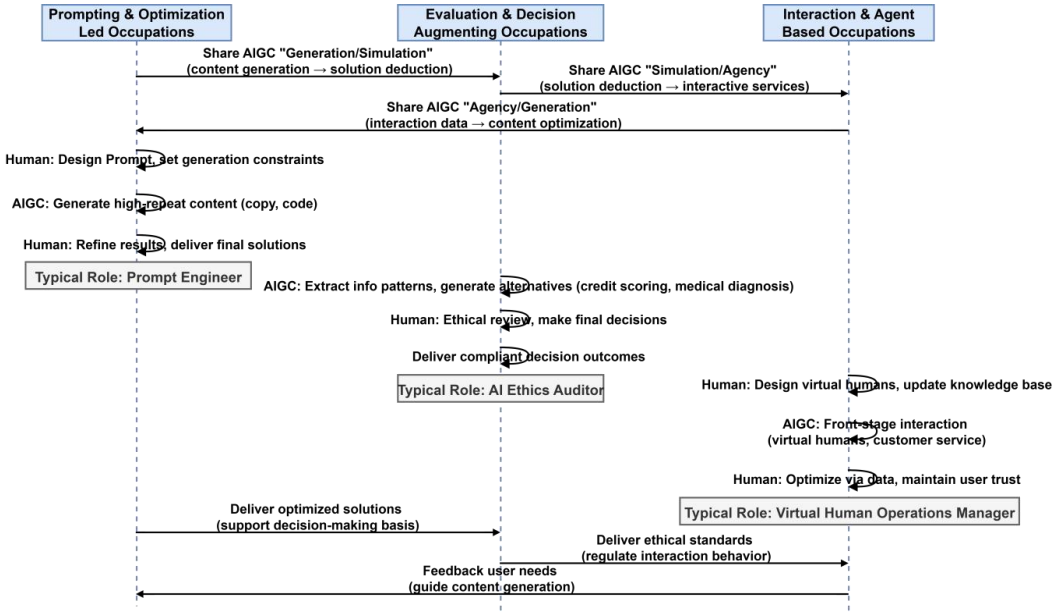

Figure 1. Classification and Human-AI Collaboration Sequence of AIGC-Driven Emerging Occupations.

As illustrated in Figure 1, this classification framework demonstrates that AIGC does not simply replace human labor. Instead, through functional embedding and capability complementarity, it fosters new occupational forms characterized by deep integration of uniquely human skills—such as creativity, ethical judgment, emotional intelligence and core AIGC capabilities, including generation, simulation, and agency. This evolutionary pathway reflects a dynamic alignment and co-evolution among technological affordances, skill systems, and societal value demands.

4. Case Illustration of Occupational Transformation Driven by AIGC

4.1 AIGC-Enabled Transformation and Upgrading of Traditional Occupations

AIGC technology is driving the transition of traditional occupations toward greater intelligence and efficiency by embedding itself into and enhancing existing workflows. This process entails not mere substitution but a fundamental restructuring of job content and an elevation of skill requirements. In the media sector, for instance, the conventional role of an editor is evolving into that of an "AIGC content curator and optimizer". Major media organizations have begun integrating generative large language models to assist in news writing, shifting the journalist’ s role from fact-gathering and drafting to prompt design, information verification, and in-depth editing of AI-generated content. Industry reports from Reuters indicate that newsrooms adopting AIGC tools have seen a notable increase in the productivity of investigative reporting, allowing journalists to devote more effort to in-depth interviews and critical analysis.

Similarly, in the creative design industry, graphic designers are transitioning into "generative design coordinators", moving their focus from manual creation toward using diffusion models, such as Stable Diffusion and DALL·E 3 for ideation, style adjustment, and iterative refinement. A 2024 joint study by Adobe and Forrester found that design teams incorporating AIGC into their workflows experienced over 60% faster proposal generation and a 25% increase in client satisfaction due to a greater diversity of options (Wu, Hsiao, & Lu, 2024). Such transformations underscore that AIGC does not replace humans but rather liberates

professionals from execution-oriented tasks, allowing them to concentrate on higher-value activities such as creative conceptualization, aesthetic judgment, and client communication.

4.2 Emergence and Scaling of Purely New Occupations

The unique capabilities of AIGC have directly led to the creation of entirely new professions centered on operating, optimizing, and governing AIGC systems. A prominent example is the "prompt engineer", a role requiring expertise in natural language expression, domain knowledge, and model behavior to elicit optimal performance from large language models through structured instructions. According to LinkedIn’s Emerging Jobs Report, the number of prompt engineering positions worldwide has grown annually by 217%, with compensation levels exceeding those of traditional software engineers by more than 30% (Fleming, Klopfer, Katz, & Knight, 2024).

Another representative emerging occupation is that of the "AI ethics auditor and alignment specialist", tasked with ensuring that AIGC outputs adhere to ethical standards while mitigating biases and harmful content. Organizations such as DeepMind and Anthropic have established dedicated teams that employ red-teaming exercises and value-alignment algorithms to systematically evaluate and improve model behavior. Academic research demonstrates that rigorous ethical auditing can reduce bias in AIGC outputs by over 50%, significantly enhancing the reliability and social acceptance of AI systems. Furthermore, in e-commerce and entertainment, roles such as "virtual live stream manager" and "digital avatar designer" are rapidly emerging. These professionals use AIGC technology to create and manage digital personas, enabling 24/7 live streaming and personalized interactions. Current data indicate that virtual streaming in China has spurred more than 150% growth in demand for related operational roles, establishing a new channel for flexible employment (Li, 2025).

4.3 Erosion of Professional Barriers and Cross-Domain Integration

AIGC substantially lowers the technical barriers to specialized content creation and knowledge work, blurring traditional professional boundaries and promoting cross-domain skill integration. In healthcare, AIGC-assisted diagnostic tools enable physicians to collaborate with AI in medical image analysis, patient record mining, and treatment plan generation. For example, diagnostic assistance systems based on Transformer architectures help primary care doctors improve diagnostic consistency, while radiologists increasingly assume the role of "AI-augmented diagnosticians", focusing on complex case reviews and critical decision-making. Studies show that medical institutions using AIGC-assisted diagnostics achieve an average 35% improvement in diagnostic efficiency and an approximately 18% reduction in misdiagnosis rates (Wang, Zhao, & Li, 2025).

In the education sector, teachers are transitioning into "personalized learning designers", using AIGC tools to rapidly generate tailored instructional materials, exercises, and feedback reports, thereby enabling large-scale personalized education. As noted in an OECD education report, AIGC teaching assistant systems can reduce teachers’ routine workload by 40%, allowing them to dedicate more attention to student emotional support and creativity development (Semenov, Abylkassymova, & Rudchenko, 2024).

These developments demonstrate that AIGC is profoundly reshaping the structure and form of occupational systems through technological empowerment, role redefinition, and cross-domain integration. While offering substantial efficiency gains and innovative opportunities, this transformation also poses new demands for skill reconfiguration, ethical governance, and adaptive social policies.

5. Restructuring Skill Requirements in the AIGC Era: A Layered Model and Capability Evolution

5.1. A Layered Architecture of AIGC Technological Dependency and Its Impact on Skills

AIGC technology is not homogeneous, its impact on occupational skill requirements exhibits a clearly stratified character, stemming from both the technical stack of AIGC systems and their varied modes of collaboration with humans. This study categorizes these into three layers: the operational interaction layer, the synergistic enhancement layer, and the strategic innovation layer—each associated with different levels of technological dependency and distinct skill combinations.

The operational interaction layer forms the foundation of human-AI collaboration, requiring core skills in efficient prompting and interaction with AIGC tools. Practitioners must master natural language programming, contextual framing, and iterative optimization to precisely guide models toward desired outputs. For instance, prompt engineers use structured chain-of-thought prompting to stimulate complex reasoning in large language models, improving task accuracy by over 40% (Chen, Zhang, Langrene, & Zhu, 2025). This layer demands strong capabilities in instruction design, output evaluation, and rapid debugging to ensure the usability of AIGC-generated results.

The synergistic enhancement layer focuses on deep complementarity between AIGC and human capabilities, calling for skills in workflow integration and ethical governance. Professionals must incorporate AIGC outputs into specialized decision-making processes, performing bias correction, interpretability analysis, and compliance review. In healthcare, for example, an AI-assisted diagnostics expert must not only understand model prediction mechanisms but also validate generated results using clinical experience and make accountable decisions, increasing diagnostic sensitivity by 25% compared to standalone model output (Sanchez et al., 2023). This tier emphasizes critical thinking, domain knowledge transfer, and algorithmic governance.

The strategic innovation layer represents the apex of AIGC's empowering potential, centered on skills for foresighted innovation and ecosystem-level planning. Practitioners need to discern AIGC-driven business model transformations, lead technological vision design, organizational change, and cross-domain resource integration. For example, a Chief AI Officer is responsible for formulating AIGC strategy, integrating generative AI across product development, marketing, and customer service to drive revenue growth and accelerate innovation. This layer requires systems thinking, strategic decision-making, and change leadership to harness the disruptive opportunities presented by AIGC.

5.2. A Hierarchical Model of Skill Requirements in the AIGC Era

Building upon the aforementioned technological stratification, skill demands in the AIGC era exhibit distinct hierarchical characteristics, forming a progressive competency framework that evolves from foundational to advanced levels. This framework comprises three interconnected tiers: operational skills, enhancement skills, and strategic skills.

The foundational operational tier emphasizes AIGC tool proficiency and data literacy. Practitioners must master the basic operation of mainstream generative tools (e.g., large language models, multimodal platforms), enabling them to acquire desired content through effective prompting and utilize visualization tools to filter, evaluate, and present generated outputs. This tier serves as the cornerstone of human-AIGC collaboration, emphasizing technological accessibility and fundamental application capabilities.

The synergistic enhancement tier focuses on human-AI workflow design, output optimization, and ethical evaluation. Professionals need to thoroughly understand the technical boundaries and uncertainties of AIGC, enabling them to design complementary human-AI workflows, perform fine-grained adjustments to generated content, conduct fact-checking and

bias detection to ensure outputs meet professional standards and social norms. In the legal domain, for instance, AI-assisted attorneys must rigorously examine model-generated documents for applicability and risk annotation, effectively preventing factual errors or logical flaws (Xie et al., 2025).

The strategic innovation tier prioritizes complex problem definition, innovation leadership, and value reconstruction. Practitioners must possess forward-looking vision to identify new scenarios and business models empowered by AIGC, and to spearhead technological integration and business transformation. For example, in educational technology, innovation leaders leverage AIGC to redesign personalized learning pathways and develop adaptive instructional content, pioneering new paradigms for technology-enhanced education. This tier demands systems thinking, cross-domain integration, and strategic decision-making capabilities to transform AIGC from a productivity tool into an innovation engine.

Research demonstrates that technological dependence in the AIGC era does not constitute simple skill substitution, but rather drives the evolution of human capabilities toward higher-order value judgment, innovation guidance, and strategic planning. Foundational skills are becoming increasingly standardized and tool-oriented, intermediate skills emphasize human-AI complementarity and governance capabilities, while top-tier skills emerge as the core source of competitive advantage, highlighting uniquely human strengths in insight, creativity, and responsibility within uncertain environments.

6. Conclusion and Outlook

6.1. Core Challenges and Governance Pathways in AIGC-Driven Occupational Evolution

While AIGC technologies are reshaping the occupational ecosystem, they also introduce multiple challenges that necessitate a systematic governance framework spanning technical, ethical, and institutional dimensions. A primary challenge lies in algorithmic trustworthiness and accountability. The inherent uncertainty, hidden biases, and "black-box" nature of AIGC outputs impose stringent requirements for explainability and accountability, particularly in high-stakes fields such as healthcare and law. For instance, clear legal and ethical guidelines are still needed to assign responsibility among developers, deploying institutions, and clinical practitioners in cases where generative AI-based diagnostic recommendations lead to misdiagnosis.

Secondly, issues of data privacy and intellectual property are becoming increasingly prominent. The training of AIGC models relies on large-scale datasets, which raises concerns over personal privacy leakage and copyright infringement. Moreover, the ownership of AIGC-generated content whether it belongs to the user, developer, or the model itself, has become a focal point of global policy debate, calling for new intellectual property paradigms adapted to generative technologies.

Third, skill adaptation and structural unemployment risks cannot be overlooked. Although AIGC creates new types of jobs, it also accelerates the obsolescence of certain medium and low-skill occupations, potentially leading to structural imbalances in the labor market (Jaccoud, 2025). Governments, businesses, and educational institutions must collaborate to implement large-scale reskilling programs and establish lifelong learning systems to mitigate social friction during this technological transition.

Addressing these challenges requires multidimensional strategies: developing explainable AI and fairness assessment tools at the technical level, establishing interdisciplinary ethics review boards and industry standards at the ethical level; and improving data protection laws and labor regulations responsive to AIGC’ s unique characteristics at the policy level. The

ultimate goal is to foster a healthy developmental ecology that balances technological empowerment with human-centered governance.

6.2. Future Prospects: Toward a New Human-AI Symbiotic Occupational Ecology

Looking ahead, AIGC will further deepen the evolution of occupational systems toward human-AI symbiosis. Collaboration between humans and AIGC will transcend instrumental assistance and advance into a more sophisticated form of cognitive integration and capability complementarity. AIGC will assume responsibility for high-volume, pattern-based generative tasks, while humans will focus on meaning-making, value judgment, emotional engagement, and complex system-level decision-making. The core of professional development will shift toward cultivating "meta-abilities" including prompt design, algorithmic critique, ethical reflection, cross-domain integration, and creative problem-solving.

New professions will continue to emerge and specialize. For example, AI behavior designers will be tasked with defining objective functions and value orientations for autonomous agents to ensure their behaviors align with social norms. Cross-modal experience architects will integrate generative text, image, audio, and video technologies to create immersive narratives and interactive experiences. Human-AI collaboration coordinators will optimize workflows and responsibility allocation within hybrid teams to maximize synergistic efficiency.

On a macro level, AIGC will profoundly alter economic production and organizational forms. It is likely to advance personalized manufacturing, mass customization, and the gig economy, while also promoting global reallocation and collaboration of talent resources. To adapt to this transformation, education systems must be fundamentally restructured to prioritize critical thinking, creativity, ethical awareness, and digital literacy, cultivating future citizens capable of co-creation with AI.

Thus, the ultimate trajectory of the occupational landscape in the AIGC era will be characterized by an organic unity of technological empowerment and human excellence. Its success will depend not only on advances in technology but also on our ability to build inclusive, equitable, and sustainable governance systems that ensure technological evolution serves the holistic development of individuals and the collective prosperity of society.

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